Scenario 1: Use as intermediate

Table 1 Description of ES 1

Section 1	**Exposure Scenario Title**
Title	**2-Pyrrolidone use as chemical intermediate; CAS RN616-45-5**
Use Descriptor	Sector of Use: Industrial (SU3)
	Process Categories: PROC2, PROC3, PROC8b, PROC9
	Environmental Release Categories: ERC6A
Processes, tasks, activities covered	Use as intermediate
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	As described below.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*

General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS137]	No specific measures identified [EI18]. {Handle substance within a predominantly closed system provided with extract ventilation [E49]}. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. ; {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	No specific measures identified [EI18]. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Process sampling [CS2].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].{Ensure operatives are trained to minimise exposures [EI119]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. (open systems) [CS108]With potential for aerosol generation [CS138].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].{Ensure operatives are trained to minimise exposures [EI119]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. (closed systems) [CS107];	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].{Ensure operatives are trained to minimise exposures [EI119]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Process sampling [CS2].	Provide extract ventilation to points where emissions occur [E54]. {Clear up spills immediately and dispose of waste safely [EI9]}. ;{Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14].	Provide extract ventilation to points where emissions occur [E54]. {Clear up spills immediately and dispose of waste safely [EI9]}. ;{Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Section 2.2	**Control of environmental exposure**
	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 3	**Exposure Estimation**

3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Confirm that RMMs and OCs are as described.
4.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	Good practice RMM phrases are {indicated} and incorporated within the ES Section 2 or consolidated into the main sections of the SDS.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.

Scenario 2: Distribution of 2-Pyrrolidone

Table 2 Description of ES 2

Section 1	**Exposure Scenario Title**
Title	**Distribution of 2-Pyrrolidone;** **CAS RN616-45-5**
Use Descriptor	Sector of Use: Industrial (SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
	Environmental Release Categories: ERC1 (loading) ERC2 (repacking)
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of

	substance, including its distribution and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	As described below.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15]. e.g. In-line additive dosing equipment, in-line filter cleaning	No specific measures identified [EI18]. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15]. ; With sample collection [CS56]. With occasional controlled exposure [CS137]	No specific measures identified [EI18]. {Handle substance within a predominantly closed system provided with extract ventilation [E49]}. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. ; {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	No specific measures identified [EI18]. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (open systems) [CS16]. Batch process [CS55]. ; With sample collection [CS56].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].{Wear suitable gloves tested to EN374 [PPE15]}.
Process sampling [CS2].	No specific measures identified [EI18]. {Avoid dip sampling [E42]}. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. {Wear suitable gloves tested to EN374 [PPE15]}.

Laboratory activities [CS36].	No specific measures identified [EI18]. {Handle in a fume cupboard or under extract ventilation [E83]}.{Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. ; (closed systems) [CS107]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].{Clear transfer lines prior to de-coupling [E39]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. ; (open systems) [CS108]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Ensure operatives are trained to minimise exposures [EI119]. {Clear transfer lines prior to de-coupling [E39]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Drum and small package filling [CS6].	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51]Ensure material transfers are under containment or extract ventilation [E66]. {Clear transfer lines prior to de-coupling [E39]}. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. {Put lids on containers immediately after use [E9]}. ; {Clear spills immediately [C&H13]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].{Transfer via enclosed lines [E52]}. {Apply vessel entry procedures including use of forced supplied air [AP15]}. {Wear suitable gloves tested to EN374 [PPE15]}. {Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]}.
Storage [CS67]With occasional controlled exposure [CS137]	Store substance within a closed system [E84].{Locate bulk storage outdoors [E88]}.{Wear suitable gloves tested to EN374 [PPE15]}.
Section 2.2	**Control of environmental exposure**
	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Confirm that RMMs and OCs are as described.

4.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	Good practice RMM phrases are {indicated} and incorporated within the ES Section 2 or consolidated into the main sections of the SDS.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.

Scenario 3: Use in coatings (industrial)

Table 3 Description of ES 3

Section 1	**Exposure Scenario Title**
Title	**Use of 2-Pyrrolidone in Coatings (Industrial); CAS RN616-45-5**
Use Descriptor	Sector of Use: Industrial (SU3)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15
	Environmental Release Categories: ERC 4
Processes, tasks, activities covered	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	As described below.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].

Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15].	No specific measures identified [EI18]. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15]. With sample collection [CS56]. ; Use in contained systems [CS38].	No specific measures identified [EI18]. {Handle substance within a predominantly closed system provided with extract ventilation [E49]}. {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing [CS94]	No specific measures identified [EI18]. {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Mixing operations (closed systems) [CS29]. General exposures (closed systems) [CS15].	No specific measures identified [EI18]. {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}. ;
Film formation - air drying [CS95]	{Provide extract ventilation to points where emissions occur [E54]}. {Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Preparation of material for application [CS96]Mixing operations (open systems) [CS30].	Provide extract ventilation to points where emissions occur [E54]. {Avoid manual

	contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Spraying (automatic/robotic) [CS97]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].{Carry out in a vented booth provided with laminar airflow [E59]}. {Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]}. ; {Wear a respirator conforming to EN140 with Type A filter or better [PPE22]}.
Manual [CS34]. Spraying [CS10].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].{Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]}. ; {Wear a respirator conforming to EN140 with Type A filter or better [PPE22]}.
Material transfers [CS3]. Non-dedicated facility [CS82]	Clear transfer lines prior to de-coupling [E39].{Provide extract ventilation to points where emissions occur [E54]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Material transfers [CS3]. Dedicated facility [CS81]	Clear transfer lines prior to de-coupling [E39].{Provide extract ventilation to points where emissions occur [E54]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Roller, spreader, flow application [CS98]	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. {Use long handled tools where possible [E50]}. {Carefully pour from containers [E62]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Dipping, immersion and pouring [CS4].	Provide extract ventilation to points where emissions occur [E54]. {Clear up spills immediately and dispose of waste safely [EI9]}. ; {Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Laboratory activities [CS36].	No specific measures identified [EI18]. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. ; {Handle in a fume cupboard or under extract ventilation [E83]}.{Wear suitable gloves tested to EN374 [PPE15]}.

Section 2.2	**Control of environmental exposure**
	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Confirm that RMMs and OCs are as described.
4.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	Good practice RMM phrases are {indicated} and incorporated within the ES Section 2 or consolidated into the main sections of the SDS.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore

	risk characterisations for environmental endpoints were not developed.

Scenario 4: Use in coatings (professional)

Table 4 Description of ES 4

Section 1	**Exposure Scenario Title**
Title	**Use of 2-Pyrrolidone in Coatings (Prof.); CAS RN616-45-5**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19
	Environmental Release Categories: ERC 8A, ERC 8C, ERC 8D, ERC 8F
Processes, tasks, activities covered	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	As described below.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are*

	good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.
General exposures (closed systems) [CS15].	No specific measures identified [EI18]. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15]. With sample collection [CS56]. ; Use in contained systems [CS38].	No specific measures identified [EI18]. {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing [CS94]	No specific measures identified [EI18]. {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Mixing operations (closed systems) [CS29]. General exposures (closed systems) [CS15].	No specific measures identified [EI18]. {Ensure material transfers are under containment or extract ventilation [E66]}. {Wear suitable gloves tested to EN374 [PPE15]}. ;
Film formation - air drying [CS95]	{Provide extract ventilation to points where emissions occur [E54]}. {Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Preparation of material for application [CS96]Mixing operations (open systems) [CS30].	Provide extract ventilation to points where emissions occur [E54]. {Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Spraying (automatic/robotic) [CS97]	Clear transfer lines prior to de-coupling [E39].{Provide extract ventilation to points where emissions occur [E54]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Manual [CS34]. Spraying [CS10].	Clear transfer lines prior to de-coupling [E39].{Provide extract ventilation to points where emissions occur [E54]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Material transfers [CS3]. Non-dedicated facility [CS82]	Clear transfer lines prior to de-coupling [E39].{Use long handled tools where possible [E50]}. {Carefully pour from containers [E62]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Material transfers [CS3]. Dedicated facility [CS81]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].{Provide extract ventilation

	to points where emissions occur [E54]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Roller, spreader, flow application [CS98]	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. {Wear suitable gloves tested to EN374 [PPE15]}.
Dipping, immersion and pouring [CS4].	Provide extract ventilation to points where emissions occur [E54]. {Clear up spills immediately and dispose of waste safely [EI9]}. ; {Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Laboratory activities [CS36].	Avoid manual contact with wet work pieces [EI17]. {Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]}. ; {Handle in a fume cupboard or under extract ventilation [E83]}.{Wear suitable gloves tested to EN374 [PPE15]}.
Section 2.2	**Control of environmental exposure**
	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 4	**Guidance to check compliance with the Exposure Scenario**

