

Scenario 1: Manufacturing of styrene (ES1)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure. The following scenarios contribute to the scenario *Manufacturing of styrene*. **Table 1. Description of ES 1**

Free short title	Manufacturing of styrene (ES1)
Systematic title based on use descriptor	ERC 1; PROC 2, 8B, 8A, 15, 1
Name of contributing environmental scenario and	ERC 1 Production of chemicals
corresponding ERC	
Name(s) of contributing worker scenarios and corresponding	PROC 2 - Use in closed, continuous process with occasional controlled exposure
PROCs	PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated
	IACHINES PROC 8a - Transfer of chemicals from/to vessels/ large containers at non
	dedicated facilities
	PROC 15 - Use of laboratory reagents in small scale laboratories
	PROC 1 - Use in closed process, no likelihood of exposure
1.1 Contributing Scenario (1) controlling environm	ental exposure for ERC 1
Operational conditions	
Annual European tonnage	4 50F6 to/year
Daily amount used at site	3./3E6 kg/day
Palaasa timas par yaar	250 days/year (justification: Survey from
Release unles per year	Storene manufacturers)
Local freshwater dilution factor	41
Local marine water dilution factor	100
Release fraction to air from process	0.013 %
Release fraction to wastewater from process	0.0048 %
Release fraction to soil from process	0.010 %
Fraction tonnage to region	100 %
Fraction used at main source	100 % (justification: Worst case estimation of local tonnage)
STP	yes
River flow rate	400000 m3/day (justification: Emission Scenario Document IC-2 Chemical
	industry:chemical used in synthesis (TGD Part IV, ECB, 2003))
Municipal sewage treatment plant discharge	10000000 L/day (justification: Emission Scenario Document IC-2 Chemical
	industry:chemical used in synthesis (TGD Part IV, ECB, 2003))
Risk management measures	
Reduction of sludge to soil	100 % (justification: Do not apply industrial sludge to natural soils)
Other modified EUSES values	
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on
	Styrene, European
	Communities, 2002))
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on
	Styrene, European
	Communities, 2002))

Fraction released to waste water (Femis.water)	0.0048 % (justification: Mean value of measured
	release fractions reported in the EU Risk Assessment Report on Styrene
	(European
	Communities, 2002))
Fraction released to air (Femis.air)	0.013 % (justification: Worst case measured release fraction reported in the EU
	Communities 2002))
Fraction used at main source	100 % (justification: Value used to reflect worst case estimation of local tonnage
Theorem used at main source	(largest manufacturing plant))
Fraction of emission directed to water by local STP (Fstp.water)	0.044 - (justification: Efficiency STP 95.6% calculated from on-site monitoring
	data at production/processing sites)
1.2 Contributing Scenario (2) controlling industrial	worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in contained systems [CS38]. Dehydrogenation Reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented
	Provide basic employee training to prevent/minimize exposures In case of
	potential exposure:
	Use suitable eye protection.
	Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and expos	nre
I ocal exhaust ventilation	no
Conditions and measures related to personal protection, hygiene ar	nd health evaluation
Protoctive gloves	No
Deserimente managemente et en	
1.3 Contributing Scenario (3) controlling industrial	worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in contained systems [CS38]. Condensation of crude styrene - water separation
Qualitative Risk Assessment	
General	Ensure good work practices are implemented
	Provide basic employee training to prevent/minimize exposures In case of
	potential exposure:
	Use suitable eye protection.
Product choracteristics	ose suitable chemicany resistant gives.
Dhysical state	liquid
Concentration in substance	
	100 %
Fugacity / Dustiness	medium

Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm2	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
1.4 Contributing Scenario (4) controlling industrial	worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Use in contained systems [CS38]. Vacuum Distillation	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use	r	
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
1.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Additivation and stabilisation [CS69]. Addition of inhibitors or retardants in distillators	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	

Physical state liquid Concentration in sobtance 100 % Prequency and duration of use	Product characteristics		
Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use 5 days / week Human factors not influenced by risk management 5 days / week Exposed skin surface 600 cm² Other given operational conditions affecting workers exposure Industrial Domain industrial Concentrational conditions and measures to control dispersion and copers Industrial Conditions and measures to control dispersion and copers Industrial Conditions and measures to control dispersion and copers Industrial Conditions and measures to control dispersion and copers Industrial Conditions and measures related to personal protection, byggeer and health evaluation Industrial Protective gloves No Industrial Respiratory protection Industrial Industrial Coad exhaust ventilation dermal. 90 % (justification: Use local exhaust ventilation with adequate effectiveness // dermal south coperation (6) controlling industrial Vorker exposure for PROC 8. Name of contributing scenario Foreset sampling (CS2). Sampling form reactors/condensors/distillators Sectario subitid Provee sampling (CS2). Sampling form reacto	Physical state	liquid	
Fugacion/plantation of use Imagino na activity 4 hours (default) Duration of activity 4 hours (default) Prequency of use 5 days / veck Human factors not influenced by risk management Exposed \$ish surface 960 cm ² Other given operational conditions allecting workers exposure Imagination of the present of th	Concentration in substance	100 %	
Frequency of activity >4 hours (defaul) Duration of activity >4 hours (defaul) Frequency of use 5 days / veck Human factors not influenced by risk management Exposed skin surface 960 cm² Other given operational conditions affecting workers exposur Location induors Domain induors Conditions and measures to control dispersion aut posure Locat chanast ventilation no Protective gloves No Respiratory protection no Locat exhaust ventilation no Locat exhaust ventilation No Respiratory protection no Locat exhaust ventilation no Locat exhaust ventilation No Locat exhaust ventilation no Locat exhaust ventilation no factivitie Locat exhaust ventilation no Locat exhaust ventilation with adequate effectiveness for demai route of exposure for PROC 8A Name contributing Scenario (6) controlling industriat vorker exposure for PROC 8A Nama contributing Scenario (a) controlling industriat <td>Fugacity / Dustiness</td> <td>medium</td>	Fugacity / Dustiness	medium	
Duration of activity >4 hours (default) Prequency of use \$ days / week Human factors not influenced by risk management >960 cm ² Conter given operational conditions affecting workers expours Indiversion Location induors Damain induors Control conditions and measures to control dispersion and exposure Locat exhauts ventilation Locat exhauts ventilation no Conditions and measures related to personal protection, hygic== and health evaluation Protective gluves Respiratory protection no Locat exhauts ventilation (dermai) 90 (usrification: Use local exhauts ventilation with adequate effectiveness) Locat exhauts ventilation inhalation 97 % (usrification: Use local exhauts ventilation with adequate effectiveness) Locat exhauts ventilation inhalation 97 % (usrification: Use local exhauts ventilation with adequate effectiveness) Locat exhauts ventilation inhalation 97 % (usrification: Use local exhauts ventilation with adequate effectiveness) Locative fistes Socanario subite Proteck exposure for PROC 8A Name of contributing scenario (6) controlling industrial worker exposure for precess and protection. Qualitative Risk Assessment	Frequency and duration of use		
Hequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Indoors Indoors Location Indostrial Industrial Technical conditions and measures to control dispersion and exposure Industrial Industrial Cocal exhaust ventilation no Industrial Industrial Conditions and measures related to personal protection, hygic— and health evaluation Industrial Industrial Protective gloves No Respiratory protection Industrial Industrial Local exhaust ventilation no Industrial Industrial Industrial Local exhaust ventilation industrial Vorker exposure for PROC 8A Name of contributing scenario (6) controlling industrial Vorker exposure for PROC 8A Name of contributing scenario Sa function exposure for PROC 8A Name of contributing scenario Restrictions Restriction exposure for PROC 8A Name of contributing scenario Foreare good work practices are implemented fucilities exposures to function with adequate effectiveness for dermal stores worked sciences are implemented fucilities and proves. Wear suitable chell scipresinal goves. Wear suitable c	Duration of activity	>4 hours (default)	
Human factors not influenced by risk management 960 cm ² Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Industrial Location industrial Domain Industrial Conditions and measures to control dispersion and exposure Exposed and exposure Local exhaust ventilation no Protective gloves No Respiratory protection no Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure) Local exhaust ventilation inbulation; 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inbulation; 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inbulation; 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inbulation; 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation ibulation; 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation Sea- Transfer of chemicals from/to vessels/ large containers at non dedicated facilities.	Frequency of use	5 days / week	
Exposed skin surface 960 cm² Other given operational conditions affecting workers exposure Indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation Conditions and measures related to personal protection, hygiere and health evaluation Protective gloves Respiratory protection no Conditions and measures related to personal protection, hygiere and health evaluation Conditions and measures related to personal protection, hygiere and health evaluation Protective gloves No Respiratory protection do Local exhaust ventilation do Conditions and measures related to personal protection, hygiere and health evaluation Do Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness) Effectiveness) Local exhaust ventilation facilitize Socararo for PROC SA Name of contributing scenario (6) controlling industrial worker exposure for PROC SA Name of contributing scenario Socararo for formize stron/rowices/strange containers at non dedicated facilitizes Scenario subtific Processampling [CS2]. Sampling from reactors/condensors/distil	Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Industrial Locat exhaust venillation no Conditions and measures related to personal protection, hyge- and health evaluation Conditions and measures related to personal protection, hyge- and health evaluation Protective gloves No Respiratory protection no Locat exhaust ventilation dermai: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust ventilation effectiveness for dermal route of exposure) Locat exhaust v	Exposed skin surface	960 cm ²	
Location indexrial Domain indexrial Technical conditions and measures to control dispersion and exposure no Local exhaust ventilation no Protective gloves No Respiratory protection no Tocal exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure) Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Qualitative second (6) controlling industrial worker exposure for PROC 8A Name of contributing scenario (6) controlling industrial Base of themicals from/to vessels/ large containers at non dedicated facilities Scenario subitile Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Uses suitable expressions Concentration in substance 100 % Provide basic employee training to preventiminizi	Other given operational conditions affecting workers exposure		
Domain industrial Technical conditions and measures to control dispersion and exposure Inclusion Local exhaust ventilation no Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves Respiratory protection no Local exhaust ventilation inclustrial Local exhaust ventilation inclustrial Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation Racarasterial from/to vessels/ large containers at non dedicated facilities Scenario subtifie Process ampling [CS2]. Sampling from reactors/condensors/distillators <t< td=""><td>Location</td><td>indoors</td></t<>	Location	indoors	
Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves Respiratory protection no Local exhaust ventilation dermai: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation effectiveness) Local exhaust ventilation Sear Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtile Procees sampling [CS2]. Sampling from reactors/condensors/disti	Domain	industrial	
Local exhaust ventilation no Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves No Respiratory protection no Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: Steposure for PROC 8A Name of contributing scenario &a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtille Provess sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable coveralls to prevent/min	Technical conditions and measures to control dispersion and e	xposure	
Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves No Respiratory protection no Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness) for dermal route of exposure) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation Ra - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable coveralls to prevent/minimize exposures Use suitable coveralls to prevent exposure to the skin. Product characteristites Physic	Local exhaust ventilation	no	
Protective gloves No Respiratory protection no Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal rotate of exposure) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation Ra - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented General Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eve protection. Use suitable eve protection. Use suitable event evecton. Use suitable event protect	Conditions and measures related to personal protection, hygien	ne and health evaluation	
Respiratory protection no Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Lo Contributing Scenario (6) controlling industrial worker exposure for PROC 8A Name of contributing scenario Sa - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented General Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable exposure to the skin. Product characteristics Physical state liquid Concentration in substance 100 % Ensure (default) Frequency and duration of use Jays / week Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location	Protective gloves	No	
Local exhaust ventilation dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Lo Contributing Scenario (6) controlling industrial worker exposure for PROC 8A Name of contributing scenario 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented General Provide basic employee training to preven/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable chemically resistant gloves. Wear suitable chemically resistant gloves. Physical state liquid Concentration in substance 100 % Prequency and duration of use Jak / Week Duration of activity >4 hours (default) Frequency of use 5 day / week Human factors not influenced by risk management Indoors Location indoors Dornain indoors Location no Conditions and measures to control	Respiratory protection	no	
effectiveness for dermal route of exposure) Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) 1.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 8A Name of contributing scenario 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented General Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable exponection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin. Product characteristics Inquid Concentration in substance 100 % Frequency and duration of use Duration of activity Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Location indoors Domain indoors Domain indoors Domain nodoors Domain	Local exhaust ventilation	dermal: 90 % (justification: Use local exhaust ventilation with adequate	
Local exhaust ventilation inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness) Lo Contributing Scenario (6) controlling industrial worker exposure for PROC 8A Name of contributing scenario 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin. Product characteristics Ifiquid Concentration in substance 100 % Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 960 cm ² Location indoors Domain indoors Domain no Cauchitions and measures to control dispersion and exposure No Respiratory protection No Respiratory protection No		effectiveness for dermal route of exposure)	
In the second s	Local exhaust ventilation	inhalation: 97 % (justification: Use local exhaust ventilation with adequate	
1.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 8A Name of contributing scenario 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated faitities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented General Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable exp protection. Use suitable exp protection. Use suitable exp protection. Vas suitable coveralls to prevent exposure to the skin. Product characteristics Physical state liquid Concentration in substance 100 % Fuquency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 day / week Human factors not influenced by risk management Exposed skin surface Location indoors Domain indours Domain no Conditions and measures to control dispersion and exposure Local exhaust ventilation No no		effectiveness)	
Name of contributing scenario 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented General Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable expertation to prevent/minimize exposures Use suitable chemically resistant gloves. Wear Product characteristics Wear suitable coveralls to prevent exposure to the skin. Product plantation of use 100 % Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location Domain indoors Location no Conditions and measures to control dispersion and exposure Conditions and measures related to personal protection, hog Protective gloves No Respiratory protection <td>1.6 Contributing Scenario (6) controlling industrial</td> <td>worker exposure for PROC 8A</td>	1.6 Contributing Scenario (6) controlling industrial	worker exposure for PROC 8A	
Scenario subtitle Process sampling [CS2]. Sampling from reactors/condensors/distillators Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable eye protection. Use suitable corenalls to prevent exposure to the skin. Product characteristics Wear suitable coveralls to prevent exposure to the skin. Physical state liquid Concentration in substance 100 % Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation Locative gloves No Protective gloves No Respiratory protection no	Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Qualitative Risk Assessment General Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eve protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin. Product characteristics Iiquid Concentration in substance 100 % Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Location indors Domain indors Domain industrial Technical conditions and measures to control dispersion and exposure Location Locations and measures to control dispersion and exposure Conditions and measures related to personal protection, hyginer and health evaluation Protective gloves No Respiratory protection no	Scenario subtitle	Process sampling [CS2]. Sampling from reactors/condensors/distillators	
General Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable cyce protection. Version of the exposure	Qualitative Risk Assessment		
Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin. Product characteristics Iiquid Product characteristics Iiquid Concentration in substance Iiquid Concentration in substance Iiquid Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Poocement Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Local conditions and measures to control dispersion and exposeme Local exhaust ventilation no Conditions and measures related to personal protection, hygie	General	Ensure good work practices are implemented	
Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin. Product characteristics Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use Duration of activity Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Dybe of the given operational conditions affecting workers exposure Indoors Domain indoors Domain no Conditions and measures to control dispersion and exposure Local exhaust ventilation Protective gloves No Respiratory protection no		Provide basic employee training to prevent/minimize exposures	
Observation of neutring protein Wear suitable coveralls to prevent exposure to the skin. Product characteristics Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Locat exhaust ventilation Locations and measures related to personal protection, hygier and health evaluation Protective gloves Protective gloves No Respiratory protection no		Use suitable eye protection. Use suitable chemically resistant gloves	
Product characteristics Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation Locat exhaust ventilation no Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves No Respiratory protection no		Wear suitable coveralls to prevent exposure to the skin.	
Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use	Product characteristics		
Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location Location indoors Domain no Conditions and measures to control dispersion and exposure Local exhaust ventilation Local exhaust ventilation no Protective gloves No Respiratory protection no	Physical state	liquid	
Fugacity / Dustiness medium Frequency and duration of use	Concentration in substance	100 %	
Frequency and duration of use Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 5 days / week Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation Locations and measures related to personal protection, hygier and health evaluation No Protective gloves No Respiratory protection no	Fugacity / Dustiness	medium	
Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 5 days / week Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygiew and health evaluation Protective gloves No Respiratory protection no	Frequency and duration of use		
Frequency of use 5 days / week Human factors not influenced by risk management 960 cm ² Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation Local exhaust ventilation no Conditions and measures related to personal protection, hygie- and health evaluation Protective gloves No Respiratory protection no	Duration of activity	>4 hours (default)	
Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation Locations and measures to control dispersion and exposure Protective gloves No No Respiratory protection no	Frequency of use	5 days / week	
Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygiere and health evaluation Protective gloves No Respiratory protection no	Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygiew and health evaluation Protective gloves No Respiratory protection no	Exposed skin surface	960 cm ²	
LocationindoorsDomainindustrialTechnical conditions and measures to control dispersion and exposureLocal exhaust ventilationnoConditions and measures related to personal protection, hygie- and health evaluationProtective glovesNoRespiratory protectionno	Other given operational conditions affecting workers exposure		
Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygie- and health evaluation Protective gloves No Respiratory protection no	Location	indoors	
Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygiere and health evaluation Protective gloves No Respiratory protection no	Domain	industrial	
Local exhaust ventilation no Conditions and measures related to personal protection, hygiere and health evaluation Protective gloves No Respiratory protection no	Technical conditions and measures to control dispersion and e	xposure	
Conditions and measures related to personal protection, hygie-re and health evaluation Protective gloves No Respiratory protection no	Local exhaust ventilation	no	
Protective gloves No Respiratory protection no	Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection no	Protective gloves	No	
	Respiratory protection	no	

