Inert Gas requirements

A summary of the current requirements

INTERTANKO Tanker Event at Istanbul 2008
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Are the present IG requirements complicated?

Above table gives DNV’s understanding of present IG requirements in SOLAS.
Why do we have IG requirements?

T/T "KONG HAAKON VII"
Keep in mind:

IG requirements relate only to low flash-point cargoes

IG requirements are given in 2 different statutory instruments:
- Chem Code
- SOLAS
Chem Code   IG requirements

- Applies when "Inert" is given in Ch. 17 column "h" of the IBC Chem Code
- Applies for this product irrespectively of ship age, ship size, tank size, etc.
- Operational requirement only; (no specific technical requirements are given):
  - Pre-purging with IG supplied from shore before loading is OK
  - Bottles with N₂ for topping up during voyage
  - Supply from shore during unloading, (if required)
- IG used is normally N₂

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Y</th>
<th>S/P</th>
<th>2</th>
<th>1G</th>
<th>Cont</th>
<th>No</th>
<th>T1</th>
<th>IIB</th>
<th>No</th>
<th>C</th>
<th>F-T</th>
<th>A, D</th>
<th>Yes</th>
<th>15.12, 15.17, 15.18, 15.19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propionitrile</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>n-Propyl acetate</td>
<td>Y</td>
<td></td>
<td>P</td>
<td></td>
<td></td>
<td>No</td>
<td></td>
<td>No</td>
<td>R</td>
<td>F</td>
<td>A, B</td>
<td>No</td>
<td>15.19.6</td>
<td></td>
</tr>
<tr>
<td>n-Propyl alcohol</td>
<td>Y</td>
<td></td>
<td>P</td>
<td></td>
<td></td>
<td>No</td>
<td></td>
<td>No</td>
<td>R</td>
<td>F</td>
<td>A</td>
<td>No</td>
<td>15.19.6</td>
<td></td>
</tr>
<tr>
<td>n-Propyamine</td>
<td>Z</td>
<td>S/P</td>
<td>2</td>
<td></td>
<td>2G</td>
<td>No</td>
<td></td>
<td>No</td>
<td>R</td>
<td>F</td>
<td>A</td>
<td>No</td>
<td>15.12, 15.19</td>
<td></td>
</tr>
<tr>
<td>Propylenebenzene (all isomers)</td>
<td>P</td>
<td></td>
<td>2</td>
<td></td>
<td>2G</td>
<td>No</td>
<td></td>
<td>No</td>
<td>R</td>
<td>F</td>
<td>A</td>
<td>No</td>
<td>15.19.6</td>
<td></td>
</tr>
<tr>
<td>Propylene glycol methyl ether acetate</td>
<td>Z</td>
<td>P</td>
<td></td>
<td>2</td>
<td>2G</td>
<td>No</td>
<td></td>
<td>No</td>
<td>R</td>
<td>F</td>
<td>A</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Propylene glycol monoalkyl ether</td>
<td>Z</td>
<td>P</td>
<td></td>
<td>2</td>
<td>2G</td>
<td>No</td>
<td></td>
<td>No</td>
<td>R</td>
<td>F</td>
<td>A, B</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Propylene glycol bisphenyl ether</td>
<td>Z</td>
<td>P</td>
<td></td>
<td>2</td>
<td>2G</td>
<td>No</td>
<td></td>
<td>No</td>
<td>R</td>
<td>F</td>
<td>A, B</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
SOLAS IG requirements

- Requirements given in Ch. II-2 Reg. 4, item 5.5
- Applicable to tankers of 20 000 DWT and above
- Full cycle required:
  - Pre-purging
  - Topping up during voyage
  - Filling during unloading
  - Topping up during tank cleaning
  - Purging until less than 2% hydrocarbons
- Both detailed equipment requirements and detailed operational requirements
The requirements are given in SOLAS Ch. II-2 Reg. 4, item 5.5 with detail requirements in:
- FSS Code
- MSC Circulars
- Res. A 567(14) (modified requirements for tankers holding Chem Code Certificate of Fitness)
- IACS UR F20

**Oil tankers:**
- must have IG capacity not less than 125% of unloading rate
- must have deck water seal

**Tankers with Chem Code CoF:**
- must limit the unloading rate to max 80% of IG capacity
- may have double block-and-bleed arrangement in lieu of deck water seal
Historical development

- Original SOLAS 74 text included IG requirements for oil tankers above 100,000 DWT and combination carriers above 50,000 DWT.

