Draft

COMMISSION DIRECTIVE ../…/EC

of […]

amending, for the purpose of its adaptation to technical progress, for the 31st time, Council Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Council Directive 67/548/EEC of 27 June 1967 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances [1], and in particular Article 28 thereof,

Whereas:

(1) Annex I to Directive 67/548/EEC contains a list of dangerous substances, together with particulars of the classification and labelling of each substance. That list needs to be updated to include further notified new substances and further existing substances, as well as to adapt certain entries to technical progress. In addition, it is necessary, in that Annex, to delete entries for certain substances.

(2) The classification and labelling of the substances listed in this Directive should be reviewed if new scientific knowledge becomes available. In this respect, considering recent preliminary, partial and not peer-reviewed information submitted by industry, special attention should be paid to the outcome of the IARC discussion of the classification of Nickel substances or any new relevant scientific findings or interpretations given to the data used to establish the current proposals for the Nickel compounds concerned by this Directive.

(3) The measures provided for in this Directive are in accordance with the opinion of the Committee on the Adaptation to Technical Progress of the Directives for the Elimination of Technical Barriers to Trade with Dangerous Substances and Preparations,

[1] OJ L 196, 16.8.1967, p. 1. Directive as last amended by Commission Directive 2008/XX/EC (OJ L XX, XX.XX.2008, p. 1)

HAS ADOPTED THIS DIRECTIVE:

Article 1

Article Directive 67/548/EEC is amended as follows:

1. Annex I is amended as follows :

(a) The entries corresponding to the entries set out in Annex 1A are replaced by the entries set out in that Annex;

(b) The entries set out in Annex 1B to this Directive are inserted in accordance with the order of the entries set out in Annex I to Directive 67/548/EEC;

(c) The entries set out in Annex 1C to this Directive are deleted.

Article 2

2. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 1 June 2009 at the latest. They shall forthwith communicate to the Commission the text of those provisions and a correlation table between those provisions and this Directive.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

3. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 3

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 4

This Directive is addressed to the Member States.

Done at Brussels, […]

For the Commission
[…]
Member of the Commission

ANNEX 1A (31st ATP)

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
001-002-00-4	aluminium lithium hydride		240-877-9	16853-85-3	F; R15 C; R35	F; C R: 15-35 S: (1/2-)7/8-26-36/37/39-43-45		
005-006-00-7	dibutyltin hydrogen borate	E	401-040-5	75113-37-0	Muta. Cat. 3; R68 Repr. Cat. 2; R60-61 T; R48/25 Xn; R21/22 Xi; R41 R43 N; R50-53	T; N R: 60-61-21/22-41-43-48/25-68-50/53 S: 53-45-60-61		
006-015-00-9	diuron (ISO); 3-(3,4-dichlorophenyl)-1,1-dimethylurea		206-354-4	330-54-1	Carc. Cat. 3; R40 Xn; R22-48/22 N; R50-53	Xn; N R: 22-40-48/22-50/53 S: (2-)13-36/37-46-60-61	C ≥ 25 %: Xn, N; R22-40-48/22-50/53 10 % ≤ C < 25 %: Xn, N; R40-48/22-50/53 2,5 % ≤ C < 10 %: Xn, N; R40-50/53 1 % ≤ C < 2,5 %: Xn, N; R40-51/53 0,25 % ≤ C < 1 %: N; R51/53 0,025 % ≤ C < 0,25 %: R52/53	
006-076-00-1	mancozeb (ISO); manganese ethylenebis(dithiocarbamate) (polymeric) complex with zinc salt		-	8018-01-7	Repr. Cat. 3; R63 R43 N; R50	Xn; N R: 43-63-50 S: (2-)36/37-46-61	C ≥ 5 %: Xn, N; R43-63-50 2,5 ≤ C < 5%: Xi, N; R43-50 1% ≤ C < 2,5%: Xi; R43	
006-077-00-7	maneb (ISO); manganese ethylenebis(dithiocarbamate) (polymeric)		235-654-8	12427-38-2	Repr. Cat. 3; R63 Xn; R20 Xi; R36 R43 N; R50-53	Xn; N R: 20-36-43-63-50/53 S: (2-)36/37-46-60-61	C ≥ 25 %: Xn, N; R20-36-43-63-50/53 20 % ≤ C < 25 %: Xn, N; R36-43-63-50/53 5 % ≤ C < 20 %: Xn, N; R43-63-50/53 2,5 % ≤ C < 5 %: Xi, N; R43-50/53 1 % ≤ C < 2,5 %: Xi, N; R43-51/53 0,25 % ≤ C < 1 %: N; R51/53 0,025 % ≤ C < 0,25 %: R52/53	
006-084-00-5	carbosulfan (ISO); 2,3-dihydro-2,2-dimethyl-7-benzofuryl		259-565-9	55285-14-8	T+; R26 T; R25 R43	T+; N R: 25-26-43-50/53 S: (1/2-)28-36/37-38-45-63-		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	[(dibutylamino)thio]methylcarbamate				N; R50-53	60-61		
006-088-00-7	benfuracarb (ISO); ethyl *N*-[2,3-dihydro-2,2-dimethylbenzofuran-7-yloxycarbonyl(methyl)aminothio]-*N*-isopropyl- β-alaninate		-	82560-54-1	Repr. Cat. 3; R62 T; R23 Xn; R22 N; R50-53	T; N R: 22-23-62-50/53 S: (1/2-)36/37-45-60-61		
007-002-00-0	nitrogen dioxide; [1] dinitrogen tetraoxide [2]		233-272-6 [1] 234-126-4 [2]	10102-44-0 [1] 10544-72-6 [2]	O; R8 T+; R26 C; R34	O; T+ R: 8-26-34 S: (1/2-)9-26-28-36/37/39-45	C ≥ 10 %: T+; R26-34 5 % ≤ C < 10 %: T; R23-34 1 % ≤ C < 5 %: T; R23-36/37/38 0,5 % ≤ C < 1 %: Xn; R20-36/37/38 0,1 % ≤ C < 0,5 %: Xn; R20	5
015-041-00-X	malathion (ISO); 1,2-bis(ethoxycarbonyl)ethyl *O*,*O*-dimethyl phosphorodithioate; [containing ≤ 0.03 % isomalathion]		204-497-7	121-75-5	Xn; R22 R43 N; R50-53	Xn; N R: 22-43-50/53 S: (2-)24-37-46-60-61	C ≥ 25 %: Xn, N; R22-43-50/53 1 % ≤ C < 25 %: Xi, N; R43-50/53 0,025 % ≤ C < 1 %: N; R50/53 0,0025 % ≤ C < 0,025 %: N; R51/53 0,00025 % ≤ C < 0,0025 %: R52/53	
015-100-00-X	phoxim (ISO); α-(diethoxyphosphinothioylimino) phenylacetonitrile		238-887-3	14816-18-3	Repr. Cat. 3; R62 Xn; R22 R43 N; R50-53	Xn; N R: 22-43-62-50/53 S: (2-)36/37-46-60-61	C ≥ 25 %: Xn, N; R22-43-62-50/53 5 % ≤ C < 25 %: Xn, N; R43-62-50/53 1 % ≤ C < 5 %: Xi, N; R43-50/53 0,025 % ≤ C < 1 %: N; R50/53 0,0025 % ≤ C < 0,025 %: N; R51/53 0,00025 % ≤ C < 0,0025 %: R52/53	
015-102-00-0	tris(2-chloroethyl)phosphate	E	204-118-5	115-96-8	Carc. Cat. 3; R40 Repr. Cat. 2; R60 Xn; R22 N; R51-53	T; N R: 60-22-40-51/53 S: 53-45-61		
015-155-00-X	glufosinate ammonium (ISO); ammonium 2-amino-4-(hydroxymethylphosphinyl)butyrate	E	278-636-5	77182-82-2	Repr. Cat. 2; R60 Repr. Cat. 3; R63 Xn; R20/21/22-48/20/22	T R: 60-20/21/22-48/20/22-63 S: 53-45		
016-009-00-8	disodium sulfide; sodium sulfide		215-211-5	1313-82-2	T; R24 Xn; R22 C; R34 R31 N; R50	T; C; N R: 22-24-31-34-50 S: (1/2-)26-36/37/39-45-61		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
017-009-00-0	ammonium perchlorate; [containing ≥ 80 % of 0-30 µm particles]	T	232-235-1	7790-98-9	E; R3 O; R9	E R: 3-9 S: (2-)14-16-36/37		
024-004-00-7	sodium dichromate	E	234-190-3	10588-01-9	O; R8 Carc. Cat. 2; R45 Muta. Cat. 2; R46 Repr. Cat. 2; R60-61 T+; R26 T; R25-48/23 Xn; R21 C; R34 R42/43 N; R50-53	O; T+; N R: 45-46-60-61-8-21-25-26-34-42/43-48/23-50/53 S: 53-45-60-61	C ≥ 25 %: T+, N; R45-46-60-61-21-25-26-34-42/43-48/23-50/53 10 % ≤ C < 25 %: T+, N; R45-46-60-61-22-26-34-42/43-48/23-51/53 7 % ≤ C < 10 %: T+, N; R45-46-60-61-22-26-36/37/38-42/43-48/20-51/53 5 % ≤ C < 7 %: T, N; R45-46-60-61-22-23-36/37/38-42/43-48/20-51/53 3 % ≤ C < 5 %: T, N; R45-46-60-61-22-23-42/43-48/20-51/53 2,5 % ≤ C < 3 %: T, N; R45-46-60-61-23-42/43-48/20-51/53 1 % ≤ C < 2,5 %: T ; R45-46-60-61-23-42/43-48/20-52/53 0,5 % ≤ C < 1 %: T; R45-46-60-61-20-42/43-52/53 0,25 % ≤ C < 0,5 %: T; R45-46-20-42/43-52/53 0,2 % ≤ C < 0,25 %: T; R45-46-20-42/43 0,1 % ≤ C < 0,2 %: T; R45-46-20	3
027-002-00-4	cobalt oxide		215-154-6	1307-96-6	Xn; R22 R43 N; R50-53	Xn; N R: 22-43-50/53 S: (2-)24-37-60-61	C ≥ 25 %: Xn, N; R22-43-50/53 2,5 % ≤ C < 25 %: Xi, N; R43-50/53 1 % ≤ C < 2,5 %: Xi, N; R43-51/53 0,25 % ≤ C < 1 %: N; R51/53 0,025 % ≤ C < 0,25 %: R52/53	
027-003-00-X	cobalt sulfide		215-273-3	1317-42-6	R43 N; R50-53	Xi; N R: 43-50/53 S: (2-)24-37-60-61	C ≥ 2,5 %: Xi, N; R43-50/53 1 % ≤ C < 2,5 %: Xi, N; R43-51/53 0,25 % ≤ C < 1 %: N; R51/53 0,025 % ≤ C < 0,25 %: R52/53	
028-003-00-2	nickel monoxide; [1] nickel oxide; [2] bunsenite [3]	E	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]	Carc. Cat. 1; R49 T; R48/23 R43 R53	T R: 49-43-48/23-53 S: 53-45-61		

