Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

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Transport provisions for small quantities of environmentally hazardous paints, printing inks, and related materials – Annexes to document ST/SG/AC.10/C.3/2024/31

Transmitted by the World Coatings Council (WCC)

Annexes to document ST/SG/AC.10/C.3/2024/31

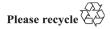
1. This informal document contains three annexes that provide supporting information for WCC's document to the sixty-fourth session of the TDG Sub-Committee (see document ST/SG/AC.10/C.3/2024/31)¹

2. Annex A provides additional information on the classification of mixtures as environmentally hazardous substances.

3. Annex B explains the differences in safety measures followed by the paint industry before and after the reclassification of certain paints from not regulated for transport to Class 9 environmentally hazardous mixtures.

4. Annex C illustrates the situations before-and-after reclassification due to the additional measures that needed to be taken to comply with Class 9 environmentally hazardous mixture requirements.

¹ WCC members provided authorization to use the materials contained in this document for the purpose of the discussion at the Sixty-Fourth Session of the Sub-Committee of Experts on the Transport of Dangerous Goods. For reproduction permission and all other issues, please contact Rhett Cash at rcash@paint.org.



Annex A

Environmentally Hazardous Classification, including M-Factors

I. Introduction

1. In 2009-2010, the term "environmentally hazardous (aquatic environment)" was implemented in the UN *Model Recommendations for the Transport of Dangerous Goods*. The criteria from GHS is used in the UN *Model Regulations* for TDG to identify environmentally hazardous chemicals, particularly those hazardous to the aquatic environment, and to define the applicable transport conditions to avoid or minimize their release into the environment (e.g., packing requirements).

2. There are two options to classify the environmental hazard in Class 9 for substances and mixtures in PG III:

- UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.; or
- UN3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

II. Criteria basics

- 3. The basic elements for classification of environmentally hazardous substances are:
 - · Acute aquatic toxicity
 - Chronic aquatic toxicity
 - · Potential for or actual bioaccumulation
 - Degradation for organic chemicals

4. The categories implemented for transport are Acute Category 1, Chronic Category 1, and Chronic Category 2. If one of these categories apply and the substance/mixture has not been assigned to hazard Classes 1-8, then it is classified as UN 3077 or UN 3082 environmentally hazardous in PG III.

5. If it meets the criteria for Classes 1-8 and another PG applies based on these hazards, then this PG takes precedence, and the environmentally hazardous substance adds to the existing classification.

6. The criteria for acute and chronic categories for substances is as follows:

Classification categories				
Acute hazard (see note 1)	Long-term hazard (see note 2)			
	Adequate chronic toxicity data available		Adequate chronic toxicity data not	
	Non-rapidly degradable substances (see note 3)	Rapidly degradable substances (see note 3)	available (see note 1)	
Category: Acute 1	Category: Chronic 1	Category: Chronic 1	Category: Chronic 1	
$L(E)C_{50} \le 1.00$	NOEC or $EC_x \le 0.1$	NOEC or $EC_x \le 0.01$	$\label{eq:L(E)C_{50} \leq 1.00 and lack of rapid} degradability and/or BCF \geq 500 or, if absent log K_{ow} \geq 4$	
	Category: Chronic 2	Category: Chronic 2	Category: Chronic 2	
	$0.1 \le \text{NOEC}$ or $\text{EC}_x \le 1$	$0.01 < \text{NOEC} \text{ or } \text{EC}_x \leq 0.1$	$\begin{array}{l} 1.00 < L(E)C_{50} \leq 10.0 \text{ and lack of} \\ \text{rapid degradability and/or} \\ BCF \geq 500 \text{ or, if absent log } K_{ow} \geq 4 \end{array}$	

Table 2.9.2: Classification scheme for substances hazardous to the aquatic environment

III. Mixture classification

7. Mixture classifications can be based on test results, bridging principles, or the summation method.

8. Mixtures can only be tested on the aquatic toxicity data for fish, crustacea, and algae/plants. Degradability and bioaccumulation data are not possible for mixtures (or it is too difficult to interpret the results). As such, degradability and bioaccumulation data are only suitable for substances.

9. The summation method is used to determine the classification for mixtures (from the 2023 revision of the UN Model Regulations for the Transportation of Dangerous Goods):

Table 2.9.3: Classification of a mixture for acute hazards based on summation of the concentrations of classified ingredients

Sum of the concentration classifie		Mixture classified as:
Acute $1 \times M^{a}$	≥ 25 %	Acute 1
^a For explanation of th	e M factor, see 2.9.3.4.6.4.	

Table 2.9.4: Classification of a mixture for long-term hazards based on summation of the concentrations of classified ingredients

Sum of the concentrations (in %) of ingredients classified as:	
≥ 25 %	Chronic 1
≥ 25 %	Chronic 2
	≥ 25 %

^a For explanation of the M factor, see 2.9.3.4.6.4.

10. The M-factor is used for substances that are highly toxic to the environment. It is based on harmonized classification or the self-classification of substances (based on manufacturer/supplier ecotoxicity information). The purpose of applying the M-factor is to give an increased weight to highly toxic substances when classifying a mixture.

11. The M-factor applies to Acute and Chronic Category 1 and its eco-toxicity value:

Acute toxicity	M factor	Chronic toxicity	M fa	actor
L(E)C ₅₀ value		NOEC value	NRD ^a ingredients	RD ^b ingredients
$0.1 < L(E)C_{50} \le 1$	1	$0.01 < \text{NOEC} \le 0.1$	1	-
$0.01 < L(E)C_{50} \le 0.1$	10	$0.001 < \text{NOEC} \le 0.01$	10	1
$0.001 < L(E)C_{50} \le 0.01$	100	$0.0001 < \text{NOEC} \leq 0.001$	100	10
$0.0001 < L(E)C_{50} \le 0.001$	1 000	$0.00001 < \text{NOEC} \le 0.0001$	1 000	100
$0.00001 < L(E)C_{50} \le 0.0001$	10 000	$0.000001 < \text{NOEC} \le 0.00001$	10 000	1 000
(continue in factor 10 intervals)		(continue in fact	or 10 intervals)	

Table 2.9.5: Multiplying factors for	· highly toxic ingredients of mixtures
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^a Non-rapidly degradable.

^b Rapidly degradable.

12. This means that a substance with a high M-factor leads to a Class 9 environmentally hazardous classification even at very low concentrations of highly toxic substances in mixtures.

13. Due to the conservative approach taken by the summation method, including use of M-factors, it has been suggested that paint manufacturers may wish to complete toxicity tests on their mixtures for classification purposes. However, there are a large number of different paint and ink formulations. As such, it is not considered feasible to test the mixtures, especially when considering the need to limit tests on animals.

14. WCC acknowledges that these substances are the most toxic to the environment and that any relaxation of the regulations must not lead to an increase in the risk from transporting such substances. However, the highly toxic ingredients that give rise to the classification of water-borne paints and inks as environmentally hazardous substances are present in the paints and inks at very low levels. The paints are classified as environmentally hazardous if it contains 0.025% or more of the substance with an M-factor Acute of 1000 or an M-factor Chronic of 100. Currently, mixtures containing only a small concentration of these substances are treated in the same way as the neat substance. However, due to the quantity of the substance in the mixture, the risk to the environment from a spill is lower due to the lower concentration of the substance in the mixture. Rather than set a limit to the M-factor, this proposal instead sets an upper concentration limit for the sum of highly toxic ingredients, as well as a limit for the packaging size to ensure that the risk is managed.

IV. Examples for the application of the formula presented above

15. Example 1: A liquid paint mixture contains one environmentally hazardous substance in a concentration of 0.03% assigned to Acute aquatic hazard category 1, M factor is 100.

Calculation for UN 3082:

Sum of the concentration of ingredients classified	Mixture is classified as:	Result:
as:		
Acute 1 x M \geq 25%	Acute 1	$0.03 \ge 100 = 3 = $ <u>Not classified</u>

This mixture is not acute aquatic toxic. Therefore, is not environmentally hazardous.

16. Example 2: A liquid paint mixture contains one environmentally hazardous substance in a concentration of 0.03% assigned to Chronic hazard category 1, M factor is 100.

Calculation for UN 3082:

Sum of the concentration of ingredients classified	Mixture is classified as:	Result:
as:		
Chronic 1 x M \ge 25%	Chronic 1	$0.03 \ge 100 = 3 = $ <u>Not classified</u>
$(M \ge 10 \ge 10 = 1) + Chronic \ge 25 \%$	Chronic 2	(100 x 10 x 0.03) + 0 = 30 =
		Classified Chronic 2 (result \geq 25)

This mixture is chronic aquatic toxic 2. Therefore, it is environmentally hazardous (UN3082).

17. Example 3: A liquid paint mixture contains one environmentally hazardous substance in a concentration of 0.03% assigned to both Acute and Chronic hazard category 1, M factor is 100 (acute) and 100 (chronic). Note: The preservative substance OIT – 2-octyl-2H-isothiazol-3-one (updated in 15th ATP of CLP) – is one of the substances with this aquatic toxic classification.

Calculation for UN 3082:

Sum of the concentration of ingredients classified	Mixture is classified as:	Result:
as:		
Acute 1 x M \geq 25%	Acute 1	$0.03 \ge 100 = 3 = $ <u>Not classified</u>

Sum of the concentration of ingredients classified	Mixture is classified as:	Result:
as:		
Chronic 1 x M \ge 25%	Chronic 1	$0.03 \ge 100 = 3 = $ Not classified
$(M \ge 10 \ge 10 = 10) + Chronic \ge 25\%$	Chronic 2	(100 x 10 x 0.03) + 0 = 30 =
		Classified Chronic 2 (result \geq 25).

This mixture is chronic aquatic toxic 2. Therefore, it is environmentally hazardous (UN3082).

18. Example 4: A liquid paint mixture contains a mixture of environmentally hazardous substances in:

- A concentration of 0.01% assigned to both Acute and Chronic hazard category 1, M factor is 100 (acute) and 100 (chronic), and
- A concentration of 0.02% assigned to Chronic hazard category 1, M factor is 1000.

Calculation for UN 3082:

Sum of the concentration of ingredients classified	Mixture is classified as:	Result:
as:		
Acute 1 x M \geq 25%	Acute 1	$0.01 \ge 100 = 1 = $ <u>Not classified</u>

Sum of the concentration of ingredients classified	Mixture is classified as:	Result:
as:		
Chronic 1 x M \ge 25%	Chronic 1	Sub1(0.01 x 100) +
		Sub2(0.02x1000) = 21 =
		not classified
$(M \ge 10 \ge 25 \%)$	Chronic 2	Sub1(100 x 10 x 0.01) +
		Sub2(1000x10x0.02) = 210 =
		Classified

This mixture is chronic aquatic toxic 2. Therefore, it is environmentally hazardous (UN 3082).

19. Example 5: A liquid paint mixture contains a mixture of environmentally hazardous substances in:

(a) A concentration of 0.3% assigned to both Acute and Chronic hazard category 1, M factor is 10 (acute) and 10 (chronic), and

(b) A concentration of 0.8% assigned to both Acute and Chronic hazard category 1, M factor is 10 (acute) and 10 (chronic).

Calculation for UN 3082:

Sum of the concentration of ingredients classified	Mixture is classified as:	Result
as:		
Acute 1 x M \geq 25%	Acute 1	Sub1(0.3 x 10) + Sub2(0.8 x 10) =
		11 =
		Not classified

Sum of the concentration of ingredients classified	Mixture is classified as:	Result
as:		
Chronic 1 x M \ge 25%	Chronic 1	Sub1(0.3 x 10) + Sub2(0.8x10) = 11
		=
		Not classified
$(M \ge 10 \ge 10 = 1) + Chronic \ge 25 \%$	Chronic 2	Sub1(10 x 10 x 0.3) +
		Sub2(10x10x0.8) = 110 =
		Classified Chronic 2 (result \geq 25).

This mixture is chronic aquatic toxic 2. Therefore, it is environmentally hazardous (UN 3082).

V. Conclusion

20. WCC's proposal is to exempt mixtures classified as UN 3082 that contain < 1% of highly toxic substances to the environment (with an M-factor > 1) from UN-approved packaging requirements in pack sizes up to and including 30 liters. This criteria is based on an upper concentration limit of the sum of highly toxic substances being less then 1% instead of a limit to the M-factor to make the calculation easier on mixture level; to exclude higher concentrations of highly toxic substance from the packaging exemption; and to align with the former 1% limit for severe marine pollutant (PP) from the IMDG Code.

