

Succinct summary
of representative risk management measures (RMMs)
and operational conditions (OCs)

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Substance: *Bis(2-methoxyethyl) ether (diglyme)*
CAS No. 111-96-6

Use title – Use 1: *Use of diglyme as a solvent for synthesis of
an anti-HIV active pharmaceutical ingredient
(API).*

Use number: *1*

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Use of diglyme as a solvent for synthesis of an anti-HIV active pharmaceutical ingredient (API).

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc.	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc.	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info in CSR (section)
ECS 1	ERC 4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article).	1 – 10 tpa	<p>- Air: pass via a scrubber to a Regenerative Thermal Oxidiser (RTO). Both the pilot installation and the commercial full-scale plant will be connected to the RTO. The combined efficiency of both measures approximates 100% (99.9997%)</p> <p>- Water: no direct release to water. Emissions to water are limited to scrubber water containing diglyme. Scrubber water is sent to on-site STP.</p> <p>- Soil: no direct release to soil. Indirect release avoided as on-site STP sludge is externally treated by incineration.</p> <p>- Waste: all waste fractions are treated as hazardous waste and incinerated by a company certified for handling hazardous waste.</p>	<p>- Max. daily use at site: 0.2-2 tonnes</p> <p>- Emission days/year: 5</p> <p>- Also see section 9.0.3.3 D of CSR</p>	Not applicable	Not applicable	<p>Effectiveness of waste water: no direct emissions to water; emissions from scrubber pass via on-site STP. Effectiveness to water 0.096% (Chesar)</p> <p>Effectiveness of waste air treatment: - scrubber $\geq 99\%$ - RTO $\geq 98\%$</p> <p>(before 1st of Jan 2019 only)</p>	<p>Pilot plant specific release factors (before 01st Jan 2019): Air: $1.97 \times 10^{-3} \%$ Water (before STP): 0.125% Soil: 0%</p> <p>Pilot plant specific release factors (after 01st Jan 2019, i.e. after implementation of the RTO): Air: $3.95 \times 10^{-5} \%$ Water (before STP): 0.125% Soil: 0%</p> <p>Commercial plant specific</p>	9.1.1

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc.	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc.	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info in CSR (section)
								release factors: Air: 3.95×10^{-5} Water (before STP): 0.125% Soil: 0%	
WCS 1	PROC 9: Warehouse storage & sampling		<ul style="list-style-type: none"> - Storage in closed metal drums (no potential for exposure). - Sampling takes place in flow booth unit (see SYN-SOP-0076). - HVAC controlled area in flow booth: presence of local exhaust ventilation and overpressure. (efficiency 70%) - Storage takes place in dedicated storage area, separated from other buildings and with restricted access for authorised personnel. - Cleaning of equipment in separate cleanings area. 	<ul style="list-style-type: none"> - Duration of activity: max. 5 min (pilot installation); 30 min (commercial installation) - Frequency: 1x per year - Also see section 9.0.3.3 D of CSR 	<ul style="list-style-type: none"> - Gloves 95% efficiency (Ansell Barrier gloves) - Respiratory protection 95% efficiency (full face ABEK-P3 filter) - Microgard 3000 coverall 	Containment: Operator is present in flow booth. As soon as the sample has been taken both drum and bottle are closed immediately.	Not applicable	Not applicable	9.1.2
WCS 2	PROC 9: Sampling for peroxide and water verification		<ul style="list-style-type: none"> - General ventilation: good natural ventilation (1 to 3 ACH) - Containment: No specific containment applicable during sampling. As soon as the 	<ul style="list-style-type: none"> - Duration of activity: max. 5 min (pilot installation); 30 min (commercial installation) - Frequency: 5x per 	<ul style="list-style-type: none"> - Gloves 95% efficiency (Ansell Barrier gloves) 	None	Not applicable	Not applicable	9.1.3

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc.	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc.	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info in CSR (section)
			sample has been taken both drum and bottle are closed immediately. - Local exhaust ventilation with efficiency 50% (ART)	year - Also see section 9.0.3.3 D of CSR	- Respiratory protection 95% efficiency (full face ABEK-P3 filter) - Microgard 3000 coverall				
WCS 3	PROC 8b: Addition of diglyme to reactor		- General ventilation: good natural ventilation (1 to 3 ACH) - Containment: No specific containment applicable during sampling. As soon as the sample has been taken both drum and bottle are closed immediately. - Local exhaust ventilation with efficiency 50% (ART)	- Duration of activity: max. 15 min (pilot installation); 30 min (commercial installation) - Frequency: 5x per year - Also see section 9.0.3.3 D of CSR	- Gloves 95% efficiency (Ansell Barrier gloves) - Respiratory protection 95% efficiency (full face ABEK-P3 filter) - Microgard 3000 coverall	None	Not applicable	Not applicable	9.1.4
WCS 4	PROC 3: Reaction and post-reaction		- General ventilation: good natural ventilation (1 to 3 ACH)	- Duration of activity: max. 60 min (pilot installation); 60 min (commercial installation)	None	None	Not applicable	Not applicable	9.1.5