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028-004-00-8	nickel dioxide	E	234-823-3	12035-36-8	Carc. Cat. 1; R49 T; R48/23 R43 R53	T R: 49-43-48/23-53 S: 53-45-61		
028-005-00-3	dinickel trioxide	E	215-217-8	1314-06-3	Carc. Cat. 1; R49 T; R48/23 R43 R53	T R: 49-43-48/23-53 S: 53-45-61		
028-006-00-9	nickel (II) sulfide; [1] nickel sulfide; [2] millerite [3]	E	240-841-2 [1] 234-349-7 [2] - [3]	16812-54-7 [1] 11113-75-0 [2] 1314-04-1 [3]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-68-50/53 S: 53-45-60-61		
028-007-00-4	trinickel disulfide; nickel subsulfide; [1] heazlewoodite [2]	E	234-829-6 [1] - [2]	12035-72-2 [1] 12035-75-1 [2]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-68-50/53 S: 53-45-60-61		
028-008-00-X	nickel dihydroxide; [1] nickel hydroxide [2]	E	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]	Carc. Cat. 1; R49 Repr. Cat. 2; R61 Muta. Cat. 3; R68 T; R48/23 Xn; R20/22 Xi; R38 R42/43 N; R50-53	T; N R: 49-61-20/22-38-42/43-48/23-68-50/53 S: 53-45-60-61		
029-013-00-X	trisodium(2-(α-(3-(4-chloro-6-(2-(2-(vinylsulfonyl)ethoxy)ethylamino)-1,3,5-triazin-2-ylamino)-2-oxido-5-sulfonatophenylazo)benzylidenehydrazino)-4-sulfonatobenzoato)copper(II)		407-580-8	130201-51-3	Xi; R41	Xi R: 41 S: (2-)26-39		
047-001-00-2	silver nitrate		231-853-9	7761-88-8	O; R8 C; R34 N; R50-53	O; C; N R: 8-34-50/53 S: (1/2-)26-36/37/39-45-60-61		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
050-002-00-0	cyhexatin (ISO); hydroxytricyclohexylstannane; tri(cyclohexyl)tin hydroxide		236-049-1	13121-70-5	Xn; R20/21/22 N; R50-53	Xn; N R: 20/21/22-50/53 S: (2-)13-60-61	C ≥ 25 %: Xn, N; R20/21/22-50/53 0,025 % ≤ C < 25 %: N; R50/53 0,0025 % ≤ C < 0,025 %: N; R51/53 0,00025 % ≤ C < 0,0025 %: R52/53	
050-003-00-6	fentin acetate (ISO); triphenyltin acetate		212-984-0	900-95-8	Carc. Cat. 3; R40 Repr. Cat. 3; R63 T+; R26 T; R24/25-48/23 Xi; R37/38-41 N; R50-53	T+; N R: 24/25-26-37/38-40-41-48/23-63-50/53 S: (1/2-)26-28-36/37/39-45-60-61	C ≥ 25 %: T+, N; R24/25-26-37/38-40-41-48/23-63-50/53 20 % ≤ C < 25 %: T+, N; R21/22-26-37/38-40-41-48/23-63-50/53 10% ≤ C < 20 %: T+, N; R21/22-26-40-41-48/23-63-50/53 7 % ≤ C < 10 %: T+, N; 21/22-26-36-40-48/20-63-50/53 5 % ≤ C < 7 %: T, N; R21/22-23-36-40-48/20-63-50/53 3 % ≤ C < 5 %: T, N; R21/22-23-40-48/20-50/53 2,5 % ≤ C < 3 %: T, N; R23-40-48/20-50/53. 1 % ≤ C < 2,5 %: T, N; R23-40-48/20-51/53 0,25 % ≤ C < 1 %: Xn, N; R20-51/53 0,1 % ≤ C < 0,25 %: Xn; R20-52/53 0,025 % ≤ C < 0,1 %: R52/53	
050-004-00-1	fentin hydroxide (ISO); triphenyltin hydroxide		200-990-6	76-87-9	Carc. Cat. 3; R40 Repr. Cat. 3; R63 T+; R26 T; R24/25-48/23 Xi; R37/38-41 N; R50-53	T+; N R: 24/25-26-37/38-40-41-48/23-63-50/53 S: (1/2-)26-28-36/37/39-45-60-61	C ≥ 25 %: T+, N; R24/25-26-37/38-40-41-48/23-63-50/53 20 % ≤ C < 25 %: T+, N; R21/22-26-37/38-40-41-48/23-63-50/53 10 % ≤ C < 20 %: T+, N; R21/22-26-40-41-48/23-63-50/53 7 % ≤ C < 10 %: T+, N; R21/22-26-36-40-48/20-63-50/53 5 % ≤ C < 7 %: T, N; R21/22-23-36-40-48/20-63-50/53 3 % ≤ C < 5 %: T, N; R21/22-23-40-48/20-50/53 2,5 % ≤ C < 3 %: T, N; R23-40-48/20-50/53 1 % ≤ C < 2,5 %: T, N; R23-40-48/20-51/53 0,25 % ≤ C < 1 %: Xn, N; R20-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
							51/53 0,1 % ≤ C < 0,25 %: Xn; R20-52/53 0,025 % ≤ C < 0,1 %: R52/53	
050-008-00-3	tributyltin compounds, with the exception of those specified elsewhere in this Annex	A	-	-	T; R25-48/23/25 Xn; R21 Xi; R36/38 N; R50-53	T; N R: 21-25-36/38-48/23/25-50/53 S: (1/2-)36/37/39-45-60-61	C ≥ 2,5 %: T, N; R21-25-36/38-48/23/25-50/53 1 % ≤ C < 2,5 %: T, N; R21-25-36/38-48/23/25-51/53 0,25 % ≤ C < 1 %: Xn, N; R22-48/20/22-51/53 0,025 % C < 0,25 %: R52/53	1
050-011-00-X	triphenyltin compounds, with the exception of those specified elsewhere in this Annex	A	-	-	T; R23/24/25 N; R50-53	T; N R: 23/24/25-50/53 S: (1/2-)26-27-28-45-60-61	C ≥ 1 %: T, N; R23/24/25-50/53 0,25 % ≤ C < 1 %: Xn, N; R20/21/22-50/53 0,025 % ≤ C < 0,25 %: N; R51/53 0,0025 % ≤ C < 0,025 %: R52/53	1
050-018-00-8	tin(II) methanesulphonate		401-640-7	53408-94-9	C; R34 Xn; R22 R43 N; R51-53	C; N R: 22-34-43-51/53 S: (1/2-)22-26-36/37/39-45-61		
053-003-00-4	iodoxybenzene		-	696-33-3	E; R2	E R: 2 S: (2-)35		
053-004-00-X	calcium iodoxybenzoate	C	-	-	E; R2	E R: 2 S: (2-)35		
080-001-00-0	mercury	E	231-106-7	7439-97-6	Repr. Cat. 2; R61 T+; R26 T; R48/23 N; R50-53	T+; N R: 61-26-48/23-50/53 S: 53-45-60-61		
080-010-00-X	mercury dichloride; mercuric chloride		231-299-8	7487-94-7	Muta. Cat. 3; R68 Repr. Cat. 3; R62 T+; R28 T; R48/24/25 C; R34 N; R50-53	T+; N R: 28-34-48/24/25-62-68-50/53 S: (1/2-)26-36/37/39-45-60-61		
602-007-00-X	bromoform; tribromomethane		200-854-6	75-25-2	T; R23 Xn; R22 Xi; R36/38	T; N R: 22-23-36/38-51/53 S: (1/2-)28-45-63-61		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					N; R51-53			
602-030-00-5	1,3-dichloropropene; [1] (*Z*)-1,3-dichloropropene [2]	C D	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]	R10 T; R24/25 Xn; R20-65 Xi; R36/37/38 R43 N; R50-53	T; N R: 10-20-24/25-36/37/38-43-65-50/53 S: (1/2-)36/37-45-60-61		
602-054-00-6	3-iodpropene; allyl iodide		209-130-4	556-56-9	F; R11 C; R34	F; C R: 11-34 S: (1/2-)7-16-26-45		
603-005-00-1	2-methylpropan-2-ol; *tert*-butyl alcohol		200-889-7	75-65-0	F; R11 Xn; R20 Xi; R36/37	F; Xn R: 11-20-36/37 S: (2-)9-16-46		
603-018-00-2	furfuryl alcohol		202-626-1	98-00-0	Carc. Cat. 3; R40 T; R23 Xn; R21/22-48/20 Xi; R36/37	T R: 21/22-23-36/37-40-48/20 S: (1/2-)36/37-45-63		
603-023-00-X	ethylene oxide; oxirane	E	200-849-9	75-21-8	F+; R12 R6 Carc. Cat. 2; R45 Muta. Cat. 2; R46 T; R23 Xi; R36/37/38	F+; T R: 45-46-6-12-23-36/37/38 S: 53-45		
603-029-00-2	bis(2-chloroethyl) ether		203-870-1	111-44-4	Carc. Cat. 3; R40 T+; R26/27/28	T+ R: 26/27/28-40 S: (1/2-)7/9-27-28-36/37-45	C ≥ 7 %: T+; R26/27/28-40 1 % ≤ C < 7 %: T; R23/24/25-40 0,1 % ≤ C < 1 %: Xn; R20/21/22	
603-046-00-5	bis(chloromethyl) ether; oxybis(chloromethane)	E	208-832-8	542-88-1	F; R11 Carc. Cat. 1; R45 T+; R26 T; R24 Xn; R22	F; T+ R: 45-11-22-24-26 S: 53-45	C ≥ 25 %: T+; R45-22-24-26 7 % ≤ C < 25 %: T+; R45-21-26 3 % ≤ C < 7 %: T; R45-21-23 1 % ≤ C < 3 %: T; R45-23 0,1 % ≤ C < 1 %: T; R45-20 0,001 % ≤ C < 0,1 %: T; R45	
603-064-00-3	1-methoxy-2-propanol; monopropylene glycol methyl ether		203-539-1	107-98-2	R10 R67	R: 10-67 S: (2-)		
603-066-00-4	1,2-epoxy-4-epoxyethylcyclohexane;		203-437-7	106-87-6	Carc. Cat. 3; R40 T; R23/24/25	T R: 23/24/25-40	C ≥ 1 %: T; R23/24/25-40 0,1 % ≤ C < 1 %: Xn; R20/21/22	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	4-vinylcyclohexene diepoxide					S: (1/2-)36/37-45-63		
605-004-00-1	2,4,6-trimethyl-1,3,5-trioxane; paraldehyde		204-639-8	123-63-7	R10	R: 10 S: (2-)29		
605-005-00-7	2,4,6,8-tetramethyl-1,3,5,7-tetraoxacyclooctane; metaldehyde		203-600-2	108-62-3	F; R11 Xn; R22	F; Xn R: 11-22 S: (2-)13-16-25-46		
606-021-00-7	*N*-methyl-2-pyrrolidone; 1-methyl-2-pyrrolidone		212-828-1	872-50-4	Repr. Cat. 2; R61 Xi; R36/37/38	T R: 61-36/37/38 S: 53-45	C ≥ 10 %: T; R61-36/37/38 5 % ≤ C < 10 %: T; R61	
607-012-00-0	benzoyl chloride		202-710-8	98-88-4	Xn; R20/21/22 C; R34 R43	C R: 20/21/22-34-43 S: (1/2-)26-36/37/39-45		
607-037-00-7	2-ethoxyethyl acetate; ethylglycol acetate	E	203-839-2	111-15-9	R10 Repr. Cat. 2; R60-61 Xn; R20/21/22	T R: 60-61-10-20/21/22 S: 53-45		
607-051-00-3	MCPA (ISO); 4-chloro-*o*-tolyloxyacetic acid		202-360-6	94-74-6	Xn; R22 Xi; R38-41 N; R50-53	Xn; N R: 22-38-41-50/53 S: (2-)26-37-39-60-61		
607-052-00-9	salts and esters of MCPA	A	-	-	Xn; R20/21/22 N; R50-53	Xn; N R: 20/21/22-50/53 S: (2-)13-60-61		
607-085-00-9	benzyl benzoate		204-402-9	120-51-4	Xn; R22 N; R51-53	Xn; N R: 22-51/53 S: (2-)25-46-61		
607-095-00-3	maleic acid		203-742-5	110-16-7	Xn; R22 Xi; R36/37/38 R43	Xn R: 22-36/37/38-43 S: (2-)24-26-28-37-46	C ≥ 25 %: Xn; R22-36/37/38-43 20 % ≤ C <25 %: Xi; R36/37/38-43 0,1 % ≤ C < 20 %: Xi; R43	
607-103-00-5	succinic anhydride		203-570-0	108-30-5	Xn; R22 Xi; R36/37	Xn R: 22-36/37 S: (2-)25-46	C ≥ 5 %: Xn; R22-36/37 1 % ≤ C < 5 %: Xi; R36/37	
607-142-00-8	propyl chloroformate; chloroformic acid propylester; *n*-propyl chloroformate		203-687-7	109-61-5	F; R11 T; R23 C; R34	F; T R: 11-23-34 S: (1/2-)16-26-36-45		
607-195-00-7	2-methoxy-1-methylethyl acetate		203-603-9	108-65-6	R10	R: 10 S: (2-)		
607-216-00-X	glutamic acid, reaction products with *N*-(C_{12-14}-		403-950-8	-	T+; R26 Xn; R22	T+; N R: 22-26-34-50		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	alkyl)propylenediamine				C; R34 N; R50	S: (1/2-)26-36/37/39-38-45-61		
607-231-00-1	clopyralid (ISO); 3,6-dichloropyridine-2-carboxylic acid		216-935-4	1702-17-6	Xi; R41	Xi R: 41 S: (2-)26-39		
607-245-00-8	*tert*-butyl acrylate	D	216-768-7	1663-39-4	F; R11 Xn; R20/21/22 Xi; R37/38 R43 N; R51-53	F; Xn; N R: 11-20/21/22-37/38-43-51/53 S: (2-)16-25-37-61	C ≥ 25 %: Xn; R20/21/22-37/38-43-51/53 20 % ≤ C < 25 %: Xi; R37/38-43-52/53 2,5 % ≤ C < 20 %: Xi; R43-52/53 1 % ≤ C < 2,5 %: Xi; R43	
607-397-00-5	A mixture of: Ca salicylates (branched C_{10-14} and C_{18-30} alkylated); Ca phenates (branched C_{10-14} and C_{18-30} alkylated); Ca sulfurised phenates (branched C_{10-14} and C_{18-30} alkylated)		415-930-6	-	Repr. Cat. 3; R62 R43	Xn R: 43-62 S: (2-)23-36/37		
608-005-00-5	*n*-butyronitrile		203-700-6	109-74-0	F; R11 T; R23/24/25	F; T R: 11-23/24/25 S: (1/2-)16-36/37-45-63		
608-011-00-8	oxalonitrile; cyanogen		207-306-5	460-19-5	F+; R12 T; R23 N; R50-53	F+; T; N R: 12-23-50/53 S: (1/2-)9-16-23-33-45-63-60-61		
609-007-00-9	2,4-dinitrotoluene; [1] dinitrotoluene [2]	E	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]	Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62 T; R23/24/25 Xn; R48/22 N; R50-53	T; N R: 45-23/24/25-48/22-62-68-50/53 S: 53-45-60-61		
611-028-00-3	*C*,*C*'-azodi(formamide)		204-650-8	123-77-3	E; R2 R42	E; Xn R: 2-42 S: (2-)22-24-37		
611-035-00-1	tetralithium 6-amino-4-hydroxy-3-[7-sulfonato-4-(5-sulfonato-2-naphthylazo)-1-naphthylazo]naphthalene-2,7-disulfonate		403-660-1	107246-80-0	N; R51-53	N R: 51/53 S: 61		
612-044-00-3	*N*,*N*'-diacetylbenzidine	E	210-338-2	613-35-4	Carc. Cat. 2; R45	T		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					Muta. Cat. 3; R68 Xn; R20/21/22	R: 45-20/21/22-68 S: 53-45		
612-050-00-6	cyclohexylamine		203-629-0	108-91-8	R10 Repr. Cat. 3; R62 Xn; R21/22 C; R34	C R: 10-21/22-34-62 S: (1/2-)26-36/37/39-45	C ≥ 25 %: C; R21/22-34-62 10 % ≤ C < 25 %: C; R34-62 5 % ≤ C < 10 %: Xn; R36/38-62 2% ≤ C < 5%: Xi; R36/38	
612-076-00-8	ethyldimethylamine		209-940-8	598-56-1	F; R11 Xn; R20/22 C; R34	F; C R: 11-20/22-34 S: (1/2-)3-16-26-36-45		
612-099-00-3	4-methyl-*m*-phenylenediamine; 2,4-toluenediamine	E	202-453-1	95-80-7	Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62 T; R25 Xn; R21-48/22 R43 N; R51-53	T; N R: 45-21-25-43-48/22-62-68-51/53 S: 53-45-61		
612-101-00-2	methenamine; hexamethylenetetramine		202-905-8	100-97-0	F; R11 R43	F; Xi R: 11-43 S: (2-)24-37		
612-151-00-5	methyl-phenylene diamine; diaminotoluene; [technical product - mixture of 4-methyl-*m*-phenylene diamine (EC No 202-453-1) and 2-methyl-*m*-phenylene diamine (EC No 212-513-9)]	E	-	-	Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62 T; R25 Xn; R21-48/22 Xi; R36 R43 N; R51-53	T; N R: 45-21-25-36-43-48/22-62-68-51/53 S: 53-45-61		
612-237-00-2	hydroxylammonium hydrogensulfate; hydroxylamine sulfate (1:1); [1] hydroxylamine phosphate; [2] hydroxylamine dihydrogenphosphate; [3] hydroxylamine 4-methylbenzenesulfonate [4]	T	233-154-4 [1] 244-077-0 [2] 242-818-2 [3] 258-872-5 [4]	10046-00-1 [1] 20845-01-6 [2] 19098-16-9 [3] 53933-48-5 [4]	E; R2 Carc. Cat. 3; R40 Xn; R21/22-48/22 Xi; R36/38 R43 N; R50	E; Xn; N R: 21/22-36/38-40-43-48/22-50 S: (2-)36/37-61		
613-116-00-7	tolylfluanid (ISO); dichloro-*N*-[(dimethylamino)sulphonyl]flu		211-986-9	731-27-1	T+; R26 T; R48/23 Xi; R36/37/38	T+; N R: 26-36/37/38-43-48/23-50 S: (1/2-)28-36/37/39-45-63-	C ≥ 20 %: T+, N; R26-36/37/38-43-48/23-50 10 % ≤ C < 20 %: T+, N; R26-43-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	oro-*N*-(*p*-tolyl)methanesulphenamide; [containing ≥ 0.1% (w/w) of particles with an aerodynamic diameter of below 50 µm]				R43 N; R50	61	48/23-50 7 % ≤ C < 10 %: T+, N; R26-43-48/20-50 2,5 % ≤ C < 7 %: T, N; R23-43-48/20-50 1 % ≤ C < 2,5 %: T; R23-43-48/20 0,1 % ≤ C < 1 %: Xn; R20	
615-001-00-7	methyl isocyanate		210-866-3	624-83-9	F; R11 Repr. Cat. 3; R63 T+; R26 T; R24/25 R42/43 Xi; R37/38-41	F; T+ R: 11-24/25-26-37/38-41-42/43-63 S: (1/2-)16-26-27/28-36/37/39-45-63		
615-004-00-3	salts of thiocyanic acid, with the exception of those specified elsewhere in this Annex	A	-	-	Xn; R20/21/22 R32 R52-53	Xn R: 20/21/22-32-52/53 S: (2-)13-36/37-46-61		
615-028-00-4	ethyl 2-(isocyanatosulfonyl)benzoate		410-220-2	77375-79-2	R14 Xn; R22-48/22 Xi; R41 R42/43	Xn R: 14-22-41-42/43-48/22 S: (2-)8-23-26-30-35-36/37/39		
615-030-00-5	alkali salts and alkali earth salts of thiocyanic acid, with the exception of those specified elsewhere in this Annex	A	-	-	Xn; R20/21/22 R32 R52-53	Xn R: 20/21/22-32-52/53 S: (2-)13-36/37-46-61		
615-031-00-0	thallium thiocyanate		222-571-7	3535-84-0	T+; R26/28 Xn; R21 R32 R33 N; R51-53	T+; N R: 21-26/28-32-33-51/53 S: (1/2-)13-28-36/37-45-61		
615-032-00-6	metal salts of thiocyanic acid, with the exception of those specified elsewhere in this Annex	A	-	-	Xn; R20/21/22 R32 N; R50-53	Xn; N R: 20/21/22-32-50/53 S: (2-)13-36/37-46-60-61		
616-124-00-9	lithium bis(trifluoromethylsulfonyl)imide		415-300-0	90076-65-6	T; R24/25 Xn; R48/22 C; R34 R52-53	T R: 24/25-34-48/22-52/53 S: (1/2-)22-26-36/37/39-45-61		
617-017-00-X	A mixture of: 2,2'-bis(*tert*-	T	412-140-3	32144-25-5	E; R2	E		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	pentylperoxy)-*p*-diisopropylbenzene; 2,2'-bis(*tert*-pentylperoxy)-*m*-diisopropylbenzene				O; R7 R53	R: 2-7-53 S: (2-)3/7-14-36/37/39-61		
650-016-00-2	Mineral wool, with the exception of those specified elsewhere in this Annex; [Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content greater than 18 % by weight]	AQR	-	-	Carc. Cat. 3 ; R40	Xn R: 40 S: (2-)36/37		
650-017-00-8	Refractory Ceramic Fibres; Special Purpose Fibres, with the exception of those specified elsewhere in this Annex; [Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content less or equal to 18 % by weight]	AR	-	-	Carc. Cat. 2; R49	T R: 49 S: 53-45		