4.1. Health	Confirm that RMMs and OCs are as described.
4.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	Good practice RMM phrases are {indicated} and incorporated within the ES Section 2 or consolidated into the main sections of the SDS.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.

Scenario 5: Use in coatings (consumer)

Table 5 Description of ES 5

Section 1		**Exposure Scenario Title**
Title		GES USES: Consumer Use of 2-Pyrrolidone in Inks and Toners (PC 18)
Sector of Use (SU code)		21 (Consumer Use)
Use Descriptor (PC codes)		PC 18
Processes, tasks, activities covered		DESCRIPTION: Use of 2-Pyrrolidone in Inks and Toners
Environmental Release Category		Refer to section 9.0 for description of relevant ERCs
Specific Environmental Release Category		No SPERCs used in this assessment
Section 2		**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required - pending better understanding from ECHA		As described below.
Section 2.1		**Control of consumer exposure**
Product characteristics		
Physical form of product		liquid
Vapour pressure (Pa)		2

Concentration of substance in product		Unless otherwise stated, cover concentrations up to 10% [ConsOC1]
Amounts used		Unless otherwise stated, covers use amounts up to40g [ConsOC2];covers skin contact area up to 71,4cm2 [ConsOC5]
Frequency and duration of use/exposure		Unless otherwise stated, covers use frequency up to 0 days per year [ConsOC3];Unless otherwise stated, covers use frequency up to 1 times per day [ConsOC4];
Other Operational Conditions affecting exposure		Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m^3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8].
Section 2.1.1		**Product categories**
PC18_n: Ink and toners--Inks and toners.	OC	Exposure time: 2.2 h/day, once per day. One cartridge (40 g) per day (printing of several hundred pages daily)
	RMM	Exposure modifier: Air exchange rate 0.6/h;

Scenario 6: Use in laboratories (industrial)

Table 6 Description of ES 6

Section 1	**Exposure Scenario Title**
Title	**Use of Small Quantities 2-Pyrrolidone in Laboratory Settings (Industrial); CAS RN616-45-5**
Use Descriptor	Sector of Use: Industrial (SU3)
	Process Categories: PROC10, PROC15
	Environmental Release Categories: ERC 4
Processes, tasks, activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	As described below.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20 ^{0}C above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational*

	measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.
Laboratory activities [CS36]. Small scale [CS61]. Handling small quantities (<1000ml) for more than 4 hours/day - inside fume cupboard.	Handle in a fume cupboard or under extract ventilation [E83].{Wear suitable gloves tested to EN374 [PPE15]}.
Cleaning [CS47]. Rolling, Brushing [CS51]. ; Vessel and container cleaning [CS103]Cleaning equiment, glassware etc under general ventilation for 15 min - 1 hour/day	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].{Use long handled tools where possible [E50]}. {Carefully pour from containers [E62]}. {Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]}.
Section 2.2	**Control of environmental exposure**
	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Confirm that RMMs and OCs are as described.
4.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk

	characterisations for environmental endpoints were not developed.
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	Good practice RMM phrases are {indicated} and incorporated within the ES Section 2 or consolidated into the main sections of the SDS.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.

Scenario 7: Use in laboratories (professional)

Table 7 Description of ES 7

Section 1	**Exposure Scenario Title**
Title	**Use of Small Quantities of 2-Pyrrolidone in Laboratory Settings (Professional); CAS RN 616-45-5**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC10, PROC15
	Environmental Release Categories: ERC 8A
Processes, tasks, activities covered	Use of small quantities within laboratory settings, including material transfers and equipment cleaning.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	As described below.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].

