



Instruction to RO no. 28-rev1

Automatic air pipe closing devices in the damage stability calculation

1 Introduction

This Instruction to RO provides further guidance to the guidelines for Automatic Air pipe closing devices Preventing progressive downflooding (APF) as circulated under circular letter 3573 (the guidelines) and aims at a uniform application of these guidelines on all ships where the principle of APF is applied. After the date of entry into force for existing and new build ships, the ItoRO contains further guidance on the type testing procedure and technical requirements for APF as well as guidance for the on board implementation requirements. For every item, a reference is made to the relevant article of the guidelines or the associated regulation of an Annex to the guidelines.

2 Relation to national and international legislation

These guidelines are a SOLAS equivalent. These guidelines do not replace the requirements of other Conventions or Regulations such as the Load Line Convention.

According to SOLAS Chapter II-1 Regulation 4.2, (Chapter II-1 Regulation 25-1.3 for ship's the keel of which is laid prior to 01-01-2009), the Administration may, for a particular ship or group of ships, accept alternative methodologies if it is satisfied that at least the same degree of safety as represented by the Convention is achieved. These guidelines contain such an alternative methodology and should be considered as a SOLAS Chapter I, Regulation 5 equivalent arrangement.

For the Netherlands's national legislation, the guidelines are considered as an equivalent arrangement which may be accepted by the Head of the Netherlands Shipping Inspectorate based on article 47 of the Ships Decree 2004.

National type certificates for APF compliant with the guidelines are issued by the Netherlands Shipping Inspectorate under article 34 of the Regulation Safety Seagoing Vessels

3 Dates of entry into force

- Ships of which the first SOLAS safety certificate for cargo ships is issued after the 1st of June 2016, shall comply with the guidelines at the delivery of the vessel, unless all air pipe closing devices fitted on that ship are considered as weathertight opening in the damage stability calculation
- Existing ships, of which the first SOLAS safety certificate for cargo ships is issued before the 1st of June 2016, shall comply with the guidelines at the first SOLAS renewal survey after the 1st of June 2016, unless all air pipe closing devices fitted on that ship are considered as weathertight opening in the damage stability calculation.



4 Guidance for type approvals of APF

- a) Accreditation of testing facility (Annex A, reg. 2)
The APF shall be tested under supervision of the RO at a testing facility accredited by a national accreditation body. When a testing facility has no accreditation for the intended tests, the RO shall verify that testing equipment, testing procedures, qualifications of personnel and other related items are of an acceptable standard for the testing facility to ensure that guarantees that the test result do reflect the actual situation during the test. Recognition based on class rules or (inter)national standards can be accepted. The RO shall confirm in the test report to NSI that the test is performed at an accredited test location or a test location acceptable to the RO and that the test procedure and test results are in accordance with the prescribed requirements.
- b) Testing of series of APF (Annex A, reg. 3.3)
In principle each size and each model of APF shall be tested separately. However, when the RO is convinced that the performance of a series is such that testing of each size and/or model is not necessary, a well founded proposal for a test of one or more representative APF may be presented to NSI. NSI shall decide on a case by case base whether testing of all sizes/ models is necessary or not. