Translation: Only the Danish document has legal validity.

Order no. 587 of 22 May 2017
issued by the Ministry of Environment and Food of Denmark

Order on the categorisation, classification, carriage and discharge of liquid substances carried in bulk in the exclusive economic zone around Greenland

The following shall be laid down pursuant to section 3(3), section 6(2), section 12 and section 44 of decree no. 1035 of 22 October 2004 on the entry into force for Greenland of the act on protection of the marine environment (*anordning om ikrafttræden for Grønland af lov om beskyttelse af havmiljøet*):

Part 1
Application

Section 1. This order shall apply to all ships in the exclusive economic zone around Greenland carrying liquid substances in bulk unless expressly provided otherwise.

Subsection 2. This order shall not apply to warships and other ships owned or used by a State as long as the ship is exclusively used for non-commercial State purposes, cf. section 3(2) of the decree.

Subsection 3. Discharge into the sea of clean or segregated ballast water shall not be subject to the requirements of this order.

Part 2
Definitions, etc.

Section 2. For the purposes of this order, the following definitions shall apply:

1) *Segregated ballast* means ballast water in a tank completely separated from the cargo and fuel oil system and which is exclusively used for the carriage of ballast or cargoes other than oil, as defined in section 8(1) of the act, or noxious liquid substances, as defined in item 19.
2) *Ballast water* means water, including water with suspended substances, taken on board a ship to regulate the ship's trim, list, draught, stability or load. Water taken on board a ship solely for other reasons than the above-mentioned, including in order to refrigerate and carry articles of food, shall not be considered ballast water.
3) *The BCH Code* (Bulk Chemical Code) means the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
4) *Arctic waters* means those waters which are located north of a line extending from latitude 58°00'.0 N, longitude 042°00'.0 W to latitude 64°37'.0 N, longitude 035°27'.0 W and thence by a rhumb line to latitude 67°03'.9 N, longitude 026°33'.4 W and thence by a rhumb line to Sørkapp, Jan Mayen and by the southern shore of Jan Mayen to the Island of Bjørnøya and thence by a great circle line from the Island of Bjørnøya to Cap Kanin Nos and thence by the northern shore of the Asian continent eastward to the Bering Strait and thence from the Bering Strait westward to latitude 60° N as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait and thence by the northern shore of the North American continent as far south as latitude 60° N and thence eastward along parallel of latitude 60° N, to longitude 56°37'.1 W and thence to the latitude 58°00'.0 N, longitude 042°00'.0 W.

5) *A similar stage of construction* shall mean the stage at which construction identifiable with a specific ship begins and assembly of that ship has commenced comprising at least 50 tonnes or 1 per cent of the estimated mass of all structural material, whichever is the less.

6) *Liquid substances* are those having a vapour pressure not exceeding 2.8 kp/cm^2 at a temperature of 37.8^{o}C, except from water, cf. section 10 of the decree.

7) *High-viscosity substance* means a substance in Category X or Y with a viscosity equal to or greater than 50 mPa.s at the unloading temperature.

8) *The IBC Code* means the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, as adopted by the IMO Marine Environment Protection Committee by Resolution MEPC.19(22), as amended by the IMO, provided that such amendments have been adopted and made effective in accordance with the provisions of article 16 of the MARPOL Convention on the amendment procedures applicable to appendices to annexes to the MARPOL Convention. Furthermore, the definition includes later additions to the IBC Code in the form of the lists of liquid substances printed in the IMO annual document MEPC.2/Circular. The latter document serves as a register of liquid substances before the formal incorporation of the substance into the IBC Code. The document consists, inter alia, of a list of liquid substances temporarily classified by a MARPOL Convention State, cf. the procedure in section 4.

9) *Non-solidifying substance* means a noxious, liquid substance that is not a solidifying substance.

10) *Chemical tanker* means a tanker constructed or adapted for the carriage in bulk of any liquid product listed in chapter 17 of the IBC Code. This shall, however, not apply to the modification of a ship which complies with the following conditions:
    a) the ship is constructed before 1 July 1986; and
    b) the ship is certified under the BCH Code to carry only those products identified by the Code as substances with pollution hazards only.

11) *Low-viscosity substance* means a noxious, liquid substance that is not a high-viscosity substance.

12) *Manual* means the Manual for Procedures and Arrangements which is in accordance with the regulations of the Danish Maritime Authority hereon, cf. Notice B from the Danish Maritime Authority, Technical regulation on the construction and equipment, etc., of ships, chapter XXII; "Control with noxious liquid substances in bulk", regulation 14.

13) *The MARPOL Convention* means the International Convention for the Prevention of Pollution from Ships, 1973/78, including Protocols, as amended.

14) *Nearest coast* means the baseline from which the territorial waters of the territory concerned is determined in accordance with international law; however, with the addition that "from the nearest coast" off the north-eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in
    latitude 11°00' S, longitude 142°08'E
    to a point in latitude 10°35' S, longitude 141°55' E,
    thence to a point latitude 10°00' S, longitude 142°00' E,
    thence to a point latitude 9°10' S, longitude 143°52' E,
    thence to a point latitude 9°00' S, longitude 144°30' E,
    thence to a point latitude 10°41' S, longitude 145°00' E,
    thence to a point latitude 13°00' S, longitude 145°00' E,
    thence to a point latitude 15°00' S, longitude 146°00' E,
    thence to a point latitude 17°30' S, longitude 147°00' E,

thence to a point latitude 21°00' S, longitude 152°55' E,
thence to a point latitude 24°30' S, longitude 154°00' E,
thence to a point on the coast of Australia in
latitude 24°42' S, longitude 153°15' E, cf. section 6(1) of the decree.

15) *ppm* means ml/m^3.

16) *Clean ballast* means ballast water carried in a tank which, since it was last used to carry a cargo containing a substance in category X, Y or Z, has been cleaned and emptied following such a cleaning in accordance with the appropriate requirements of this order.

17) *Residue* means any noxious, liquid substance to be disposed of.

18) *Residue/water-mixture* means a residue to which water has, for some reason, been added (such as by tank cleaning or in ballast water).

19) *Noxious liquid substances* means substances listed under the pollution categories in chapter 17 or 18 of the IBC Code or which, pursuant to section 4, have temporarily been determined as belonging to category X, Y or Z.

20) *Ship constructed ("ship built")* means a ship the keel of which is laid or which is at a similar stage of construction. A ship converted into a chemical tanker shall, irrespective of the date of construction, be treated as a chemical tanker built on the date on which the conversion was initiated.

21) *Solidifying substance* means a noxious, liquid substance which, with a melting point of less than 15^oC, is at a temperature of less than 5^oC above its melting point at the time of unloading; or which, with a melting point equal to or greater than 15^oC, is at a temperature of less than 10^oC above its melting point at the time of unloading.

22) *Underway* means that the ship is following a course that may include deviations from the shortest direct route and which contributes to any discharge being spread over the greatest possible sea area to the extent that it is possible from a navigational point of view.

23) *Water depth* means the depth indicated in the chart.

Part 3
Categorisation and classification of noxious, liquid substances and other substances

Section 3. For the purposes of this order, liquid substances shall be divided into four categories:

1) Category X: noxious, liquid substances that, if discharged into the sea during tank cleaning or discharge of ballast, would present a great risk either to the resources of the sea or human health and, consequently, warrant prohibition against being discharged into the sea.

2) Category Y: noxious, liquid substances that, if discharged into the sea during tank cleaning or discharge of ballast, would present a risk either to the resources of the sea or human health or would harm the recreational values of the seas or cause inconvenience to any other rightful use of the sea and, consequently, warrant a limitation to the method and the quantity of discharge into the sea.

3) Category Z: noxiuos, liquid substances that, if discharged into the sea during tank cleaning or discharge of ballast, would present a minor risk either to the resources of the sea or human health and, consequently, warrant some minor restrictions in the method and quantity of discharge into the sea.

4) Other substances: substances given as OS (Other Substances) in the column with pollution categories in chapter 18 of the IBC Code which are assessed as falling beyond category X, Y or Z because they

are not, currently, considered to present a risk to the resources of the sea, human health, the recreational values of the sea or to be an inconvenience to any other rightful use of the sea if discharged into the sea during tank cleaning or discharge of ballast.

Section 4. A liquid substance not covered by the IBC Code, as amended, shall, before being carried to in the exclusive economic zone around Greenland be classified by the Danish Environmental Protection Agency, which shall acquire a statement of the Naalakkersuisut beforehand.. The Danish Environmental Protection Agency shall, together with the government(s) Parties to the MARPOL Convention affected by the intended transport, make and agree on a temporary assessment of the intended transport on the basis of the guidelines in annex 1.

Subsection 2. If the Danish Environmental Protection Agency and the affected government(s) do not reach full agreement, the substances shall not be carried.

