

Economic Commission for Europe

Inland Transport Committee

17 January 2017

Working Party on the Transport of Dangerous Goods

Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) (ADN Safety Committee)

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Geneva, 23 - 27 January 2017

Item 5 (b) of the provisional agenda

Proposals for amendments to the Regulations annexed to ADN: other proposals

Autonome Schutzsysteme

Mitteilung von EBU, ESO und ERSTU

Ausgangslage

Zur 29. Sitzung des Sicherheitsausschusses sind zahlreiche Dokumente vorgelegt worden, die die Anforderungen an Explosionsgruppen für nicht-elektrische Geräte betreffen.

Weil es aus Zeitgründen nicht möglich war, im ADN 2017 Änderungen vorzunehmen, hat sich der Sicherheitsausschuss darauf geeinigt, die Probleme in der ersten Phase durch multilaterale Abkommen zu regeln.

Hierfür ist das Binnenschiffahrtsgewerbe dankbar. Allerdings verlangt die multilaterale Vereinbarung ADN / M 018 von denjenigen Schiffen, deren Zulassungszeugnis nach dem 31. Dezember 2018 erneuert werden muss, schon sehr bald Maßnahmen, die gründlicher Vorbereitung bedürfen.

Aus diesem Grunde ist es erforderlich, sich mit einigen vom Schiffahrtsgewerbe aufgeworfenen Fragen rechtzeitig zu beschäftigen.

Frage

Im Protokoll der 29. Sitzung des Sicherheitsausschusses ADN/WP.15/AC.2/60 ist unter Ziffer 44. festgehalten worden, dass die informelle Arbeitsgruppe „Stoffe“ mittlerweile um die Prüfung verschiedener Sachverhalte gebeten worden ist.

Wie weit sind diese Prüfungen gediehen ?

Nachfrage zum Protokolls der 29. Sitzung

Im Protokoll der 29. Sitzung des Sicherheitsausschusses ADN/WP.15/AC.2/60 ist unter Ziffer 44. – zweiter Unterpunkt - festgehalten worden, dass das Gewerbe die Arbeitsgruppe Stoffe mit einschlägigen Informationen versorgen müsse. Diese Formulierung des Protokolls bedarf der Nachfrage.

Zweifellos ist das Binnenschiffahrtsgewerbe der Hauptinteressent an einer systematischen Überprüfung und ggf. Anpassung der Einträge in Spalte 16 von Tabelle C des ADN.

Das Binnenschiffahrtsgewerbe erlangt niemals Eigentum an den Ladegütern. Daher sieht sich das Binnenschiffahrtsgewerbe nicht in der Position, Aufträge zur experimentellen Feststellung von Explosionsgruppen oder –untergruppen anhand von Ladungsproben zu erteilen.

Des weiteren verfügt das Binnenschiffahrtsgewerbe im Falle von N.A.G. Zeilen in aller Regel nicht über die notwendigen Informationen, anhand der die vorzuschreibenden Explosionsgruppen oder -untergruppen ermittelt werden können.

Auch das verladende Gewerbe ist von den Erkenntnissen über Explosionsgruppen oder –untergruppen betroffen. Das verladende Gewerbe ist sehr viel besser über die Eigenschaften der zu verladenden Güter informiert, als das Binnenschiffahrtsgewerbe.

Die Verbände der Binnenschiffahrt fragen daher den Sicherheitsausschuss, wie er sich die Bereitstellung der besagten Informationen „durch das Gewerbe“ genau vorstellt.

Feststellung der Explosionsgruppe oder -untergruppen

Das Binnenschiffahrtsgewerbe hat zur 29. Sitzung des Sicherheitsausschusses mit dem Dokument INF.21 den Hinweis auf einen theoretischen Ansatz zur Feststellung von Explosionsgruppen oder –untergruppen gegeben. Eine Beispielrechnung für UN 1170 Ethanol wurde vorgelegt.

Das Binnenschiffahrtsgewerbe hat aufgrund der Komplexität der Materie Verständnis dafür, dass dieser Aspekt bei der 29. Sitzung nicht im Detail behandelt worden ist.

Das Binnenschiffahrtsgewerbe regt jetzt an, eine systematische Überprüfung der Explosionsgruppen oder –untergruppen nach dem theoretischen Ansatz in den Normen EN-IEC 60079-20-1 und ISO/IEC DIS 80079-20-1 vorzunehmen.

Besonders hervorzuheben ist, dass nach den Recherchen des Schiffahrtsgewerbes die n.a.g. Positionen der UN 1268 und 3295, die in vielen Millionen Ladungstonnen befördert werden, bevorzugt zu untersuchen und voraussichtlich in die Explosionsgruppe IIA umzustufen sind.