R0000009 Version 1 Revision date: 2017-04-12 Page 4 of 106

Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control exposure)	
1.7 Contributing Scenario (7) controlling industrial	worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle I	Laboratory activities [CS36]. Laboratory - Quality Control	
Qualitative Risk Assessment		
General I	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state 1	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain i	industrial	
Technical conditions and measures to control dispersion and exp	posure	
Local exhaust ventilation	10	
Conditions and measures related to personal protection, hygiene	e and health evaluation	
Protective gloves	No	
Respiratory protection r	no	
1.8 Contributing Scenario (8) controlling industrial	worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure	
Scenario subtitle	Material transfers [CS3]. Transfer from distillator to storage tanks via pipelines.	
Qualitative Risk Assessment		
General I I I I I I I I I I I I I I I I I I I	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state 1	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness r	medium	
Frequency and duration of use		
Duration of activity >	>4 hours (default)	
Frequency of use 5	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location i	indoors	
Domain i	industrial	

Version 1

Revision date: 2017-04-12

Technical conditions and measures to control dispersion and ex	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
1.9 Contributing Scenario (9) controlling industrial	worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Additivation and stabilisation [CS69]. Stabiliser addition for storage and transport	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
Local exhaust ventilation	dermal: 90 % (justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure)	
Local exhaust ventilation	inhalation: 97 % (justification: Use local exhaust ventilation with adequate effectiveness)	
1.10 Contributing Scenario (10) controlling industr	ial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Material transfers [CS3]. Unloading storage tanks for road, rail or boat transport	
Qualitative Risk Assessment		
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
	1 -	

Version 1

Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	outdoors (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
1.11 Contributing Scenario (11) controlling industr	ial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
1.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 2		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented	
R0000009	Version 1 Revision date: 2017-04-12 Page 7 of 106	

	Provide basic employee training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
Product characteristics	Use suitable chemicany resistant gioves.	
Physical state	liquid	
Concentration in substance	100 %	
Eugoaity / Dustinges	nodium	
Fugacity / Dustilless	Inedium	
Frequency and duration of use		
	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm^2	
Other given operational conditions affecting workers exposure) 	
	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
1.13 Contributing Scenario (13) controlling industr	ial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to	
	storage containers: off-line in workplace	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented	
	Provide basic employee training to prevent/minimize exposures	
	Use suitable eve protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and a	VIDGUIRE	
Local exhaust ventilation	no	
Conditions and macanes valated to newsonal protection leads	no and health evaluation	
Conditions and measures related to personal protection, nygles		
Protective gloves		
Respiratory protection	110	

Scenario 2: Continuous mass polymerisation of Polystyrene (HIPS and GPPS) (ES2)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Continuous mass polymerisation of Polystyrene (HIPS and GPPS).

Table 2. Description of ES 2

Free short title	Continuous mass polymerisation of Polystyrene (HIPS and GPPS) (ES2)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 8A, 15, 14, 9
Name of contributing environmental scenario and	ERC 6c Production of plastics
corresponding ERC	
Name(s) of contributing worker scenarios and corresponding PROCs	 PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 9 - Transfer of chemicals into small containers (dedicated filling line)
2.1 Contributing Scenario (1) controlling environm	ental exposure for ERC 6C

Operational conditions		
Annual European tonnage	2.42E6 to/year	
Daily amount used at site	4.83E5 kg/day	
Release times per year	300 days/year	
Local freshwater dilution factor	10	
Local marine water dilution factor	100	
Release fraction to air from process	0.102 %	
Release fraction to wastewater from process	0.000012 %	
Release fraction to soil from process	0 %	
Fraction tonnage to region	10 %	
Fraction used at main source	60 %	
STP	yes	
River flow rate	18000 m ³ /day	
Municipal sewage treatment plant discharge	2000000 L/day	
Other modified EUSES values		
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk	
	Assessment Report on Styrene, European Communities,	
	2002))	
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk	
	Assessment Report on Styrene, European Communities,	
Fraction released to waste water (Femis.water)	0.000012 % (justification: Realese for production by continuous masss process	
	(20 Risk Assessment report))	
Fraction released to air (Femis.air)	0.102 % (justification: worst case estimation from European polymerisation sites (EU Pisk Assessment Papert on Styrene European	
	Communities. 2002))	
Fraction used at main source	60 % (instification: Value adopted to account for worst-case	
	European manufacturing site)	
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)	
2.2 Contributing Scenario (2) controlling industrial	worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
_		

R0000009 Version 1 Revision date: 2017-04-12 Page 9 of 106

Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygic	ne and health evaluation
Protective gloves	No
Respiratory protection	no
2.3 Contributing Scenario (3) controlling industrial	worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Continuous process [CS54]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	
riolective gloves	No

Respiratory protection	no	
2.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 2		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Continuous process [CS54]. Charging reactor via pipeline	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
2.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 2		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Heat exchange and agitator in reactor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	

Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
2.6 Contributing Scenario (6) controlling industrial	worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Continuous process [CS54]. Devolatilisation tower	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
2.7 Contributing Scenario (7) controlling industrial	worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Continuous process [CS54]. Recycling styrene from tower to rector via pipeline	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		

Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Permitter protection		
2.8 Contributing Scenario (8) controlling industrial	I worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/devolatilisation tower	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics	1 1	
Physical state	liquid	
Concentration in substance	100 %	
Eugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection by give	ne and health evaluation	
Protective gloves		
Respiratory protection	no	
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control	
	exposure)	
2.9 Contributing Scenario (9) controlling industrial	worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		

R0000009 Version 1 Revision date: 2017-04-12 Page 13 of 106

Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain		
Local exhaust ventilation		
Conditions and measures related to personal protection, byging and health evaluation		
Protective gloves		
Respiratory protection	no	
2.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 14		
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion,	
	pelletisation	
Scenario subtitle	Extrusion and masterbatching [CS88]. Extruder - Pelletizing	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
2.11 Contributing Scenario (11) controlling industr	ial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)	
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		

Version 1

Revision date: 2017-04-12

Protective gloves	No	
Respiratory protection	no	
2.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposu	re	
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and	avnosiira	
Local exhaust ventilation		
	ino	
Conditions and measures related to personal protection, nyg		
Protective gloves	NO	
Respiratory protection		
2.13 Contributing Scenario (13) controlling indus	trial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container	
Product characteristics	1	
Physical state		
Fugacity / Dustiness	nedium	
Frequency and duration of use	inventini	
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface 960 cm	2	
Other given operational conditions affecting workers exposure		
Location Demoin	Indoors	
Domain industrial		
Local exhaust ventilation	no	
Conditions and measures related to personal protection hygiene and health evaluation		
Protective gloves	No	

R0000009 Version 1 Revision date: 2017-04-12 Page 15 of 106

	no
2.14 Contributing Scenario (14) controlling industr	ial worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or
	adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe
	training to prevent/minimize exposures
	In case of potential exposure:
	Use suitable eye protection.
Des last de servicit.	Use suitable chemically resistant gloves.
Product characteristics	1::1
Physical state	
Concentration in substance	100 %
Fugacity / Dustiness	meatum
Frequency and duration of use	> 4 hours (default)
	>4 hours (default)
Henry for the set in floor and he wish many set	5 days / week
Exposed skin surface	180 cm^2
Exposed skill sufface	480 cm
Location	indeers
Domain	induotis
Domain Technical conditions and macaning to control dispension and a	
Legal arborations and measures to control dispersion and e	
Conditions and massures related to personal protection bygi	no and health evaluation
Conditions and measures related to personal protection, hygie	
Protective gloves	
Respiratory protection	
2.15 Contributing Scenario (15) controlling indust	Tal worker exposure for PKOC 8D
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated
Compania antida	Tachnues
Scenario subilite	storage containers, off line in workplace
Qualitativa Pick Assassment	storage containers. on-time in workplace
General	Ensure good work practices are implemented Provide basic employe
General	L'IISULC 2001 WOLK DIACHCES ALC'HHDICHCHCH I LOVIUC DASIC CHIDIOVE
	training to prevent/minimize exposures
	training to prevent/minimize exposures In case of potential exposure:
	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.
	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state Concentration in substance	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state Concentration in substance Fugacity / Dustiness	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and conditions	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial xposure
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² industrial xposure no
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and c Local exhaust ventilation Conditions and measures related to personal protection, hygic	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial xposure no ne and health evaluation
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and of Local exhaust ventilation Conditions and measures related to personal protection, hygic Protective gloves	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial xposure no no no no no no no no

 R0000009
 Version 1
 Revision date: 2017-04-12
 Page 16 of 106

Scenario 3: Batch suspension polymerisation of Polystyrene (HIPS and GPPS) (ES3)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Batch suspension polymerisation of Polystyrene (HIPS and GPPS).

Table 3. Description of ES 3

Free short title	Batch suspension polymerisation of Polystyrene (HIPS and GPPS) (ES3)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 14, 9
Name of contributing environmental scenario and	ERC 6c Production of plastics
corresponding ERC	
Name(s) of contributing worker scenarios and corresponding	PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
	PROC 2 - Use in closed, continuous process with occasional controlled
	PROC 3 - Use in closed batch process (synthesis or formulation)
	PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
	PROC 15 - Use of laboratory reagents in small scale laboratories
	PROC 14 - Production of preparations or articles by tabletting, compression,
	extrusion, pelletisation
	PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

3.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions		
Annual European tonnage	2.42E6 to/year	
Daily amount used at site	4.83E5 kg/day	
Release times per year	300 days/year (justification: Continuous production)	
Local freshwater dilution factor	10	
Local marine water dilution factor	100	
Release fraction to air from process	0.102 %	
Release fraction to wastewater from process	0.000012 %	
Release fraction to soil from process	0 %	
Fraction tonnage to region	10 %	
Fraction used at main source	60 %	
STP	yes	
River flow rate	18000 m ³ /day	
Municipal sewage treatment plant discharge	2000000 L/day	
Other modified EUSES values		
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))	
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))	
Fraction released to waste water (Femis.water)	0.000012 % (justification: EU Risk Assessment Report, 2002)	
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report, 2002)	
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)	
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)	
3.2 Contributing Scenario (2) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport	
Qualitative Risk Assessment		