ANNEX 1B (31st ATP)

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
005-017-00-7	sodium perborate; [1] perboric acid, sodium salt; [2] perboric acid, sodium salt, monohydrate; [3] sodium peroxometaborate; [4] perboric acid (HBO(O2)), sodium salt, monohydrate; [5] sodium peroxoborate; [containing < 0.1 % (w/w) of particles with an aerodynamic diameter of below 50 µm]	E	239-172-9 [1] 234-390-0 [2] - [3] 231-556-4 [4] - [5]	15120-21-5 [1] 11138-47-9 [2] 12040-72-1 [3] 7632-04-4 [4] 10332-33-9 [5]	O; R8 Repr. Cat. 2; R61 Repr. Cat. 3; R62 Xn; R22 Xi; R37-41	O; T R: 61-8-22-37-41-62 S: 53-45	C ≥ 25 %: T; R61-22-37-41-62 22 % ≤ C < 25 %: T; R61-37-41-62 20 % ≤ C < 22 %: T; R61-36/37-62 14 % ≤ C < 20 %: T; R61-36-62 9 % ≤ C < 14 %: T; R61-62 6,5 % ≤ C < 9 %: T; R61	
005-017-01-4	sodium perborate; [1] perboric acid, sodium salt; [2] perboric acid, sodium salt, monohydrate; [3] sodium peroxometaborate; [4] perboric acid (HBO(O2)), sodium salt, monohydrate; [5] sodium peroxoborate; [containing ≥ 0.1 % (w/w) of particles with an aerodynamic diameter of below 50 µm]	E	239-172-9 [1] 234-390-0 [2] - [3] 231-556-4 [4] - [5]	15120-21-5 [1] 11138-47-9 [2] 12040-72-1 [3] 7632-04-4 [4] 10332-33-9 [5]	O; R8 Repr. Cat. 2; R61 Repr. Cat. 3; R62 T; R23 Xn; R22 Xi; R37-41	O; T R: 61-8-22-23-37-41-62 S: 53-45	C ≥ 25 %: T; R61-22-23-37-41-62 22 % ≤ C < 25 %: T; R61-20-37-41-62 20 % ≤ C < 22 %: T ; R61-20-36/37-62 14 % ≤ C < 20 %: T; R61-20-36-62 9 % ≤ C < 14 %: T; R61-20-62 6,5 % ≤ C < 9 %: T; R61-20 3 % ≤ C < 6,5 %: Xn; R20	
005-018-00-2	perboric acid (H3BO2(O2)), monosodium salt trihydrate; [1] perboric acid, sodium salt, tetrahydrate; [2] perboric acd (HBO(O2)), sodium salt, tetrahydrate; [3] sodium peroxoborate hexahydrate; [containing < 0.1 % (w/w) of particles with an aerodynamic diameter of below 50 µm]		- [1] - [2] - [3]	13517-20-9 [1] 37244-98-7 [2] 10486-00-7 [3]	Repr. Cat. 2; R61 Repr. Cat. 3; R62 Xi; R37-41	T R: 61-37-41-62 S: 53-45-47	C ≥ 36 %: T; R61-37-41-62 22 % ≤ C < 36 %: T; R61-36/37-62 20 % ≤ C < 22 %: T; R61-37-62 14 % ≤ C < 20 %: T; R61-62 10 % ≤ C < 14 %: T; R61	
005-018-01-X	perboric acid (H3BO2(O2)), monosodium salt, trihydrate; [1] perboric acid, sodium salt, tetrahydrate; [2] perboric acid (HBO(O2)), sodium salt, tetrahydrate; [3] sodium peroxoborate hexahydrate;	E	- [1] - [2] - [3]	13517-20-9 [1] 37244-98-7 [2] 10486-00-7 [3]	Repr. Cat. 2; R61 Repr. Cat. 3; R62 Xn; R20 Xi; R37-41	T R: 61-20-37-41-62 S: 53-45-47	C ≥ 36 %: T; R61-20-37-41-62 25 % ≤ C < 36 %: T; R61-20-36/37-62 22 % ≤ C < 25 %: T; R61-36/37-62 20 % ≤ C < 22 %: T; R61-37-62 14 % ≤ C < 20 %: T; R61-62 10 % ≤ C < 14 %: T; R61	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	[containing ≥ 0.1 % (w/w) of particles with an aerodynamic diameter of below 50 µm]							
016-094-00-1	sulfur		231-722-6	7704-34-9	Xi; R38	Xi R: 38 S: (2-)46		
017-009-01-8	ammonium perchlorate; [containing < 80 % of 0-30 µm particles]	T	232-235-1	7790-98-9	E; R2 O; R9	E R: 2-9 S: (2-)14-16-36/37		
028-002-01-4	nickel powder; [particle diameter < 1 mm]		231-111-4	7440-02-0	Carc. Cat. 3; R40 T; R48/23 R43 R52-53	T R: 40-43-48/23-52/53 S: (2-)36/37/39-45-61		
028-013-00-7	nickel matte	E, H	273-749-6	69012-50-6	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-014-00-2	slimes and sludges, copper electrolytic refining, decopperised, nickel sulfate	E	295-859-3	92129-57-2	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 Xn; R20/22 Xi; R38 R42/43 N; R50-53	T; N R: 49-61-20/22-38-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-20/22-38-42/43-48/23-68-50/53 20 % ≤ C < 25 %: T, N; R49-61-38-42/43-48/23-68-51/53 2,5 % ≤ C < 20 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-015-00-8	slimes and sludges, copper electrolyte refining, decopperised	E, H	305-433-1	94551-87-8	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 1; R61 Repr. Cat. 3; R62 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-62-68-50/53 S: 53-45-60-61		
028-016-00-3	nickel diperchlorate;	E, H	237-124-1	13637-71-3	Carc. Cat. 1; R49	T; N	C ≥ 25 %: T, N; R49-61-34-42/43-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	perchloric acid, nickel(II) salt				Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 C; R34 R42/43 N; R50-53	R: 49-61-34-42/43-48/23-68-50/53 S: 53-45-60-61	48/23-68-50/53 5 % ≤ C < 25 %: T, N; R49-61-34-42/43-48/23-68-51/53 2,5 % ≤ C < 5 %: T, N; R49-61-36/38-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-36/38-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-017-00-9	nickel dipotassium bis(sulfate); [1] diammonium nickel bis(sulfate) [2]	E, H	237-563-9 [1] 239-793-2 [2]	13842-46-1 [1] 15699-18-0 [2]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 Xn; R20/22 R42/43 N; R50-53	T; N R: 49-61-20/22-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-20/22-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-018-00-4	nickel bis(sulfamidate); nickel sulfamate	E, H	237-396-1	13770-89-3	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-019-00-X	nickel bis(tetrafluoroborate)	E, H	238-753-4	14708-14-6	Carc. Cat. 1; R49	T; N	C ≥ 25 %: T, N; R49-61-42/43-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; 49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-021-00-0	nickel diformate; [1] formic acid, nickel salt; [2] formic acid, copper nickel salt [3]	E, H	222-101-0 [1] 239-946-6 [2] 268-755-0 [3]	3349-06-2 [1] 15843-02-4 [2] 68134-59-8 [3]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5%: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C 0,1 %: Xi; R43	
028-022-00-6	nickel di(acetate); [1] nickel acetate [2]	E, H	206-761-7 [1] 239-086-1 [2]	373-02-4 [1] 14998-37-9 [2]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 Xn; R20/22 R42/43 N; R50-53	T; N R: 49-61-20/22-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-20/22-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N: R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-024-00-7	nickel dibenzoate	E, H	209-046-8	553-71-9	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61	T; N R: 49-61-42/43-48/23-68-50/53	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					T; R48/23 R42/43 N; R50-53	S: 53-45-60-61	42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-025-00-2	nickel bis(4-cyclohexylbutyrate)	E, H	223-463-2	3906-55-6	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-026-00-8	nickel(II) stearate; nickel(II) octadecanoate	E, H	218-744-1	2223-95-2	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-027-00-3	nickel dilactate	E, H	-	16039-61-5	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					N; R50-53		48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-028-00-9	nickel(II) octanoate	E, H	225-656-7	4995-91-9	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat 2; R61 T; R48/23 C; R35 R42/43 N; R50-53	T; C; N R: 49-61-35-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, C, N; R49-61-35-42/43-48/23-68-50/53 10 % ≤ C < 25 %: T, C, N; R49-61-35-42/43-48/23-68-51/53 5 % ≤ C < 10 %: T, N; R49-61-34-42/43-48/23-68-51/53 2,5 % ≤ C < 5 %: T, N; R49-61-36/38-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-36/38-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-029-00-4	nickel difluoride; [1] nickel dibromide; [2] nickel diiodide; [3] nickel potassium fluoride [4]	E, H	233-071-3 [1] 236-665-0 [2] 236-666-6 [3] - [4]	10028-18-9 [1] 13462-88-9 [2] 13462-90-3 [3] 11132-10-8 [4]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; 49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; 49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-030-00-X	nickel hexafluorosilicate	E, H	247-430-7	26043-11-8	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61	T; N R: 49-61-42/43-48/23-68-50/53	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					T; R48/23 R42/43 N; R50-53	S: 53-45-60-61	42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-031-00-5	nickel selenate	E, H	239-125-2	15060-62-5	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-032-00-0	nickel hydrogen phosphate; [1] nickel bis(dihydrogen phosphate); [2] trinickel bis(orthophosphate); [3] dinickel diphosphate; [4] nickel bis(phosphinate); [5] nickel phosphinate; [6] phosphoric acid, calcium nickel salt; [7] diphosphoric acid, nickel(II) salt [8]	E, H	238-278-2 [1] 242-522-3 [2] 233-844-5 [3] 238-426-6 [4] 238-511-8 [5] 252-840-4 [6] - [7] - [8]	14332-34-4 [1] 18718-11-1 [2] 10381-36-9 [3] 14448-18-1 [4] 14507-36-9 [5] 36026-88-7 [6] 17169-61-8 [7] 19372-20-4 [8]	Carc. Cat. 1; R49 T; R48/23 R42/43 N; R50-53	T; N R: 49-42/43-48/23-50/53 S: 53-45-60-61		
028-033-00-6	diammonium nickel hexacyanoferrate	E, H	-	74195-78-1	Carc. Cat. 1; R49 T; R48/23 R42/43 N; R50-53	T; N R: 49-42/43-48/23-50/53 S: 53-45-60-61		
028-034-00-1	nickel dicyanide	E, H	209-160-8	557-19-7	Carc. Cat. 1; R49 T; R48/23	T; N R: 49-32-42/43-48/23-50/53		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					R42/43 R32 N; R50-53	S: 53-45-60-61		
028-035-00-7	nickel chromate	E, H	238-766-5	14721-18-7	Carc. Cat. 1; R49 T; R48/23 R42/43 N; R50-53	T; N R: 49-42/43-48/23-50/53 S: 53-45-60-61		
028-036-00-2	nickel(II) silicate; [1] dinickel orthosilicate; [2] nickel silicate (3:4); [3] silicic acid, nickel salt; [4] trihydrogen hydroxybis[orthosilicato(4-)]trinickelate(3-) [5]	E, H	244-578-4 [1] 237-411-1 [2] 250-788-7 [3] 253-461-7 [4] 235-688-3 [5]	21784-78-1 [1] 13775-54-7 [2] 31748-25-1 [3] 37321-15-6 [4] 12519-85-6 [5]	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-037-00-8	dinickel hexacyanoferrate	E, H	238-946-3	14874-78-3	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-038-00-3	trinickel bis(arsenate); nickel(II) arsenate	E, H	236-771-7	13477-70-8	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-039-00-9	nickel oxalate; [1] oxalic acid, nickel salt [2]	E, H	208-933-7 [1] 243-867-2 [2]	547-67-1 [1] 20543-06-0 [2]	Carc. Cat. 1; R49 T; R48/23 R43 N: R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-040-00-4	nickel telluride	E, H	235-260-6	12142-88-0	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-041-00-X	trinickel tetrasulfide	E, H	-	12137-12-1	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-042-00-5	trinickel bis(arsenite)	E, H	-	74646-29-0	Carc. Cat. 1; R49 T; R48/23 R43	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					N; R50-53			
028-043-00-0	cobalt nickel gray periclase; C.I. Pigment Black 25; C.I. 77332; [1] cobalt nickel dioxide; [2] cobalt nickel oxide [3]	E, H	269-051-6 [1] 261-346-8 [2] - [3]	68186-89-0 [1] 58591-45-0 [2] 12737-30-3 [3]	Carc. Cat. 1; R49 T; R48/23 R43	T R: 49-43-48/23 S: 53-45		
028-044-00-6	nickel tin trioxide; nickel stannate	E, H	234-824-9	12035-38-0	Carc. Cat. 1; R49 T; R48/23 R43	T R: 49-43-48/23 S: 53-45		
028-045-00-1	nickel triuranium decaoxide	E, H	239-876-6	15780-33-3	Carc. Cat. 1; R49 T; R48/23 R43	T R: 49-43-48/23 S: 53-45		
028-046-00-7	nickel dithiocyanate	E, H	237-205-1	13689-92-4	Carc. Cat. 1; R49 Muta. Cat. 3;R68 Repr. Cat. 2; R61 T; R48/23 R42/43 R32 N; R50-53	T; N R: 49-61-32-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T: R49-61-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-047-00-2	nickel dichromate	E, H	239-646-5	15586-38-6	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; 49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1% ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C 0,1 %: Xi; R43	
028-048-00-8	nickel(II) selenite	E, H	233-263-7	10101-96-9	Carc. Cat. 1; R49	T; N		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
					T; R48/23 R42/43 N; R50-53	R: 49-42/43-48/23-50/53 S: 53-45-60-61		
028-049-00-3	nickel selenide	E, H	215-216-2	1314-05-2	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-050-00-9	silicic acid, lead nickel salt	E, H	-	68130-19-8	Carc. Cat. 1: R49 Repr. Cat. 1: R61 Repr. Cat. 3; R62 T; R48/23 R43 N; R50-53	T; N R: 49-61-43-48/23-62-50/53 S: 53-45-60-61		
028-051-00-4	nickel diarsenide; [1] nickel arsenide [2]	E, H	235-103-1 [1] 248-169-1 [2]	12068-61-0 [1] 27016-75-7 [2]	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-052-00-X	nickel barium titanium primrose priderite; C.I. Pigment Yellow 157; C.I. 77900	E, H	271-853-6	68610-24-2	Carc. Cat. 1: R49 T; R48/23 R43	T R: 49-43-48/23 S: 53-45		
028-053-00-5	nickel dichlorate; [1] nickel dibromate; [2] ethyl hydrogen sulfate, nickel(II) salt [3]	E, H	267-897-0 [1] 238-596-1 [2] 275-897-7 [3]	67952-43-6 [1] 14550-87-9 [2] 71720-48-4 [3]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43 N; R50-53	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N: R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T: R49-61-42/43-48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T: R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	
028-054-00-0	nickel(II) trifluoroacetate; [1] nickel(II) propionate; [2] nickel bis(benzenesulfonate); [3] nickel(II) hydrogen citrate; [4]	E, H	240-235-8 [1] 222-102-6 [2] 254-642-3 [3] 242-533-3 [4] 242-161-1 [5]	16083-14-0 [1] 3349-08-4 [2] 39819-65-3 [3] 18721-51-2 [4] 18283-82-4 [5]	Carc. Cat. 1; R49 Muta. Cat. 3; R68 Repr. Cat. 2; R61 T; R48/23 R42/43	T; N R: 49-61-42/43-48/23-68-50/53 S: 53-45-60-61	C ≥ 25 %: T, N; R49-61-42/43-48/23-68-50/53 2,5 % ≤ C < 25 %: T, N; R49-61-42/43-48/23-68-51/53 1 % ≤ C < 2,5 %: T; R49-61-42/43-	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	citric acid, ammonium nickel salt; [5] citric acid, nickel salt; [6] nickel bis(2-ethylhexanoate); [7] 2-ethylhexanoic acid, nickel salt; [8] dimethylhexanoic acid nickel salt; [9] nickel(II) isooctanoate; [10] nickel isooctanoate; [11] nickel bis(isononanoate); [12] nickel(II) neononanoate; [13] nickel(II) isodecanoate; [14] nickel(II) neodecanoate; [15] neodecanoic acid, nickel salt; [16] nickel(II) neoundecanoate; [17] bis(D-gluconato-O^1, O^2)nickel; [18] nickel 3,5-bis(*tert*-butyl)-4-hydroxybenzoate (1:2); [19] nickel(II) palmitate; [20] (2-ethylhexanoato-*O*)(isononanoato-*O*)nickel; [21] (isononanoato-*O*)(isooctanoato-*O*)nickel; [22] (isooctanoato-*O*)(neodecanoato-*O*)nickel; [23] (2-ethylhexanoato-*O*)(isodecanoato-*O*)nickel; [24] (2-ethylhexanoato-*O*)(neodecanoato-*O*)nickel; [25] (isodecanoato-*O*)(isooctanoato-*O*)nickel; [26] (isodecanoato-*O*)(isononanoato-*O*)nickel; [27] (isononanoato-*O*)(neodecanoato-*O*)nickel; [28] fatty acids, $C_{6\text{-}19}$-branched, nickel salts; [29] fatty acids, $C_{8\text{-}18}$ and C_{18}-		245-119-0 [6] 224-699-9 [7] 231-480-1 [8] 301-323-2 [9] 249-555-2 [10] 248-585-3 [11] 284-349-6 [12] 300-094-6 [13] 287-468-1 [14] 287-469-7 [15] 257-447-1 [16] 300-093-0 [17] 276-205-6 [18] 258-051-1 [19] 237-138-8 [20] 287-470-2 [21] 287-471-8 [22] 284-347-5 [23] 284-351-7 [24] 285-698-7 [25] 285-909-2 [26] 284-348-0 [27] 287-592-6 [28] 294-302-1 [29] 283-972-0	22605-92-1 [6] 4454-16-4 [7] 7580-31-6 [8] 93983-68-7 [9] 29317-63-3 [10] 27637-46-3 [11] 84852-37-9 [12] 93920-10-6 [13] 85508-43-6 [14] 85508-44-7 [15] 51818-56-5 [16] 93920-09-3 [17] 71957-07-8 [18] 52625-25-9 [19] 13654-40-5 [20] 85508-45-8 [21] 85508-46-9 [22] 84852-35-7 [23] 84852-39-1 [24] 85135-77-9 [25] 85166-19-4 [26] 84852-36-8 [27] 85551-28-6 [28] 91697-41-5 [29] 84776-45-4 [30] 72319-19-8 [31]	N; R50-53		48/23-68-52/53 0,5 % ≤ C < 1 %: T; R49-61-43-48/20-52/53 0,25 % ≤ C < 0,5 %: T; R49-43-48/20-52/53 0,1 % ≤ C < 0,25 %: T; R49-43-48/20 0,01 % ≤ C < 0,1 %: Xi; R43	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	unsaturated, nickel salts; [30] 2,7-naphthalenedisulfonic acid, nickel(II) salt; [31]		[30] - [31]					
028-055-00-6	nickel(II) sulfite; [1] nickel tellurium trioxide; [2] nickel tellurium tetraoxide; [3] molybdenum nickel hydroxide oxide phosphate [4]	E, H	231-827-7 [1] 239-967-0 [2] 239-974-9 [3] 268-585-7 [4]	7757-95-1 [1] 15851-52-2 [2] 15852-21-8 [3] 68130-36-9 [4]	Carc. Cat. 1; R49 T; R48/23 R42/43 N; R50-53	T; N R: 49-42/43-48/23-50/53 S: 53-45-60-61		
028-056-00-1	nickel boride (NiB); [1] dinickel boride; [2] trinickel boride; [3] nickel boride; [4] dinickel silicide; [5] nickel disilicide; [6] dinickel phosphide; [7] nickel boron phosphide [8]	E, H	234-493-0 [1] 234-494-6 [2] 234-495-1 [3] 235-723-2 [4] 235-033-1 [5] 235-379-3 [6] 234-828-0 [7] - [8]	12007-00-0 [1] 12007-01-1 [2] 12007-02-2 [3] 12619-90-8 [4] 12059-14-2 [5] 12201-89-7 [6] 12035-64-2 [7] 65229-23-4 [8]	Carc. Cat. 1; R49 T; R48/23 R43 N; R50-53	T; N R: 49-43-48/23-50/53 S: 53-45-60-61		
028-057-00-7	dialuminium nickel tetraoxide; [1] nickel titanium trioxide; [2] nickel titanium oxide; [3] nickel divanadium hexaoxide; [4] cobalt dimolybdenum nickel octaoxide; [5] nickel zirkonium trioxide; [6] molybdenum nickel tetraoxide; [7] nickel tungsten tetraoxide; [8] olivine, nickel green; [9] lithium nickel dioxide; [10] molybdenum nickel oxide; [11]	E, H	234-454-8 [1] 234-825-4 [2] 235-752-0 [3] 257-970-5 [4] 268-169-5 [5] 274-755-1 [6] 238-034-5 [7] 238-032-4 [8] 271-112-7 [9] - [10] - [11]	12004-35-2 [1] 12035-39-1 [2] 12653-76-8 [3] 52502-12-2 [4] 68016-03-5 [5] 70692-93-2 [6] 14177-55-0 [7] 14177-51-6 [8] 68515-84-4 [9] 12031-65-1 [10] 12673-58-4 [11]	Carc. Cat. 1; R49 T; R48/23 R43	T R: 49-43-48/23 S: 53-45		
603-211-00-1	2,3-epoxypropyltrimethylammonium chloride ...%; glycidyl trimethylammonium chloride ...%	B E	221-221-0	3033-77-0	Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62 Xn; R21/22-48/22 Xi; R41 R43 R52-53	T R: 45-21/22-41-43-48/22-62-68-52/53 S: 53-45-61		
603-212-00-7	1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylindeno(5,6-c)pyran; galaxolide;		214-946-9	1222-05-5	N; R50-53	N R: 50/53 S: 60-61		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	(HHCB)							
603-213-00-2	2-methoxy-2-methylbutane; *tert*-amyl methyl ether		213-611-4	994-05-8	F; R11 Xn; R22 R67	F; Xn R: 11-22-67 S: (2-)9-16-23-33		
604-074-00-0	tetrabromobisphenol-A; 2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol		201-236-9	79-94-7	N; R50-53	N R: 50/53 S: 60-61		
604-075-00-6	4-(1,1,3,3-tetramethylbutyl)phenol; 4-*tert*-octylphenol		205-426-2	140-66-9	Xi; R38-41 N; R50-53	Xi; N R: 38-41-50/53 S: (2-)26-37/39-60-61	C ≥ 20 %: Xi, N; R38-41-50/53 10 % ≤ C < 20 %: Xi, N; R41-50/53 5 % ≤ C < 10 %: Xi, N; R36-50/53 2,5 % ≤ C < 5 %: N; R50/53 0,25 % ≤ C < 2,5 %: N; R51/53 0,025 % ≤ C < 0,25 %: R52/53	
604-076-00-1	phenolphthalein		201-004-7	77-09-8	Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62	T R: 45-62-68 S: 53-45	C ≥ 5%: T; R45-62-68 1% ≤ C < 5%: T; R45-68	
607-618-00-5	menadione sodium bisulfite; 2-naphthalenesulfonic acid,1,2,3,4-tetrahydro-2-methyl-1,4-dioxo-, sodium salt		204-987-0	130-37-0	Xi; R36/38 N; R50-53	Xi; N R: 36/38-50/53 S: (2-)24/25-60-61		
607-619-00-0	menadione nicotinamide bisulfite; 1,2,3,4-tetrahydro-2-methyl-1,4-dioxonaphthalene-2-sulfonic acid, compound with nicotin-3-amide (1:1)		277-543-7	73581-79-0	Xi; R36/38 N; R50-53	Xi; N R: 36/38-50/53 S: (2-)24/25-60-61		
607-620-00-6	trisodium nitrilotriacetate		225-768-6	5064-31-3	Carc. Cat. 3; R40 Xn; R22 Xi; R36	Xn R: 22-36-40 S: (2-)26-36/37-46	C ≥ 25 %: Xn; R22-36-40 20 ≤ % C < 25 %: Xn; R36-40 5 ≤ % C < 20 %: Xn; R40	
607-622-00-7	2-ethylhexyl-2-ethylhexanoate		231-057-1	7425-14-1	Repr. Cat. 3; R63	Xn R: 63 S: (2-)36/37		
607-623-00-2	diisobutyl phthalate		201-553-2	84-69-5	Repr. Cat. 2; R61 Repr. Cat. 3; R62	T R: 61-62 S: 53-45	C ≥ 25 %: T; R61-62 5 % ≤ C < 25 %: Xn; R62	
607-624-00-8	perfluorooctane sulfonic acid; heptadecafluorooctane-1-sulfonic acid; [1] potassium perfluorooctane sulfonate;	E	217-179-8 [1] 220-527-1 [2] 274-460-8 [3] 249-415-0 [4] 249-644-6 [5]	1763-23-1 [1] 2795-39-3 [2] 70225-14-8 [3] 29081-56-9 [4] 29457-72-5 [5]	Carc. Cat. 3; R40 Repr. Cat. 2; R61 T; R48/25 Xn; R20/22 R64	T; N R: 61-20/22-40-48/25-64-51/53 S: 53-45-61		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	potassium heptadecafluorooctane-1-sulfonate; [2] diethanolamine perflurooctane sulfonate; heptadecafluorooctanesulfonate, compound with 2,2'-iminodiethanol (1:1); [3] ammonium perfluorooctane sulfonate; ammonium heptadecafluorooctanesulfonate; [4] lithium perfluorooctane sulfonate; lithium heptadecafluorooctanesulfonate [5]				N; R51-53			
607-624-00-8	perfluorooctane sulfonic acid; heptadecafluorooctane-1-sulfonic acid; [1] potassium perfluorooctane sulfonate; potassium heptadecafluorooctane-1-sulfonate; [2] diethanolamine perfluorooctane sulfonate; [3] ammonium perfluorooctane sulfonate; ammonium heptadecafluorooctanesulfonate; [4] lithium perfluorooctane sulfonate; lithium heptadecafluorooctanesulfonate [5]	E	217-179-8 [1] 220-527-1 [2] - [3] 249-415-0 [4] 249-644-6 [5]	1763-23-1 [1] 2795-39-3 [2] 70225-39-5 [3] 29081-56-9 [4] 29457-72-5 [5]	Carc. Cat. 3; R40 Repr. Cat. 2; R61 T; R48/25 Xn; R20/22 R64 N; R51-53	T; N R: 61-20/22-40-48/25-64-51/53 S: 53-45-61		
607-625-00-3	clodinafop-propargyl (ISO)		-	105512-06-9	Xn; R22-48/22 R43 N; R50-53.	Xn; N R: 22-43-48/22-50/53 S: (2-)24-36/37-46-60-61	C ≥ 25 %: Xn, N; R22-43-48/22-50/53 10 % ≤ C < 25 %: Xn, N; R43-48/22-51/53 2,5 % ≤ C < 10 %: Xi, N; R43-51/53	