Contributing Scenarios	Risk Management Measures *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Laboratory activities [CS36]. Small scale [CS61]. ; Fume-cupboard Activity [CS139].	Handle in a fume cupboard or under extract ventilation [E83].{Wear suitable gloves tested to EN374 [PPE15]}.
Cleaning [CS47]. Rolling, Brushing [CS51]. ; Vessel and container cleaning [CS103]	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].{Use long handled tools where possible [E50]}. {Carefully pour from containers [E62]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Section 2.2	**Control of environmental exposure**
	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Confirm that RMMs and OCs are as described.
4.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant

	concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	Good practice RMM phrases are {indicated} and incorporated within the ES Section 2 or consolidated into the main sections of the SDS.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.

Scenario 8: Use in polymer processing

Table 8 Description of ES 8

Section 1	**Exposure Scenario Title**
Title	**Use of 2_Pyrrolidone in Polymer Processing; CAS RN 616-45-5**
Use Descriptor	Sector of Use: Industrial (SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14
	Environmental Release Categories: ERC6D
Processes, tasks, activities covered	Polymer processing
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	As described below.
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*

Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Bulk transfers [CS14]. (closed systems) [CS107].Bulk transfers of polymer prill/pellet etc to/from storage	No specific measures identified [EI18]. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. (closed systems) [CS107].Bulk transfers of polymer prill/pellet etc to/from storage	Ensure material transfers are under containment or extract ventilation [E66]. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. Semi-bulk transfers to/from storage e.g. IBCs, big bags	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].{Clear transfer lines prior to de-coupling [E39]}. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15]. With sample collection [CS56]. In-line weighing of (bulk) polymer additives	No specific measures identified [EI18]. {Wear suitable gloves tested to EN374 [PPE15]}.
With sample collection [CS56]. small scale weighing of polymer additives	Provide extract ventilation to points where emissions occur [E54]. {Clear up spills immediately and dispose of waste safely [EI9]}. ;{Avoid manual contact with wet work pieces [EI17]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Additive premixing [CS92].Pre-mixing of polymer additives e.g. polyols	Provide extract ventilation to points where emissions occur [E54]. {Wear suitable gloves tested to EN374 [PPE15]}.
Additive premixing [CS92].batch pre-mixing of additives	Provide extract ventilation to points where emissions occur [E54]. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. transfer of polymer additives to calendars	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].{Clear transfer lines prior to de-coupling [E39]}. {Wear suitable gloves tested to EN374 [PPE15]}.
Bulk transfers [CS14]. transfer of polymer additives to calendars	Provide extract ventilation to points where emissions occur [E54]. {Wear suitable gloves tested to EN374 [PPE15]}.
Calendering (including Banburys) [CS64].Calendaring activities	Provide extract ventilation to points where emissions occur [E54]. {Wear suitable gloves tested to EN374 [PPE15]}.

Production of articles by dipping and pouring [CS113].Formation of articles via polyol processes	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) [E40].{Wear suitable gloves tested to EN374 [PPE15]}.
Extrusion and masterbatching [CS88].Extrusion and masterbatching of finished/ formulated polymer	Ensure material transfers are under containment or extract ventilation [E66]. {Wear suitable gloves tested to EN374 [PPE15]}.
Injection moulding of articles [CS89].Article formation (injection moulding)	No specific measures identified [EI18]. {Wear suitable gloves tested to EN374 [PPE15]}.
Equipment maintenance [CS5]. build up and finishing of articles (dermal exposures)	Drain down system prior to equipment break-in or maintenance [E65].{Wear suitable gloves tested to EN374 [PPE15]}.
Storage [CS67].With occasional controlled exposure [CS137]	No specific measures identified [EI18]. {Avoid dip sampling [E42]}. {Provide extract ventilation to material transfer points and other openings [E82]}.{Wear suitable gloves tested to EN374 [PPE15]}.
Section 2.2	**Control of environmental exposure**
	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 3	**Exposure Estimation**
3.1. Health	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.
3.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	Confirm that RMMs and OCs are as described.
4.2. Environment	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment -**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	

Selection of relevant Contributing Scenario phrases	Good practice RMM phrases are {indicated} and incorporated within the ES Section 2 or consolidated into the main sections of the SDS.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterisations for environmental endpoints were not developed.