- TSPP 78 SOLAS Protocol requires IG for “new” oil tankers on or above 20,000 DWT and gives time scheme for upgrading “existing” tankers above on or above 20,000 DWT.

- SOLAS 81-Amendments make reference to Res. A 473(XII) with some relaxations for combined oil/chemical tankers when carrying oil cargoes; (IG not required for low-flash chemicals).

- SOLAS 83-Amendments make IBC Code mandatory under SOLAS (IG still not required for chemicals).
SOLAS IG requirements

Historical development (continued)

- SOLAS 89-Amendments clarified that:
  - Chemical tankers keel-laid before 1986-07-01 need not use IG for Ch. 17 and Ch. 18 products
  - Chemical tankers keel-laid on or after 1986-07-01 must use IG for low FP Ch. 17 and 18 products
    - when tanks are 3 000 m³ or above or
    - when tank cleaning machines exceed 17.5 m³/h pr. nozzle or 110 m³/h totally
SOLAS IG requirements

Background for present requirements

- Tank size limitations because water washing in larger tanks was taken to cause possibility for electrostatic charges causing ignition

- Relaxations for chemicals because gas from IG generator will cause contamination of cargo; (N₂ generators not available when the requirements were established)
## DNV understanding of SOLAS IG requirements

### INERT GAS REQUIREMENTS FOR OIL TANKERS AND CHEMICAL TANKERS

*when carrying cargoes with flash point not exceeding 60 °C*

<table>
<thead>
<tr>
<th>Category</th>
<th>I. Oil tankers 20 000 - 40 000 DWT, existing according to TSPP 78</th>
<th>II. Oil tankers 20 000 DWT and above not included in Category I.</th>
<th>III. Chemical tankers of or above 20 000 DWT keel-laid before 1 July 1986</th>
<th>IV. Chemical tankers of or above 20 000 DWT keel-laid on or after 1 July 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products</td>
<td>Cargo tanks not exceeding 3 000 m³</td>
<td>Cargo tanks exceeding 3 000 m³</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Crude oil | IG required unless specially exempted, (Exemption Cert.) | IG required unless exempted as for Category I | IG required | IG required |
| Oil products | IG not required subj. to each washing machine not exceeding 60 m³/h | IG required | IG required | IG required |
| Chem Code Ch. 17 | Prohibited cargoes | Prohibited cargoes | IG not required subj. to each tank wash. mach. nozzle not exceeding 17.5 m³/h and total wash water input not exceeding 110 m³/h | IG required |
| Chem Code Ch. 18 | IG not required ²| IG required | IG not required | IG required |

IG is required for any tanker, irrespectively of its size and age, if using crude oil washing. Otherwise IG not required for any tanker less than 20 000 DWT.

1) Contracted before 1 June 79 (or, if no contract, keel-laid before 1 Jan. 80) and delivered before 1 June 82.

2) Tankers above 40 000 DWT may also carry these products without IG.
## Tank ventilation / gas freeing requirements cargoes with FP not exceeding 60 °C

<table>
<thead>
<tr>
<th>Type of ship</th>
<th>Oil tankers (GT 500 and above)</th>
<th>Chemical tankers (any size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOLAS 74 ships</td>
<td>Keel laid on or after 1 Sept. 84 (<em>new</em> according to SOLAS 81- Amendments) but before 1 Feb. 92</td>
<td>Keel laid before 1 July 86 (BCH)</td>
</tr>
<tr>
<td>kooled laid before 1 Sept. 84.</td>
<td>Keel laid on or after 1 Feb. 92 (<em>new</em> according to SOLAS 81- Amendments)</td>
<td>Keel laid between 1 July 86 and 1 Jan. 94</td>
</tr>
<tr>
<td>Type of cargo</td>
<td>Keel laid on or after 1 Jan. 94</td>
<td>Keel laid on or after 1 Jan. 94</td>
</tr>
<tr>
<td><strong>Oil</strong></td>
<td><strong>With IG</strong></td>
<td><strong>Without IG</strong></td>
</tr>
<tr>
<td>Very general requirements, (suitable means /minimize hazards), given in original SOLAS 74 Ch. II-2 regs 55 and 62.</td>
<td>Use 10 through fixed vent riser until below 2% hydrocarbons; outlet min. 2 m above deck, outlet velocity min. 20 m/s (with min. 3 tanks at the time). Afterwards air with open ventilation at deck level.</td>
<td>Use fixed vent riser until below 30% LEL, outlet min. 2 m above deck, outlet velocity min. 20 m/s (with flame screen). Afterwards with open ventilation at deck level.</td>
</tr>
<tr>
<td>Ch. 17</td>
<td>“Prohibited” cargoes, (BCH Code not mandatory under SOLAS)</td>
<td>Prohibited cargoes</td>
</tr>
<tr>
<td>As for oil cargoes given above #1</td>
<td>As for oil cargoes given above #1</td>
<td>As for oil cargoes given above #1</td>
</tr>
</tbody>
</table>