Subsection 3. If the Danish Environmental Protection Agency has taken the initiative for an agreement as mentioned in subsection 1, the Danish Environmental Protection Agency shall, no later than 30 days after the conclusion of the agreement, inform the Secretariat of the IMO hereof with detailed information about the substances and the temporary assessment.

Part 4
General provisions on discharge and transport

Section 5. Liquid substances not classified, cf. section 3, or temporarily assessed, cf. section 4, or ballast water, tank washings or other mixtures containing such substances shall not be carried or discharged into the sea.

Section 6. Discharge into the sea of substances belonging to category X, Y or Z or of substances temporarily assessed as belonging under such a category or of ballast water, tank washings or other mixtures containing such substances shall take place only if the discharge is in accordance with sections 9-12, cf. however sections 7-8.

Section 7. In Arctic waters, discharge of liquid substances or mixtures containing such substances shall be prohibited.

Section 8. Before the tank cleaning or discharge procedure is carried out in accordance with this order, the tank in question shall be discharged to the greatest extent possible in accordance with the procedure described in the Manual.

Part 5
Discharge of category X substances

Section 9. If a tank that has contained category X substances has been unloaded, it shall be cleaned before the ship leaves the port. The residues shall be delivered to a reception facility until the concentration

of the substance is at or below 0.1 per cent (weight). When the required concentration has been reached, residues of tank washings shall be discharged to the reception facility until the tank is empty.

Subsection 2. Exhaustive descriptions of operations mentioned in subsection 1 shall be recorded in the cargo record and be endorsed by the inspector, cf. Notice B from the Danish Maritime Authority, Technical regulation on the construction and equipment, etc. of ships, chapter XXII, Control with noxious liquid substances in bulk, regulation 16.

Subsection 3. Water that is subsequently filled into the tank may be emptied into the sea in accordance with the requirements of section 12. In case of ballast water, the discharge shall be made in accordance with the requirements of section 11.

Subsection 4. If it is impracticable to measure the concentration of the substance in the waste water without causing undue delay of the ship, the Danish Environmental Protection Agency may accept an alternative method for deciding the concentration stipulated in subsection 1, provided that:

1) the tank is cleaned in accordance with a procedure approved by the Danish Maritime Authority, by other Parties to the MARPOL Convention or by other EU authorities, including institutes recognised by these authorities, and
2) extensive records have been made in the cargo record and been endorsed by an inspector, cf. Notice B from the Danish Maritime Authority, Technical regulation on the construction and equipment, etc. of ships, chapter XXII, Control with noxious liquid substances in bulk, regulation 16.

Part 6
Discharge of category Y and Z substances

Section 10. The discharge of substances belonging to category Y or Z shall be in accordance with the requirements of section 12.

Subsection 2. If the unloading of substances belonging to category Y or Z is not carried out in accordance with the Manual, tank cleaning shall be made before the ship leaves the port unless alternative measures have been made approved by an inspector, cf. Notice B from the Danish Maritime Authority, Technical regulation on the construction and equipment, etc. of ships, chapter XXII, Control of noxious liquid substances in bulk, regulation 16, to remove cargo residues from the ship to an extent complying with the provisions of this order. If possible, the produced tank washings shall be discharged to a reception facility in the port or in another port with a suitable reception facility provided that it has been confirmed in writing that there is a reception facility in the relevant port and that it is suitable for the purpose.

Subsection 3. For high-viscosity substances or solidifying substances of category Y, the following shall apply:

1) A tank cleaning procedure specified in annex 2 to this order shall be used.
2) Residue/water mixtures from the tank cleaning shall be discharged into a reception facility until the tank is empty.
3) Water that is subsequently filled into the tank may be discharged into the sea in accordance with the requirements of section 12. In case of ballast water, the discharge shall be made in accordance with the requirements of section 11.

Part 7

Ballast water management

Section 11. After unloading and, if necessary, after tank cleaning, a cargo tank may be ballasted. The discharge of ballast water covered by this order shall meet the provisions of section 12, cf. however subsection 2.

Subsection 2. Ballast water in a cargo tank that has been cleaned to such an extent that the ballast water contains less than 1 ppm of the substance that the tank has contained may be discharged into the sea without consideration of the provisions stipulated in section 12 on discharge rate, the ship's speed or the location of the discharge provided that the ship is not less than 12 nautical miles from the nearest coast and is in waters that are not less than 25 metres deep.

Subsection 3. The required purity, cf. subsection 2, has been achieved when a tank cleaning as specified in annex 2 to this order has been carried out and the tank has subsequently been washed by a complete work process of the tank cleaning installation for ships built before 1 July 1994 or by a water quantity not less than the one calculated when k = 1.0.