R0000009 Version 1 Revision date: 2017-04-12

Ensure good work practices are implemented Provide basic employe training to prevent minimize exposure: Use suitable expension. Use suitable expension. Use suitable expension. Use suitable expension. Product characteristics Physical state liquid Concentration in substance 100 % Progency Ouse 5 mins to 1 hour Progency Ouse 5 duys / veck Human factors not influenced by risk management 5 duys / veck Human factors not influenced by risk management 5 duys / veck Hours factors not influenced by risk management 5 duys / veck Concentration on a darivity 9 do cm ² Other given operational conditions affecting workers expoure Concentration Location indoors Domain no Conditions and measures to control dispersion and exposure Conditions and measures related to personal protection, byeumend health evaluation Protective gloves No So Respiratory protection 0 So So contributing scenario (3) controlling industration So So So contributing scenario (3) controlling industration So So Conditions and measures related to personal protection, byeuce So duration	General	Clear transfer lines prior to de-coupling	
training to prevent maintaine exposures: In easies of potential exposures: Use suitable exposures: Use suitable exposures: Use suitable exposures: Use suitable exposures: Physical state Iquid Concentration in substance Io0 % Exposure of the exposures: Internation in substance Io0 % Product characteristies Internation in substance Ion of % Exposure of the ex		Ensure good work practices are implemented Provide basic employe	
In case of potential degrammed to the section. Use statistic experiod to the section. Use statistic experiod to the statistic experiment experime experiment experiment experiment experiment experiment		training to prevent/minimize exposures	
Its suitable chemically resistant gloves. Product characteristics Physical state Iquid Concentration in substance Prequency and duration of use Prequency and duration of use Duration of activity 15 mins to 1 hour Prequency and duration of use Burnan factors not influenced by risk management 960 cm ² Consention Indoors Constitution of activity 960 cm ² Conter given operational conditions affecting workers expourse Indoors Location Indoors Domain indoors Conditions and measures to control dispersion ad exposure Incola chustur wentilation Conditions and measures related to personal protection, hygicer and halth evaluation Protective gloves No Scenario subite No Scenario subite No Quiltative Risk Assessment Inserie grown precision Quiltative Risk Assessment Inserie grown precision are implemented Provide basic employee training to prevent mining to prevent mining exposure. Use suitable exposure: Use sui		Use suitable eve protection.	
Product characteristics Iiquid Physical state Iiquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency of duration of use Duration of activity Duration of activity 15 mins to 1 hour Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Location indoors Domain indoors Protective gloves No Respiratory protection no Scharbity that generation (3) controlling industrial vorker exposure for PROC 2 Name of contributing scenario (3) controlling industrial vorker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtite Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to preveat/minimize exposures to coastro potential exposures. Concentration in substance Iiquid Concentration in substance Iiqquid </td <td></td> <td>Use suitable chemically resistant gloves.</td>		Use suitable chemically resistant gloves.	
Physical state lquid Concentration in substance 100 % Fagacity / Dustiness medium Frequency and duration of use S Duration of activity 15 mins to 1 hour Frequency of use S days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Exposed skin surface Location indoors Domain indoors Conditions and measures to control dispersion and exposure Exposed skin surface Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves Respiratory protection no S.3 Contributing Scenario (3) controlling industrial Worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtite Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to preventiminitize exposures Concentration in substance 100 % Engacity / Dustiness medium Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surfae <td>Product characteristics</td> <td></td>	Product characteristics		
Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use 5 days / veek Duration of activity 15 mins to 1 hour Frequency and duration of use 5 days / veek Human factors not influenced by sisk management > Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Lacation indoors Domain indoors Conditions and measures to control dispersion and exposure Local exhaust ventilation no Protective gloves No Respiratory protection no Sta Contributing scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Seenario subtite Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/mininic exposures General Inguid Conceasional controlled exposure: Use suitable chemically resistant gloves. No Pro	Physical state	liquid	
Fugacity / Dustiness medium Frequency and duration of use Duration of activity 15 mins to 1 hour Frequency of use 5 days / week Human factors not influenced by risk management 5 days / week Cher given operational conditions affecting workers exposure 1 indoors Location indoors Domain indoors Conditions and measures to control dispersion and exposure Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 · Use in closed, continuous process with occasional controlled exposure General Ensure good work practices exposures Gualitative Risk Assessment Ensure good work practices exposures General Isquid transfer [GS], Styrene Storage in tanks Product characteristics Industrial Product characteristics Industrial Ensure good work practices exposures In case of potential exposures; In case of potential exposures; In case of potential exposure; Product characteristics Industrial <td>Concentration in substance</td> <td>100 %</td>	Concentration in substance	100 %	
Frequency and duration of use Duration of activity 15 mins to 1 hour Frequency of use 5 days / week Human factors not influenced by risk management 960 cm ² Other given operational conditions affecting workers exposure Indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Conditions and measures related to personal protection, hygive and health evaluation Protective gloves No Respiratory protection no Sal Contributing Scenario (3) controlling industrial Worker exposure for PROC 2 Name of contributing scenario (3) controlling industrial Worker exposure for PROC 2 Name of contributing scenario (3) controlling industrial Teshica conduction supposes with occasional controlled exposure Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to provent/minimize exposures General liquid Concentration in substance 100 % Frequency of use 5 days / week Physical state liquid Concentration in substance 400 cm ² Frequency of use 5 days / week	Fugacity / Dustiness	medium	
Duration of activity 15 mins to 1 hour Frequecy of use 5 days / week Human factors not influenced by risk management Exposed skin surface Stopsed skin surface 960 cm ² Other given operational conditions affecting workers exposure indoors Location indoors Domain indoors Conditions and measures to control dispersion and exposure Locat exhaust ventilation Locat exhaust ventilation no Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves Name of contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subilite Material transfers [CS3]. Styrene Storage in tunks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to provent/minimize exposures. In case of potential exposures. In case of potential exposure: Use suitable chemically resistant gloves. Product characteristics medium Product characteristics medium Product characteristics medium Progency of use 5 days / week Human factors not influenc	Frequency and duration of use		
Frequency of use 5 days / week Human factors not influenced by risk management 960 cm² Other given operational conditions affecting workers exposure indoors Location indoors Domain indoors Conditions and measures to control dispersion and exposure Local exhaust veniliation Conditions and measures related to personal protection, hygie= and health evaluation no Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures. General liquid Concentration in substance 100 % Physical state liquid Concentration in substance 100 % Protectory of use 5 days / week Human factors on findenced by risk management 5 days / week Concentration in substance 100 % Product characteristics 5 days / week Duration of activity >4 hours (default)	Duration of activity	15 mins to 1 hour	
Human factors not influenced by risk management Exposed skin surface 960 cm ³ Other given operational conditions affecting workers exposure indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Indoors Locat exhaust ventilation no Conditions and measures to control dispersion and exposure Indoors Conditions and measures related to personal protection, hygiew and health evaluation no Protective gloves No Respiratory protection no Sa. Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures. General liquid Concentration in substance Industrial Produet characteristics medium Produet characteristics Industrial Duration of activity >4 hours (default) Frequency of use 5 days / week	Frequency of use	5 days / week	
Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposur indosrs Location indosrs Domain industrial Technical conditions and measures to control dispersion and exposure Locat exhaust ventilation Technical conditions and measures to control dispersion and exposure and health evaluation Conditions and measures related to personal protection, hygier and health evaluation Protective gloves Respiratory protection no Important to the second sec	Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure Location indoors Domain industrial Domain industrial Coditions and measures to control dispersion and exposure Inclustrial Local exhaust ventilation no Conditions and measures related to personal protection, hygier and health evaluation Protective gloves Respiratory protection No Respiratory protection 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Incluse of potential exposures in prevent/minimize exposures in case of potential exposures. General Inguid Concentration in substance 100 % Product characteristics medium Frequency and duration of use 5 days / week Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 480 cm ² Local exhaust ventilation indostrial Concentration in substance 5 days / week Frequency of use <td>Exposed skin surface</td> <td>960 cm²</td>	Exposed skin surface	960 cm ²	
Location indoors Domain industrial Technical conditions and measures to control dispersion acryposure Local exhaust ventilation Local exhaust ventilation no Conditions and measures related to personal protection, hygiematheait evaluation Conditions and measures related to personal protection, hygiematheait evaluation Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industriat worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtile Matrial transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures. Use suitable exposure: Use suitable exporter: Use suitable exporter: Use suitable exponence: Use suitable exposure: Use suitable exposure: Use suitable exposure: Use suitable exposure: Use suitable exposure: Use suitable exposures In Case of potential exposure: Product characteristics medium Frequency of use 5 days / week Human factors son influenced by risk management	Other given operational conditions affecting workers exposure	, ,	
Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygit= anhealth evaluation Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable chemically resistant gloves. Product characteristics Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable chemically resistant gloves. Product characteristics medium Concentration in substance 100 % Frequency and duration of use 5 days / week Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface<	Location	indoors	
Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygiener and health evaluation No Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 · Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [C83]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Product characteristics Use suitable eye protection. Use suitable eye protection. Physical state liquid Concentration in substance 100 % Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 480 cm² Otaction indoors Domain industrial	Domain	industrial	
Local exhaust ventilation no Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtite Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Product characteristics Use suitable eye protection. Physical state liquid Concentration in substance 100 % Frequency and duration of use puation of (default) Prequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Domain industrial	Technical conditions and measures to control dispersion and e	xposure	
Conditions and measures related to personal protection, hygie=r and health evaluation Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Product characteristics Inguid Concentration in substance 100 % Frequency and duration of use Equation of use Duration of activity >4 hours (default) Frequency of use 5 days / week	Local exhaust ventilation	no	
Protective gloves No Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable cyce protection. Use suitable cyce protection. Use suitable cyce protection. Product characteristics Iiquid Concentration in substance 100 % Frequency and duration of use pade (default) Prequency of use 5 days / week Human factors not influenced by risk management Exposure Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Domain indousrial	Conditions and measures related to personal protection, hygie	ne and health evaluation	
Respiratory protection no 3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Ves suitable eye protection. Use suitable eye protection. Fugacity / Dustiness medium Frequency and duration of use 100 % Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation	Protective gloves	No	
3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2 Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Ordentration in substance 100 % Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Cotter given operational conditions affecting workers exposure Location Domain indoors Domain industrial Technical conditions and measures to control dispersion and exposure Locat exhaust ventilation	Respiratory protection	no	
Name of contributing scenario 2 - Use in closed, continuous process with occasional controlled exposure Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Physical state liquid Concentration in substance 100 % Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Location indoors Domain indoors Location indoors Location no	3.3 Contributing Scenario (3) controlling industrial	worker exposure for PROC 2	
Scenario subtitle Material transfers [CS3]. Styrene Storage in tanks Qualitative Risk Assessment Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Product characteristics Iiquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use week Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Locat exhaust ventilation	Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Qualitative Risk Assessment General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Use suitable chemically resistant gloves. Product characteristics Iiquid Physical state Iiquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use Duration of activity Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Location indoors Domain indoors Location no	Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks	
General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable eye protection. Product characteristics Iiquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use >4 hours (default) Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 480 cm ² Other given operational conditions affecting workers exposure: Location Domain indoors Domain indours Locat exhaust ventilation no	Qualitative Risk Assessment		
training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable eye protection. Use suitable chemically resistant gloves. Product characteristics Physical state Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation	General	Ensure good work practices are implemented Provide basic employe	
In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. Product characteristics Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use >4 hours (default) Prequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Domain indoors Domain indours Local exhaust ventilation no		training to prevent/minimize exposures	
Product characteristics Use suitable eye protection. Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation		In case of potential exposure:	
Product characteristics Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Indoors indoors Domain indosrs Cotal conditions and measures to control dispersion and exposure Local exhaust ventilation		Use suitable chemically resistant gloves.	
Physical stateliquidConcentration in substance100 %Fugacity / DustinessmediumFrequency and duration of usemediumDuration of activity>4 hours (default)Frequency of use5 days / weekHuman factors not influenced by risk managementExposed skin surface480 cm²Other given operational conditions affecting workers exposureindoorsLocationindoorsDomainindustrialTechnical conditions and measures to control dispersion and exposureLocal exhaust ventilationno	Product characteristics		
Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use medium Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 5 days / week Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Ioo	Physical state	liquid	
Fugacity / DustinessmediumFrequency and duration of useDuration of activity>4 hours (default)Frequency of use5 days / weekHuman factors not influenced by risk managementExposed skin surface480 cm²Other given operational conditions affecting workers exposureLocationindoorsDomainindoorsTechnical conditions and measures to control dispersion and exposureLocal exhaust ventilationno	Concentration in substance	100 %	
Frequency and duration of use >4 hours (default) Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no	Fugacity / Dustiness	medium	
Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no	Frequency and duration of use		
Frequency of use5 days / weekHuman factors not influenced by risk management480 cm2Exposed skin surface480 cm2Other given operational conditions affecting workers exposure1000000000000000000000000000000000000	Duration of activity	>4 hours (default)	
Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no	Frequency of use	5 days / week	
Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Indoors Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Indoors Local exhaust ventilation no	Human factors not influenced by risk management	· ·	
Other given operational conditions affecting workers exposure Location indoors Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no	Exposed skin surface	480 cm ²	
Location indoors Domain industrial Technical conditions and measures to control dispersion and exosure Local exhaust ventilation no	Other given operational conditions affecting workers exposure		
Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no	Location	indoors	
Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no	Domain	industrial	
Local exhaust ventilation no	Technical conditions and measures to control dispersion and e	xposure	
	Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation	Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves No	Protective gloves	No	
Respiratory protection no	Respiratory protection	no	

R0000009 Version 1 Revision date: 2017-04-12 Page 18 of 106

3.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 3		
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
3.5 Contributing Scenario (5) controlling industrial	worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Dispersing and heat in reactor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	

Page 19 of 106

Technical conditions and measures to control dispersion and e	Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygier	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
3.6 Contributing Scenario (6) controlling industrial	worker exposure for PROC 3		
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)		
Scenario subtitle	Batch process [CS55]. Washed and dried tanks		
Oualitative Risk Assessment	1		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	240 cm^2		
Other given operational conditions affecting workers exposure			
Location	indoors		
Ventilation	good (30%)		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygic	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
3.7 Contributing Scenario (7) controlling industrial	worker exposure for PROC 8A		
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated		
Scenario subtitle	receives sampling [CS2]. Sampling from reactors/tanks		
Oualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
rugacity / Dustilless	incului		
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	960 cm ²		

R0000009 Version 1

Revision date: 2017-04-12

Page 20 of 106

Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control	
	exposure)	
3.8 Contributing Scenario (8) controlling industrial	worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable chemically resistant gloves	
Product characteristics	ose suitable chemically resistant gloves.	
Physical state	liquid	
Concentration in substance	100 %	
Eugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management	5 days / week	
Exposed skin surface	240 cm^2	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
3.9 Contributing Scenario (9) controlling industrial	l worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion,	
	pelletisation	
Scenario subtitle	Operation of solids filtering equipment [CS117]. Pelletizing	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface 480 cm ²		
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		

Protective gloves	No	
Respiratory protection	no	
3.10 Contributing Scenario (10) controlling industr	ial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)	
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface 480 cm ²		
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and ex	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
3.11 Contributing Scenario (11) controlling industr	ial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance:	
	opening and cleaning manufacturing equipment for maintenance purposes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface 960 cm ²		
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
3.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar,	
	container	

 R0000009
 Version 1
 Revision date: 2017-04-12
 Page 22 of 106

Product characteristics			
Physical state	liquid		
Concentration in substance	1-5%		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	960 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	NO		
Respiratory protection	no		
3.13 Contributing Scenario (13) controlling industr	ial worker exposure for PROC 2		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure		
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or		
	adsorption/ desorption processes		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe		
	training to prevent/minimize exposures		
	In case of potential exposure:		
	Use suitable eye protection.		
	Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	480 cm^2		
Other given operational conditions affecting workers exposure			
Location	indeers		
Domain	industrial		
l ecnnical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
3.14 Contributing Scenario (14) controlling industr	ial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities		
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace		
Qualitative Risk Assessment	- A		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.		
R0000009	Version 1 Revision date: 2017-04-12 Page 23 of 106		

	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	

Scenario 4: Production of Expandable Polystyrene (ES4)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Production of Expandable Polystyrene.