Das Binnenschiffahrtsgewerbe hat als Einstieg in diese Diskussion bereits umfangreiche Vergleichsrechnungen durchgeführt, die in zahlreichen Fällen aufzeigen, dass anstelle der Explosionsgruppe IIB eine „leichtere“ Explosionsgruppe oder –untergruppe ausreicht. Diese Ergebnisse sind in der beiliegenden Tabelle zusammengefasst.

Das Binnenschiffahrtsgewerbe hat aufgrund der Bedeutung der Angelegenheit bereits signalisiert, dass an den künftigen Beratungen der informellen Arbeitsgruppe “Stoffe“ zu diesem Thema weitere Sachverständige aus dem Gewerbe teilnehmen möchten.

MESG

Group IIA: MESG ≥ 0,9 mm.
 Group IIB: 0.5 mm < MESG < 0,9 mm.
 Group IIC: MESG ≤ 0,5 mm.

MIC

Group IIA: MIC > 0,8.
 Group IIB: 0,45 ≤ MIC ≤ 0,8.
 Group IIC: MIC < 0,45.

SUBGROUP IIB

Group IIB: MESG ≥ 0,5 mm.
 Group IIB3: MESG ≥ 0,65 mm.
 Group IIB2: MESG ≥ 0,75 mm.
 Group IIB1: MESG ≥ 0,85 mm.
 Group IIA: MESG ≥ 0,9 mm.

FORMULA for MIXTURES

$$\text{MESG}1/ \sum(X/\text{MESG}_i)$$

Methode according to ISO-EIC-DIS 80079-20-1

a = classified according to MESG determination.
 b = classified according to MIC ratio.
 c = both MESG and MIC ratio have been determined.
 d = classified according to similarity of chemical structure (provisional classification).
 Classificatie van gas mengsels

According to the formula in ISO-EIC-DIS 80079-20-1 for mixtures and the mixture doesn't contain components for what IIB or IIC is described or the mixture contains less 30% of these components, IIB3 complies

