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The BCF guide to the classification of coatings or inks and packaging as waste

*Provides a procedure for the classification
of own and customer-generated wastes*

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Ref: E 019
Date: September 2007



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The BCF guide to the classification of coatings or inks and packaging as waste

1. Introduction

1.1 The British Coatings Federation (BCF) is the sole UK trade association for manufacturers of decorative coatings, printing inks, industrial coatings and wall-coverings, representing a £2.5 billion value industry and the interests of over 100 member companies¹.

1.2 This document provides a general procedure to enable member companies to classify, as wastes, coating and inks, and packaging, such as part-used or emptied raw material and finished goods containers.

1.3 The need for definitive industry guidance is demonstrated by the conflicting and incorrect advice on waste classification that member companies report receiving from waste authorities and waste management companies. For example, it has been stated that *“all waste paint and their containers are hazardous waste”*, and *“if there is a CHIP² symbol on the container, the waste paint and container will be hazardous waste”*. Neither of these statements is totally correct as the rules make it clear that the classification will be dependent on the composition and type of waste concerned.

1.4 The guidance is based on the BCF’s interpretation of Technical Guidance Document WM2³ and application of the UK regulations⁴, which implement the European Waste Catalogue into national legislation.

[Note 1: There is an error in WM2. Figure C3.1: Decision Tree for the Assessment of Hazard H3 on page C14 contains an error in the second box in from the left in the top line of text boxes. It should read “less than or equal to” before 55C, not “greater than or equal to” as printed.]

[Note 2: Throughout this document the terms “hazardous waste” and “List of Wastes” are used in respect of England, Northern Ireland and Wales. In relation to legislation applicable in Scotland, the terms “special waste” and “Special Waste (Amendment) Regulations” should be substituted].

1.5 The procedures for the classification of wastes are for use by BCF members:

- for the disposal of waste coatings or inks and emptied containers generated on their own manufacturing sites and
- to provide information to industrial and professional users, in Section 13 of safety data sheets and in any general guidance, to enable them to classify and to dispose of their wastes through appropriate waste management routes.

Acknowledgements

The guidance and advice received from the Hazardous Wastes Process Section of the Environment Agency in the preparation of this document is gratefully acknowledged.

¹ More information on the BCF and membership profile is available on www.coatings.org.uk

² “CHIP” The Classification (Hazard Information and Packaging for Supply) Regulations 2002, SI2002:1689 and amendments; The Classification (Hazard Information and Packaging for Supply) Regulations (Northern Ireland) 2002, SR2002: 301 and amendments

³ Hazardous Waste: interpretation of the definition and classification of hazardous waste, WM2, Environment Agency, June 2003, download from www.environment-agency.gov.uk

⁴ The List of Wastes (England) Regulations 2005, SI2005:895 and amendments; The List of Wastes Regulations (Northern Ireland) 2005, SR2005: 301; The Special Waste Amendment (Scotland) Regulations 2005, SSI2005:112; The List of Wastes (Wales) Regulations 2005, SI2005:1820 (W.148)

2. Classification Procedure

2.1 Introduction

The procedure enables members to

- to determine if a waste coating or ink, or emptied packaging is hazardous
- to determine the waste classification of any waste coating or ink, or emptied packaging.

It can be applied to

- used and emptied raw material packaging from the manufacturing processes
- waste raw materials, coatings or inks from manufacturing processes
- support customer enquiries on the disposal of waste products and emptied containers

2.2 Use of the procedure

- 2.2.1 Decide which category the waste in question is the best fit:
- waste coating, ink or raw material, as such (see [Section 3.1](#))
 - container with residual waste coating or ink, or raw material *and* not treated (see [Section 3.2](#))
 - container with residual waste coating or ink, or raw material *and* treated (see [Section 3.3](#))
- 2.2.2 For the waste in question:
- identify the CHIP classification of each hazardous component present
 - establish the concentration of each of the hazardous component present in the whole waste.
- 2.2.3 Enter the information from Step 2.2.2 in the standard Waste Classification Table (see [Table 1](#)).
- 2.2.4 For each component, compare the concentration present with the relevant hazardous waste classification limit.
- 2.2.5 Record when the concentration exceeds the classification limit.
- 2.2.6 Allocate the most appropriate List of Waste Code, either for a hazardous waste or a controlled waste.
- 2.2.7 Use the classification and waste code to complete waste consignment notes for wastes removed from manufacturing sites.
- 2.2.8 Use the classification and waste code to identify appropriate plug-in phrases to include in Section 13 of product safety data sheets (see [Section 4](#)).

A worked example for a two-pack industrial coating is used to illustrate the procedure.

[Note 3: waste classification is subtly different from the CHIP supply classification. Waste classification uses the absolute classification and risk phrases for each individual substance i.e. the information in Section 3 of the safety data sheet or the Approved Supply List classification, rather than the overall classification of the product, which is found in Section 2⁵].

⁵ For safety data sheets issued **before** 1st June 2007, this information will be found in Sections 2 and 3 respectively

Table 1: Waste Classification Table

A Hazardous Property	B Symbol ⁶ and R phrase(s) [see WM2 Table 3.1]	C Notes	D Conc'n Limits (%)	E Component		F % present	G Waste Property Applicable
				R phrase	% present		
H1 Explosive	E R2, R3		Waste automatically hazardous				
H2 Oxidising	O R7, 8, 9	See WM2 Appendix C1	Test / Calculate				
H3A Highly flammable	F R11, 12, 15, 17, 18, 19		Waste automatically hazardous				
H3B Flammable	R10		Waste automatically hazardous				
H4 Irritant	Xi R36, 37, 38		≥20%				
	Xi R41		≥10%				
	C R35	See WM2 Table C4.1	≥1%<5%				
	C R34		≥5%<10%				
H5 Harmful	Xn R20, 21, 22, 65, 68 + (R48)		≥25%				
	T+ R26, 27, 28 + (R39)	See WM 2 Table C5.1	≥0.1%<7%				
	T R23, 24, 25 + (R39/48)		≥3%<25%				
H6 Toxic	T R23, 24, 25 + (R39/48)	Can be H5 See WM2	≥25%				
	T+ R26, 27, 28 +(R39)		≥7%				
H7 Carcinogenic	C3 R40		≥1%				
	C1,2 R45, R49		≥0.1%				
H8 Corrosive	C R34	Can be H4 see WM2 Table C4.1	≥10%				
	C R35		≥5%				
H9 Infectious							
H10 Toxic for reproduction	R1 R60		≥0.5%				
	R2 R61		≥0.5%				
	R3 R62, 63		≥5%				
H11 Mutagenic	M1,2 R46		≥0.1%				
	M3 R68		≥1%				
H12 Substances / Preparations which release toxic gases	R29, 31, 32	WM2 Appendix C12	Test / calculate				
H13 Capable of yielding another substance	E R1 by H1 R4,5,6, 16, 18, 19, 44 by H1		Waste automatically hazardous				
H14 Ecotoxic	N R50		≥25%				
	N R50/53		≥0.25%				
	N R51/53		≥2.5%				
	R52/53		≥25%				
	R52, 53		≥25%				
	R59		≥0.1%				
Conclusion							
Plug in phrases							

⁶ Symbol	Classification	Symbol	Classification	Symbol	Classification
E	Explosive	X _n	Harmful	C1, 2, 3	Carcinogenic categories 1,2,3
O	Oxidising	Xi	Irritant	R1, 2, 3	Reprotoxic categories 1,2,3
T	Toxic	C	Corrosive	M1, 2, 3	Mutagenic categories 1,2,3
T ⁺	Very Toxic	N	Dangerous for the Environment		

3. Procedure

3.1 waste coating or ink or raw material, as such

3.1.1 For the waste in question, determine the actual % content of any **hazardous** substances:

- from Section 3⁵ of the safety data sheet (e.g. raw materials/finished products)
- from knowledge of the composition (e.g. intermediates/process wastes)

3.1.2 For each hazardous component, enter the following in the Waste Classification Table:

- in **Column E**: the relevant R phrase
- in **Column F**: the % concentration of the substance concerned [where a range is given, e.g. from the safety data sheet, use the top figure (e.g. 25%, if the range is given as 10 – 25%)]

3.1.3 If the concentration in **Column F** is greater than the concentration limit in

Column D enter the hazardous property code (e.g. H3A, H5, H14) in

Column G

3.1.4 Any waste either containing no hazardous substances or without a hazard code in

Column G is a controlled waste only.

The most appropriate List of Wastes Regulations (LoWR) 6-digit code/ description is assigned from Table 2

Table 2: non-hazardous waste codes for waste raw materials, coatings or inks

LoWR six digit code	Description
08 01 Wastes from MFSU (manufacture, formulation, supply and use) and removal of paint and varnish	
08 01 12	Waste paint and varnish
08 01 14	Sludges from paint or varnish
08 01 16	Aqueous sludges containing paint or varnish
08 01 18	Wastes from paint or varnish removal
08 01 20	Aqueous suspensions containing paint or varnish
08 01 99	Wastes not otherwise specified
08 02 Wastes from MFSU of other coatings (including ceramic materials)	
08 02 01	Waste coating powders
08 02 Wastes from MFSU of printing inks	
08 03 07	Aqueous sludges containing ink
08 03 08	Aqueous liquid waste containing ink
08 03 13	Waste inks
09 03 15	Ink sludges
08 03 18	Waste printing toner
08 03 99	Wastes not otherwise specified