#1 Because II-2 reg 55 all the time has included the words “and other liquid products having similar fire hazard” it is taken that the requirement applicable to oil cargoes also applies for Ch. 18 products, with the exception that the reference to any “percentage of hydrocarbons” is inappropriate for non-hydrocarbon products such as methanol.

2005-02-10

Nyq
Comments:

1. The SOLAS requirements for tank ventilation / gas freeing after carriage non-oil low FP cargoes are generally rather unspecific. It seems that initially the matter was addressed only by use of general wording without any clarifying details. The fact that SOLAS does not provide for specific certification of a tanker’s ability to carry such cargoes have probably added to this matter receiving low attention. Attempting, afterwards, to clarify what were the requirements when the ships were built (and what are today’s actual requirements to such old tankers) can easily cause that more details are read into the “old” text than what was intended originally. This can well turn into or look like application of hindsight. (Likewise the fact that SOLAS does not provide for a cargo/product specific certificate does also cause problems in respect of the following up of the fire fighting requirements of II-2/55.2 for e.g. methanol (for which alcohol resistant foam is necessary).)

2. The 92-Amendments to the IBC Code (effective for ships keel laid on or after 1 January 94) make it clear that for these chemical tankers the tank ventilation / gas freeing requirements of Ch. 8 of the IBC Code take precedence above the similar requirements of SOLAS. Item 8.1.5 of the Code says “For ships to which the Code applies .....” without giving a limitation on the range of products covered by this statement. Therefore it seems clear that 8.1.5 applies also when a chemical tanker is carrying oil cargoes as well as when it is carrying Ch. 18 cargoes.

3. For chemical tankers keel laid on or after 1 July 86, but before 1 January 94, item 8.1.4 of the IBC Code (from 94-Amendments) gives that the requirements of Ch. 8 of the earlier versions of the IBC Code apply in lieu of SOLAS II-2/59 (assumedly also for oil and Ch. 18 cargoes). However, these earlier versions of the IBC Code do not include any requirements for tank ventilation / gas freeing but rather include a footnote reference back to SOLAS II-2/59 from the 83-Amendments. The result is that these texts are going in a complete circle without giving any specific requirements. The further result / conclusion seems to be that for this age group of chemical tankers there are no requirements with regard to tank ventilation / gas freeing after carriage of chemical cargoes, oil cargoes or Ch. 18 cargoes irrespectively of such cargoes having been carried with or without inert gas.

4. For the even older (BCH Code) chemical tankers keel laid before 1 July 86 the situation is that:
   - the BCH Code is not mandatory under SOLAS,
   - the BCH Code does nowhere address the matter of tank ventilation / gas freeing.
Accordingly we are, for all types of cargoes, left with the SOLAS tanker requirements as applicable to these ships.

History:

- SOLAS 74 entered into force 25 May 1980 and is applicable for (new) ships keel laid on or after that date.
- SOLAS TSPP 78 Protocol entered into force 1 May 1981; new: contract 1 June 79 / keel 1 Jun. 82 / del. 1 June 82
- 1981 SOLAS Amendments (with complete new Ch. II-2) entered into force 1 Sept. 1984 and are applicable for ships keel laid on or after 1 Sept 1984.
- 1983 SOLAS Amendments (with IBC Code) entered into force 1 July 1986 and are applicable for ships keel laid on or after 1 July 1986.
- 1989 SOLAS Amendments (MSC.13(57)) entered into force 1 February 92 and separates between existing and new ships by keel laying before or after this date.