UN	Naam	Norm ISO-EIC-DIS 80079-20-1			ADN 2015	according to this norm	
		MESG	MIC	method.			
1088	ACETAL	0,81		d	IIB ⁴		
1089	ACETALDEHYDE (ETHANAL)	0,92	0,98	a	IIA	IIA	Similar to 1,2 Diethoxyethane
1090	ACETONE	1,01	1	c	IIA	IIA	
1092	ACROLEINE	0,72			IIB	IIB3	(ADN WP.15/AC.2/2016/4 says IIB3)
1093	ACRYLONITRILE	0,87	0,78	c	IIB	IIB1	(ADN WP.15/AC.2/2016/4 says IIB2)
1098	ALLYL ALCOHOL	0,84		a	IIB	IIB2	(ADN WP.15/AC.2/2016/4 says IIB3)
1100	ALLYL CHLORIDE	1,17	1,33	a	IIA	IIA	
1105	PENTANOLS (n-PENTANOL)				IIA	IIA	
1106	AMYLAMINE (n-AMYLAMINE)				IIA ⁷	IIA	
1107	AMYLCHLORIDES				IIA	IIA	
1108	1-PENTENE (n-AMYLENE)	0,96		a	IIB ⁴	IIA	all amines products MESG IIA, all AMYL CHLORIDES MESG IIA, according to AMYLENE IIA
1114	BENZENE	0,99		a	IIA	IIA	
1120	BUTANOLS (n-BUTYL ALCOHOL)	0,91		a	IIB	IIA	(ADN WP.15/AC.2/2016/4 says IIB2)
1120	BUTANOLS (sec.- BUTYLALCOHOL)			d says IIA,	IIB ⁷	IIA	(ADN WP.15/AC.2/2016/4 says IIB2)
1120	BUTANOLS (tert.- BUTYLALCOHOL)				IIA ⁷	IIA	(ADN WP.15/AC.2/2016/4 says IIB2)
1123	BUTYLACETATES (n-BUTYL ACETATE)	1,04	1,08	c	IIA	IIA	
1123	BUTYLACETATES (sec-BUTYL ACETATE)				IIA ⁷	IIA	
1125	n-BUTYLAMINE	0,92	1,13	c	IIA	IIA	
1127	CHLORORBUTANES (1-CHLORO BUTANE)	1,06		a	IIA	IIA	
1127	CHLORORBUTANES (2-CHLORO BUTANE)	1,16		a	IIA	IIA	
1127	CHLORORBUTANES (1-CHLORO-2-METHYLPROPANE)	1,25		a	IIA	IIA	
1127	CHLORORBUTANES (2-CHLORO-2-METHYLPROPANE)	1,40		a	IIA	IIA	
1129	BUTYRALDEHYDE	0,92			IIA	IIA	
1131	CARBON DISULFIDE	0,34	0,39	c	IIC	IIC	
1134	CHLOORBENZENE (phenylchloride)			d says IIA	IIA ⁶	IIA	
1135	ETHYLENE CHLOROHYDRIN (2-chloroethanol)			d says IIA	IIA ⁶	IIA	
1143	CROTONALDEHYDE	0,81		a	IIB	IIB2	(ADN WP.15/AC.2/2016/4 says IIB2)
1145	CYCLOHEXANE	0,94		a	IIA	IIA	
1146	CYCLOPENTANE	1,01		d	IIA	IIA	
1150	(trans) 1,2-DICHLOROETHYLENE	3,91		a	IIA	IIA	
1150	(cis)1,2-DICHLOROETHYLENE	3,91		a	IIA	IIA	
1153	ETHYLENE GLYCOL DIETHYLETER				IIB	IIB2	(ADN WP.15/AC.2/2016/4 says IIB2)
1154	DIETHYLAMINE	1,15		a	IIA	IIA	
1155	DIETHYL ETHER	0,87	0,88	a	IIB	IIB1	ADN WP.15/AC.2/2016/4 says IIB1
1157	DIISOBUTYL KETONE			a	IIB ⁴	IIA	all xxxYL KETONES products MESG IIA,
1159	DIISOPROPYL ETHER	0,94		a	IIA	IIA	
1160	DIMETHYLAMINE AQUEOUS SOLUTION	1,15		a	IIA	IIA	
1163	DIMETHYLHYDRAZINE	0,85		a	IIC	IIB1	Similar to 1,1-Dimethylhydrazine ?
1165	DIOXANE	0,70	0,19	a	IIB	IIB3	Similar to 1,4-Dioxane and ADN WP.15/AC.2/2016/4 says IIB3
1167	DIVINYL ETHER	0,68		d	IIB	IIB3	similar to Divinylene oxide)
1170	ETHANOL (ETHYLALCOHOL) > 70% ALCOHOL	0,89	0,88	c	IIB	IIB1	ADN WP.15/AC.2/2016/4 says IIB1
1170	ETHANOL (ETHYLALCOHOL) 24 < ALCOHOL% , 70	>0,9			IIB	IIA	according Norm ISO-EIC-DIS 80079-20-1 ≥ 4 vol-% water IIA
1171	ETHYLENE GLYCOL MONOETHYL ETHER	0,78		a	IIB	IIB2	ADN WP.15/AC.2/2016/4 says IIB1 ⁴
1172	ETHYLENE GLYCOL MONETHYLETER-ACETATE	0,97		a	IIA	IIA	ADN WP.15/AC.2/2016/4 says IIB2
1173	ETHYL ACETATE	0,99		a	IIA	IIA	
1175	ETHYL BENZENE			d	IIA	IIA	
1177	2-ETHYLBUTYL ACETATE			d	IIA	IIA	
1179	ETHYLBUTYLETER (ETHYL-tert-BUTYLETER)				IIB ⁴	IIA	Similar to UN 2398 MTBE ?
1184	ETHYLENE DICHLORIDE (1,2-dichloorethane)	1,80		a	IIA	IIA	
1188	ETHYLENE GLYCOL MONOMETHYL ETHER	0,85		a	IIB	IIB1	
1191	OCTYL ALDEHYDES (2-ethylcapronaldehyde)			a	IIA ⁷	IIA	
1191	OCTYL ALDEHYDES (n-OCTALDEHYDE)			a	IIB ⁴	IIA	n-octaldehyde classified by MIC
1193	ETHYLMETHYLKETONE or METHYLETHYLKETONE	0,84	0,92	b	IIA	IIA	
1198	FORMALDEHYDE SOLUTION	0,57			IIB	IIB	
1199	FURALDEHYDES (a-FURALDEHYDE) or FURFURALDEHYDES (a-FURFURALDEHYDE)	0,88		a	IIB	IIB1	ADN WP.15/AC.2/2016/4 says IIB1
1203	MOTORSPIRIT or GASOLINE or PETROL				IIA	IIA	petrol or gasoline isnt classified in this norm
1206	HEPTANES	0,91	0,88	c	IIA	IIA	
1208	HEXANES	0,93	0,88	c	IIA	IIA	
1212	ISOBUTANOL or ISOBUTYLALCOHOL	0,96		a	IIA	IIA	
1213	ISOBUTYLACETATE	1,04		a	IIA ⁷	IIA	similar to n-butylacetate
1214	ISOBUTYLAMINE	1,12		a	IIA ⁷	IIA	similar to DIISOBUTYLAMINE
1216	ISOOCETENES	0,95		a	IIB ⁴	IIA	similar to n-octene
1218	ISOPRENE	0,79			IIB	IIB2	similar to 1,3-butadiène and ADN WP.15/AC.2/2016/4 says IIB2
1219	ISOPROPYLALCOHOL of ISOPROPANOL	1,00		a	IIA	IIA	