[Note 4: coating powder wastes can only be categorised as non-hazardous, regardless of their composition]

- 3.1.5 any waste with a hazard code in **Column G** is a hazardous waste. The most appropriate List of Wastes Regulations (LoWR) 6-digit code/description is assigned from Table 3

Table 3: hazardous waste codes for waste raw materials, coatings or inks

LoWR six digit code	Description
08 01 Wastes from MFSU and removal of paint and varnish	
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances
08 01 13*	Sludges from paint or varnish containing organic solvents or other dangerous substances
08 01 15*	Aqueous sludges containing paint or varnish containing organic solvents or other dangerous substances
08 01 17*	Wastes from paint or varnish removal containing organic solvents or other dangerous substances
08 01 19*	Aqueous suspensions containing paint or varnish containing organic solvents or other dangerous substances
08 01 21*	Waste paint or varnish remover
08 02 Wastes from MFSU of printing inks	
08 03 12*	Waste ink containing dangerous substances
08 03 14*	Ink sludges containing dangerous substances
08 03 16*	Waste etching solutions
08 03 17*	Waste printing toner containing dangerous substances

- 3.1.6 The waste classification and hazard codes (if applicable) are used to complete waste consignment or waste transfer notes associated with disposal of wastes from BCF member company sites.

[Note 5: see [Section 4](#) for guidance on information to provide to industrial users on classification and disposal of wastes]

3.2 container with residual waste coating or ink, or raw material *and* not treated

- 3.2.1 For the waste in question, determine the actual % content of any **hazardous** substances in the waste in the container:

- from Section 3⁵ of the safety data sheet (e.g. raw materials/finished products)
- from knowledge of the composition (e.g. intermediates/process wastes)

[Note 6: if the composition of the waste has changed on standing, for instance, by reaction of the contents or evaporation of volatile components, due allowance must be made for this change in composition. The worked examples provide more detail.]

- 3.2.2 For each hazardous component, enter the following in the Waste Classification Table:

- in **Column E**: the relevant R phrase
- in **Column F**: the % concentration of the substance concerned [where a range is given, e.g. from the safety data sheet, use the top figure (e.g. 25%, if the range is given as 10 – 25%)]

- 3.2.3 If the concentration in **Column F** is greater than the concentration limit in

Column D enter the hazardous property code (e.g. H3A, H5, H14) in

Column G

- 3.2.4 Any waste either containing no hazardous substances or without a hazard code in **Column G** is a controlled waste only.

The most appropriate List of Wastes Regulations (LoWR) 6-digit code/ description is assigned from Table 2

- 3.2.5 Any waste with a hazard code in **Column G** is a hazardous waste.

The most appropriate List of Wastes Regulations (LoWR) 6-digit code/ description is assigned from Table 3

- 3.2.6 The waste classification and hazard codes (if applicable) are used to complete waste consignment or waste transfer notes associated with disposal of wastes from BCF member company sites.

[Note 7: see Section 4 for guidance on information to provide to industrial users on classification and disposal of wastes]

3.3 **container with residual waste coating or ink, or raw material and treated (e.g. drained and/or rigorously scraped out or emptied)**

- 3.3.1 For this type of waste, determine the actual % content of any **hazardous** substances in the waste in relation to the weight of the container:

- from Section 3⁵ of the safety data sheet (e.g. raw materials/finished products)
- from knowledge of the composition (e.g. intermediates/process wastes)

[Note 8: if the composition of the waste has changed on standing, for instance, by reaction of the contents or evaporation of volatile components, due allowance must be made for this change in composition. The worked examples provide more detail.]

- 3.3.2 For each hazardous component, enter the following in the Waste Classification Table:

- in **Column E**: the relevant R phrase
- in **Column F**: the % concentration of the substance concerned [where a range is given, e.g. from the safety data sheet, use the top figure (e.g. 25%, if the range is given as 10 – 25%)]

- 3.3.3 If the concentration in **Column F** is greater than the concentration limit in

Column D enter the hazardous property code (e.g. H3A, H5, H14) in

Column G

- 3.3.4 Any waste either containing no hazardous substances or without a hazard code in **Column G** is a controlled waste only.

The most appropriate List of Wastes Regulations (LoWR) 6-digit code/ description is assigned from Table 4

Table 4: non-hazardous waste codes for treated containers (e.g. drained *and/or* rigorously scraped out or emptied)

LoWR six digit code	Description
15 01 Waste packaging	
15 01 01	Paper and cardboard packaging
15 01 02	Plastic packaging
15 01 04	Metallic packaging
15 01 05	Paper packaging

3.3.5 Any waste with a hazard code in Column G is a hazardous waste.

There is only one code in the List of Wastes Regulations (LoWR) 6-digit code/description that can be assigned, as shown in Table 5

Table 5: hazardous waste code for treated containers (e.g. drained *and/or* rigorously scraped out or emptied)

LoWR six digit code	Description
15 01 Waste packaging	
15 01 10*	Packaging containing residues of or contaminated by dangerous substances

3.3.6 The waste classification and hazard codes (if applicable) are used to complete waste consignment or waste transfer notes associated with disposal of wastes from BCF member company sites.