Example	Contain < 1% (sum of conc.)	UN approved packaging under our proposal
Example 2	0.03% Chronic cat. 1, M = 100	No $(0.03\% < 1\%$ high toxic to environment
UN 3082		substance)
Example 3	0.03% Acute cat. 1 (M = 100);	No $(0.03\% < 1\%$ high toxic to environment
UN 3082	Chronic cat. 1 ($M = 100$)	substance)
Example 4	Substance 1: 0.01% Acute cat. 1 (M	No $(0.01 + 0.02\%) = 0.03\% < 1\%$ high toxic to
UN 3082	= 100); Chronic cat. 1 (M = 100)	environment substance)
	Substance 2: 0.02% Chronic cat. 1	
	(M = 1000)	
Example 5	Substance 1: 0.3% Acute cat. 1 (M =	Yes $(0.3 + 0.8 = 1.1\%$ which is above sum of
UN 3082		concentration limit)
	Substance 2: 0.8% Acute cat. 1 (M =	
	10); Chronic cat. 1 ($M = 10$)	

VI. Additional considerations

21. Limited data was available on substances when Class 9 environmentally hazardous classification was introduced in 2009 (as well as information on M-factors). This has increased over the years due to the proliferation of high M-factors.

22. High M-factors have led to the environmentally hazardous classification for a mixture at disproportionately low levels (e.g. 0.025%) when compared to mixture classification for corrosive (5%) or toxic (oral at 33.3%; dermal at 30%; and inhalation at 5%). UN 3077 and UN 3082 only exist in PG III (less danger), whereas corrosive and toxic have the full range of PGs (PG I for severe danger; PG II for medium danger; and PG III for less danger). The environmentally hazardous classification does not take precedence over Classes 1-8 and is an additional hazard, whereas corrosive and toxic are not. Consequently, this classification has inadvertently become "over-prioritized" through the link between GHS & transport regulations, primarily due to M-Factors.

23. In transport classification for health hazards, only acute toxic classification is taken into account and not chronic toxic classification. In contrast, for environmentally hazardous classification, both acute and chronic (1 and 2) are seen as dangerous in transport.

Annex B

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Impact of GHS/CLP classification changes on documentation and transportation, with pictorial examples in Annex C

1. The following table shows the safety measures that need to be taken to transport paint, paint related material, and printing ink before and after the regulation for reclassification to Class 9 takes place.

2. The table shows that many safety measures were already in place before 15th ATP, which adhered to existing dangerous goods regulations and were already implemented by industry. Additional measures were also introduced after implementation of 15th ATP in accordance with Class 9 environmentally hazardous mixture requirements (and in line with the transitional measures in ADR/RID 2023).

3. Annex C illustrates the situations before-and-after due to the additional measures that needed to be taken.

Safety measures to be taken to transport paint, paint related material and printing inks	Measures in place before implementation of 15 th ATP	Additional measures to put into place after implementation of 15 th ATP and classification as UN 3082	Adherence (bold italics indicates the additional new safety measures implemented due to UN 3082 Class 9 Environmentally Hazardous classification)
Posting of CLP/GHS Labeling on packaging	In place	Addition: Env. Haz- Pict. and additional H- and P-Phrases	Full adherence
Sections 2 and 14 of the SDS	No mentioning of environmental hazard in section 2; no dangerous goods specifications in section 14 <i>(see figures IV & V in Annex C)</i>	Additional information on environmental hazard in section 2; dangerous goods specifications in section 14 <i>(see figures VI & VII in Annex C)</i>	Full adherence
Use of packaging of good quality	In place à Currently used packaging is in full accordance with 4.1.1.1 of the dangerous goods regulations	Packaging needs to be UN-approved	Adherence not possible due to non-existing UN- packaging
Use of Transport Labels and Marks on outer/single packaging	Not applicable <i>(see figure I in Annex C)</i>	Class 9 Label + UN-Number + Env. Haz. Mark + mode of transport specific marking (see figures II & III in Annex C)	Full adherence
Building of safe and stable loading units	Adherence with international, EU, and national regulations already in place. Examples of industry common practices are:	No additional measures to be taken	Full adherence
	Shrink wrapping with high-tensile wrapping foil.		