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SUBGROUP IIB

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UN	Naam	Norm ISO-EIC-DIS 80079-20-1			ADN 2015	according to this norm
		MESG	MIC	method.		
1220	ISOPROPYL ACETATE	1,05		a	IIA ⁷	IIA
1221	ISOPROPYLAMINE	1,02		a	IIA ⁷	IIA
1223	KEROSINE			d	IIA ⁷	IIA
1224	KETONES N.O.S	0,84	0,92	b	IIB ⁴	IIA
1229	MESITYL OXYDE	0,93		a	IIB ⁴	IIA
1230	METHANOL	0,92	0,82	c	IIA	IIA
1231	METHYL ACETATE	0,97	1,08	c	IIA	IIA
1235	METHYLAMINE, AQUEOUS solution	1,10		a	IIA	IIA
1243	METHYL FORMATE	0,94		a	IIA	IIA
1244	METHYL HYDRAZINE				IIC ⁵	IIB1 ⁷
1245	METHYL ISOBUTYL KETONE	1,01		a	IIA	IIA
1247	METHYLMETHACRYLATE	0,95		a	IIA	IIA
1262	OCTANES	0,94		a	IIA	IIA
1264	PARALDEHYDE	1,01		a	IIA ⁷	IIA
1265	n-PENTANES	0,93	0,97	c	IIA	IIA
1265	PENTANES (2-METHYLBUTANE)	0,98		a	IIA	IIA
1267	PETROLEUM CRUDE OIL with more than 10% BENZENE				IIB ⁴	IIB3
1267	PETROLEUM CRUDE OIL				IIB ⁴	IIB3
1268	PETROLEUMDESTILLATES NOS. (NAPHTA)				IIA	IIA
1268	PETROLEUMDESTILLATES NOS				IIB ⁴	IIB3
1268	PETROLEUMDESTILLATES NOS, with more than 10% BENZENE				IIB ⁴	IIB3
1268	PETROLEUMDESTILLATES NOS. (BENZENE HEARTCUT)				IIA	IIA
1274	PROPYLALCOHOL	0,89		a	IIB	IIB1
1275	PROPIONALDEHYDE	0,86		a	IIB	IIB3
1276	n-PROPYLACETATE	1,04		a	IIA	IIA
1277	PROPYLAMINE (1-AMINOPROPANE)	1,13		a	IIA	IIA
1278	1-CHLOROPROPANE (propylchloride)	---		a	IIA	IIA
1279	1,2-DICHLOROPROPANE (PROPYLENE DICHLORIDE)	---		d	IIA ⁸	IIA
1280	PROPYLENE OXIDE	0,70		d	IIB	IIB3
1282	PYRIDINE	---		d	IIA ⁸	IIA
1289	SODIUM METHYLATE SOLUTION in alcohol				IIA	IIA
1294	TOLUENE	1,06		a	IIA	IIA
1296	TRIETHYLAMINE			d	IIA ⁸	IIA
1300	TURPENTINE SUBSTITUTE			d	IIB ⁴	IIA
1301	VINYLACETATE	0,94		a	IIA	IIA
1307	XYLENES (m-XYLENE) XYLENE (o-XYLENE)	1,09		a	IIA	IIA
1545	ALLYL ISOTHIO CYANATE				IIB ⁴	IIB2
1578	CHLORONITROBENZENES (P-CHLORONITROBENZE)				IIB ⁴	IIA
1604	ETHYLENEDIAMINE	1,18		a	IIA	IIA
1648	ACETONITRIL (methylcyanide)	1,50		a	IIA	IIA
1662	NITROBENZENE	0,94		a	IIB	IIA
1663	NITROPHENOLS				IIB ⁴	IIA
1715	ACETIC ANHYDRIDE	1,23		a	IIA	IIA
1717	ACETYL CHLORIDE	---		d	IIA ⁸	IIA
1738	BENZYL CHLORIDE			d	IIA ⁸	IIA
1750	CHLOROACETIC ACID SOLUTION				IIA	IIA
1764	DICHLOROACETIC ACID				IIA	IIA
1779	FORMIC ACID WITH MORE THAN 85% acid by mass	1,86		a	IIA	IIA
1783	HEXAMETHYLENEDIAMINE solution				IIB ⁴	IIA
1863	FUEL, AVIATION, TURBINE ENGINE	---		d	IIB ⁴	IIA
1863	FUEL, AVIATION, TURBINE ENGINE (with more than 10% BENZENE)	---		d	IIB ⁴	IIA
1915	CYCLOHEXANONE	0,95		a	IIA	IIA
1917	ETHYLACRYLATE	0,86		a	IIB	IIB1
1918	ISOPROPYLBENZEEN (cumeen)	1,05		d	IIA ⁸	IIA
1919	METHYLACRYLATE	0,85	0,98	b	IIB	IIA
1920	NONANES	---		d	IIA	IIA
1922	PYRROLIDINE				IIA ⁷	IIA
1986	ALCOHOLS, FLAMABLE, TOXIC, NOS				IIB ⁴	IIB1
1987	ALCOHOLS NOS				IIB ⁴	IIB1
1987	ALCOHOLS, NOS (cyclohexanol)	---		d	IIA	IIA
1987	ALCOHOLS, NOS (90 mas-% tert.-BUTANOL en 10 mas-% METHANOL)	---		d	IIA	IIA
1989	ALDEHYDES NOS				IIB ⁴	IIB2
1991	CHLOROPRENE				IIB ⁴	IIB2
1992	FLAMABLE LIQUID TOXIC, NOS				IIB ⁴	IIB3

MESG

Group IIA: MESG ≥ 0,9 mm.
 Group IIB: 0.5 mm < MESG < 0,9 mm.
 Group IIC: MESG ≤ 0,5 mm.

MIC

Group IIA: MIC > 0,8.
 Group IIB: 0,45 ≤ MIC ≤ 0,8.
 Group IIC: MIC < 0,45.

SUBGROUP IIB

Group IIB: MESG > 0,5 mm.
 Group IIB3: MESG ≥ 0,65 mm.
 Group IIB2: MESG ≥ 0,75 mm.
 Group IIB1: MESG ≥ 0,85 mm.
 Group IIA: MESG ≥ 0,9 mm.

FORMULA for MIXTURES

$$MESG \leq \frac{\sum(X_i/MESG_i)}{1}$$

Methode according to ISO-EIC-DIS 80079-20-1

a = classified according to MESG determination.
 b = classified according to MIC ratio.
 c = both MESG and MIC ratio have been determined.
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 Classificatie van gas mengsels

According to the formula in ISO-EIC-DIS 80079-20-1 for mixtures and the mixture doesn't contain components for what IIB of IIC is described or the mixture contains less 30% of these components, IIB3 complies

UN	Naam	Norm ISO-EIC-DIS 80079-20-1			ADN 2015	according to this norm	0,006410035
		MESG	MIC	method.			
1993	FLAMABLE LIQUID , NOS.(CYCLOHEXANONE / CYCLOHEXANOL MIXTURE)				IIA	IIA	
1993	FLAMABLE LIQUID , NOS.(with more than 10% BENZENE)				IIB ⁴	IIB3	###
1993	FLAMABLE LIQUID , NOS				IIB ⁴	IIB3	###
1999	TARS, LIQUID, including road oils and cutback bitumens				IIA ⁷	IIA	
2021	CHLOROPHENOLS, LIQUID (2-CHLOROPHENOL)				IIA ⁷	IIA	
2022	CRESILIC ACID				IIA ⁷	IIA	
2023	EPICHLOROXYDRINE	0,74		a	IIB	IIB3	ADN WP. 15/AC.2/2016/4 says IIB3
2045	ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)				IIA ⁷	IIA	similar to butyraldehyde MESG = 0,92
2046	CYMENES	---		d	IIA ⁷	IIA	
2047	1,3-DICHLOROPROPENE				IIA ⁷	IIA	
2047	2,3-DICHLOROPROP-1-ENE				IIA ⁷	IIA	
2047	MIXTURE of 2,3-DICHLOROPROP-1-ENE and 1,3-DICHLOROPROPENE)				IIA ⁷	IIA	
2048	DICYCLOPENTADIENE	0,91		a	IIA	IIA	
2050	DIISOBUTYLENE				IIA ⁷	IIA	similar to isobutylene MESG = 1,00
2051	2-DIMETHYLAMINO ETHANOL				IIA ⁷	IIA	
2053	METHYLISOBUTYL CARBINOL (methylamylalcohol)	1,01		a	IIB ⁴	IIA	
2054	MORPHOLINE	0,92		a	IIA	IIA	
2055	STYRENE, monomer		1,21	b	IIA	IIA	
2056	TETRAHYDROFURAN	0,87		a	IIB	IIB1	ADN WP. 15/AC.2/2016/4 says IIB1
2057	TRIPROPYLENE (nonene)				IIB ⁴	IIA	according to octene (IIA), and decene isnt even classified.
2078	TOLUENE DIISOCYANATE				IIB ⁴	IIA	TOLUENE connection MESG >0,9 and similar to methylisocyanate MESG = 1,21
2205	ADIPONITRILE				IIB ⁴	IIA?	similar to cyanides without double connections and butane?
2215	MALEIC ANHYDRIDE, MOLTEN				IIB ⁴	IIA?	similar to ACETIC ANHYDRIDE gives MESG > 1,00
2218	ACRYLIC ACID, STABILIZED	0,86		a	IIIB	IIB1	ADN WP. 15/AC.2/2016/4 says IIB1