[Note 9: see [Section 4](#) for guidance on information to provide to industrial users on classification and disposal of wastes]

4. Plug-in phrases for inclusion in Section 13 of Safety Data Sheets

- 4.1 Information can be provided to industrial users on the classification of the coatings and inks supplied, when they become wastes, to enable the users to determine appropriate management and disposal routes. Information can be provided on the three waste types:
- waste coating, ink or raw material, as such (see [Section 3.1](#))
 - container with residual waste coating or ink, or raw material *and* not treated (see [Section 3.2](#))
 - container with residual waste coating or ink, or raw material *and* treated (see [Section 3.3](#))
- 4.2 A number of standardised plug-in phrases have been developed by the BCF, for inclusion in Section 13 of safety data sheets. These are set out in [Table 6](#).
- 4.3 Identify the relevant waste category from Columns 1 and 2, and select the appropriate waste-specific plug-in phrase(s) from Column 4.
- 4.4 From the previous assessment ([3.1.4](#), [3.1.5](#), [3.2.4](#), [3.2.5](#), [3.3.4](#), [3.3.5](#)), add the relevant LoWR code(s) for the type(s) to be included in the SDS.
- 4.5 In all cases, include the general plug-in phrase.
- 4.6 The plug-in phrases assigned can be recorded in the Waste Classification Table (see [Table 1](#)).

Table 6: Standard product waste plug-in phrases

1	2	3	4
Waste type	Option	Section ref	Phrase
Waste-specific plug-in phrases			
waste coating, ink or raw material, as such	Not hazardous	<u>3.1.4</u>	<i>"When this coating, in its liquid state, as supplied, becomes a waste, it is categorised as non-hazardous waste, with code 08 [XX XX] (List of Wastes)"</i>
	Hazardous	<u>3.1.5</u>	<i>"When this coating, in its liquid state, as supplied or skinned, becomes a waste, it is categorised as hazardous waste, with code 08 [XX XX]* (List of Wastes)"</i>
container with residual waste coating or ink, or raw material <i>and</i> not treated	Not hazardous	<u>3.2.4</u>	<i>"Part-used containers, not drained and/or rigorously scraped out and containing dried residues of the supplied coating, are categorised as non-hazardous waste, with code 08 [XX XX] (List of Wastes)"</i>
	Hazardous	<u>3.2.5</u>	<i>"Part-used containers, not drained and/or rigorously scraped out and containing dried residues of the supplied coating, are categorised as hazardous waste, with code 08 [XX XX]* (List of Wastes)"</i>
container with residual waste coating or ink, or raw material <i>and</i> treated	Not hazardous	<u>3.3.4</u>	<i>"Used containers, drained and/or rigorously scraped out and containing dried residues of the supplied coating, are categorised as non-hazardous waste, with code [15 01 02/15 01 04] (List of Wastes)"</i>
	Hazardous	<u>3.3.5</u>	<i>"Used containers, drained and/or rigorously scraped out and containing dried residues of the supplied coating, are categorised as hazardous waste, with code 15 01 10* (List of Wastes)"</i>
General plug-in phrase			
All	All	<u>3.1.4</u> <u>3.1.5</u> <u>3.2.4</u> <u>3.2.5</u> <u>3.3.4</u> <u>3.3.5</u>	<i>"If mixed with other wastes, the above waste code may not be applicable"</i>

Worked examples

The worked examples use a two-pack epoxy primer, spray applied to structural steel. The product contains low molecular weight epoxy resin, zinc phosphate and xylene (“base”) and is mixed with an amine curing agent (“additive”) prior to use.

The examples cover classification of each component, the mixed coating and of emptied packaging. In the case of the latter, three separate scenarios are considered:

- 1) Scenario 1: Wet Paint unmixed Additive and Base** i.e. a partly-full container of base and a partly-full container of additive, where their properties are as per the SDS
- 2) Scenario 2: Mixed Paint - container scraped out thoroughly and left to dry.** Cured residue of mixed base and additive in the 20L pail (Assuming 200 grammes of cured residue and a pail weight of 1.8Kg) and a 5L can weighing 500 grammes containing 50 grammes of unreacted additive.
- 3) Scenario 3: Mixed paint - container not thoroughly scraped out, but left to dry.** Cured residue of mixed base and additive in the 20L pail (Assuming 750 grammes of cured residue and a pail weight of 1.8Kg) and a 5L can weighing 500 grammes containing 150 grammes of unreacted additive.

Note: Care should be taken to check that any skinned paint is free of solvent i.e. there is no liquid under the skin.

Section 3⁵ of the SDS for the product identifies the hazardous to health and the environment classification and risk phrases of the individual constituents of the unmixed coating. Section 2^{Error! Bookmark not defined.} of the SDS identifies the physiochemical classification and risk phrases applicable to the coating. Both base and additive contain xylene as the solvent used, which is classified as a flammable liquid and assigned the R10 risk phrase.

2 Composition/Information on Ingredients

The following ingredients have recognized health effects or exposure limits, and are present in concentrations above the limits laid down in the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 and amendments (CHIP 3.1).

Substance	Weight in Paint	Classification	Risk Phrases*	EINECS Number
Base:				
Epoxy resin (Numbers Average Mol Wt <= 700)	25-50%	N Xi Xi	R53 R51 R36/38 R43	500-033-8
trizinc bis(orthophosphate)	10-25%	N	R53 R50	231-944-3
Xylene (mixture of isomers)	10-25%	Xi Xn	R38 R20/21	215-535-7
Additive:				
Benzyl alcohol	25-50%	Xn	R20/22	202-859-9
Xylene (mixture of isomers)	10-25%	Xi Xn	R38 R20/21	215-535-7
2,4,6-tris(dimethylaminomethyl) phenol	10-25%	Xi Xn	R36/38 R22	202-013-9

Substance	Weight in Paint	Classification	Risk Phrases*	EINECS Number
Nonylphenol	2.5-10%	C N Repr. Cat. 3 Repr. Cat. 3 Xn	R53 R34 R50 R62 R63 R22	246-672-0
4,4'-methylenebis(cyclohexylamine)	2.5-10%	C N Xi Xi Xn	R53 R35 R51 R37 R43 R22	217-168-8

Scenario 1 Wet Paint unmixed Additive and Base

1.1 Base - part full container

Base:				
Epoxy resin (Numbers Average Mol Wt <= 700)	25-50%	N Xi Xi	R53 R51 R36/38 R43	500-033-8
trizinc bis(orthophosphate)	10-25%	N	R53 R50	231-944-3
Xylene (mixture of isomers)	10-25%	Xi Xn	R38 R20/21	215-535-7

Using the Table we get:-

A Hazardous Property	B Symbol and R phrase(s) [see WM2 Table 3.1]	C Notes	D Conc'n Limits (%)	E Component		G Waste Property Applicable
				R phrase	% present	
H1 Explosive	E R2, R3		Waste automatically hazardous	-		
H2 Oxidising	O R7, 8, 9	See WM2 Appendix C1	Test / Calculate	-		
H3A Highly flammable	F R11, 12, 15, 17, 18, 19		Waste automatically hazardous	-		
H3B Flammable	R10		Waste automatically hazardous	R10		H3B
H4 Irritant	Xi R36, 37, 38		≥20%	R36/38 R38	25-50% 10-25%	H4
	Xi R41		≥10%			
	C R35	See WM2 Table C4.1	≥1%<5%			
	C R34		≥5%<10%			
H5 Harmful	Xn R20, 21, 22, 65, 68 + (R48)		≥25%	R20/21	10-25%	H5
	T+ R26, 27, 28 + (R39)	See WM 2 Table C5.1	≥0.1%<7%			
	T R23, 24, 25 + (R39/48)		≥3%<25%			
H6 Toxic	T R23, 24, 25 + (R39/48)	Can be H5 See WM2	≥25%	-		
	T+ R26, 27, 28 +(R39)		≥7%			
H7 Carcinogenic	C3 R40		≥1%	-		
	C1,2 R45, R49		≥0.1%			
H8 Corrosive	C R34	Can be H4 see WM2 Table C4.1	≥10%	-		
	C R35		≥5%			
H9 Infectious				-		
H10 Toxic for reproduction	R1 R60		≥0.5%			
	R2 R61		≥0.5%			
	R3 R62, 63		≥5%			
H11 Mutagenic	M1,2 R46		≥0.1%	-		
	M3 R68		≥1%			
H12 Substances / Preparations which release toxic gases	R29, 31, 32	WM2 Appendix C12	Test / calculate	-		
H13 Capable of yielding another substance	E R1 by H1 R4,5,6, 16, 18, 19, 44 by H1		Waste automatically hazardous	-		
H14 Ecotoxic	N R50		≥25%			H14 H14
	N R50/53		≥0.25%	R50/53	10-25%	
	N R51/53		≥2.5%	R51/53	25-50%	
	R52/53		≥25%			
	R52, 53		≥25%			
	R59		≥0.1%			
Conclusion	Since there is a significant residue, the waste has to be treated as one originating from the MFSU of Coatings. This is Section 08 01 of the List of Wastes Regulations 2005 (LoWR). Within 0801 identify the appropriate description. In this instance it is 08 01 11* as this is a "waste paint and varnish containing organic solvents or other dangerous substances".					
Plug in phrases						

1.2 Additive:- Part - full container

Additive:				
Benzyl alcohol	25-50%	Xn	R20/22	202-859-9
Xylene (mixture of isomers)	10-25%	Xi Xn	R38 R20/21	215-535-7
2,4,6-tris(dimethylaminomethyl) phenol	10-25%	Xi Xn	R36/38 R22	202-013-9
Nonylphenol	2.5-10%	C N Repr. Cat. 3 Repr. Cat. 3 Xn	R53 R34 R50 R62 R63 R22	246-672-0
4,4'-methylenebis(cyclohexylamine)	2.5-10%	C N Xi Xi Xn	R53 R35 R51 R37 R43 R22	217-168-8

Using the Table we get

A Hazardous Property	B Symbol and R phrase(s) [see WM2 Table 3.1]	C Notes	D Conc'n Limits (%)	E Component		G Waste Property Applicable
				R phrase	% present	
H1 Explosive	E R2, R3		Waste automatically hazardous	-		
H2 Oxidising	O R7, 8, 9	See WM2 Appendix C1	Test / Calculate	-		
H3A Highly flammable	F R11, 12, 15, 17, 18, 19		Waste automatically hazardous	-		
H3B Flammable	R10		Waste automatically hazardous	R10		H3B
H4 Irritant	Xi R36, 37, 38	See WM2 Table C4.1	≥20%	R38 R36/38 R37	10-25% 10-25% 2.5-10%	H4
	Xi R41		≥10%			
	C R35		≥1%<5%	R35	2.5-10%	
	C R34		≥5%<10%	R34	2.5-10%	
H5 Harmful	Xn R20, 21, 22, 65, 68 + (R48)	See WM 2 Table C5.1	≥25%	R20/22 R20/21 R22 R22 R22	25-50% 10-25% 10-25% 2.5-10% 2.5-10%	H5
	T+ R26, 27, 28 + (R39)		≥0.1%<7%			
	T R23, 24, 25 + (R39/48)		≥3%<25%			
H6 Toxic	T R23, 24, 25 + (R39/48)	Can be H5 See WM2	≥25%			
	T+ R26, 27, 28 +(R39)		≥7%	-		
H7 Carcinogenic	C3 R40		≥1%			
	C1,2 R45, R49		≥0.1%			
H8 Corrosive	C R34	Can be H4 see WM2 Table C4.1	≥10%	R34	2.5-10%	H8
	C R35		≥5%	R35	2.5-10%	
H9 Infectious						
H10 Toxic for reproduction	R1 R60		≥0.5%			H10
	R2 R61		≥0.5%	-		
	R3 R62, 63		≥5%	R62/63	2.5-10%	
H11 Mutagenic	M1,2 R46		≥0.1%			
	M3 R68		≥1%			
H12 Substances / Preparations which release toxic gases	R29, 31, 32	WM2 Appendix C12	Test / calculate	-		
H13 Capable of yielding another substance	E R1 by H1 R4,5,6, 16, 18, 19, 44 by H1		Waste automatically hazardous			
H14 Ecotoxic	N R50		≥25%	-		H14
	N R50/53		≥0.25%	R50/53	2.5-10%	
	N R51/53		≥2.5%	R51/53	2.5-10%	
	R52/53		≥25%			
	R52, 53		≥25%			
	R59		≥0.1%			
Conclusion	Since there is a significant residue, the waste has to be treated as one originating from the MFSU of Coatings. This is Section 08 01 of the List of Wastes Regulations 2005 (LoWR). Within 08 01 identify the appropriate description. In this instance it is 08 01 11* as this is a "waste paint and varnish containing organic solvents or other dangerous substances".					
Plug in phrases						

Scenario 2 Mixed Paint - Scraped out thoroughly and left to dry

Cured residue of mixed base and additive in the 20L pail (Assuming 200 grammes of cured residue and a pail weight of 1.8Kg) and a 5L can weighing 500 grammes containing 50 grammes of unreacted additive.

2.1 Base Container.

Xylene evaporated and therefore the flammable risk (R10) is no longer present and all other components are reacted to produce an inert cured paint film. Only hazardous constituent still present is the Zinc Phosphate since this is unchanged. Its hazardous properties are N R50/53.