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
							0,25 % ≤ C < 2,5 %: Xi; R43-52/53 0,001 % ≤ C < 0,25 %: Xi; R43	
609-069-00-7	musk ketone; 3,5-dinitro-2,6-dimethyl-4-*tert*-butylacetophenone; 4'-*tert*-butyl-2',6'-dimethyl-3',5'-dinitroacetophenone		201-328-9	81-14-1	Carc. Cat. 3; R40 N; R50-53	Xn; N R: 40-50/53 S: (2-)36/37-46-60-61		
612-238-00-8	(3-chloro-2-hydroxypropyl) trimethylammonium chloride ...%	B	222-048-3	3327-22-8	Carc. Cat. 3, R40 R52-53	Xn R: 40-52/53 S: 36/37-61		
612-239-00-3	biphenyl-3,3',4,4'-tetrayltetraamine; diaminobenzidine		202-110-6	91-95-2	Carc. Cat. 2; R45 Muta. Cat. 3; R68	T R: 45-68 S: 53-45		
612-240-00-9	pyrimethanil (ISO); *N*-(4,6-dimethylpyrimidin-2-yl)aniline		-	53112-28-0	N; R51-53	N R: 51/53 S: 61		
612-241-00-4	piperazine hydrochloride; [1] piperazine dihydrochloride; [2] piperazine phosphate [3]		228-042-7 [1] 205-551-2 [2] 217-775-8 [3]	6094-40-2 [1] 142-64-3 [2] 1951-97-9 [3]	Repr. Cat. 3; R62-63 Xi; R36/38 R42/43 R52-53	Xn R: 36/38-42/43-62-63-52/53 S: (1/2-)22-36/37-45-63-61		
612-242-00-X	cyprodinil (ISO); 4-cyclopropyl-6-methyl-*N*-phenylpyrimidin-2-amine		-	121552-61-2	R43 N; R50-53	Xi; N R: 43-50/53 S: (2-)24-37-46-60-61	C ≥ 2,5 %: Xi, N; R43-50/53 1 % ≤ C < 2,5 %: Xi, N; R43-51/53 0,25 % ≤ C < 1 %: N; R51/53 0,025 % ≤ C < 0,25 %: R52/53	
612-278-00-6	ethidium bromide; 3,8-diamino-1-ethyl-6-phenylphenantridinium bromide		214-984-6	1239-45-8	Muta. Cat. 3; R68 T+; R26 Xn; R22	T+ R: 22-26-68 S: (1/2-)28-36/37-45-63		
612-280-00-7	3-amino-9-ethyl carbazole; 9-ethylcarbazol-3-ylamine	H	205-057-7	132-32-1	Carc. Cat. 2; R45	T R: 45 S: 53-45		
613-116-01-4	tolylfluanid (ISO); dichloro-*N*-[(dimethylamino)sulphonyl]fluoro-*N*-(*p*-tolyl)methanesulphenamide; [containing < 0.1% (w/w) of particles with an aerodynamic diameter of below 50 µm]		211-986-9	731-27-1	Xi; R36/37/38 R43 N; R50	Xi; N R: 36/37/38-43-50 S: (2-)25-36/37-46-61	C ≥ 20 %: Xi, N; R36/37/38-43-50 2,5 % ≤ C < 20 %: Xi, N; R43-50 1 % ≤ C < 2,5 %: Xi; R43	
613-280-00-X	tetrahydro-1,3-dimethyl-1*H*-pyrimidin-2-one;		230-625-6	7226-23-5	Repr. Cat. 3; R62 Xn; R22	Xn R: 22-41-62		