Part 8

Discharge requirements

Section 12. When, according to sections 9-11, it is permitted to discharge residual quantities of category X, Y and Z substances or of substances temporarily assessed as belonging under such a category or it is permitted to discharge ballast water, tank washings or other mixtures containing such substances, the following conditions shall apply:

1) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;
2) the discharge is made below the waterline at a discharge rate not exceeding the permitted rate calculated for the discharge; and
3) the discharge is made at a distance of not less than 12 nautical miles from the nearest land in a depth of water of not less than 25 metres.

Subsection 2. For ships built before 1 January 2007, discharge below the waterline, cf. subsection 1(ii), shall not be required for residual quantities of category X, Y and Z substances or of substances temporarily assessed as such or for ballast water, tank washings or other mixtures containing such substances.

Part 9

Ventilation of cargo residues

Section 13. Ventilation of cargo residues made by a procedure approved by the Danish Maritime Authority, by other Parties to the MARPOL Convention or by other EU authorities, including institutes recognised by these authorities, may be used for removing cargo residues from a tank.

Subsection 2. The procedure under subsection 1 shall be in accordance with annex 3.

Subsection 3. Water subsequently filled into the tank shall be considered clean and shall not be subject to the discharge requirements of this order.

Part 10

Exemption from tank cleaning

Section 14. Upon request from the ship's master, the Danish Environmental Protection Agency may exempt a ship from tank cleaning if it is proved:

1) that the unloaded tank is reloaded with the same substance or another substance compatible with the previous one and that the tank is not cleaned or ballasted prior to the loading;
2) that the unloaded tank is neither cleaned nor ballasted at sea. Tank cleaning shall subsequently be made in another port provided that it is confirmed in writing that a reception facility is available in that port and that it is suitable for the purpose; or
3) that cargo residues are removed by a ventilation method approved by the Danish Maritime Authority, by other Parties to the MARPOL Convention or by other EU authorities, including institutes recognised by these authorities in accordance with annex 3.

Part 11

Use of cleaning agents and additives

Section 16. When another agent than water, such as mineral oil or a chlorine-containing solvent, is used to clean a tank, discharge shall be made in accordance with the provisions of this order or the provisions of the order on the discharge of oil from ships that would apply if this agent had been carried as cargo.

Subsection 2. Tank cleaning procedures including the use of a solvent as mentioned in subsection 1 shall be given in the Manual and be approved by the Danish Maritime Authority, by other Parties to the MARPOL Convention or by other EU authorities, including institutes recognised by these authorities.

Subsection 3. When water is added to small quantities of cleaning agents to make the tank cleaning easier, category X substances shall not be used except for the components that are quickly biodegradable and occur in concentrations not exceeding 10 per cent of the cleaning agent. No further limitations shall apply in addition to those applicable to the previous cargo.

Part 12

Sanction

Section 16. Unless a severer sanction is incurred under other legislation, anyone shall be liable to punishment by fine pursuant to the criminal code for Greenland who:

1) makes discharges of substances, etc. in contravention of sections 5-7, section 9(3), section 10(1), section 11(2), section 12 or section 15(1);
2) carries liquid substances in violation of section 4(2) or section 5;
3) contravenes the provisions of section 8, section 9(1) and (2), section 10(2) and (3) or section 15(2) and (3);
4) in contravention of section 13(2) uses a procedure for ventilating cargo residues that is not in accordance with annex 3; or

5) does not observe the conditions of an exemption granted pursuant to section 14.

Part 13

Promulgation of regulations

Section 17. The IBC Code, as amended, MEPC.2/Circular, the BCH Code, MEPC/Circ.265, as amended, and the Tanker Safety Guide (Chemicals) from the International Chamber of Shipping shall not be inserted in the Danish Gazette. The regulations are available for inspection from the Danish Environmental Protection Agency.

Part 14

Entry into force

Section 18. This order shall enter into force on 1 July 2017.

Ministry of Environment and Food of Denmark, 22 May 2017

Esben Lunde Larsen / Hans Christian Karsten

Annex I

Guidelines for the categorization of noxious liquid substances, cf. section 4(1)

Products are connected with a pollution category on the basis of an assessment of their properties as reflected in the resulting GESAMP risk profile as shown in the below table:

Regulation	A1 Bioaccu-mulation	A2 Biodegra-dation	B1 Acute tox-icity	B2 Chronic toxicity	D3 Long term health ef-fects	E2 Effects on marine wildlife and on benthic habitats	Category
1			≥ 5				
2	≥ 4		4				
3		NR	4				
4	≥ 4	NR			CMRTNI		**X**
5			4				
6			3				
7			2				
8	≥ 4	NR		Not 0			**Y**
9				≥ 1			
						Fp, F or S if not unorganic	
10							
11					CMRTNI		
12	All products that do not meet the criteria for regulations 1-11 and 13						**Z**
13	All products identified as: ≤2 in column A1; R in column A2; blank in column D3; not Fp, F or S (if not organic) in column E2; and 0 (zero) in all other columns in the GESAMP risk profile						**OS**

Reference is made to the revised guidelines for a preliminary assessment of chemicals, MEPC.1/Circ.265, as amended.

Abbreviated guidelines for the revised GESAMP risk assessment procedure

Columns A and B – marine environment					
	A			**B**	
	Bioaccumulation and biodegradation			**Aquatic toxicity**	
Numerical classification	**A 1* Bioaccumulation**		**A 2* Biodegra-dation**	**B 1* Acute toxicity**	**B 2* Chronic toxicity**
	Log P_{ow}	BCF		LC/EC/IC_{50} (mg/l)	NOEC (mg/l)
0	<1 or > about 7	not measurable	R: high bio-degradability NR: Low bio-degradability Unorg.: Unor-ganic substance	>1000	>1
1	≥1 - <2	≥ 1 - <10		>100 - ≤1000	>0.1 - ≤1
2	≥2 - <3	≥ 10 - <100		>10 - ≤100	>0.01 - ≤0.1
3	≥3 - <4	≥ 100 - <500		>1 - ≤10	>0.001 - ≤0.01
4	≥4 - <5	≥ 500 - <4000		>0.1 - ≤1	≤0.001
5	≥5 - < about 7	≥ 4000		>0.01 - ≤0.1	
6				≤0.01	

* These columns are used to define pollution categories.

Columns C and D – Human health (Mammalian toxicity)						
	C			D		
	Acute mammalian toxicity			Irritation, corrosion and long term health effects		
Numerical classification	**C 1 Oral toxicity LD_{50} (mg/kg)**	**C 2 Acute dermal toxicity LD_{50} (mg/kg)**	**C 3 Inhalation toxicity LC_{50} (mg/l)**	**D 1 Skin irritation and corrosion**	**D 2 Eye irritation and corrosion**	**D 3* Long term effects**
0	>2000	>2000	>20	Not irritating	Not irritating	C – Carcinogenic M – Mutagenic R – Retroproxic S – Sensitising A – Aspiration hazard T – Target organ oriented systemic toxicity L – Lung injury N – Neurotoxic I - Immunotoxic
1	>300 - ≤2000	>1000 - ≤2000	>10 - ≤20	Mildly irritating	Mildly irritating	
2	>50 - ≤300	>200 - ≤1000	>20 - ≤10	Irritating	Irritating	
3	>5 - ≤50	>50 - ≤200	>0.5 - ≤2	3 Severely irritating or corrosive 3A Corr. (≤4hr) 3B Corr. (≤1hr) 3C Corr. (≤3m)	Severely irritating	
4	≤5	≤50	≤0.5			

* These columns are used to define pollution categories.

Column E - Interference with other uses of the sea			
E1 **Less tainting**	**E2*** **Physical effects on wildlife and benthic habitats**	**E3** **Interference with coastal amenities**	
		Numerical classification	**Description and measures**
NT: not less tainting (tested) T: tainting test positive	Fp: Persistent floating substance F: Floating substance S: Sinking substance	0	no effect, **no warning**
		1	slightly criticizable **warning, the facility is not closed**
		2	moderately criticizable, **possible closing of the facility**
		3	extremely criticizable, **closing of facility**

* These columns are used to define pollution categories.

Annex 2

Prewash procedure

A. For ships built prior to 1 July 1994

A prewash procedure is required to comply with section 9(4)(i), section 10(3)(i) and section 11(3). This annex explains how these prewash procedures are to be carried out.

Prewash procedures for non-solidifying substances

1. Tanks shall be washed using a rotating jet of water at a sufficiently high water pressure. In case of category X substances, the tank cleaning machines shall be located in positions ensuring that all tank surfaces are washed. In case of category Y substances, it is sufficient that they are located in one position.
2. During the cleaning, the quantity of water in the tank shall be minimized by pumping out slops continuously and promoting flow to the suction point (positive list and trim). If this condition cannot be met, the washing procedure shall be repeated three times, with thorough stripping of the tank between washings.
3. Substances which have a viscosity equal to or greater than 50 mPa.s at 20 C shall be washed with hot water (temperature at least 60 C), unless the properties of the substances make such washing less effective.
4. The number of cycles of the cleaning machine used shall not be less than that specified in table 6-1. A cleaning machine cycle is defined as the period between two consecutive identical orientations of the tank cleaning machine (rotation through 360).
5. After the cleaning, the tank cleaning machine(s) shall be kept operating long enough to flush the cargo lines, pump and filter, and the discharge to reception facilities ashore shall be continued until the tank is stripped.

Prewash procedures for solidifying substances

1. Tanks shall be prewashed as soon as possible after unloading. If possible, tanks should be heated prior to this washing.
2. Residues in hatches and manholes should preferably be removed prior to prewash.
3. Tanks shall be washed using a rotating jet of water at a sufficiently high water pressure from tank cleaning machines located in positions ensuring that all tank surfaces are washed.
4. During the cleaning, the amount of water in the tank shall be minimized by pumping out slops continuously and promoting flow to the suction point (positive list and trim). If this condition cannot be met, the washing procedure shall be repeated three times, with thorough stripping of the tank between washings.
5. Tanks shall be washed with hot water (temperature at least 60 C), unless the properties of the substances make such washing less effective.
6. The number of cycles of the cleaning machine used shall not be less than that specified in table 6-1. A cleaning machine cycle is defined as the period between two consecutive identical orientations of the tank cleaning machine (rotation through 360).
7. After the cleaning, the tank cleaning machine(s) shall be kept operating long enough to flush the cargo lines, pump and filter, and the discharge to reception facilities ashore shall be continued until the tank is stripped.

Table 6-1: Number of cleaning machine cycles in every position

Category of substance	Number of cleaning machine cycles	
	Non-solidifying substances	Solidifying substances
Category X	1	2
Category Y	1 2	1

B. For ships built on or after 1 July 1994 and recommended for ships built before 1 July 1994

A prewash procedure is required to comply with section 10(4)(i), section 11(3)(i) and section 12(3). This annex explains how these prewash procedures are to be carried out and how to decide the minimum permitted quantity of detergent to be used. Smaller quantities of detergents may be used if a test is carried out confirming that the result is satisfactory to the Danish Maritime Authority or other Parties to the MARPOL Convention. If the use of reduced quantities is approved, a remark to this effect shall be entered in the Manual.

If another medium than water is used for the prewashing, the provision of section 16(1) shall apply.

Prewash procedures for non-solidifying substances without recycling

1. Tanks shall be washed using (a) rotating jet(s) of water at a sufficiently high water pressure. In case of category X substances, the tank cleaning machines shall be located in positions ensuring that all tank surfaces are washed. In case of category Y substances, it shall be sufficient to use one position.
2. During the cleaning, the amount of water in the tank shall be minimized by pumping out slops continuously and promoting flow to the suction point. If this condition cannot be met, the washing procedure shall be repeated three times, with thorough stripping of the tank between washings.
3. Substances which have a viscosity equal to or greater than 50 mPa.s at 20 C shall be washed with hot water (temperature at least 60 C), unless the properties of the substances make such washing less effective.
4. The quantity of washing water used shall not be less than the quantities given in part 20 or decided under part 21.
5. After prewashing, the tank, pump and cargo lines shall be thoroughly stripped.

Prewash procedures for solidifying substances without recycling

6. Tanks shall be washed as soon as possible after unloading. If possible, tanks shall be heated prior to this washing.
7. Residues in hatches and manholes shall preferably be removed prior to the prewash.
8. Tanks shall be washed using (a) rotating jet(s) of water at a sufficiently high water pressure from positions ensuring that all tank surfaces are washed.
9. During the cleaning, the amount of water in the tank shall be minimized by pumping out slops continuously and promoting flow to the suction point. If this condition cannot be met, the washing procedure shall be repeated three times, with thorough stripping of the tank between washings.
10. Tanks shall be washed with hot water (temperature at least 60 C), unless the properties of the substances make such washing less effective.
11. The quantity of washing water used shall not be less than the quantities given in part 20 or decided under part 21.

12. After prewashing, the tank, pump and cargo lines shall be thoroughly stripped.

Prewash procedures with recycling of the washing medium

13. Prewashing with a recycled washing medium may be adopted for the purpose of washing more than one cargo tank. In determining the quantity of washing medium, due regard shall be given to the expected amount of residues in the tanks and the properties of the prewashing medium and whether any initial rinse or flushing is employed. Unless sufficient data are provided, the calculated end concentration of cargo residues in the washing medium shall not exceed 5% based on the nominal stripping quantities.
14. The recycled prewashing medium shall only be used for washing tanks having contained the same or similar substances.
15. A quantity of prewashing medium sufficient to allow continuous washing shall be added to the tank or tanks to be prewashed.
16. All tank surfaces shall be washed using (a) rotating jet(s) at a sufficiently high pressure. The recycling of the prewashing medium may either be within the tank to be washed or via another tank, e.g. a slop tank.
17. The prewashing shall be continued until the accumulated throughput is not less than the quantities given in part 20 or determined pursuant to part 21.
18. Solidifying substances and substances with viscosity equal to or greater than 50 mPa.s at 20 shall be prewashed with hot water (temperature at least 60 C) if water is used as a washing medium unless the properties of the substances make such washing less effective.
19. After completing the tank prewashing with recycling to the extent specified in part 17, the washing medium shall be discharged and the tank be thoroughly stripped. Thereafter, the tank shall be subjected to a rinse, using clean washing medium, with continuous drainage and discharged to a reception facility. The rinse shall, as a minimum, cover the tank bottom and be sufficient to flush the pipelines, pump and filter.

Minimum quantity of water to be used in a prewash

20. The minimum quantity of water to be used in a prewash is determined by the residual quantity of the noxious liquid substance in the tank, the tank size, the cargo properties, the permitted concentration in any subsequent wash water effluent and the application area. The minimum quantity is given by the following formula:

    $Q = k\,(15r^{0.8} + 5r^{0.7} \times V/1000)$

    where

    Q = the required minimum quantity in m^3

    r = the residual quantity per tank in m^3. The value of r (actual stripping efficiency test result) shall not be taken lower than 0.100 m^3 for a tank volume of 500 m^3 and above, and not lower than 0.040 m^3 for a tank volume of 100 m^3 and below. For tank sizes between 100 m^3 and 500 m^3 the minimum value of r allowed to be used in the calculation is obtained by linear interpolation.

    For category X substances, the value of r shall be determined by either a stripping test pursuant to the Manual observing the above-mentioned minimum limits or be set at 0.9 m^3.

    V = tank volume in m^3

    k = a factor having values as follows:

    Category X, non-solidifying, low-viscosity substance k = 1.2

Category X, solidifying or high-viscosity substance	k = 2.4
Category Y, non-solidifying, low-viscosity substance	k = 0.5
Category Y, solidifying or high-viscosity substance	k = 1.0

The table below has been calculated using the formula and with a k factor of 1. The table may be used for quick calculations.

Discharged quantity (m^3)	**Tank volume (m^3)**		
	100	**500**	**3000**
<0.04	1.2	2.9	5.4
0.10	2.5	2.9	5.4
0.30	5.9	6.8	12.2
0.90	14.3	16.1	27.7

21. It shall be permitted to carry out verification testing provided that the Danish Maritime Authority or other Parties to the MARPOL Convention consider it satisfactory with a view to approval of prewash quantities lower than those stipulated in part 20 in order to demonstrate that the requirements of the order are met considering the substances that the ship has been approved to carry. The thus verified prewash quantity shall be adjusted to other prewashing conditions by using the factor k defined in part 20.

Annex 3

Ventilation procedures, cf. section 13(2) and section 14(1)(iii)

1. Cargo residues of substances with a vapour pressure greater than 5 KPa at 20°C may be removed from a cargo tank by ventilation.
2. Before residues of noxious liquid substances are ventilated from a tank, the safety hazards relating to cargo flammability and toxicity shall be considered. With regard to safety aspects, the operational requirements for openings in cargo tanks in SOLAS 74, as amended, cf. Notice B from the Danish Maritime Authority, Technical regulation on the construction and equipment, etc. of ships, chapter II-1, Structure – Construction, sub-division and stability, machinery and electrical installations, the International Bulk Chemical Code, the Bulk Chemical Code and the ventilation procedures in the International Chamber of Shipping (ICS) Tanker Safety Guide (Chemicals) shall be consulted.
3. Port authorities may also have regulations on cargo tank ventilation.
4. The procedures for ventilation of cargo residues from a tank are as follows:
    a. The pipelines shall be drained and further cleared of liquid by means of ventilation equipment.
    b. The list and trim shall be adjusted to the minimum levels possible so that evaporation of residues in the tank is enhanced.
    c. Ventilation equipment producing an airjet which can reach the tank bottom shall be used. For assistance in evaluation of adequacy of equipment used to vent a tank of a given depth, figure 1 may be used.
    d. Ventilation equipment shall be placed in the tank opening closest to the tank sump/suction point.
    e. Ventilation equipment shall, if practicable, be positioned so that the airjet is directed at the tank sump/suction point. Impingement of the airjet on tank structural members is to be avoided as much as possible.
    f. Ventilation shall continue until no visible remains of liquid can be observed in the tank. This shall be verified by a visual examination or an equivalent method.