Table 4. Description of ES 4

Free short title	Production of Expandable Polystyrene (ES4)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 14, 9
Name of contributing environmental scenario and	ERC 6c Production of plastics
corresponding ERC	
Name(s) of contributing worker scenarios and corresponding PROCs	 PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

4.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year (justification: Continuous production)
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))
Fraction released to waste water (Femis.water)	0.000012 % (justification: EU Risk Assessment Report, 2002)
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)
4.2 Contributing Scenario (2) controlling industria	l worker exposure for PROC 8B
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	

General	Clear transfer lines prior to de-coupling	
	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures	
	training to prevent/minimize exposures	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
4.3 Contributing Scenario (3) controlling industrial	worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management	-	
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
· · · ·		

 R0000009
 Version 1
 Revision date: 2017-04-12
 Page 26 of 106

4.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 3			
Name of contributing scenario 3 - Use in closed batch process (synthesis or formulation)			
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use	•		
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management	-		
Exposed skin surface	240 cm^2		
Other given operational conditions affecting workers exposure			
Location	indoors		
Ventilation	good (30%)		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation no			
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
4.5 Contributing Scenario (5) controlling industria	worker exposure for PROC 3		
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)		
Scenario subtitle	Batch process [CS55] Dispersing and heat in reactor		
Seemano Suctine	Buten process [CDCD]. Dispersing and near in reactor		
Qualitative Risk Assessment	Baten process [Coos]. Bispersing and near in reactor		
Qualitative Risk Assessment General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Qualitative Risk Assessment General Product characteristics	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Qualitative Risk Assessment General Product characteristics Physical state	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default)		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ²		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ²		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ²		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%)		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure po		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure no		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure no ne and health evaluation		
Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure no ne and health evaluation No		

4.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 3			
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)		
Scenario subtitle	Batch process [CS55]. Washed and dried tanks		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	240 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Ventilation	good (30%)		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
4.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 8A			
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities		
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	960 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		

R0000009 Version 1

Revision date: 2017-04-12

Technical conditions and measures to control dispersion and e	xposure				
Local exhaust ventilation	no				
Conditions and measures related to personal protection, hygiene and health evaluation					
Protective gloves	No				
Respiratory protection	no				
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control exposure)				
4.8 Contributing Scenario (8) controlling industrial	al worker exposure for PROC 15				
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories				
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control				
Qualitative Risk Assessment					
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.				
Product characteristics					
Physical state	liquid				
Concentration in substance	100 %				
Fugacity / Dustiness	medium				
Frequency and duration of use					
Duration of activity	>4 hours (default)				
Frequency of use	5 days / week				
Human factors not influenced by risk management					
Exposed skin surface	240 cm^2				
Other given operational conditions affecting workers exposure					
Location	indoors				
Domain	industrial				
Technical conditions and measures to control dispersion and e	id exposure				
Local exhaust ventilation no					
Conditions and measures related to personal protection, hygie	ne and health evaluation				
Protective gloves	No				
Respiratory protection	no				
4.9 Contributing Scenario (9) controlling industrial	worker exposure for PROC 14				
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation				
Scenario subtitle	Operation of solids filtering equipment [CS117]. Pelletizing				
Product characteristics	•				
Physical state	liquid				
Concentration in substance	1-5%				
Fugacity / Dustiness	medium				
Frequency and duration of use					
Duration of activity	>4 hours (default)				
Frequency of use	5 days / week				
Human factors not influenced by risk management					
Exposed skin surface	480 cm ²				
Other given operational conditions affecting workers exposure					
Location	indoors				
Domain	industrial				
R0000009	Version 1 Revision date: 2017-04-12 Page 29 of 106				

Technical conditions and measures to control dispersion and exposure				
Local exhaust ventilation	no			
Conditions and measures related to personal protection, hygiene and health evaluation				
Protective gloves	No			
Respiratory protection	no			
4.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 9				
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)			
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product			
Product characteristics				
Physical state	liquid			
Concentration in substance	1-5%			
Fugacity / Dustiness	medium			
Frequency and duration of use				
Duration of activity	>4 hours (default)			
Frequency of use	5 days / week			
Human factors not influenced by risk management				
Exposed skin surface	480 cm ²			
Other given operational conditions affecting workers exposure				
Location	indoors			
Domain	industrial			
Technical conditions and measures to control dispersion and exposure				
Local exhaust ventilation	no			
Conditions and measures related to personal protection, hygie	ne and health evaluation			
Protective gloves	No			
Respiratory protection	no			
4.11 Contributing Scenario (11) controlling industr	ial worker exposure for PROC 8B			
4.11 Contributing Scenario (11) controlling industr Name of contributing scenario	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities			
4.11 Contributing Scenario (11) controlling industr Name of contributing scenario Scenario subtitle	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes			
4.11 Contributing Scenario (11) controlling industr Name of contributing scenario Scenario subtitle Qualitative Risk Assessment	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes			
 4.11 Contributing Scenario (11) controlling industring scenario Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.			
4.11 Contributing Scenario (11) controlling industr Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.			
 4.11 Contributing Scenario (11) controlling industric Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.			
 4.11 Contributing Scenario (11) controlling industring scenario Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.			
 4.11 Contributing Scenario (11) controlling industring scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium			
 4.11 Contributing Scenario (11) controlling industric Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium			
 4.11 Contributing Scenario (11) controlling industring scenario Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium			
 4.11 Contributing Scenario (11) controlling industring scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week			
 4.11 Contributing Scenario (11) controlling industring Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week			
 4.11 Contributing Scenario (11) controlling industring scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²			
 4.11 Contributing Scenario (11) controlling industring Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²			
 4.11 Contributing Scenario (11) controlling industring scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors			
 4.11 Contributing Scenario (11) controlling industring Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain 	ial worker exposure for PROC 8B 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial			

Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	No		
Respiratory protection	no		
4 12 Contributing Scenario (12) controlling industr	ial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated		
Name of contributing scenario	facilities		
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar,		
	container		
Product characteristics			
Physical state	liquid		
Concentration in substance	<u>1-5%</u>		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface 960 cm ²			
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
4.13 Contributing Scenario (13) controlling industr	ial worker exposure for PROC 2		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure		
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or		
Qualitative Dick Accomment	adsorption/ desorption processes		
General	Ensure good work practices are implemented Provide basic employe		
General	training to prevent/minimize exposures		
	In case of potential exposure:		
	Use suitable eye protection.		
	Use suitable chemically resistant gloves.		
Product characteristics	1.0 · · ·		
Physical state			
Eugenity / Dustiness	100 %		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	480 cm^2		
Other given operational conditions affecting workers exposure	}		
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
A 14 Contributing Cooponia (14) controlling inductor	ial worker exposure for PROC 88		

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated		
	facilities		
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to		
	storage containers: off-line in workplace		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe		
	training to prevent/minimize exposures		
	In case of potential exposure:		
	Use suitable eye protection.		
	Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	15 mins to 1 hour		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface 960 cm ²			
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and exposure			
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygien	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		

Scenario 5: Production of Styrenic Copolymers (ES5)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Production of Styrenic Copolymers.

Table	5	Description	of FS	5
1 aute	э.	Description	ULD	2

Free short title	Production of Styrenic Copolymers (ES5)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
Name of contributing environmental scenario and	ERC 6c Production of plastics
corresponding ERC	
Name(s) of contributing worker scenarios and corresponding	PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated
PROCs	facilities
	PROC 2 - Use in closed, continuous process with occasional controlled
	exposure
	PROC 3 - Use in closed batch process (synthesis or formulation)
	PROC 8a - Transfer of chemicals from/to vessels/ large containers at non
	dedicated facilities
	PROC 15 - Use of laboratory reagents in small scale laboratories
	PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

5.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year (justification: Continuous production)
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %

R0000009 V

Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to waste water (Femis.water)	0.000012 % (justification: EU Risk Assessment Report, 2002)
Fraction released to air (Femis.air)	0.102 % (iustification: EU Risk Assessment Report, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)
5.2 Contributing Scenario (2) controlling industrial	worker exposure for PROC 8B
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling
	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.
	Use suitable chemically resistant gloves.
Product characteristics	1
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygier	ne and health evaluation
Protective gloves	No
Respiratory protection	no
5.3 Contributing Scenario (3) controlling industrial	worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
ROOOOOQ	Version 1 Revision date: 2017-04-12 Page 33 of 106

General	Ensure good work practices are implemented Provide basic employe			
	training to prevent/minimize exposures			
	In case of potential exposure: Use suitable eve protection			
	Use suitable chemically resistant gloves.			
Product characteristics				
Physical state	liquid			
Concentration in substance	100 %			
Fugacity / Dustiness	medium			
Frequency and duration of use				
Duration of activity	>4 hours (default)			
Frequency of use	5 days / week			
Human factors not influenced by risk management				
Exposed skin surface	480 cm ²			
Other given operational conditions affecting workers exposure				
Location	indoors			
Domain	industrial			
Technical conditions and measures to control dispersion and e	xposure			
Local exhaust ventilation	no			
Conditions and measures related to personal protection, hygie	ne and health evaluation			
Protective gloves	No			
Respiratory protection	no			
5.4 Contributing Scenario (4) controlling industrial	worker exposure for PROC 3			
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)			
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline			
Qualitative Risk Assessment				
General	Ensure good work practices are implemented Provide basic employe			
	training to prevent/minimize exposures			
	In case of potential exposure:			
	Use suitable ave protection			
	Use suitable eye protection. Use suitable chemically resistant gloves.			
Product characteristics	Use suitable eye protection. Use suitable chemically resistant gloves.			
Product characteristics Physical state	Use suitable eye protection. Use suitable chemically resistant gloves.			
Product characteristics Physical state Concentration in substance	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 %			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default)			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ²			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ²			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%)			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure no			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure no ne and health evaluation			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure no ne and health evaluation No			
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Ventilation Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves Respiratory protection	Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 240 cm ² indoors good (30%) industrial xposure no no No no			

5.5 Contributing Scenario (5) controlling industrial	worker exposure for PROC 3
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dissolving and polymerisation reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	No
Respiratory protection	no
5.6 Contributing Scenario (6) controlling industrial	worker exposure for PROC 3
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Suspension reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial

Version 1

Revision date: 2017-04-12

Local exhaust ventilation no Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves No				
Conditions and measures related to personal protection, hygiene and health evaluation Protective gloves No				
Protective gloves No				
Respiratory protection no				
5.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 3				
Name of contributing scenario 3 - Use in closed batch process (synthesis or formulation)				
Scenario subtitle Batch process [CS55]. Washed and dried tanks				
Qualitative Risk Assessment				
GeneralEnsure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.				
Product characteristics				
Physical state liquid				
Concentration in substance 100 %				
Fugacity / Dustiness medium				
Frequency and duration of use				
Duration of activity >4 hours (default)				
Frequency of use 5 days / week				
Human factors not influenced by risk management				
Exposed skin surface 240 cm ²				
Other given operational conditions affecting workers exposure				
Location indoors				
Ventilation good (30%)				
Domain industrial				
Technical conditions and measures to control dispersion and exposure				
Local exhaust ventilation no				
Conditions and measures related to personal protection, hygiene and health evaluation				
Protective gloves No				
Respiratory protection no				
5.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 8A				
Name of contributing scenario 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities				
Scenario subtitle Process sampling [CS2]. Sampling from reactors/tanks				
Qualitative Risk Assessment				
General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.				
Product characteristics				
Physical state liquid				
Concentration in substance 100 %				
Fugacity / Dustiness medium				
Frequency and duration of use				
Duration of activity >4 hours (default)				
Frequency of use 5 days / week				

Version 1

Revision date: 2017-04-12

Page 36 of 106
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control exposure)	
5.9 Contributing Scenario (9) controlling industrial	worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
5.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 9		
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)	
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	

R0000009 Version 1 Revision date: 2017-04-12 Page 37 of 106

Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and ex	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
5.11 Contributing Scenario (11) controlling industr	ial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and ex	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
5.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
R0000009	Version 1 Revision date: 2017-04-12 Page 38 of 106	

Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure	e	
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	exposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ene and health evaluation	
Protective gloves	No	
Respiratory protection	no	
5.13 Contributing Scenario (13) controlling industr	rial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or	
	adsorption/ desorption processes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use	1	
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm^2	
Other given operational conditions affecting workers exposure	e	
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	exposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ene and health evaluation	
Protective gloves	No	
Respiratory protection	no	
5.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
R0000009	Version 1 Revision date: 2017-04-12 Page 39 of 106	

Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	

Scenario 6: Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.) (ES6)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.).