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
	dimethyl propyleneurea				Xi; R41	S: 26-36/37/39		
613-281-00-5	quinoline	E	202-051-6	91-22-5	Carc. Cat. 2; R45 Muta. Cat. 3; R68 Xn; R21/22 Xi; R36/38 N; R51-53	T; N R: 45-21/22-36/38-68-51/53 S: 53-45-61		
613-282-00-0	triticonazole (ISO); (*RS*)-(*E*)-5-(4-chlorobenzylidene)-2,2-dimethyl-1-(1*H*-1,2,4-triazol-1-methyl)cyclopentanol		-	131983-72-7	N; R51-53	N R: 51/53 S: 61		
613-283-00-6	ketoconazole; 1-[4-[4-[[(2*SR*,4*RS*)-2-(2,4-dichlorophenyl)-2-(imidazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]piperazin-1-yl]ethanone	E	265-667-4	65277-42-1	Repr. Cat. 2; R60 T; R25 Xn; R48/22 N; R50-53	T; N R: 60-25-48/22-50/53 S: 53-45-60-61		
613-284-00-1	metconazole (ISO); (1*RS*,5*RS*;1*RS*,5*SR*)-5-(4-chlorobenzyl)-2,2-dimethyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol		-	125116-23-6	Repr. Cat. 3; R63 Xn; R22 N; R51-53	Xn; N R: 22-63-51/53 S: (2-)36/37-46-61		
613-285-00-7	1-hydroxybenzotriazole, anhydrous; [1] 1-hydroxybenzotriazole, monohydrated [2]		219-989-7 [1] 219-989-7 [2]	2592-95-2 [1] 123333-53-9 [2]	E; R2	E R: 2 S: 16-35		
613-316-00-4	trimethylopropane tri(3-aziridinylpropanoate); (TAZ)	H	257-765-0	52234-82-9	Muta. Cat. 3; R68 Xi; R41 R43	Xn R: 41-43-68 S: 26-36/37/39-42		
615-044-00-1	4-chlorophenylisocyanate		203-176-9	104-12-1	T+; R26 Xn; R22 Xi; R37/38-41 R42 N; R50-53	T+; N R: 22-26-37/38-41-42-50/53 S: (1/2-)26-28-36/37/39-45-63-60-61		