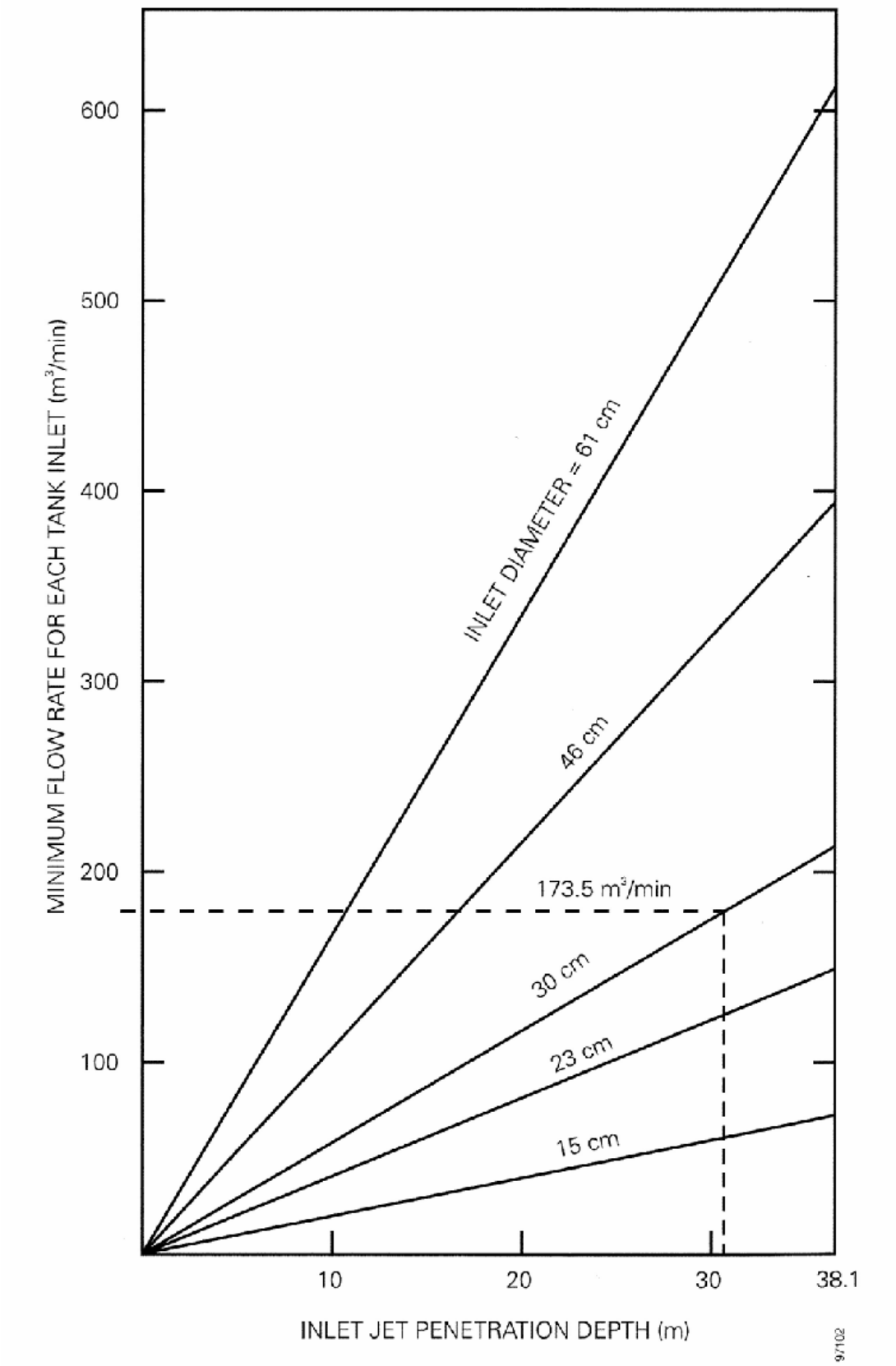

Figure 1. Minimum flow rate as a function of jet penetration depth. Jet penetration depth should be compared against tank height