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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the Transport of Dangerous Goods

Twenty-ninth session
Geneva, 3-12 (a.m.) July 2006
Item 6 of the provisional agenda

LISTING, CLASSIFICATION AND PACKING

Organic peroxides

New formulations to be listed in 2.5.3.2.4, IBC 520 and T23

Transmitted by the International Council of Chemical Associations (ICCA)

1. Introduction

Since several new peroxides and formulations have become commercially available, there is a need to update 2.5.3.2.4, IBC 520 and T23. A list of new products, proposed classification, the accompanying competent authority approvals and a summary of the supporting test data are given in the annex to this proposal.

2. Proposals

ICCA proposes to include a number of new or amended entries in 2.5.3.2.4, list of currently assigned organic peroxides, as indicated in 2.1. Further, ICCA proposes to include a number of new entries or change one entry in packaging IBC520, as indicated in 2.2. In addition for one organic peroxide formulation an additional type of diluent is proposed for inclusion in portable tank instruction T23.

2.1 Proposed amendments to 2.5.3.2.4 List of currently assigned organic peroxides:

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B 1) (%)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
ADD:										
tert-AMYL PEROXYNEODECANOATE	=47	= 53				OP8	0	+10	3119	
tert-BUTYL PEROXY 3,5,5-TRIMETHYLHEXANOATE	=42			=48		OP7			3106	
CUMYL PEROXYNEO DECANOATE	= 87	= 13				OP7	-10	0	3115	
2,2-DI-(tert-AMYLPEROXY)BUTANE	= 57	= 43				OP7			3105	
1,1-DI-(tert-BUTYLPEROXY)CYCLOHEXANE	= 72		= 28			OP5			3103	30)
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE + tert-BUTYLPEROXY-2-ETHYLHEXANOATE	=43+=16	= 41				OP 7			3105	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	= 90		= 10			OP5			3103	30)
DI-2,4-DICHLOROBENZOYL PEROXIDE	= 52 as a paste					OP8	+20	+25	3118	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	=77	= 23				OP 7	-5	+5	3115	
3-HYDROXY-1,1-DIMETHYL BUTYLPEROXYNEODECANOATE	=52 as a stable dispersion in water					OP 8	-5	+5	3119	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	=52	= 48				OP 8	-5	+5	3117	
METHYL ISOPROPYL KETONE PEROXIDE(S)	See remark 31)	= 70				OP8			3109	31)
3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	=100					OP8			3107	

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B 1) (%)	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary risks and remarks
CHANGE:										
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	= 62 as a stable dispersion in water					OP8	-15	-5	**change 3117 to 3119**	
tert-AMYLPEROXY-3,5,5-TRIMETHYLHEXANOATE	=100					**Change OP5 to OP7**			**Change 3101 to 3105**	
DICUMYL PEROXIDE	>52-100			**Delete ~~= 57~~**		OP8			3110	12)
DELETE:										
~~DI-(2-ETHYLHEXYL) PEROXYDICARBONATE~~	~~= 52 as a stable dispersion in water~~					~~OP8~~	~~-15~~	~~-5~~	~~3119~~	

Add new notes:
Note 30) Diluent type B with a boiling point >130°C
Note 31) Active oxygen = 6.7 %

2.2 Proposed amendments to packing instruction IBC520:

UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres)	Control temperature	Emergency Temperature
3109	**ORGANIC PEROXIDE TYPE F, LIQUID**				
	ADD:				
	tert-Butyl peroxybenzoate, not more than 32% in diluent type A	31A	1250		
	1,1-Di-(tert-Butylperoxy)cyclohexane, not more than 47% in diluent type A,	31A	1250		
	CHANGE:				
	Change: tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than **32%** in diluent type A **To:** tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than **37%** in diluent type A	31A 31HA1	1250 1000		
3119	**ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED**				
	ADD:				
	tert-Amyl peroxypivalate, not more than 32% in diluent type A	31A	1250	+10	+15
	tert-Butyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-5	+5
	Di-(2-neodecanoylperoxyisopropyl)-benzene, not more than 42%, stable dispersion, in water	31A	1250	-15	-5
	3-Hydroxy-1,1-dimethylbutylperoxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-15	-5
	CHANGE:				
	Di-(2-ethylhexyl) peroxydicarbonate, not more than 52%, stable dispersion in water **INTO:** Di-(2-ethylhexyl) peroxydicarbonate, not more than 62%, stable dispersion in water	31A 31A	1250 1250	-20 -20	-10 -10