ANNEX 1C (31st ATP)

Index No	Chemical name	Notes related to substances	EC No	CAS No	Classification	Labelling	Concentration Limits	Notes related to preparations
024-004-01-4	sodium dichromate, dihydrate	E	234-190-3	7789-12-0	O; R8 Carc. Cat. 2; R45 Muta. Cat. 2; R46 Repr. Cat. 2; R60-61 T+; R26 T; R25-48/23 Xn; R21 C; R34 R42/43 N; R50-53	O; T+; N R: 45-46-60-61-8-21-25-26-34-42/43-48/23-50/53 S: 53-45-60-61	C ≥ 25 %: T+, N; R45-46-60-61-21-25-26-34-42/43-48/23-50/53 10 % ≤ C < 25 %: T+, N; R45-46-60-61-22-26-34-42/43-48/23-51/53 7 % ≤ C < 10 %: T+, N; R45-46-60-61-22-26-36/37/38-42/43-48/20-51/53 5 % ≤ C < 7 %: T, N; R45-46-60-61-22-23-36/37/38-42/43-48/20-51/53 3 % ≤ C < 5 %: T, N; R45-46-60-61-22-23-42/43-48/20-51/53 2,5 % ≤ C < 3 %: T, N; R45-46-60-61-23-42/43-48/20-51/53 1 % ≤ C < 2,5 %: T; R45-46-60-61-23-42/43-48/20-52/53 0,5 % ≤ C < 1 %: T; R45-46-60-61-20-42/43-52/53 0,25 % ≤ C < 0,5 %: T; R45-46-20-42/43-52/53 0,2 % ≤ C < 0,25 %: T; R45-46-20-42/43 0,1 % ≤ C < 0,2 %: T; R45-46-20	3
603-037-01-3	cellulose nitrate; nitrocellulose, containing a maximum of 12,6 % nitrogen		-	-	F; R11	F R: 11 S: (2-)16-33-37/39		
603-155-00-8	Reaction products of 2-(4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl)-5-hydroxyphenol with ((C_{10-16}, rich in C_{12-13} alkyloxy)methyl)oxyrane		410-560-1	-		R: S:		
611-084-00-9	A mixture of: *N*-(4-chlorophenyl)-4-(2,5-dichloro-4-(dimethylsulfamoyl)phenylazo)-3-hydroxy-2-naphthalenecarboxamide; *N*-(4-chlorophenyl)-4-(2,5-dichloro-4-(methylsulfamoyl)phenylazo)-3-hydroxy-2-		412-550-2	-		R: S:		

	naphthalenecarboxamide							

Directive 67/548 on classification, packaging and labelling of dangerous substances – 31st ATP

1) Introduction:

In its 40+ year history, Directive 67/548/EEC laying down common provisions for the classification, labelling and packaging of dangerous substances has been adapted to technical progress via comitology 30 times in order to take into account scientific and technical progress to make sure a high level of protection of man and the environment, as well as the correct functioning of the internal market is guaranteed.

The changes to Directive 67/548/EEC proposed in the 31st ATP constitute another very important step forward in this regard as it contains a large number of substances classified for carcinogenicity, mutagenicity or reproductive toxicity. The classifications of nearly 22 existing entries have been revised to include these effects. In addition, 96 entries with these effects are included in the Annex for the first time along with another 110 new entries for substances that may cause either sensitisation by inhalation and skin contact or serious damage to health from prolonged exposure. This information will allow manufacturers, importers and downstream users of the substances to apply, or recommend, risk reduction measures to protect workers, the general public and the environment from these effects.

The above changes are contained in three annexes to the draft directive:
Annex 1 A: Revised C&L for existing entries => 83 entries (6 on nickels covering 12 out of 100 substances)
Annex 1 B: C&L for new entries => 385 entries (45 entries on Nickels covering 97 out of 500 substances)
Annex 1 C: Deleted entries => 4 entries

Due to their commercial importance and a sustained lobbying campaign of the nickel industry, the proposed classification of some 110 nickel compounds has attracted particular attention and this paper therefore aims in particular to explain the history of and scientific rationale for the proposed classifications.

2) Classification History and Scientific rationale for classification of Nickel compounds

Procedure for harmonised classification:

The determination of the classification of a substance requires specialised knowledge about the intrinsic properties of the substance. In order to provide a solid scientific basis for the preparation of Commission proposals for harmonised classification and labelling, DG Environment has set up a committee of Member State experts and industry observers, called the Technical Committee on Classification and Labelling (TC C&L). Meetings of this Technical Committee are organised by the European Chemicals Bureau (ECB) at the Commission's Joint Research Centre (JRC) Ispra. All conclusions the TC C&L arrives at are recommendations for possible inclusion in an ATP of Directive 67/548/EEC.

Category/Grouping approach:

The category or grouping approach is a technique for grouping closely related chemicals that are then considered as a group, or category, rather than individual chemicals. Under this approach, not every chemical needs to be test for every effect. The overall data set allows the estimation of the hazard for the untested endpoints for the chemicals in the category. The structural similarities may be based on a common functional group (acid, alcohol, specific metal ion). The grouping approach is listed in Annex XI of REACH as an alternative method to avoid animal testing. The OECD has also published a detailed guidance on grouping of chemicals. The OECD guidance document is based on the guidance developed by US Environmental Protection Agency and experience gained within OECD programme on chemicals.
The category approach is widely used in Annex I (list of classified dangerous substances) to Directive 67/548/EEC. Nearly 100 group entries are already included in Annex I. Some of the entries are defined in quite general terms, such as "arsenic acid and its salts". Other entries are equally general, but do make some exceptions to the general entry. Other entries are more specific, such as "Triethyltin compounds, with the exception of those specified elsewhere in this Annex".

History of Nickel compounds classification:

- The Danish EPA has reviewed five selected nickel compounds under the EU existing chemicals programme. The five substances are nickel (metal), nickel sulfate, nickel dichloride, nickel dinitrate and nickel carbonate (i.e., those listed in the 30th ATP).
- Given that a large number of other nickel compounds are not covered by Annex I, in 2005 the Danish EPA considered that additional proposals for classification of relevant nickel compounds based on a category approach were required.
- The category is defined as "nickel and nickel compounds". "Nickel and nickel compounds" includes over 300 identified compounds of very diverse chemical structure.
- There are a number of scientific bases underlying any grouping of nickel compounds for estimating their biological properties. The main basis is that it is the nickel ion that is responsible for the effects to be assessed. The concentration of the ion at the site of action is the most important factor determining the toxicity of the compound; however this information is almost never known and usually difficult to determine experimentally. Bioavailability can be used as tool to establish categories. Simply defined, bioavailability is the fraction of the metal ion that reaches target sites for toxicity. The bioavailability depends on various characteristics of the individual nickel compounds of which solubility is considered as being particularly important for the release of the nickel ion and thus the systemic bioavailability of the nickel ion.
- The division into groups across the spectrum of water solubility follows the approach already widely used for nickel compounds[1]. The read-across[2] within groups of compounds of

[1] The NiPERA report prepared for DG V in 1996 (Occupational exposure limits: Criteria Document for nickel and nickel compounds. Volume I: Summary, Conclusions and Recommendations; Volume II: Assessment of Occupational Exposures; Volume III: Health Assessment of various species of Nickel. Prepared by NiPERA in collaboration with Eurométaux for the European Commission, Directorate General V. Public health and Safety at Work Directorate. Batiment Jean Monnet, Plateau du Kirchberg. L-2920 Luxembourg) considers compounds under the headings of "soluble nickel", "sulphidic nickel", "oxidic nickel", "metallic nickel" and "nickel carbonyl". Other reviews, such as the TERA (1999) (Toxicological review of soluble nickel salts. Prepared for: Metal Finishing Association of Southern California, Inc., US Environmental Protection Agency and Health Canada.) base their conclusion on a common biological effect across a range of water solubilites.

[2] Read-across approach: Human health and environmental effects may be predicted from data for reference substances by interpolation to other substances in the group.

similar water solubility is not only justified, but provides the possibility of hazard identification that would be difficult or impossible for certain endpoints (cancer) or would involve the use of costly animal testing and thus the unnecessary use of experimental animals.

- There is a vast database on the human health effects of nickel compounds. A search in Toxline gave 2538 hits for nickel and toxicity, 5077 hits for "nickel" and "effects" and about 16000 hits for "nickel" and "sensitisation". However, the data available for any individual nickel compound can vary considerably. The two compounds for which there is data that covers most endpoints are the two soluble compounds, nickel dichloride and nickel sulfate. Much of the database relating to nickel metal is linked to sensitisation. On the other hand, there is virtually no data at all for most other nickel compounds. In particular, data on the organic nickel compounds is extremely limited.

- Due to lack of data for most of the Nickel compounds a grouping approach has been proposed by Danish EPA. A matrix has been elaborated on the data availability on selected nickel compounds (<http://cms.mim.dk/NR/rdonlyres/07DB028E-134E-4796-BF6D-97B9AD5F9E82/0/Nikkel.pdf >). There is a good dataset? for some of the water soluble and the insoluble compounds on which to base a read-across. Read-across for the sparingly soluble salts is clearly the group on which there is least data. On the other hand, their position in the middle of the solubility range with more data rich compounds or greater and less solubility compensate for this, at least to some extent.

- **In November 2005** there was a wide-ranging discussion in the TC C&L of the principle and detail of the proposal. Member States and Industry appeared willing to accept the concept of a group approach. However the number of end points (acute toxicity, irritation) to which it can be applied was identified as an issue for further consideration. Industry also signaled concern that water solubility was not an appropriate indication of toxicity.

- In **March 2006** a modified and reduced proposal from Denmark was discussed. There was MS consensus towards agreement on a reduced number of substances (e.g.., exclusion of metal-metal substances) and a reduced number of end points. However fundamental differences of opinion with the nickel industry remained. The representatives of the Industry made clear they did not regard the proposal as scientifically valid and also that they regarded the proposal as not meeting the requirements of the Directive. In the Nickel industry's view the Directive? calls for specific substance-based information. MS did not regard these concerns as grounds for invalidating the modified proposal. Indeed several argued that the work was a clear priority and should be progressed in order to be concluded as part of the 31st ATP.