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc.	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc.	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info in CSR (section)
			- Containment: high level of containment, installation is fully closed system.	- Frequency: 5x per year - Also see section 9.0.3.3 D of CSR					
WCS 5	PROC 3: Sampling for IPC-1 (conversion check)		- General ventilation: good natural ventilation (1 to 3 ACH) - Containment: Medium level containment as sample is taken within enclosed box (efficiency of 99%). - Local exhaust ventilation with efficiency 50% (ART)	- Duration of activity: max. 15 min (pilot installation); 15 min (commercial installation) - Frequency: 5x per year - Also see section 9.0.3.3 D of CSR	- Gloves 95% efficiency (Ansell Barrier gloves) - Respiratory protection 95% efficiency (full face ABEK-P3 filter) - Microgard 3000 overall	None	Not applicable	Not applicable	9.1.6
WCS 6	PROC 8b: Discharge of centrifuge		- General ventilation: HVAC system in place, recorded number of ACH = 29. - Containment: part 1: The reaction mixture is present within the centrifuge, which is still closed (medium level containment). The activity takes place within an enclosed area, but the	- Duration of activity: part 1 max. 10 + part 2 max. 30 min = 40 min (pilot installation); 0 min (commercial installation) - Frequency: 5x per year - Also see section 9.0.3.3 D of CSR	- Gloves 95% efficiency (Ansell Barrier gloves) - Respiratory protection 95% efficiency	None	Not applicable	Not applicable	9.1.7

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc.	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc.	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info in CSR (section)
			operator needs to be present in the area during the activity. - Containment: part 2: No specific containment applicable during the discharge activity. The activity takes place within an enclosed area, but the operator needs to be present in the area during the activity. <i>Note however, that this is only relevant for the pilot installation as the transfer is done in an automated way in the commercial installation, without the need for any manual intervention.</i>		(full face ABEK-P3 filter) (in future production campaigns inhalation protection with independent air supply will be used (APF of minimal 20) - Microgard 3000 coverall				
WCS 7	PROC 8b: Transfer of filtrate to waste		- General ventilation: good natural ventilation (1 to 3 ACH) - Containment: Transfer via dedicated piping system. No additional specific containment applicable for this transfer activity. - Local exhaust ventilation with efficiency 50% (ART)	- Duration of activity: 10 min (pilot installation); 0 min (commercial installation) - Frequency: 5x per year - Also see section 9.0.3.3 D of CSR	- Gloves 95% efficiency (Ansell Barrier gloves) - Respiratory protection 95% efficiency (full face	None	Not applicable	Not applicable	9.1.8

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc.	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc.	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info in CSR (section)
					ABEK-P3 filter) - Microgard 3000 coverall				
WCS 8	PROC 8b: Charging of reactor with TMC-2 crude		<ul style="list-style-type: none"> - General ventilation: good natural ventilation (1 to 3 ACH) - Containment: within the pilot installation, no specific containment is applicable during the discharge activity. <i>Note however, that this is only relevant for the pilot installation as the transfer is done in an automated way in the commercial installation, without the need for any manual intervention. Within the commercial installation, transfer is fully contained as the sleeve system as mentioned above is used.</i> - Local exhaust ventilation with efficiency 50% (ART) 	<ul style="list-style-type: none"> - Duration of activity: 10 min (pilot installation); 0 min (commercial installation) - Frequency: 5x per year - Also see section 9.0.3.3 D of CSR 	<ul style="list-style-type: none"> - Gloves 95% efficiency (Ansell Barrier gloves) - Respiratory protection 95% efficiency (full face ABEK-P3 filter) - Microgard 2000 coverall 	None	Not applicable	Not applicable	9.1.9
WCS 9	PROC 28: Maintenance		<ul style="list-style-type: none"> - General ventilation: good natural ventilation (1 to 3 ACH) - Containment: No specific containment during this activity 	<ul style="list-style-type: none"> - Duration of activity: 30 min (pilot installation); 30 min (commercial installation) - Also see section 9.0.3.3 D of CSR 	<ul style="list-style-type: none"> - Gloves 95% efficiency (Ansell Barrier gloves) - Respiratory 	None	Not applicable	Not applicable	9.1.10

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc.	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc.	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info in CSR (section)
					protection 95% efficiency (full face ABEK-P3 filter) - Microgard 3000 coverall				

Abbreviations: WCS=Worker contributing scenario, ECS=Environmental Contributing Scenario,* ERC=Environmental Release Category (or spERC if available) , PROC=Process category, LEV=Local Exhaust Ventilation, PPE=Personal Protective Equipment