2.3 Proposed amendments to portable tank instruction T23:

UN No.	Substance	Min. test pressure (bar)	Min. shell thickness (mm-reference steel)	Bottom openings requirements	Pressure-relief requirements	Degree of filling	Control temp.	Emergency temp.
3119	**ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED** **ADD:**	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13	c	c
	Tert-Amyl peroxyneodecanoate, not more than 47% in diluent type A						-10	-5
	CHANGE:							
	Di-(3,5,5-trimethyl-hexanoyl)peroxide, not more than 38% in diluent type B **IN:** Di-(3,5,5-trimethyl-hexanoyl)peroxide, not more than 38% in diluent type A **or type B**						0 °C 0 °C	+5°C +5°C

Annex (IN ENGLISH ONLY)

TEST RESULTS OF NEW ORGANIC PEROXIDES AND FORMULATIONS TO BE ADDED TO 2.5.3.2.4 or IBC520 or T23

				Test results							
no	**Product**	**packaging**	**UN**	*Koenen/ E.1*	*DPVT/ E.2*	*P/T / C.1*	*Deflagration / C.2*	*SADT (1000ml)*	*Trauzl/ F.3*	*Detonation/ A.1 cav.*	**approval number**
1	tert-Amylperoxypivalate, 32% - diluent type A	IBC/31A/ 1250l	3119	<1,0mm ("0")	1,2mm(10g)	<2170kPa	< 0,35 mm/s	25 °C	7,0 ml/10g (no)	No propagation	BAM/ Tgb.-Nr.II.2-792/98
2	tert-Butylperoxybenzoate, 32% - diluent type A	IBC/31A/ 1250l	3109	<1,0mm ("0")	1,0mm (50g)	<2170kPa	< 0,35 mm/s	> 60 °C	5,5 ml/10g (no)	No propagation	BAM/ Tgb.-Nr.II.2-1182/01
3	tert-Butylperoxy -3,5,5-trimethylhexanoate, 37% - diluent type A	IBC/31A/ 1250l	3109	<1,0mm ("0")	1,0mm (50g)	yes, slowly	<0,35 mm/s	> 60 °C	6,0 ml/10g (no)	No propagation	BAM/ Tgb.-Nr.II.2-1506/01
4	tert-Butylperoxyneodecanoate, 52% as a stable dispersion in water	IBC/31A/ 1250l	3119	<1,0mm ("0")	1,0mm (50g)	<2170kPa	< 0,35 mm/s	15 °C	10,0ml/10g (low)	No propagation	BAM/ Tgb.-Nr.II.2-1510/01 and BAM/Tgb:-Nr. II.2-861/02
5	Cumylperoxyneodecanoate, 87% - diluent type A	OP7	3115	1.0 mm	8.0 mm (10g)	293 ms, yes, slowly	<0,35 mm/s	10 °C (400ml)	n.a.	No propagation	TNO 05DV3/0741
6	2,2-Di-(tert-amylperoxy)butane, 57% in diluent type A	OP7	3105	1.5 mm	2.0 mm (10g)	<2170kPa	<0,35 mm/s	70°C (400ml)	n.a.	Partial propagation UN A.6	TNO 05DV3/0855
7	1,1-Di-(tert-butylperoxy)cyclohexane, 72% - diluent type B**	OP5	3103	2,0 mm	6,0mm (50g)	-	<0,35 mm/s	70 °C (400ml)	n.a.	No propagation (borderline)	BAM/ Tgb.-Nr.II.2-420/04
8	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane, 90% - diluent type B**	OP5	3103	2,5 mm	9.0 mm (10g, technically pure)	800 ms (technically pure)	0.48 mm/s (technically pure)	70 °C (400ml)	n.a.	No propagation (technically pure)	BAM/ Tgb.-Nr. II.2- 442/04
9	Di-(2,4-dichlorobenzoyl) peroxide, 52% as a paste	OP8	3118	<1,0mm ("0")	1,0mm (50g)	<2170kPa	<0,35 mm/s	35°C (400ml)	n.a.	No propagation (77%)	TNO 03D2/0570

	Test results										
no	**Product**	**packaging**	**UN**	*Koenen/ E.1*	*DPVT/ E.2*	*P/T / C.1*	*Deflagration / C.2*	*SADT (1000ml)*	*Trauzl/ F.3*	*Detonation/ A.1 ca v.*	**approval number**
10	Di-(2-ethylhexyl)peroxydicarbonate, 62% as a stable dispersion in water	OP8 IBC/31A 1250l	3119	<1,0mm ("A")	1,0mm (50g)	<2170kPa	<0,35 mm/s	5° C (400 ml) 0 °C (1000ml)	0.4 ml/Modified Trauzl F.4 (no)	Partial propagation UN A.6	TNO 02D2/0086 NO 02D2/0155
11	Di-(3,5,5-trimethylhexanoyl)peroxide, 38% - diluent type B	T23	3119	<1,0mm ("A")	<1,0mm(10g)	<2170kPa	<0,35 mm/s	10 °C (Test H.3)	7.2 ml/Modified Trauzl F.4 (low)	No propagation	TNO 02D2/0115
12	Di-(2-neodecanoylperoxyisopropyl)-benzene, 42% as a stable dispersion in water	IBC/31A/ 1250l	3119	<1,0mm ("0")	1,0mm (50g)	yes, slowly	<0,35 mm/s	5 °C	No	No propagation	BAM/ Tgb. - Nr.II.2-484/02
13	3,3,5,7,7-Pentamethyl-1,2,4-trioxepane, technically pure	OP8	3107	<1,0mm ("0")	1.5 mm (10g)	<2170kPa	<0,35 mm/s	120 °C (400 ml)	6.4 ml/Modified Trauzl F.4 (low)	No propagation, UN A.6	TNO 05DV3/0728
14	Methyl isopropyl ketoneperoxide(s), 27% in diluent type A (active oxygen 6.5%)	OP8	3109	<1,0mm ("A")	2.0 mm (10g)	>30 ms	<0,35 mm/s	50°C (400ml)	3.1 ml/Modified Trauzl F.4 (low)	No propagation	TNO 02D/0087-rev.1
15	Tert-Amyl peroxyneodecanoate, not more than 47 % in diluent typeA	OP8/ T23	3119	<1,0mm ("0")	2,5 mm (10g)	<2170kPa*	0,07 mm/s	20°C (500ml) 0°C (3000ml)	7 ml/Modified Trauzl F.4 (No)	No propagation	BAM/Tgb. - Nr. II.2-370/03 und II.2-354/04
16	Tert-Amylperoxy-3,5,5-trimethylhexanoate, technically pure	OP7	3105	1,5 mm("F")	8 mm (10g)	<2070kPa	1,09 mm/s	55°C	n.a.	No propagation	BAM/Tgb. - Nr. II.2-178/04
17	3-Hydroxy-1,1-dimethylbutylperoxyneodecanoate, not more than 77 % in diluent type A	OP7	3115	< 1,0mm("0")	3,5 mm (10g)	Yes,slowly	0,12 mm/s	= 15 °C	9 ml/Modified Trauzl (No)	No propagation	BAM/Tgb. - Nr. II.2-55/04 und II.2-1109/00
18	3-Hydroxy-1,1-dimethylbutylperoxyneodecanoate, not more than 52%, as a stable dispersion in water	OP8/ IBC/31A/1250l	3119	<1,0 mm	1,0 mm (50g)	<2170kPa	0,115 mm/s	15°C (500 ml) 5°C (1000 ml)	7 ml/modified Trauzl F.3	No propagation	BAM/Tgb. - Nr. 4-1660/90 und II.2-92/00
19	3-Hydroxy-1,1-dimethylbutylperoxyneodecanoate, not more than 52 % in diluent type A	OP8	3117	<1,0 mm	1,5 mm (10g)	<2170kPa	0,115 mm/s	15°C	7 ml/modified Trauzl F.3	No propagation ***	BAM/Tgb. - Nr. 4-1660/90

				Test results							
no	**Product**	**packaging**	**UN**	*Koenen/ E.1*	*DPVT/ E.2*	*P/T / C.1*	*Deflagration / C.2*	*SADT (1000ml)*	*Trauzl/ F.3*	*Detonation/ A.1 cav.*	**approval number**
20	(1,1-Di-(tert-Butylperoxy)cyclohexane 43% + tert-Butylperoxy-2-ethylhexanoate 16%) in diluent type A	OP7	3105	1 mm ("F")	8 mm (10g)	766 ms	0,401 mm/s	60°C	7 ml/modified Trauzl F.3	No propagation	BAM/Tgb.-Nr. 4/3367/89
21	1,1-Di-(tert-Butylperoxy)cyclohexane, not more than 47% in diluent Type A	IBC/31A/1250l	3109	<1mm	1,0 mm (50g)	< 2170kPa	0,229 mm/s	>60°C	No	No propagation	BAM/Tgb-Nr. II.2-374/03 und 4-394/93
22	tert-Butyl Peroxy-3,5,5-trimethylhexanoate, 42% with inert solid	OP7	3106	<1.0mm ("0")	1.0 (50g)	1375ms*	0.27mm/s*	55°C* (400 ml)	2.9ml(no)	No propagation*	CA2002100015

* Results from DATATOP, data base on test results of organic peroxides, issued by TNO, The Netherlands

****** Diluent type B with a boiling point >130°C

*** According BAM/Tgb. II.2-1109/00