The discussion concluded with Member States' agreement to a written procedure for the final refinement of the proposal based on discussions in the meeting. No MS opposed the final proposal.

- **In December 2007**, the recommendation from the MS was placed on the ECB website.

Information submitted by Industry:

- The nickel industry was mainly represented in the meeting of the TC C&L by Eurométaux, and included ENiG (the European Nickel Group), ENIA (European Nickel Industry Association) and NiPERA (the US based Nickel Producers Environmental Research Association). ENIA is the European branch of the Nickel Institute, which itself has also taken part in the discussions.

- The Nickel industry, while agreeing to the principle of read across, considered this approach to be subject to validation. The Nickel industry argued that the approach using water solubility is scientifically invalid as it assumes the mechanism relies on the nickel ion alone and ignores delivery mechanisms. Since 2005 the Nickel Institute has sent several letters to the Commission claiming that the 31st ATP is based on flawed science. They also provided the Commission with the view of an expert panel that supported the nickel industry's conclusions. However, the nickel industry has as yet not submitted any information or experimental results to substantiate its view.

- Industry has had the opportunity to put forward data disproving this classification. One branch of Industry, Eurocolour, a CEFIC sector group, has taken advantage of this possibility in close collaboration with the Danish representatives in the TC C&L. This has led to the deletion of a number of pigments containing nickel compounds from the proposal, as the data generated by the CEFIC sector group showed that the application of the group assessment approach to some pigments was not justified. Both the nickel industry and other Industry groups are free at any time to carry out further testing after a classification has been made, if it considers that the data derived from such testing can demonstrate that the classification should be changed.

Classification of the Ni compounds in the 31st ATP proposal:

For the purposes of this evaluation, nickel compounds are placed in one of eight sub-categories:

a) nickel sulfate, nickel dichloride, nickel dinitrate and other soluble compounds with a water-solubility greater than 10^{-2} mol/L (groups of "soluble" compounds).
Classification: Carcinogen cat. 1, reproductive toxicant cat.2, Mutagen cat. 3, chronic toxicity by inhalation, sensitisation by inhalation and skin contact, very toxic for the environment.

b) nickel carbonate, nickel dihydroxide and other sparingly soluble compounds with a water-solubility in the range 10^{-4} -10^{-2} mol/L, (group of "slightly soluble" compounds).
Classification: Carcinogen cat. 1, chronic toxicity by inhalation, sensitisation by inhalation and skin contact, very toxic for the environment.

c) nickel sulphide, nickel subsulphide and other 'insoluble' compounds with a water solubility less than 10^{-4} mol/L (group of "insoluble" compounds)
Classification: Carcinogen cat. 1, chronic toxicity by inhalation, sensitisation by skin contact, very toxic for the environment.

d) nickel oxide and mixed nickel oxides
Classification: Carcinogen cat. 1, chronic toxicity by inhalation, sensitisation by skin contact, possible of long term effects for the environment.

e) metallic nickel and metallic nickel compounds
Not included. Studies on the inhalational carcinogenicity of metallic nickel are currently in progress, and the relevance of including these metal-metal compounds can be considered when the results of this study have been evaluated.

f) nickel carbonyl

No change of the current classification.

g) nickel compounds specifically excluded from the category

see: <http://cms.mim.dk/NR/rdonlyres/07DB028E-134E-4796-BF6D-97B9AD5F9E82/0/Nikkel.pdf_>

h) nickel compounds not included in the category

see: <http://cms.mim.dk/NR/rdonlyres/07DB028E-134E-4796-BF6D-97B9AD5F9E82/0/Nikkel.pdf_>

Rationale for each endpoint retained in the category approach:

- Carcinogen cat. 1: There is epidemiological evidence for carcinogenicity of some soluble nickel compounds as well as of some insoluble soluble and nickel oxides. Chronic animal studies have shown carcinogenicity for the poorly water-soluble nickel compounds tested. The overall findings indicate that nickel ions generated in target cells are critical determinants for the carcinogenic process.
The cellular uptake of soluble and insoluble nickel compounds is different as insoluble nickel compounds enter the cell via phagocytosis[3], while soluble nickel compounds enter the cell via metal ion transport systems or through membrane diffusion. The latter two processes are much less efficient implicating that the same extracellular levels of soluble and insoluble nickel compounds lead to lower intracellular nickel levels for soluble nickel compounds. Soluble forms of nickel interact with the cell in a way that maximises cytotoxicity and minimises nickel delivery to the nucleus and interaction with DNA, while insoluble forms of nickel interact with cells in a way that decreases the cytotoxic potential while increasing the delivery of nickel to the nucleus. Thus, the mechanism for cellular uptake could differ between soluble Nickel compounds and insoluble ones. For the group of “slightly soluble" compounds, the mechanism for cellular uptake is unknown and could be similar either to the one of the soluble nickel compounds or to the one of the insoluble nickel compounds. However, since both groups are classified as carcinogens, the group of “slightly soluble" should also be classified in a similar way. This is the logic followed for the 30th ATP in which the soluble and slightly soluble compounds listed in the ATP have been classified as carcinogens. Indeed, it is reasonable to assume that all nickel compounds that can create nickel ions inside or outside the cell are carcinogenic to humans following exposure by inhalation. As a consequence, soluble, slightly and insoluble Nickel compounds as well as nickel oxides are proposed to be classified as carcinogens in the 31st ATP.

- Chronic toxicity by inhalation: Inhalation of the insoluble nickel compounds (subsulphide and oxide) results in lung inflammation and fibrosis. Inhalation of the soluble nickel sulphate and chloride also affects the lungs. Chronic lung inflammation and lung fibrosis are serious and potentially irreversible effects. Repeated dose toxicity following inhalation is an effect that leads to classification of both soluble (nickel sulphate) and insoluble nickel compounds (nickel subsulphide and nickel oxide). The effects are seen at substantially lower levels with nickel sulphate than with

[3] a cellular process whereby the cell engulfs solid particles by cell membrane to form an internal membrane-bound compartment

the insoluble compounds. For this effect, we are in the same situation as for carcinogenicity, therefore, a logic similar to carcinogenicity is followed. In other words, soluble, slightly and insoluble Nickel compounds as well as nickel oxides are proposed to be classified as toxic by inhalation following repeated exposure in the 31st ATP.

- Reproductive toxicity cat.2: There are no relevant studies in humans. Only animal data on two soluble nickel compounds are available. In the 30th ATP, based on the consistent evidence of developmental toxicity (stillbirth, post-implantation/perinatal lethality) in rats at dose levels not causing maternal toxicity, some soluble nickel compounds have been classified for developmental toxicity in Category 2. As the available information is limited to soluble nickel compounds, it is proposed in the 31st ATP to classify only the group of soluble nickel compounds as reproductive toxicant.

- Mutagen cat. 3: There is considerable evidence of the *in vitro* genotoxicity of nickel compounds. Positive effects are generally seen in studies of chromosomal effects, cell transformation tests and tests for DNA damage and repair. Interpretation of the results of *in vivo* studies is more complicated. Most of the studies have been carried out with the three soluble nickel compounds listed in the 30th ATP. There is little *in vivo* data on other soluble compounds, and data on sparingly soluble nickel compounds and insoluble compounds is also very limited. In the 30th ATP, based on the evidence of in vivo genotoxicity in somatic cells, after systemic exposure, some soluble nickel compounds have been classified as mutagens cat.3. As the available information demonstrates mutagenicity only for soluble nickel compounds, it is proposed in the 31st ATP to classify only the group of soluble nickel compounds as mutagens.

- Sensitisation by skin contact: Nickel is well known as a skin sensitizer, and is one of the most frequent skin sensitizers in man. Nickel skin sensitisation has been evaluated almost entirely on the basis of human studies with very water-soluble nickel compounds, and studies on release rates with nickel metal. There is limited data on skin sensitisation or nickel release from compounds with lower water-solubility. There is however agreement that this effect also occurs with compounds with very low water solubility such as nickel oxide. In a similar way as for carcinogenicity and reproductive toxicity, soluble, slightly and insoluble Nickel compounds as well as nickel oxides are proposed to be classified as sensitizers by skin contact in the 31st ATP.

- Sensitisation by inhalation: Respiratory sensitisation is recognised as an effect with the soluble and sparingly water-soluble nickel compounds. The TC C&L has agreed that (insoluble) nickel sulphide, nickel subsulphide or metallic nickel should not be classified for this end-point, although there is limited evidence from people exposed to metallic nickel, and some suggestion that this effect can also be seen with other compounds, as shown by the anecdotal evidence that nickel matte also shows this effect. The TC C&L agreed to read-across this classification for all the soluble and sparingly soluble nickel compounds. It is possible that further studies may show that this effect occurs across a wider spectrum of water-solubility than is currently recognised.

- Toxicity for the environment: Metal compounds may be toxic in the aquatic environment depending on the toxicity of the metal ion and the rate and extent to which

metal compounds can produce soluble available ionic species in aqueous media. The availability of a metal substance means the extent to which the metal ion portion of a metal compound can disaggregate from the rest of the compound. To determine the classification of a nickel substance, its capacity to solubilise in water and liberate its nickel ion is compared with the reference toxic value for the nickel ion. The appropriate $L(E)C_{50}$ value for the evaluation of Nickel compounds is 0.068 mg/L. On the basis of this analysis, all the nickel compounds with the exception of the nickel oxides and metallic nickel should be classified as very toxic for aquatic organisms.

Rationale for each endpoint excluded from the category approach:

- Irritation/corrosivity: The available data that indicates that soluble nickel compounds can cause skin irritation is derived from humans, whilst the available animal data does not support classification for this effect. Unlike nickel sulphate, nickel dinitrate showed severe eye irritation. It was suggested that the greater severity of this compound was due to its oxidising properties. This suggests that this local property is more dependent on the counterion[4] than other systemic effects. This endpoint not only depends on the water solubility of the nickel compound, but also on the nature of the anion[5], and that the read-across for nickel salts must include an evaluation of not just nickel ion availability, but also the irritancy of the anions. Since the water soluble nickel salts are not irritating at concentrations below 20% it will be impossible to consider a direct extrapolation of irritancy data without some knowledge of the bioavailable fraction of nickel released by a particular compound and the potential irritancy of the molecule to which it is bound.

- Acute toxicity: Most of the available data for both soluble and slightly soluble compounds is in the range of oral toxicity are covered by the criteria for "harmful". The counter-ions may lead to increased toxicity, and it is likely that there are additional soluble nickel compounds that, like nickel chloride, show a toxicity in the range of oral toxicity covered by the criteria for "toxic" or "very toxic". However, the uncertainties reflected in the discussion led to deleting acute toxicity from the proposals.

[4] The ion that accompanies an ionic species in order to maintain electric neutrality
[5] A negatively charged ion, which has more electrons in its electron shells than it has protons in its nuclei