Table 6. Description of ES 6

Free short title	Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.) (ES6)
Systematic title based on use descriptor	ERC 2; PROC 1, 3, 4, 5, 15, 9, 8B, 8A
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations
Name(s) of contributing worker scenarios and corresponding	PROC 1 - Use in closed process, no likelihood of exposure
PROCs	PROC 3 - Use in closed batch process (synthesis or formulation)
	PROC 4 - Use in batch and other process (synthesis) where opportunity for
	exposure arises
	PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact)
	PROC 15 - Use of laboratory reagents in small scale laboratories
	PROC 9 - Transfer of chemicals into small containers (dedicated filling line)
	PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated
	TACHILLES
	dedicated facilities
6.1 Contributing Scenario (1) controlling environm	ental exposure for ERC 2
Operational conditions	
Annual European tonnage	2.28E5 to/year
Daily amount used at site	4.57E4 kg/day
Release times per year	300 days/year (justification: Continuous production)
Local freshwater dilution factor	41
Local marine water dilution factor	100
Release fraction to air from process	0.200 %
Release fraction to wastewater from process	0.0049 %

Release fraction to soil from process	0.010 %	
Fraction tonnage to region	10 %	
Fraction used at main source	60 %	
STP	yes	
River flow rate	400000 m ³ /day (justification: Site specific information)	
Municipal sewage treatment plant discharge	10000000 L/day (justification: Site specific information)	
Risk management measures		
Reduction of sludge to soil	100 % (justification: Do not apply industrial sludge to natural soils)	
Other modified EUSES values		
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release (EU Risk Assessment Report on Styrene,European Communities, 2002))	
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))	
Fraction released to waste water (Femis.water)	0.0049 % (justification: Worst-case estimate from measured concentrations at manufacturing sites (EU Risk Assessment Report on Styrene, European Communities, 2002))	
Fraction released to air (Femis.air)	0.200 % (justification: EU Risk Assessment Report on Styrene, European Communities, 2002)	
Fraction used at main source	60 % (justification: Value adopted to account for largest European manufacturing site (EU Risk Assessment Report on Styrene,European Communities, 2002))	
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)	
6.2 Contributing Scenario (2) controlling industria	l worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure	
Scenario subtitle	General exposures [CS1]. Use in contained batch processes [CS37].	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location		
	indoors	
Domain	indoors industrial	
Domain Technical conditions and measures to control dispersion and e	indoors industrial xposure	
Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation	indoors industrial xposure no	
Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie	indoors industrial xposure no ne and health evaluation	
Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves	indoors industrial xposure no ne and health evaluation Gloves APF 5 80 %	

Good standard of general ventilation; natural or controlled	inhalation: 30 % (justification: Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.)	
6.3 Contributing Scenario (3) controlling industrial	worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Bulk transfers [CS14]. Receipt and storage of raw materials in bulk or as packed goods, indoor and outdoor; Raw material assembly and charging; dispensing of liquids and solids via pipeline;	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure	(1 (200/))	
Domain	in dustrial	
Technical conditions and massures to control dispersion and a		
Local exhaust ventilation		
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
6.4 Contributing Scenario (4) controlling industrial	worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	General exposures (closed systems) [CS15]. Dissolving linear UP/VE polymer into styrene in blending vessel (or dissolver)	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm^2	

Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xnosure	
Local exhaust ventilation		
Conditions and macroscapelated to normanal protection busics	no	
Conditions and measures related to personal protection, hygier		
	Gloves APF 5 80 %	
Respiratory protection	no	
6.5 Contributing Scenario (5) controlling industrial	worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises	
Scenario subtitle	Material transfers [CS3]. All internal transport Raw material assembly and charging / raw material dispensing of liquids and solids manually from bulk storage or packed goods into blending tank	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics	······································	
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface 480 cm ²		
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and ex	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection		
6.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 5		
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)	
Scenario subtitle	Drum/batch transfers [CS8]; Pouring from small containers [CS9]; Transfer from/pouring from containers [CS22]; Mixing operations (open systems) [CS30]. Mixing liquid and solid components / into final formulated resin in blending vessel; Examples are gelcoat blending and compounding	
Qualitative Risk Assessment		
General	Keep lids of containers closed during blending Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	

R0000009 Version 1

Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	ves (inhalation 90 %)	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	Gloves APE 5 80 %	
Respiratory protection		
67 Contributing Sconoria (7) controlling inductrial	worker exposure for PDOC 4	
V. Contributing Scenario (7) controlling industrial		
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure	
Scenario subtitle	Process sampling [CS2] Sampling from blander	
	Flocess sampling [CS2]. Sampling from blender	
General	Avoid dip sampling	
	training to prevent/minimize exposures	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
	Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
6 8 Contributing Sconario (8) controlling inductrial	worker exposure for PDOC 15	
o.o Contributing Scenario (8) controlling industrial worker exposure for PROC 15		
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS56]. All laboratory activities Quality control work of samples from reactor and blending vessel: R&D work including handling of	
	samples from 1 kg to 1 drum	

 R0000009
 Version 1
 Revision date: 2017-04-12
 Page 44 of 106

General	Qualitative Risk Assessment		
	Ensure good work practices are implemented Provide basic employe		
	training to prevent/minimize exposures		
	Use suitable eve protection		
	Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Eugocity / Dustiness	medium		
Frequency and duration of use	inedium		
Provency and duration of use	A have (Jafanle)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	240 cm^2		
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
Carry out in a vented booth or extracted enclosure	inhalation: 90 % (justification: Carry out in a vented booth or extracted		
	enclosure)		
6.9 Contributing Scenario (9) controlling industrial	worker exposure for PROC 9		
Name of contributing scenario 9 - Transfer of chemicals into small containers (dedicated filling line)			
Name of contributing scenario	y - mansier of eleminears into small containers (dedicated mining inte)		
Scenario subtitle	Bulk transfers [CS14]. All activities related to transport finished product to		
Scenario subtitle	Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene +		
Scenario subtitle	Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment	Bulk transfer of chemicus into small containers (teducated iming inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General	Bulk transfer of chemicus into small containers (teducated iming inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General	Bulk transfer of chemicus into small containers (teducated minig inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure:		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General	Bulk transfer of chemicus into small containers (teducated minig inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General	Bulk transfer of chemicals into small containers (teducated mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics	Bulk transfer of chemicals into small containers (teducated minig inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state	Bulk transfer of chemicals into small containers (teducated minig inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Energie (Desting)	Bulk transfer of chemicals into small containers (teducated mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Encourse and duration of use	Bulk transfer of chemicals into small containers (teducated mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity	Bulk transfer of chemicals into small containers (teducated mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use	b Finaliser of chemicals into small containers (deducted mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management	b Finaliser of chemicals into small containers (deducted mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 480 cm ²	b Finaliser of chemicals into small containers (deducted mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure	Bulk transfer of chemicals into small containers (dedicated mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposured	b Finaliser of chemicals into small containers (deducted mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Domain	b Financies (contained sinual containers (dedicated fining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e	b Finalise of elemetats into small containers (dedicated mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week sindoors indoors industrial xposure		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation	b Finalise of elemetats into small containers (dedicated mining inte) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week e indoors industrial xposure no		
Name of contributing scenario Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface 480 cm ² Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie	b Finaliser of enclineas into small containers (dedicated fining into) Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week indoors industrial xposure no no no no		

R0000009 Version 1 Revision date: 2017-04-12

Page 45 of 106

Respiratory protection	no
LEV	inhalation: 90 % (justification: Fill containers/cans at dedicated fill points
	supplied with local extract ventilation)
6.10 Contributing Scenario (10) controlling industr	ial worker exposure for PROC 8B
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) into roadtanker. Tier2 assessment has been done to prove safe use of styrene
Qualitative Risk Assessment	has been done to prove sale use of styrene
General	Use bulk or semi-bulk handling systems
	Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.
Product abaracteristics	Use suitable chemically resistant gloves.
Physical state	liquid
Concentration in substance	
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygic	ne and health evaluation
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Use of external/measured value inhalation	Exposure assessment using the Bayesian model of ART Version 1.0 Bayesian model results using one specific dataset consisting of 28 measurement values representing worker exposure of 6 workers located at one site. The predicted 90th percentile full-shift exposure is 24 mg/m ³ . The confidence interval is 11 mg/m ³ to 70 mg/m ³ . PROC 8b Emission sources: Far-field exposure Vapour pressure: 1300 Pa (Elevated temperature) Liquid mole fraction: 1 Activity coefficient: 1 Process temperature: Room temperature Substance product type: Liquids Activity class: Falling of liquids Transfer technique: Transfer liquid products flow > 1000 L/min Situation: Splash loading Localised controls: None Effective housekeeping practices in place? Yes Work area: Outdoors, close to buildings Duration (mins): 480 min
6.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)

Version 1

Scenario subtitle	Equipment cleaning and maintenance [CS39]. Cleaning and maintenance of blending vessel, roadtankers etc.	
Qualitative Rick Assessment		
Conorol	Ensure good work practices are implemented Provide basis employe	
General	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
Apply vessel entry procedure including use of forced supplied air	inhalation: 30 % (justification: Drain down and flush system prior to equipment break-in or maintenance)	
6.12 Contributing Scenario (12) controlling industr	ial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated	
Scenario subtitle	Equipment cleaning and maintenance [CS39]. Cleaning and maintenance of	
	pipes, pumps, filters, etc.	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eye protection.	
	Wear suitable coveralls to prevent exposure to the skin	
Product characteristics	wear suitable coveraits to prevent exposure to the skin.	
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	ves (inhalation 90 %)	
Conditions and measures related to nersonal protection, bygie		
Conditions and incasures related to personal protection, hygie	ne and health evaluation	
Protective gloves	ne and health evaluation	
Protective gloves	ne and health evaluation Gloves APF 5 80 %	

Forced air circulation	inhalation: 70 % (justification: Drain or remove substance from equipment prior to break-in or maintenance)	
6.13 Contributing Scenario (13) controlling indu	strial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Disposal of wastes [CS28]. Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment	
Qualitative Risk Assessment		
General	Dispose of empty containers and wastes safely Dispose of waste in accordance with environmental legislation Reduce duration of activity to less than 60 min Alternatively: Wear a suitable respiratory protection with adequate effectiveness . Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion an	d exposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hy	giene and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
Provide a good standard of general ventilation; natural or controlled	inhalation: 30 % (justification: Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.)	

Scenario 7: FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES7)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.).

Table 7. Description of ES 7

Free short title	FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES7)
Systematic title based on use descriptor	ERC 6D; PROC 10, 7, 13, 5, 3, 14, 8A, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6d Production of resins/rubbers

Name(s) of contributing worker scenarios and corresponding	PROC 10 - Roller application or brushing
PROCs	PROC 7 - Industrial spraying
	PROC 13 - Treatment of articles by dipping and pouring
	PROC 5 - Mixing or blending in batch processes (multistage and/or significant
	PROC 3 - Use in closed batch process (synthesis or formulation)
	PROC 14 - Production of preparations or articles by tabletting, compression,
	extrusion, pelletisation
	PROC 8a - Transfer of chemicals from/to vessels/ large containers at non
	PROC 15 - Use of laboratory reagents in small scale laboratories
7.1 Contributing Scenario (1) controlling environm	ental exposure for ERC 6D
Operational conditions	
Annual European tonnage	8.06E5 to/year
Daily amount used at site	1.61E5 kg/day
Release times per year	300 days/year (justification: Continous release)
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.00063 %
Release fraction to soil from process	0.025 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk
	Assessment Report on Styrene, European Communities,
	2002))
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk
	Assessment Report on Styrene, European Communities,
Fraction released to waste water (Femis.water)	0.00063 % (justification: EU Risk Assessment Report, 2002)
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for Worstcase European
	manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)
7.2 Contributing Scenario (2) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] All open
	mould applications where resins is applied by brushing, rolling and other low
	filament winding
Oualitative Risk Assessment	6
General	Use long handled brushes and rollers where possible Ensure the ventilation
	system is regularly maintained and tested
	Dispose of empty containers and wastes safely
	Ensure good work practices are implemented Provide basic employe
	Use suitable eve protection
	Use suitable chemically resistant gloves.
	Wear suitable coveralls to prevent exposure to the skin