Safety measures to be taken to transport paint, paint related material and printing inks	Measures in place before implementation of 15 th ATP	Additional measures to put into place after implementation of 15 th ATP and classification as UN 3082	Adherence (bold italics indicates the additional new safety measures implemented due to UN 3082 Class 9 Environmentally Hazardous classification)
	Strapping with high-tensile strapping-cord		
	Use of high-tensile adhesive tape		
	(see figures III & IV in Annex C)		
Load securing	Adherence with international, EU, and national regulations already in place (examples):	No additional measures to be taken	Full adherence
	CTU-Code		
	EN 12195		
	VDI 2700 (Germany)		
	49 CFR, Part 177, Subpart B (USA)		
Safety measures to be taken to transport paint, paint related material and printing inks	Measures in place before implementation of 15 th ATP	Additional measures to put into place after implementation of 15 th ATP and classification as UN 3082	Adherence (Bold text shows the additional new safety measures implemented due to UN 3082 Class 9 Environmentally Hazardous classification)
Placarding and marking of CTU's	Not applicable	Full compliance with Placarding and Marking requirements/provisions	Full adherence
DG-qualification of drivers	Not applicable	Full DG-qualification required	Full adherence
Vehicle emergency response equipment	Not applicable	Full DG-equipment required	Full adherence
Construction and registration of vehicles	Not applicable	Full compliance with DG regulations required	Full adherence
Transport documentation	Not applicable (except for standard transport documents such as delivery note or CMR etc.)	Full DG-documentation needed, in addition to standard transport documentation	Full adherence

Annex C

Pictures illustrating the current situation for transporting paints

1. Annex C contains pictorial examples that are referenced in the table in Annex B. Please consider Annex B when reviewing these pictures.



Figure I

Unmarked and unlabeled shipment before classification change.



Figure II

Shipment of nonflammable solvent-borne exterior paint with full transport marking and labeling after classification change.



Figure III

Example of a stable shrink-wrapped loading unit.



Figure IV

Example of the proven stability of a shrink-wrapped load via the tilting test.

2.1 Classification of the su	ubstance or mixture
Product definition	: Mixture
Classification according Skin Sens. 1, H317 STOT RE 1, H372 (central Aquatic Chronic 3, H412	to Regulation (EC) No. 1272/2008 [CLP/GHS] nervous system (CNS))
The product is classified as	s hazardous according to Regulation (EC) 1272/2008 as amended.
in the second	etailed information on health effects and symptoms.
Hazard pictograms	
2.2 Label elements Hazard pictograms Signal word	: Danger.
Hazard pictograms	 : Danger. : H317 - May cause an allergic skin reaction. H372 - Causes damage to organs through prolonged or repeated exposure. (central nervous system (CNS)) H412 - Harmful to aquatic life with long lasting effects.

Figure V

Example of a portion of Section 2 of an SDS before ATP 15 without environmentally hazardous information.

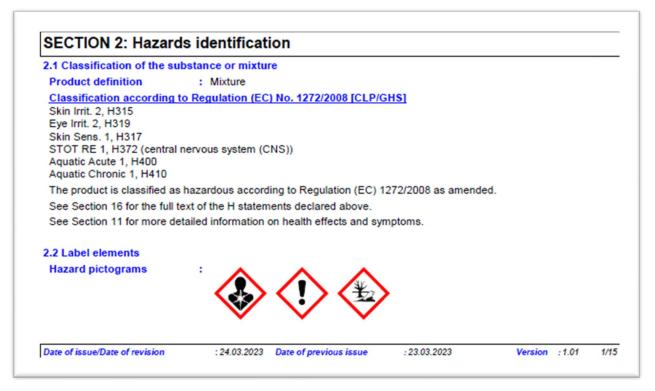


Figure VI

Example of a portion of Section 2 of an SDS after ATP 15, which includes the environmentally hazardous information.

	ADR/RID	ADN	IMDG	IATA
14.1 UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
14.2 UN proper shipping name	-	-	-	-
14.3 Transport hazard class(es)	-	-	-	-
14.4 Packing group	-	-	-	-
14.5 Environmental hazards	No.	No.	No.	No.

Figure VII

Example of Section 14 of an SDS before ATP 15 without transport classification.

	ADR/RID	ADN	IMDG	IATA
14.1 UN number or ID number	UN3082	UN3082	UN3082	UN3082
14.2 UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. (4,5-dichloro-2-octyl- 2H-isothlazol-3-one (DCOIT))	Environmentally hazardous substance, liquid, n.o.s. (4,5-dichloro-2-octyl- 2H-lisothlazol-3-one (DCOIT))	Environmentally hazardous substance, liquid, n.o.s. (4,5-dichioro-2-octyl- 2H-isothiazol-3-one (DCOIT)). Marine pollutant (4,5-dichioro- 2-octyl-2H-isothiazol- 3-one (DCOIT))	Environmentally hazardous substance, liquid, n.o.s. (4,5-dichloro-2-octyl- 2H-isothlazol-3-one (DCOIT))
14.3 Transport hazard class(es)		°	° (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	° € €
14.4 Packing group	ш	111	10	ш
14.5 Environmental hazarda	Yes.	Yes.	Yes.	Yes.
ADN	: This produ	ct is not regulated as a d	langerous good when tra	nsported in sizes of =5
	: This produ or ≤5 kg, p and 4.1.1.4	ct is not regulated as a d rovided the packagings r 4 to 4.1.1.8.	meët the gëneral provisio	ns of 4.1.1.1, 4.1.1.2
ate of issue/Date of rev	: This produ or <5 kg, p and 4.1.1.4	ct is not regulated as a d rovided the packagings r 4 to 4.1.1.8.	reët the gëneral provisio	Version : 1.01 12
ate of issue/Date of rev proforms to Regulation (RYDOLIN O(Jemaling	: This produ or <5 kg, p and 4.1.1.4 /laton : 24.03.2023 (EC) No. 1907/2006 (REACH), /	ct is not regulated as a d rovided the packagings r 4 to 4.1.1.8. Date of previous lasse Annex II, as amended by Con	reët the gëneral provisio	Version : 1.01 12
onforms to Regulation (MYDOLIN Openating SECTION 14: 1	: This produ or <5 kg, p and 4.1.1.4 (Islon : 24.03.2023 (EC) No. 1907/2006 (REACH), /	ct is not regulated as a d rovided the packagings r 4 to 4.1.1.8. Date of previous issue Annex II, as amended by Con Nation	neët the gëneral provisio : 23.03.2025 nmission Regulation (EU) 203	Version : 1.01 12/
hate of issue/Date of rev onforms to Regulation (RYGOLIN O(Jemaling	: This produ or ≤5 kg, p and 4,1.1.4 (EC) No. 1807/2006 (REACH), / Transport inform : This produ or ≤5 kg, p and 4,1.1.4 Emergenc : This produ or ≤5 kg, p	Annex II, as amended by Con rovided the packagings i 4 to 4.1.1.8. Date of previous lasce Annex II, as amended by Con vation ct is not regulated as a d rovided the packagings i 4 to 4.1.1.8. ty schedules F-A, S-F ct is not regulated as a d	reët the gëneral provisio	www.lon : 1.01 12/ www.lon : 1.01 12/ zors78
enforms to Regulation (RYDOLIN Offemaling SECTION 14: 1 IMDG	This produ or ≤5 kg, p and 4,1.1.4 (EC) No. 1807/2006 (REACH), / Transport inform This produ or ≤5 kg, p and 4,1.1.4 Emergenc This produ or ≤5 kg, p 5.0.2.6.1.1 dions for : Transport upright and	Annex II, as amended by Con ation to 4.1.1.8. Dete of previous lasse Annex II, as amended by Con ation ct is not regulated as a d rovided the packagings r 4 to 4.1.1.8. ty schedules F-A, S-F ct is not regulated as a d rovided the packagings r and 5.0.2.8. within user's premises	Index the general provisions in the general provision is a set of the general provision (EU) 2022 is a set of the general provision is a set o	wms/on : 1.01 12/ wms/on : 1.01 12/ cons7s ::::::::::::::::::::::::::::::::::::

Figure VIII

Example of Section 14 of an SDS after ATP 15, which includes the required transport classification information