2227	n-BUTYL METHACRYLATE	0,95		a	IIA	IIA	
2238	p, m or o CHLOROTOLUENE	---		d	IIA ⁷	IIA	
2241	CYCLOHEPTANE	---		d	IIA ⁷	IIA	
2247	n-DECANE	1,05		a	IIA	IIA	
2248	Di-n-BUTYLAMINE				IIA ⁷	IIA	similar to n-butylamine with the smallest MESG (0,92) from all butylamines
2259	TRIETHYLENETETRAMINE				IIB ⁴	IIA	similar to the smallest MESG (0,92) from all amineconnections
2263	DIMETHYLCYCLOHEXANEN			d	IIA ⁷	IIA	
2264	N,N-DIMETHYLCYCLOHEXYLAMINE				IIB ⁴	IIA	similar to all N,N xxx Amines (MESG > 0,9)
2265	N,N-DIMETHYLFORMAMIDE	1,08		d	IIA	IIA	
2266	DIMETHYL-N-PROPYLAMINE				IIA ⁷	IIA	similar to the smallest MESG (0,92) from all amineconnections
2276	2-ETHYLHEXYLAMINE				IIA ⁷	IIA	similar to the smallest MESG (0,92) from all amineconnections
2278	n-HEPTENE				IIB ⁴	IIA	(ADN WP. 15/AC.2/2016/4 says IIB1)
2280	HEXAMETHYLENEDIAMINE, SOLID,				IIB ⁴	IIA	similar to the smallest MESG (0,92) from all amineconnections
2282	HEXANOLS				IIA	IIB1	similar to 1-hexanol (MESG = 0,85)
2286	PENTAMETHYLHEPTANE			d	IIA ⁷	IIA	
2288	ISOHEXENEN				IIB ⁴	IIA	similar to all alkenes ≥ C3 (MESG > 0,9)
2289	ISOPHORONEDIAMINE				IIA ⁷	IIA	similar to the smallest MESG (0,92) from all amineconnections
2302	5-METHYLHEXAN-2-ONE				IIA	IIA	similar to hexan-2-on (MESG =0,98)
2303	ISOPROPENYLBENZENE	0,88		a	IIB	IIB1	ADN WP. 15/AC.2/2016/4 says IIB1
2309	OCTADIENE (1,7-OCTADIENE)				IIB ⁴	IIA	similar to penta-1,3-diene (MESG = 0,97)?
2312	PHENOL, MOLTEN			d	IIA ⁸	IIA	
2321	TRICHLOROBENZENES				IIA ⁷	IIA	all chloro and benzene connections MESG > 0,9
2323	TRIETHYL PHOSPHITE				IIB ⁴	?	
2324	TRIISOBUTYLENE				IIB ⁴	IIA	Similar to isobutylene (MESG = 1,00)
2325	1,3,5-TRIMETHYLBENZENE	0,98		a	IIA ⁷	IIA	
2333	ALLYLACETATE	0,96		a	IIA ⁷	IIA	
2348	BUTYLACRYLATEN, n-BUTYLACRYLAAT	0,88		a	IIB	IIB1	ADN WP. 15/AC.2/2016/4 says IIB1
2350	BUTYLMETHYLETHER				IIB ⁴	IIA	similar to tert-Butyl methylether (MESG = 1,0)
2356	2-CHLOROPROPANE	1,32		a	IIA	IIA	
2357	CYCLOHEXYLAMINE				IIB ⁴	IIA	similar to the smallest MESG (0,92) from all amineconnections
2362	1,1-DICHLOROETHANE	1,82		a	IIA	IIA	
2370	1- HEXENE				IIB ⁴	IIA	similar to all alkenes ≥ C3 (MESG > 0,9)
2381	DIMETHYL DISULPHIDE				IIB	IIA	similar to the group sulfides MESG > 0,9
2382	DIMETHYL HYDRAZINE SYMMETRICAL				IIC ⁵	IIB1?	Similar to dimethyl hydrazine with a MESG = 0,85
2383	DIPROPYLAMINE	0,95		a	IIA	IIA	
2397	3-METHYLBUTAN-2-ONE				IIA ⁷	IIA	
2398	METHYL-tert-BUTYLETHER (MTBE)	1,00		a	IIA	IIA	
2404	PROPIONITRILE				IIA ⁷	IIA	
2414	THIOPHENE	0,91		a	IIA	IIA	