Physical state liquid Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use Duration of activity Prequency and duration of use >4 hours (default) Frequency and duration of use Duration of activity Frequency and duration of use Buration of activity Frequency and duration of use Buration of activity Frequency and duration of use Buration of activity Human factors not influenced by risk management Exposed skin surface Potection activity of use Bott colspan="2">Advors Control influenced by risk management Location Indoors Potection of influenced by risk management Location Name and measures to control dispersion activity industrial Conditions and measures related to personal protection, hygic::::::::::::::::::::::::::::::::::::		
Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location indoors Ventilation enhanced (70%) Domain industrial Technical conditions and measures to control dispersion and exposure Locat exhaust ventilation no Protective gloves Gloves APF 5 80 % Respiratory protection no 7.3 Contributing Scenario (3) controlling industrial Name of contributing scenario 7 - Industrial spraying Scenario subtile Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resin is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Fugacity / Dustiness medium Frequency and duration of use >4 hours (default) Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 5 days / week Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposur 1 Location indoors Ventilation enhanced (70%) Domain industrial Technical conditions and measures to control dispersion and ->vursure 1 Locat exhaust ventilation no Conditions and measures related to personal protection, hygie and health evaluation Protective gloves Gloves APF 5 80 % Respiratory protection no 7. Acontributing Scenario (3) controlling industrial verker exposure for PROC 7 Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, geleoat spraying and "chop-hoop" filament winding		
Frequency and duration of use Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location indoors Ventilation enhanced (70%) Domain industrial Technical conditions and measures to control dispersion and exposure Locat exhaust ventilation no Control dispersion and exposures related to personal protection, hysic Protective gloves Gloves APF 5 80 % Respiratory protection 7 - Industrial spraying Name of contributing Scenario (3) controlling industrial Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray capin without direct worker involvement. Examples are spray lamination, gelecat spraying and "chop-hoop" filament winding		
Duration of activity>4 hours (default)Frequency of use5 days / weekHuman factors not influenced by risk managementExposed skin surface960 cm²Other given operational conditions affecting workers exposureLocationindoorsVentilationenhanced (70%)DomainindustrialTechnical conditions and measures to control dispersion and exposureLocal exhaust ventilationnoConditions and measures to control dispersion and exposureLocal exhaust ventilationnoConditions and measures related to personal protection, hygie:		
Frequency of use 5 days / week Human factors not influenced by risk management 960 cm ² Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Indoors Location indoors Ventilation enhanced (70%) Domain industrial Technical conditions and measures to control dispersion and exposure Icoal exhaust ventilation Local exhaust ventilation no Conditions and measures related to personal protection, hygier and health evaluation Protective gloves Respiratory protection no Protective gloves Gloves APF 5 80 % Respiratory protection no Name of contributing scenario (3) controlling industrial Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure indoors Location indoors Ventilation enhanced (70%) Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation Local exhaust ventilation no Conditions and measures related to personal protection, hygie and health evaluation Protective gloves Gloves APF 5 80 % Respiratory protection no 7.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 7 Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure Location indoors Ventilation enhanced (70%) Domain industrial Technical conditions and measures to control dispersion and exposure Local exhaust ventilation no Conditions and measures related to personal protection, hygier and health evaluation Protective gloves Gloves APF 5 80 % Respiratory protection no 7.3 Contributing Scenario (3) controlling industriat worker exposure for PROC 7 Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Other given operational conditions affecting workers exposureLocationindoorsVentilationenhanced (70%)DomainindustrialTechnical conditions and measures to control dispersion and exposureLocal exhaust ventilationnoConditions and measures related to personal protection, hygie and health evaluationProtective glovesGloves APF 5 80 %Respiratory protectionno7.3 Contributing Scenario (3) controlling industriaVorker exposure for PROC 7Name of contributing scenario7 - Industrial sprayingScenario subtitleSpraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
LocationindoorsVentilationenhanced (70%)DomainindustrialTechnical conditions and measures to control dispersion and Technical conditions and measures to control dispersion and Technical conditions and measures to control dispersion and Technical conditions and measures related to personal protection, hysiLocal exhaust ventilationnoOnclutions and measures related to personal protection, hysiProtective glovesGloves APF 5 80 %Respiratory protectionno7.3 Contributing Scenario (3) controlling industriaworker exposure for PROC 7Name of contributing scenario7 - Industrial sprayingScenario subtitleSpraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Ventilationenhanced (70%)DomainindustrialTechnical conditions and measures to control dispersion and essures related to personal protection, hysisLocal exhaust ventilationnoOnditions and measures related to personal protection, hysisProtective glovesGloves APF 5 80 %Respiratory protectionno7.3 Contributing Scenario (3) controlling industriaworker exposure for PROC 7Name of contributing scenario7 - Industrial sprayingScenario subtitleSpraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
DomainindustrialTechnical conditions and measures to control dispersion and essuresLocal exhaust ventilationnoConditions and measures related to personal protection, hygie and health evaluationProtective glovesGloves APF 5 80 %Respiratory protectionno7.3 Contributing Scenario (3) controlling industriatworker exposure for PROC 7Name of contributing scenario7 - Industrial sprayingScenario subtitleSpraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Technical conditions and measures to control dispersion and exoureLocal exhaust ventilationnoConditions and measures related to personal protection, hygi= and health evaluationProtective glovesGloves APF 5 80 %Respiratory protectionno7.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 7Name of contributing scenario7 - Industrial sprayingScenario subtitleSpraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelecoat spraying and "chop-hoop" filament winding		
Local exhaust ventilationnoConditions and measures related to personal protection, hygi=		
Conditions and measures related to personal protection, hygi=- and health evaluationProtective glovesGloves APF 5 80 %Respiratory protectionno7.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 7Name of contributing scenario7 - Industrial sprayingScenario subtitleSpraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Protective glovesGloves APF 5 80 %Respiratory protectionno7.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 7Name of contributing scenario7 - Industrial sprayingScenario subtitleSpraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Respiratory protection no 7.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 7 Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
7.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 7 Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Scenario subtitle Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding		
Qualitative Risk Assessment		
General Ensure the ventilation system is regularly maintained and tested Dispose of empty containers and wastes safely Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Wear suitable coveralls to prevent exposure to the skin Use suitable eye protection. Wear suitable face shield Wear chemically resistant gloves in combination with intensive management supervision control.		
Product characteristics		
Physical state liquid		
Concentration in substance 100 %		
Fugacity / Dustiness medium		
Frequency and duration of use		
Duration of activity >4 hours (default)		
Frequency of use 5 days / week		
Human factors not influenced by risk management		
Exposed skin surface 1,500 cm ²		
Other given operational conditions affecting workers exposure		
Location indoors		
Domain industrial		
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves Gloves APF 5 80 %		

Version 1

Revision date: 2017-04-12 Pag

Carry out in a vented booth or extracted enclosure inhalation: 95 % (justification: Carry out in a vented booth or extracted enclosure) 7.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 7 Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding Qualitative Risk Assessment Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable fore shield		
7.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 7 Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding Qualitative Risk Assessment Carefully pour from containers General Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable for exhibited		
Name of contributing scenario 7 - Industrial spraying Scenario subtitle Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding Qualitative Risk Assessment Carefully pour from containers General Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable fore shield		
Scenario subtitle Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding Qualitative Risk Assessment Carefully pour from containers General Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Waer suitable fore shield		
Qualitative Risk Assessment General Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable fore shield		
General Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable fore shield		
Wear suitable race sined Wear suitable coveralls to prevent exposure to the skin Wear chemically resistant gloves in combination with intensive management supervision control.		
Product characteristics		
Physical state liquid		
Concentration in substance 100 %		
Fugacity / Dustiness medium		
Frequency and duration of use		
Duration of activity >4 hours (default)		
Frequency of use 5 days / week		
Human factors not influenced by risk management		
Exposed skin surface 1,500 cm ²		
Other given operational conditions affecting workers exposure		
Location indoors		
Ventilation good (30%)		
Domain industrial		
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves Gloves APF 5 80 %		
Respiratory protection 90 %		
7.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 10		
Name of contributing scenario 10 - Roller application or brushing		
Scenario subtitle Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of repair putties; Application of bonding pastes / adhesives.		
Qualitative Risk Assessment		
General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.		
Product characteristics		
Physical state liquid		
Concentration in substance 5-25%		
Fugacity / Dustiness medium		

R0000009 Version 1 Revision date: 2017-04-12 Page 51 of 106

Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	enhanced (70%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
7.6 Contributing Scenario (6) controlling industrial	worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring	
Scenario subtitle	Dipping, immersion and pouring [CS4]; Continuous process [CS54]. Continuous processes with open impregnation steps, such as pultrusion with open impregnation baths and (semi-) continuous production of flat laminates	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	yes (inhalation 90 %)	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
7.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 5		
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)	
Scenario subtitle	Casting operations [CS32]; Mixing operations (open systems) [CS30]. Casting and mixing operations in (semi-) open containers. Examples are centrifugal casting, casting of polymer concrete and artificial marble and the manufacturing of SMC / BMC/ TMC, etc	
Qualitative Risk Assessment		

General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eye protection.	
	Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	5-25%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	yes (inhalation 90 %)	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
7.8 Contributing Scenario (8) controlling industrial	worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)	
Scenario subtitle	General exposures (closed systems) [CS15]. Mixing liquid and solid components	
	/ into final formulated resin in blending vessel; Examples are gelcoat blending	
	and compounding, formulation of repair putties, bonding pastes, chemical	
Qualitative Risk Assessment	anchoring, etc	
General	Put lide on containers immediately after use	
	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eye protection.	
	Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	enhanced (70%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	

R000009 Version 1

Revision date: 2017-04-12

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.9 Contributing Scenario (9) controlling industrial	worker exposure for PROC 3
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]; Automated process with (semi) closed systems [CS93]; Use in contained batch processes [CS37]. Resin injection and transfer processes, such as vacuüm infusion, RTM, impregnation of sewer relining sleeves
Qualitative Risk Assessment	
General	Put lids on containers immediately after use. Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygier	ne and health evaluation
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.10 Contributing Scenario (10) controlling industr	ial worker exposure for PROC 14
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Material transfers [CS3]; Production or preparation or articles by tabletting, compression, extrusion or pelletisation [CS100]; Treatment by heating [CS129]; Batch processes at elevated temperatures [CS136]. Processes where curing of UP / VE resins takes place at high temperature. Examples are pultrusion with injection dies and processing of SMC / BMC / TMC, etc
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
·	·

R0000009 Version 1 Revision date: 2017-04-12

Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skip surface (190 cm ²		
Other given operational conditions affecting workers exposure		
Location	indeers	
Ventilation	enhanced (70%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
7.11 Contributing Scenario (11) controlling industr	ial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Material transfers [CS3]. Product delivery/storage - delivery of bulk and	
	packaged products - outdoor / indoor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
Product characteristics	Ose suitable chemicany resistant gioves.	
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	vnoenpa	
Legal arbanet ventilation		
Conditions and measures related to personal protection, hygie		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
7.12 Contributing Scenario (12) controlling industr	ial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)	
Scenario subtitle	Drum/batch transfers [CS8]; Pouring from small containers	
	[CS9]; Transfer from/pouring from containers [CS22]; Mixing operations (open	
	systems) [CS30]. Loading of mixing equipment; Preparation of material for	
	application; (liquid products) - batch, indoor	
Qualitative Risk Assessment		
General	Put lids on containers immediately after use.	
	Ensure good work practices are implemented Provide basic employe	
	Use suitable eve protection.	

	Use suitable chemically resistant gloves.
	Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	11 11
Physical state	
Concentration in substance	100 %
Fugacity / Dustiness	meatum
Frequency and duration of use	A hours (default)
	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	4802
Exposed skin surface	480 cm ²
Under given operational conditions affecting workers exposure	indoors
Damain	induotis
Technical conditions and measures to control dispersion and s	
Local exhaust ventilation	vos (inhelation 90 %)
Conditions and measures related to nersonal protection by	yes (minimum 70 70)
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7 13 Contributing Sconorio (13) controlling induct	ial worker evocure for DDAC 84
Nome of contributing scenario	Participation Partitetttttttttttttttttttttttttttttttttt
Name of contributing scenario	sa - iransier of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]; Maintenance of small items [CS18]. Equipment cleaning and maintenance, open indoor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	e
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Local exhaust ventilation	inhalation: 70 % (justification: Use local exhaust ventilation with adequate effectiveness)
R000009	Version 1 Revision date: 2017-04-12 Page 56 of 106

7.14 Contributing Scenario (14) controlling indust	rial worker exposure for PROC 15
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Quality control work of samples from blending vessel; R&D work including handling of samples from 1 kg to 1 drum
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposur	e
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and	exposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.15 Contributing Scenario (15) controlling indust	rial worker exposure for PROC 8A
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated
Scenario subtitle	Disposal of wastes [CS28]. Handling of non cured waste; Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment
Qualitative Risk Assessment	
General	Put lids on containers immediately after use. Contain and dispose of waste according to local regulations Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	I I I I I I I I I I I I I I I I I I I
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposur	e
Location	indoors
R0000009	Version 1 Revision date: 2017-04-12 Page 57 of 106

Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	yes (inhalation 90 %)	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	

Scenario 8: FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES8)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.).

Table 8. Description of ES 8

Free short title	FRP manufacturing in a professional setting, using UP/VE resins and/or
	formulated resins (gelcoat, bonding paste, putty etc.) (ES8)
Systematic title based on use descriptor	ERC 8E; PROC 10, 11, 5, 4, 3, 8A
Name of contributing environmental scenario and	ERC 8e Wide dispersive outdoor use of reactive substances in open systems
corresponding ERC	
Name(s) of contributing worker scenarios and corresponding	PROC 10 - Roller application or brushing
PROCs	PROC 11 - Non industrial spraying
	PROC 5 - Mixing or blending in batch processes (multistage and/or significant
	contact)
	PROC 4 - Use in batch and other process (synthesis) where opportunity for
	exposure arises
	PROC 3 - Use in closed batch process (synthesis or formulation)
	PROC 8a - Transfer of chemicals from/to vessels/ large containers at non
	dedicated facilities

8.1 Contributing Scenario (1) controlling environmental exposure for ERC 8E

Operational conditions

-		
Annual European tonnage	2.42E6 to/year	
Daily amount used at site	4.83E5 kg/day	
Release times per year	300 days/year (justification: Continous production)	
Local freshwater dilution factor	10	
Local marine water dilution factor	100	
Release fraction to air from process	0.102 %	
Release fraction to wastewater from process	0.000012 %	
Release fraction to soil from process	0 %	
Fraction tonnage to region	10 %	
Fraction used at main source	60 %	
STP	yes	
River flow rate	18000 m ³ /day	
Municipal sewage treatment plant discharge	2000000 L/day	
Other modified EUSES values		
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))	
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))	

Fraction released to waste water (Femis.water)	0.000012 % (justification: EU Risk Assessment Report, 2002)
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)
8.2 Contributing Scenario (2) controlling profession	nal worker exposure for PROC 10
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Rolling, Brushing [CS51]: Roller, spreader, flow application [CS98] All open
	mould applications where resins is applied by brushing, rolling and other low
	energy spreading operations; Examples are handlamination, gelcoatbrushing,
	semi-continuous production of flat panels and laminates
Qualitative Risk Assessment	1
General	Use long handled brushes and rollers where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves.
	Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	L
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
	>4 hours (default)
Frequency of use	5 days / week
Fuman factors not influenced by risk management	060 am^2
Other given operational conditions offerting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %
8.3 Contributing Scenario (3) controlling profession	nal worker exposure for PROC 11
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament
	winding
Qualitative Risk Assessment	
General	Keep people not involved in the activity, away from the operation Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable face shield Wear suitable coveralls to prevent exposure to the skin. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
R0000009	Version 1 Revision date: 2017-04-12 Page 59 of 106

Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	1 - 4 hours	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	1,500 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	95 %	

Name of contributing scenario	10 - Roller application or brushing	
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of repair putties; Application of bonding pastes / adhesives.	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	5-25%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and exposure		

R0000009 Version 1 Revis

Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	90 %	
8.5 Contributing Scenario (5) controlling profession	nal worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing	
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of floorings, mastics, coatings, castings	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure	2	
Location	indoors	
Ventilation	good (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	90 %	
8.6 Contributing Scenario (6) controlling professional worker exposure for PROC 5		
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)	
L	1	

 R0000009
 Version 1
 Revision date: 2017-04-12
 Page 61 of 106

Scenario subtitle	Material transfers [CS3]; Pouring from small containers [CS9]. Preparation of material for application (liquids) - transfer of material from one container to another; Formulating / blending resins, gelcoats, bonding pastes, putties etc. in blending vessels	
Qualitative Risk Assessment		
General	Use drum pumps. Put lids on containers immediately after use. Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	90 %	
8.7 Contributing Scenario (7) controlling professional worker exposure for PROC 4		
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises	
Scenario subtitle	Use in contained batch processes [CS37]. Sewer relining operation	
Qualitative Risk Assessment		

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
	r i i r i i i i i i i i i i i i i i i i	
Product characteristics	·	
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	outdoors (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	90 %	
8.8 Contributing Scenario (8) controlling professio	nal worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Use in contained batch processes [CS37]. Application of chemical anchoring	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	5-25%	
Fugacity / Dustiness	medium	
Frequency and duration of use	<u> </u>	
Duration of activity	>4 hours (default)	
L		
R000009	Version 1 Revision date: 2017-04-12 Page 63 of 106	

Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure	2	
Location	outdoors (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
8.9 Contributing Scenario (9) controlling profession	nal worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Equipment maintenance [CS5]; Maintenance of small items [CS18]. Equipment cleaning and maintenance, open indoor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	

Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	
8.10 Contributing Scenario (10) controlling profess	sional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Disposal of wastes [CS28]. Handling of non cured waste; Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment	
Qualitative Risk Assessment		
General	Dispose of empty containers and wastes safely Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use	·	
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure	e	
Location	indoors	
Ventilation	good (30%)	
Domain	professional	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	Gloves APF 5 80 %	
Respiratory protection	no	

Scenario 9: Production of Styrene Butadiene Rubber (SBR) (ES9)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Production of Styrene Butadiene Rubber (SBR).