Its concentration in the mixed paint needs to be calculated by using the mixing ratio for the product (4:1 Base to Additive) and further adjusted for the evaporation of the solvent.

i.e. the concentration of zinc phosphate is adjusted by a factor of 0.8 from the dilution effect of the additive being mixed with the base (it is reduced by 20%) and then by a factor of 1.25 since the concentration of zinc phosphate is increased by 25% due to the evaporation of the solvent.

From the SDS we take the zinc phosphate level to be 25% (worse case). To correct this level for the dilution and evaporation effects we need to do the following calculation

Original value * Dilution effect factor * evaporation effect factor = final concentration

$25 * 0.8 * 1.25 = 25\%$ final concentration of zinc phosphate in the dry cured paint

We need to calculate what percentage the residue is of the waste package i.e. container **and** residue combined to make it hazardous.

Calculation is

Weight of residue * $\frac{\text{hazardous}}{\text{wt of residue and container}}$

i.e. $200 * 25 / 2000 = 2.5\%$. So 2.5% of the waste package is zinc phosphate.

Consulting the HWCT table we see that for a waste package containing a substance classified as N R50/53 to be hazardous under H14 the concentration of the material must be greater than or equal to 0.25%

2.5% is greater than 0.25 and therefore the waste package is classed as a hazardous waste with hazard property H 14

Since as much residue has been removed as practicable we are now dealing with a packaging waste rather than a waste paint. This is Section 15 01 of the List of Wastes Regulations 2005 (LoWR). Within 15 01 identify the appropriate description.

In this instance the waste is 15 01 10* Packaging containing residues of or contaminated by dangerous substances.

2.2 Additive

This material is unchanged other than the solvent (xylene) has evaporated leaving the other constituents at a higher concentration. If we use the worse case value we have a 25% increase in the concentration of the other constituents

The percentage residue is $50/550 * 100 = 9.1\%$

So need to apply a factor of 0.091 and 1.25 (i.e. multiply by 0.11) to the figures quoted in the example in the first scenario for the additive to see if the new concentration of hazardous materials still cause the container to be hazardous.

A Hazardous Property	B Symbol and R phrase(s) [see WM2 Table 3.1]	C Notes	D Conc'n Limits (%)	E Component		G Waste Property Applicable
				R phrase	% present	
H1 Explosive	E R2, R3		Waste automatically hazardous	-		
H2 Oxidising	O R7, 8, 9	See WM2 Appendix C1	Test / Calculate	-		
H3A Highly flammable	F R11, 12, 15, 17, 18, 19		Waste automatically hazardous	-		
H3B Flammable	R10		Waste automatically hazardous	-		
H4 Irritant	Xi R36, 37, 38		≥20%	R37 R36/38	0.275-1.1% 1.1-2.75%	H4
	Xi R41		≥10%			
	C R35	See WM2 Table C4.1	≥1%<5%	R35	0.275-1.1%	
	C R34		≥5%<10%	R34	0.275-1.1%	
H5 Harmful	Xn R20, 21, 22, 65, 68 + (R48)	See WM 2 Table C5.1	≥25%	R20/22 R22 R22 R22	2.75-5.5% 1.1-2.75% 0.275-1.1% 0.275-1.1%	
	T+ R26, 27, 28 + (R39)		≥0.1%<7%			
	T R23, 24, 25 + (R39/48)		≥3%<25%			
H6 Toxic	T R23, 24, 25 + (R39/48)	Can be H5 See WM2	≥25%			
	T+ R26, 27, 28 +(R39)		≥7%	-		
H7 Carcinogenic	C3 R40		≥1%			
	C1,2 R45, R49		≥0.1%			
H8 Corrosive	C R34	Can be H4 see WM2 Table C4.1	≥10%	R34	0.275-1.1%	
	C R35		≥5%	R35	0.275-1.1%	
H9 Infectious						
H10 Toxic for reproduction	R1 R60		≥0.5%			
	R2 R61		≥0.5%	-		
	R3 R62, 63		≥5%	R62/63	0.275-1.1%	
H11 Mutagenic	M1,2 R46		≥0.1%			
	M3 R68		≥1%			
H12 Substances / Preparations which release toxic gases	R29, 31, 32	WM2 Appendix C12	Test / calculate	-		
H13 Capable of yielding another substance	E R1 by H1 R4,5,6, 16, 18, 19, 44 by H1		Waste automatically hazardous			
H14 Ecotoxic	N R50		≥25%	-		H14
	N R50/53		≥0.25%	R50/53	0.275-1.1%	
	N R51/53		≥2.5%	R51/53	0.275-1.1%	
	R52/53		≥25%			
	R52, 53		≥25%			
	R59		≥0.1%			
Conclusion	Since as much residue has been removed as practicable we are now dealing with a packaging waste rather than a waste paint. Using the methodology in 2.1 above this is 15 01 10* Packaging containing residues of or contaminated by dangerous substances.					
Plug in phrases						

Scenario 3:- Mixed paint not thoroughly scraped out but left to dry

Residue in 20L pail of 750 grammes and a pail weight of 1.8Kg. 5L can of additive has residue of unmixed additive totaling 150g and a can weight of 500 grammes.

3.1 Base Container.

Xylene evaporated and all other components reacted to produce an inert cured paint film. Only hazardous constituent is the Zinc Phosphate since this is unchanged. Its hazardous properties are N R50/53. Its concentration in the mixed paint needs to be calculated using the mixing ratio for the product (4:1) and further adjusted for the evaporation of the solvent. I.e. the concentration of zinc phosphate is adjusted by 0.8 and by 1.25 from mixing ratio and solvent evaporation to give a level of 25%

We need to calculate what percentage of the waste i.e. container and residue combined is hazardous

Calculation is

Wt of residue * % hazardous / wt of residue and container

i.e. $750 * 25 / 2550 = 7.4\%$. So 7.4% of the waste is zinc phosphate .

Consulting the table we see that for a waste containing a substance classified as N R50/53 to be hazardous under H14 the concentration of the material must be greater than or equal to 0.25% 7.4% is greater than 0.25 and therefore the waste is a hazardous waste with hazard property H 14 Dispose of as 08 01 11*

Since there is a significant residue, the waste has to be treated as one originating from the MFSU of Coatings. Section 08 01 and then 08 01 11* as this is a "waste paint and varnish containing organic solvents or other dangerous substances".

3.2 Additive Container

This material is unchanged other than the solvent has evaporated leaving the other constituents at a higher concentration. If we use the worse case value we have a 25% increase in the concentration of the other constituents

The percentage residue is $150/650 * 100 = 23\%$

So need to apply a factor of 0.23 and 1.25 (i.e. multiply by 0.29) to the figures quoted in the example in the first scenario for the additive to see if the new concentration of hazardous materials still cause the container to be hazardous.

A Hazardous Property	B Symbol and R phrase(s) [see WM2 Table 3.1]	C Notes	D Conc'n Limits (%)	E Component		G Waste Property Applicable
				R phrase	% present	
H1 Explosive	E R2, R3		Waste automatically hazardous	-		
H2 Oxidising	O R7, 8, 9	See WM2 Appendix C1	Test / Calculate	-		
H3A Highly flammable	F R11, 12, 15, 17, 18, 19		Waste automatically hazardous	-		
H3B Flammable	R10		Waste automatically hazardous	-		
H4 Irritant	Xi R36, 37, 38		≥20%	R36/38 R37	2.9-7.25% 0.725-2.9%	H4
	Xi R41		≥10%			
	C R35	See WM2 Table C4.1	≥1%<5%			
	C R34		≥5%<10%	R34 R34	0.725-2.9% 0.725-2.9%	
H5 Harmful	Xn R20, 21, 22, 65, 68 + (R48)		≥25%	R20/22 R22 R22 R22	7.25-14.5% 2.9-7.25% 0.725-2.9% 0.725-2.9%	
	T+ R26, 27, 28 + (R39)	See WM 2 Table C5.1	≥0.1%<7%			
	T R23, 24, 25 + (R39/48)		≥3%<25%			
H6 Toxic	T R23, 24, 25 + (R39/48)	Can be H5 See WM2	≥25%			
	T+ R26, 27, 28 +(R39)		≥7%	-		
H7 Carcinogenic	C3 R40		≥1%			
	C1,2 R45, R49		≥0.1%			
H8 Corrosive	C R34	Can be H4 see WM2 Table C4.1	≥10%	R34	0.725-2.9%	
	C R35		≥5%	R35	0.725-2.9%	
H9 Infectious						
H10 Toxic for reproduction	R1 R60		≥0.5%			
	R2 R61		≥0.5%			
	R3 R62, 63		≥5%	R62/63	0.725-2.9%	
H11 Mutagenic	M1,2 R46		≥0.1%	-		
	M3 R68		≥1%			
H12 Substances / Preparations which release toxic gases	R29, 31, 32	WM2 Appendix C12	Test / calculate			
H13 Capable of yielding another substance	E R1 by H1 R4,5,6, 16, 18, 19, 44 by H1		Waste automatically hazardous			
H14 Ecotoxic	N R50		≥25%	R50	0.725-2.9%	H14
	N R50/53		≥0.25%			
	N R51/53		≥2.5%	R51/53	0.725-2.9%	
	R52/53		≥25%			
	R52, 53		≥25%			
	R59		≥0.1%			
Conclusion	Since there is a significant residue, the waste has to be treated as one originating from the MFSU of Coatings. Section 08 01 and then 08 01 11* as this is a " waste paint and varnish containing organic solvents or other dangerous substances".					
Plug in phrases						