MESG

Group IIA: MESG ≥ 0,9 mm.
 Group IIB: 0.5 mm < MESG < 0,9 mm.
 Group IIC: MESG ≤ 0,5 mm.

MIC

Group IIA: MIC > 0,8.
 Group IIB: 0,45 ≤ MIC ≤ 0,8.
 Group IIC: MIC < 0,45.

SUBGROUP IIB

Group IIB: MESG > 0,5 mm.
 Group IIB3: MESG ≥ 0,85 mm.
 Group IIB2: MESG ≥ 0,75 mm.
 Group IIB1: MESG ≥ 0,85 mm.
 Group IIA: MESG ≥ 0,9 mm.

FORMULA for MIXTURES

$$\text{MESG} \frac{1}{\sum(X/\text{MESG}_i)}$$

Norm ISO-EIC-DIS 80079-20-1

MESG MIC method.

Methode according to ISO-EIC-DIS 80079-20-1

a = classified according to MESG determination.
 b = classified according to MIC ratio.
 c = both MESG and MIC ratio have been determined.
 d = classified according to similarity of chemical structure (provisional classification).
 Classificatie van gas mengsels

According to the formula in ISO-EIC-DIS 80079-20-1 for mixtures and the mixture doesn't contain components for what IIB of IIC is described or the mixture contains less 30% of these components, IIB3 complies