Table 9. Description of ES 9

Ence about 441c	Dre dretier of Steward Deste diere Deskhar (SDD) (ESO)
	EDC (C. DDOC 9D, 2, 2, 9A, 15, 0
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	 PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)
1 Contributing Scenario (1) controlling environmen	tal exposure for ERC 6C
Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year (justification: Continous production)
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to waste water (Famis water)	0 000012 % (justification: EU Rick Assassment Penart 2002)
Fraction released to air (Femis air)	0.102 % (justification: EU Risk Assessment Papart 2002)
Fraction used at main source	60 % (justification: Value adopted to account for worst-case
	Luropean manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (Justification: Efficiency STP 91.9%)
2 Contributing Scenario (2) controlling industrial w	orker exposure for PROC 8B
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.

	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
3 Contributing Scenario (3) controlling industrial v	vorker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
4 Contributing Scenario (4) controlling industrial worker exposure for PROC 3		
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline	
Qualitative Risk Assessment		

General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
5 Contributing Scenario (5) controlling industrial v	vorker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Polymerisation reactor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm^2	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
	t	

R0000009 Version 1 Revision date: 2017-04-12 Page 68 of 106

Respiratory protection	no	
6 Contributing Scenario (6) controlling industrial worker exposure for PROC 3		
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Vacuum steam distillation	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm^2	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
7 Contributing Scenario (7) controlling industrial v	vorker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Coagulation reactor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	

Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	Νο	
Pasnimtory protection		
8 Contributing Scenario (8) controlling industrial v	vorker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Drying tank	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
9 Contributing Scenario (9) controlling industrial v	vorker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Material transfers [CS3]. Recycling styrene from distillator to reactor via pipeline	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use 5 days / week		
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		

Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and ex	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
10 Contributing Scenario (10) controlling industria	l worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated	
Scenario subtitle	Process sampling [CS2] Sampling from reactors	
Onalitative Risk Assessment	riocess sampning [eb2]. Sampning nom reactors	
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
	Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
	indoors	
Domain		
Legal appaged and measures to control dispersion and es		
Conditions and measures related to nersonal protection, bygies	no and health ovaluation	
Protective gloves		
Respiratory protection	no	
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control	
ose a sampling system designed to condot exposure	exposure)	
11 Contributing Scenario (11) controlling industria	l worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control	
Qualitative Rick Assessment		
Concerci	Ensure and work practices are implemented Provide basis employe	
General	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Eugocity / Dustinees	madium	
	Inconom	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		

Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
12 Contributing Scenario (12) controlling industria	l worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)	
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
13 Contributing Scenario (13) controlling industria	l worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance:	
	opening and cleaning manufacturing equipment for maintenance purposes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
--	---	--
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local avhauet vantilation		
Conditions and macross related to manage a langt of the		
Conditions and measures related to personal protection, hygies	he and health evaluation	
Protective gloves	No	
Respiratory protection	no	
14 Contributing Scenario (14) controlling industria	l worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar,	
	container	
Product characteristics		
Physical state		
Eucocentration in substance	1-5%	
Fuguency / Dustilless		
Frequency and duration of use	A hours (default)	
Frequency of use	>4 flours (default)	
Frequency of use	5 days / week	
Human factors not initialiced by fisk management		
Exposed skin surface 960 cm ²		
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection		
15 Contributing Scenario (15) controlling industria	l worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or	
	adsorption/ desorption processes	
Qualitative Risk Assessment	En anna an daoine de annation ann innellan antaid Deanide ha sin annalann	
General	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	

Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
16 Contributing Scenario (16) controlling industria	l worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to	
	storage containers: off-line in workplace	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	

Scenario 10: Production of Styrene Butadiene Latex (SBL) (ES10)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Production of Styrene Butadiene Latex (SBL). Table 10. Description of ES 10

Free short title	Production of Styrene Butadiene Latex (SBL) (ES10)	
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9	
Name of contributing environmental scenario and	ERC 6c Production of plastics	
corresponding ERC		
Name(s) of contributing worker scenarios and corresponding	PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
PROCs	facilities	
	PROC 2 - Use in closed, continuous process with occasional controlled	
	exposure	
	PROC 3 - Use in closed batch process (synthesis or formulation)	
	PROC 8a - Transfer of chemicals from/to vessels/ large containers at non	
	dedicated facilities	
	PROC 15 - Use of laboratory reagents in small scale laboratories	
	PROC 9 - Transfer of chemicals into small containers (dedicated filling line)	
10.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C		
Operational conditions		
Annual European tonnage	2.42E6 to/year	
R0000009	Version 1 Revision date: 2017-04-12 Page 74 of 106	

Page 74 of 106

Daily amount used at site	4.83E5 kg/day	
Release times per year	300 days/year (justification: Continous production)	
Local freshwater dilution factor	10	
Local marine water dilution factor	100	
Release fraction to air from process	0.102 %	
Release fraction to wastewater from process	0.000012 %	
Release fraction to soil from process	0 %	
Fraction tonnage to region	10 %	
Fraction used at main source	60 %	
STP	yes	
River flow rate	18000 m ³ /day	
Municipal sewage treatment plant discharge	2000000 L/day	
Other modified EUSES values		
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene.European Communities.	
	2002))	
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk	
	Assessment Report on Styrene, European Communities, 2002))	
Fraction released to waste water (Femis, water)	0.000012 % (justification: EU Risk Assessment Report, 2002)	
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report 2002)	
Fraction used at main source	60 % (justification: Value adopted to account for worst-case	
raction used at main source	European manufacturing site)	
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)	
10.2 Contributing Scenario (2) controlling industri	al worker exposure for PROC 8B	
Name of contributing scenario 8h - Transfer of chamicals from/to vassals/ large containers at dedicated facilities		
Nume of contributing scenario	ob Thurster of chemicals nonico vessels, harge containers at acateded racintees	
Scenario subtitle	Material transfers [CS3] Loading tank storage from road rail or boat transport	
Scenario subtitle Onalitative Rick Assessment	Material transfers [CS3]. Loading tank storage from road, rail or boat transport	
Scenario subtitle Qualitative Risk Assessment General	Material transfers [CS3]. Loading tank storage from road, rail or boat transport	
Scenario subtitle Qualitative Risk Assessment General	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe	
Scenario subtitle Qualitative Risk Assessment General	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures	
Scenario subtitle Qualitative Risk Assessment General	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure:	
Scenario subtitle Qualitative Risk Assessment General	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.	
Scenario subtitle Qualitative Risk Assessment General	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Scenario subtitle Qualitative Risk Assessment General Product characteristics	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 %	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposured	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial xposure	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. Iiquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial xposure no	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection by vie	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial xposure no me and health evaluation	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves	Material transfers [CS3]. Loading tank storage from road, rail or boat transport Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial xposure no ne and health evaluation No	

Respiratory protection	no
10.3 Contributing Scenario (3) controlling industria	al worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	No
Respiratory protection	no
10 4 Contributing Scenario (4) controlling industri	al worker exposure for PROC 3
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3] Charging reactors via pipeline
Ovalitative Risk Assessment	Waterial datisfers [COO]. Charging reactors via pipeline
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
R0000009	Version 1 Revision date: 2017-04-12 Page 76 of 106

Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygie	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
10.5 Contributing Scenario (5) controlling industria	al worker exposure for PROC 3		
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)		
Scenario subtitle	Batch process [CS55]. Polymerisation reactor		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management	<u> </u>		
Exposed skin surface	240 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Ventilation	good (30%)		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation no			
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	No		
Respiratory protection	no		
10.6 Contributing Scenario (6) controlling industria	al worker exposure for PROC 3		
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)		
Scenario subtitle	Batch process [CS55]. Vacuum steam distillation		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			

R0000009 Version 1 F

Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
10.7 Contributing Scenario (7) controlling industria	al worker exposure for PROC 3	
Name of contributing scenario 3 - Use in closed batch process (synthesis or formulation)		
Scenario subtitle	Material transfers [CS3]. Recycling styrene from distillator to reactor via pipeline	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
10.8 Contributing Scenario (8) controlling industria	al worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Process sampling [CS2]. Sampling from reactors	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		

Concentration in substance 100 % Fugacity / Dustiness medium Frequency and duration of use Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure		
Fugacity / Dustiness medium Frequency and duration of use		
Frequency and duration of use Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management 5 Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure		
Duration of activity >4 hours (default) Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure 960 cm ²		
Frequency of use 5 days / week Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure 960 cm ²		
Human factors not influenced by risk management Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure		
Exposed skin surface 960 cm ² Other given operational conditions affecting workers exposure		
Other given operational conditions affecting workers exposure		
Location indoors		
Domain industrial		
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves No		
Respiratory protection no		
Use a sampling system designed to control exposure . inhalation: 80 % (justification: Use a sampling system designed to control exposure)		
10.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 15		
Name of contributing scenario 15 - Use of laboratory reagents in small scale laboratories		
Scenario subtitle Laboratory activities [CS36]. Laboratory - Quality Control		
Qualitative Risk Assessment		
General Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloyes		
Product characteristics		
Physical state liquid		
Concentration in substance 100 %		
Fugacity / Dustiness medium		
Frequency and duration of use		
Duration of activity >4 hours (default)		
Frequency of use 5 days / week		
Human factors not influenced by risk management		
Exposed skin surface 240 cm ²		
Other given operational conditions affecting workers exposure		
Location indoors		
Domain industrial		
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves No		
Respiratory protection no		
10.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 9		
Name of contributing scenario 9 - Transfer of chemicals into small containers (dedicated filling line)		
Scenario subtitle Small package filling [CS7]. Small package filling - Packaging of product		
Product characteristics		

Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	Νο
Respiratory protection	no
10.11 Contributing Seeneric (11) controlling induct	riel worker evreques for DDOC 8P
10.11 Contributing Scenario (11) controlling indust	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xDosure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	No
Respiratory protection	no
10.12 Contributing Sconorio (12) controlling induct	rial worker experience for DDOC 88
10.12 Contributing Scenario (12) controlling indust	
Name of contributing scenario	80 - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
R0000009	Version 1 Revision date: 2017-04-12 Page 80 of 106

Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
10 13 Contributing Scenario (13) controlling indust	rial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed continuous, process with occasional controlled exposure	
Scenario subtitle	A sterial transfers [CS3] Waste management : recovery using condensation or	
	adsorption/ desorption processes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
10.14 Contributing Scenario (14) controlling indust	rial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace	
R0000009	Version 1 Revision date: 2017-04-12 Page 81 of 106	

Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	

Scenario 11: Production of Styrene Isoprene Copolymers (ES11)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Production of Styrene Isoprene Copolymers.

Table 11. Description of ES 11

Systematic title based on use descriptor ERC 6C; PROC 8B, 2, 3, 8A, 15, 9 Name of contributing environmental scenario and corresponding ERC ERC 6C Production of plastics Name(s) of contributing worker scenarios and corresponding PROCs PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedica facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled	
Name of contributing environmental scenario and corresponding ERC ERC 6c Production of plastics Name(s) of contributing worker scenarios and corresponding PROCs PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedica facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure	
Name(s) of contributing worker scenarios and corresponding PROCs PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedica facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure	
PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)
11.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C	

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year (justification: Continous production)
Local freshwater dilution factor	10
Local marine water dilution factor	100

R0000009 Version 1 Revision date: 2017-04-12 Page 82 of 106

Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))
Fraction released to waste water (Femis.water)	0.000012 % (justification: EU Risk Assessment Report, 2002)
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)
11.2 Contributing Scenario (2) controlling industri	al worker exposure for PROC 8B
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	,
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	o dajo / wook
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	vnosura
Local exhaust ventilation	
Conditions and manufacture related to normal protection busic	no and health evaluation
Conditions and measures related to personal protection, hygie	
Despiratory protection	
11.3 Contributing Scenario (3) controlling industria	al worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
R000009	Version 1 Revision date: 2017-04-12 Page 83 of 106

Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management	1	
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure	9	
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
11.4 Contributing Scenario (4) controlling industria	al worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm^2	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection. hygie	ne and health evaluation	
Protective gloves	No	
	1	

Version 1

Respiratory protection	no	
11.5 Contributing Scenario (5) controlling industri	al worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Dissolving and polymerisation reactor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm^2	
Other given operational conditions affecting workers exposure	2	
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
11.6 Contributing Scenario (6) controlling industri	al worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Suspension reactor	
Qualitative Risk Assessment	•	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure	2	
Location	indoors	
Ventilation	good (30%)	

Version 1

Revision date: 2017-04-12

Page 85 of 106

Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
11.7 Contributing Scenario (7) controlling industria	al worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Washed and dried tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
11.8 Contributing Scenario (8) controlling industri	al worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
R000009	Version 1 Revision date: 2017-04-12 Page 86 of 106	

Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control exposure)	
11.9 Contributing Scenario (9) controlling industria	al worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control	
Oualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
11.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 9		
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)	
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product	
Product characteristics		
Physical state		
Fugacity / Dustiness	1-370 medium	
Frequency / Dustiness		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		

Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers	exposure	e
Location	r	indoors
Domain		industrial
Technical conditions and measures to control dispers	ion and e	exposure
Local exhaust ventilation		no
Conditions and measures related to personal protecti	on, hygie	ene and health evaluation
Protective gloves	, , , , , , ,	No
Respiratory protection		no
11.11 Contributing Scenario (11) controllin	g indust	strial worker exposure for PROC 8B
Name of contributing scenario	5	8b - Transfer of chemicals from/to vessels/ large containers at dedicated
i tunic of contributing scenario		facilities
Scenario subtitle		Equipment maintenance [CS5]. Manufacturing equipment maintenance:
		opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment		
General		Ensure good work practices are implemented Provide basic employe
		training to prevent/minimize exposures
		In case of potential exposure:
		Use suitable eye protection.
		Use suitable chemically resistant gloves.
Product characteristics		
Physical state		liquid
Concentration in substance		100 %
Fugacity / Dustiness		medium
Frequency and duration of use		
Duration of activity		15 mins to 1 hour
Frequency of use		5 days / week
Human factors not influenced by risk management		
Exposed skin surface		960 cm ²
Other given operational conditions affecting workers	exposure	
Location		Indoors
	• •	industrial
Technical conditions and measures to control dispers	ion and e	exposure
Local exhaust ventilation		
Conditions and measures related to personal protection	on, hygie	ene and health evaluation
Protective gloves		No
	• •	
11.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario		8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle		Bulk transfers [CS14]. Finished product Loading of road tanker, railcar
		container
Product characteristics		
Physical state		liquid
Concentration in substance		1-5%
Fugacity / Dustiness		medium
Frequency and duration of use		
Duration of activity		>4 hours (default)
Frequency of use		5 days / week
Human factors not influenced by risk management		
Exposed skin surface		960 cm^2
Other given operational conditions affecting workers	exposure	e
Location		indoors
Domain		industrial
Technical conditions and measures to control dispers	ion and e	exposure
Local exhaust ventilation		no
R000	0009	Version 1 Revision date: 2017-04-12 Page 88 of 106

Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
11.13 Contributing Scenario (13) controlling indust	rial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or	
	adsorption/ desorption processes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
11.14 Contributing Scenario (14) controlling indust	rial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to	
	storage containers: off-line in workplace	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eve protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	

Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation no		
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	

Scenario 12: Production of other Styrene based polymeric dispersions (ES12)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario Production of other Styrene based polymeric dispersions.

Table 12. Description of ES 12

Free short title	Production of other Styrene based polymeric dispersions (ES12)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	 PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)
12.1 Contributing Scenario (1) controlling environ	nental exposure for ERC 6C
Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year (justification: Continous production)
Local freshwater dilution factor	10
Local marine water dilution factor	
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	
Fraction tonnage to region	
Fraction used at main source	60 %
River flow rate	18000 m ³ /day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))
Fraction released to waste water (Femis.water)	0.000012 % (justification: EU Risk Assessment Repoert, 2002)
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Repoert, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)
12.2 Contributing Scenario (2) controlling industria	al worker exposure for PROC 8B
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling

	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eve protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
12.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 2		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eve protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
12.4 Contributing Scenario (4) controlling industria	al worker exposure for PROC 3	
	•	

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Eugacity / Dustiness	medium
Frequency and duration of use	incentum
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation no	<u>^</u>
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	No
Respiratory protection	no
12.5 Contributing Scenario (5) controlling industri	al worker exposure for PROC 3
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dissolving and polymerisation reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	•
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
	xposure
Local exhaust ventilation	no
Local exhaust ventilation Conditions and measures related to personal protection, hygie	xposure no ne and health evaluation
Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves	xposure no ne and health evaluation No
Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves Respiratory protection	xposure no

R0000009 Version 1

on 1 R

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Suspension reactor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eve protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
	indoors	
Ventilation	good (30%)	
Domain	industrial	
Legal approximations and measures to control dispersion and e	xposure	
Conditions and measures related to personal protection, busic	10	
Protective gloves		
Respiratory protection	no	
12.7 Contributing Scenario (7) controlling industria	al worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Washed and dried tanks	
Qualitative Risk Assessment	1	
General	Ensure good work practices are implemented Provide basic employe	
General	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygies	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
R0000009	Version 1 Revision date: 2017-04-12 Page 94 of 106	

12.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 8A		
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control exposure)	
12.9 Contributing Scenario (9) controlling industria	al worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
R0000009	Version 1 Revision date: 2017-04-12 Page 95 of 106	

1	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
12.10 Contributing Scenario (10) controlling indust	trial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)	
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygie	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
12.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes	
Scenario subtitle Qualitative Risk Assessment	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes	
Scenario subtitle Qualitative Risk Assessment General	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Scenario subtitle Qualitative Risk Assessment General Product characteristics	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 %	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ²	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors	
Scenario subtitle Qualitative Risk Assessment General Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain	facilities Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium 15 mins to 1 hour 5 days / week 960 cm ² indoors industrial	

Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
12.12 Contributing Scenario (12) controlling indust	rial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container	
Product characteristics		
Physical state	liquid	
Concentration in substance	1-5%	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management	·	
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
12.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 2		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or	
	adsorption/ desorption processes	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state		
Concentration in substance	100 %	
rugacity / Dustiness	meanum	
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management	5 aujor wook	
Exposed skin surface	480 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	

Version 1

Revision date: 2017-04-12

Page 97 of 106

Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
12.14 Contributing Scenario (14) controlling indust	trial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated	
	facilities	
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to	
	storage containers: off-line in workplace	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	In case of potential exposure:	
	Use suitable eye protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	15 mins to 1 hour	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	

Scenario 13: Production of filled Polyols (ES13)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure. The following scenarios contribute to the scenario Production of filled Polyols. Table 13. Description of ES 13

Free short title	Production of filled Polyols (ES13)	
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9	
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics	
Name(s) of contributing worker scenarios and corresponding PROCs	 PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line) 	
13.1 Contributing Scenario (1) controlling environment	nental exposure for ERC 6C	
Operational conditions		
Annual European tonnage	2.42E6 to/year	
Daily amount used at site	4.83E5 kg/day	
Release times per year	300 days/year (justification: Continous production)	
Local freshwater dilution factor	10	
Local marine water dilution factor	100	
Release fraction to air from process	0.102 %	
Release fraction to wastewater from process	0.000012 %	
Release fraction to soil from process	0%	
Fraction tonnage to region		
Fraction used at main source	60 %	
SIP Di di di	yes	
River flow rate	18000 m ³ /day	
Municipal sewage treatment plant discharge	2000000 L/day	
Other modified EUSES values		
Fraction released to agricultural soil (Femis.agric)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))	
Fraction released to industrial soil (Femis.ind)	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))	
Fraction released to waste water (Femis.water)	0.000012 % (justification: EU Risk Assessment Report, 2002)	
Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report, 2002)	
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)	
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 91.9%)	
13.2 Contributing Scenario (2) controlling industria	al worker exposure for PROC 8B	
ame of contributing scenario 8b - Transfer of chemicals from/to vessels/ large containers at dedicated faciliti		
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport	
Oualitative Risk Assessment		
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures	
R0000009	Version 1 Revision date: 2017-04-12 Page 99 of 106	

Version 1

	In case of potential exposure:
	Use suitable eye protection.
Product characteristics	Use suitable chemicany resistant gioves.
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	incutum
Duration of activity	15 mins to 1 hour
Erequency of use	5 days / weak
Human factors not influenced by rick management	J days / week
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and e	xposure
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygie	ne and health evaluation
Protective gloves	No
Respiratory protection	no
13.3 Contributing Scenario (3) controlling industri	al worker exposure for PROC 2
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe
	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection.
	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state	In case of potential exposures Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state Concentration in substance	In case of potential exposures Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics Physical state Concentration in substance Fugacity / Dustiness	In case of potential exposures Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use	liquid 100 % medium
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity	In case of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default)
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use	In case of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management	In case of potential exposures In case of potential exposures Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface	In case of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ²
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure	In case of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location	In case of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ²
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain	Incase of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ² indoors industrial
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e	In case of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ² indoors industrial xposure
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation	Image good work protected and important of novice dask employed training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ² indoors industrial xposure no
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie	Incase of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ² indoors industrial xposure no no me and health evaluation
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves	In case of potential exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ² indoors industrial xposure no me and health evaluation
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves Respiratory protection	Incluster good work products are implemented it for the basic emproye training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium >4 hours (default) 5 days / week 480 cm ² indoors industrial xposure no me and health evaluation No no
Product characteristics Physical state Concentration in substance Fugacity / Dustiness Frequency and duration of use Duration of activity Frequency of use Human factors not influenced by risk management Exposed skin surface Other given operational conditions affecting workers exposure Location Domain Technical conditions and measures to control dispersion and e Local exhaust ventilation Conditions and measures related to personal protection, hygie Protective gloves Respiratory protection 13.4 Contributing Scenario (4) controlling industria	In case of potential exposures In case of potential exposures Use suitable eye protection. Use suitable chemically resistant gloves. liquid 100 % medium

Scenario subtitle		Material transfer	s [CS3]. Charging reactors via pipeline	
Qualitative Risk Assessment				
General		Ensure good wor training to preven In case of potenti Use suitable eye	k practices are implemented Provide bas nt/minimize exposures al exposure: protection.	sic employe
Due du et al eurostenistica		Use suitable cher	nically resistant gloves.	
Product characteristics		11		
		100 %		
Fugacity / Dustiness		medium		
Frequency and duration of use		A 1 (1- f1/	Λ	
Duration of activity		>4 nours (default)	
Human factors not influenced by rick man		5 days / week		
Fuman factors not influenced by Fisk man	agement	240 am^2		
Other given energianel conditions offective	a wankana awaasaa	240 CIII		
Location	ig workers exposur	indoors		
Ventilation		mood (30%)		
Domain		industrial		
Technical conditions and massures to cont	rol disporsion and			
Local exhaust ventilation	for dispersion and	no		
Conditions and measures related to person	al protection bygi	ano and boalth ave	lustion	
Protective gloves	ai protection, nygi		luation	
Respiratory protection		no		
13.5 Contributing Scenario (5) con	trolling industr	ial worker eve	sure for PROC 3	
Nome of contributing scenario	ti oning muusti	2 Use in closed	hetch process (sunthesis or formulation)
Seenario subtitle		Batch process [C	S551 Dissolving and polymerisation rea)
Qualitativa Bick Assessment		Batch process [C	555]. Dissolving and polymensation rea	
General		Ensura good wor	k practices are implemented Provide ba	sic amploya
General		training to preven	t/minimize exposures	sie employe
		In case of potent	al exposure:	
		Use suitable eye	protection.	
Product characteristics		Ose suitable cher	incarly resistant gloves.	
Physical state		liquid		
Concentration in substance		100 %		
Fugacity / Dustiness		medium		
Frequency and duration of use		inculum		
Duration of activity		>4 hours (default)	
Frequency of use		5 days / week	2	
Human factors not influenced by risk man	agement	e adje, ween		
Exposed skin surface		240 cm ²		
Other given operational conditions affectir	g workers exposur	·e		
Location	8 · · · · ·	indoors		
Ventilation		good (30%)		
Domain		industrial		
Technical conditions and measures to cont	rol dispersion and	exposure		
Local exhaust ventilation		no		
<u></u>	D 000000	Voraion 1	Povision data: 2017 04 42	Daga 101 of 100
	KUUUUUU9	VEISION	Revision date. 2017-04-12	rage IUI 01 100

Conditions and measures related to personal protection, hygiene and health evaluation		
Protective gloves	No	
Respiratory protection	no	
13.6 Contributing Scenario (6) controlling industria	al worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Suspension reactor	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eve protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
13.7 Contributing Scenario (7) controlling industria	al worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)	
Scenario subtitle	Batch process [CS55]. Washed and dried tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe	
	training to prevent/minimize exposures	
	Use suitable eve protection.	
	Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	240 cm ²	
Other given operational conditions affecting workers exposure		
	Version 1 Revision date: 2017-04-12 Page 102 of 106	

Location	indoors	
Ventilation	good (30%)	
Domain	industrial	
Fechnical conditions and measures to control dispersion and exposure		
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygien	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
13.8 Contributing Scenario (8) controlling industria	al worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities	
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	
Fugacity / Dustiness	medium	
Frequency and duration of use		
Duration of activity	>4 hours (default)	
Frequency of use	5 days / week	
Human factors not influenced by risk management		
Exposed skin surface	960 cm ²	
Other given operational conditions affecting workers exposure		
Location	indoors	
Domain	industrial	
Technical conditions and measures to control dispersion and e	xposure	
Local exhaust ventilation	no	
Conditions and measures related to personal protection, hygier	ne and health evaluation	
Protective gloves	No	
Respiratory protection	no	
Use a sampling system designed to control exposure	inhalation: 80 % (justification: Use a sampling system designed to control exposure)	
13.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 15		
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories	
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control	
Qualitative Risk Assessment		
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.	
Product characteristics		
Physical state	liquid	
Concentration in substance	100 %	

Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	240 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and ex	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygien	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
13.10 Contributing Scenario (10) controlling indust	rial worker exposure for PROC 9		
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)		
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product		
Product characteristics			
Physical state	liquid		
Concentration in substance	1-5%		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	480 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and exposure			
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygien	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
13.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 8B			
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities		
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		

Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	15 mins to 1 hour		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	960 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	No		
Respiratory protection	no		
13.12 Contributing Scenario (12) controlling indust	rial worker exposure for PROC 8B		
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities		
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container		
Product characteristics			
Physical state	liquid		
Concentration in substance	1-5%		
Fugacity / Dustiness	medium		
Frequency and duration of use			
Duration of activity	>4 hours (default)		
Frequency of use	5 days / week		
Human factors not influenced by risk management			
Exposed skin surface	960 cm ²		
Other given operational conditions affecting workers exposure			
Location	indoors		
Domain	industrial		
Technical conditions and measures to control dispersion and e	xposure		
Local exhaust ventilation	no		
Conditions and measures related to personal protection, hygier	ne and health evaluation		
Protective gloves	No		
Respiratory protection	no		
13.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 2			
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure		
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes		
Qualitative Risk Assessment			
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.		
Product characteristics			
Physical state	liquid		
Concentration in substance	100 %		
R000009	Version 1 Revision date: 2017-04-12 Page 105 of 106		

Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
13.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no