UN	Naam	MESG	MIC	method.	ADN 2015	according to this norm
2430	ALKYLPHENOLS SOLID, NOS MOLTEN				IIA ⁷	IIA
2458	HEXADIENES				IIB ⁴	IIA
2477	METHYL ISOTHIOCYANATE				IIB ⁴	IIA (ADN WP.15/AC.2/2016/4 says IIA)
2485	n-BUTYLISOCYANATE or ISOBUTYLISOCYANATE				IIB ⁴	IIA similar to METHYLISOCYANATE and thio-groups (all MESG >0,9)
2486	ISOBUTYL ISOCYANATE				IIB ⁴	IIA similar to METHYLISOCYANATE(MESG = 1,21)
2487	PHENYLISOCYANATE				IIA	IIA similar to METHYL ISOCYANATE en PHENYL ISOCYANATE (UN 2487)
2491	ETHANOLAMINE				IIB ⁴	IIA similar to METHYLISOCYANATE(MESG = 1,21)
2493	HEXAMETHYLENIMINE				IIA	IIA (ADN WP.15/AC.2/2016/4 says IIA)
2527	ISOBUTYLACRYLATE				IIB ⁹	IIA similar to cyclohexan en amines
2528	ISOBUTYLISOBUTYRATE	1,00		a	IIA	IIA similar to n-Butyl acrylate (MESG = 0,88)
2531	METHACRYLIC ACID,	0,95		a	IIB ⁴	IIA
2564	TRICHLOROACETIC ACID				IIA ⁷	IIA
2608	NITROPROPANES	0,84		a	IIB ⁷	IIA
2615	ETHYLPROPYLETHYER				IIA ⁷	IIA
2618	VINYLTOLUENE				IIB ⁴	IIA similar to vinylbenzene (MIC= 1,21)
2683	AMMONIUM SULPHIDE SOLUTION				IIB ⁴	IIA according to NH3 and Sulfides IIA
2709	BUTYLBENZENES (n-BUTYLBENZENE)				IIA ⁷	IIA
2733	2-AMINOBUTANE	0,92		c	IIA ⁷	IIA similar to 1-aminobutane (MESG = 0,92)
2789	ACETIC ACID SOLUTION, more than 80% acid by mass.				IIA ⁷	IIA
2811	TOXIC SOLID ORGANIC NOS (1,3,5, trichlorobezene, MOLTEN)				IIB ⁴	IIA all chloro and benzene connections MESG > 0,9, and ADN WP.15/AC.2/2016/4 says IIA
2920	HEXADECYLTRIMETHYLAMMONIUM CHLORIDE (50%) and ETHANOL 35%)				IIB	IIA according to Ethanol IIB1, all chlorides MESG . 0,9
2920	2-PROPANOL and DODECYLDIMETHYLAMMONIUM CHLORIDE				IIA	IIA According to propanol IIA , all chlorides MESG > 0,9
2924	AQUEOUS SOLUTION OF DIALKYL-(C8-C18)-DIMETHYLAMMONIUM CHLORIDE and 2-PROPANOL)				IIA	IIA
2924	FLAMMABLE LIQUID, CORROSIVE, NOS				IIB ⁴	IIA similar to all ADN class 8 products there is no IIB product, so IIB3 complies
2929	TOXIC ORGANIC LIQUID,FLAMMABLE, NOS				IIB ⁴	IIA
2935	ETHYL-2-CHLORO-PROPIONATE				IIA	IIA
2947	ISOPROPYL CHLOROACETATE	1,24		a	IIA	IIA
2983	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, WITH ≤ 30% ETHYLENE OXIDE				IIB	IIA According to the formula in ISO-EIC-DIS 80079-20-1 for mixtures, ETH oX MESG 0,59 and 30%, prop ox MESG 0,7 and 70%
3079	METHACRYLNITRILE				IIB ⁴	IIA according to methanenitrile (HCN) MESG-0,8
3092	1-METHOXY-2-PROPANOL				IIB	IIA (ADN WP.15/AC.2/2016/4 says IIB1)
3175	SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S., MOLTEN				IIA ⁷	IIA
3256	ELEVATED TEMPERATURE LIQUID,FLAMMABLE, N.O.S.				IIB ⁴	IIA UN 3256 mainly contains hydrocarbons with large alkane chains and connections with cyclo products MESG > 0,9, so IIB3 complies
3271	ETHERS, NOS. (tert.-AMYL METHYLETHYER)				IIB ⁴	IIA similar to diethylene ether (MESG=0,7)
3271	ETHERS, NOS. (tert.-AMYL METHYLETHYER)				IIB ⁴	IIA similar to diethylene ether (MESG=0,7)
3272	ESTERS, NOS				IIB ⁴	IIA similar to the products with the smallest MESG within the group acetic acid X esters, ((= Acetoacetic acid methyl ester) MESG= 0,85
3286	FLAMMABLE LIQUID, TOXIC CORROSIVE, N.O.S.				IIB ⁴	IIA according to the toxic propertys and coorsive propertys IIB3 complies
3295	HYDROCARBONS LIQUID NOS, with > 10% BENZENE				IIB ⁴	IIA
3295	HYDROCARBONS LIQUID NOS.(1-OCTEEN)				IIB ⁴	IIA
3295	HYDROCARBONS LIQUID NOS.(mixture of POLYCYCL AROMATES)				IIA	IIA
3295	HYDROCARBONS LIQUID NOS.CONTAINS ISOPRENE EN PENTADIEN				IIB ⁴	IIA
3412	FORMIC ACID	1,86		a	IIA	IIA
3429	CHLOROTOLUIDINES, LIQUID				IIA ⁷	IIA
3446	NITROTOLUENES, SOLID, MOLTEN				IIB ⁴	IIA similar to NITROBENZENE MESG > 0,9 en TOLUENE MESG > 1, IIB3 complies
3451	TOLUIDINES, SOLID, MOLTEN				IIA ⁶	IIA
3455	CRESOLS, SOLID, MOLTEN				IIA ⁶	IIA
3463	PROPIONIC ACID with not less than 90% acid by mass				IIA ⁷	IIA
3475	ETHANOL AND GASOLINE MIXTURE with > 10% but < 90% ethanol				IIA	IIA
3475	ETHANOL AND GASOLINE MIXTURE met > 90% ethanol				IIB	IIA According to the formula in ISO-EIC-DIS 80079-20-1 for mixtures 90% ethanol
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC				IIB ⁴	IIA
9001	SUBSTANCESWITH A FLASHPOINT FP > 60 °C, HANDED OVER FOOR CARRIAGE AT A TEMP WITHIN 15 k FROM THE FLASHPOINT				IIB ⁴	IIA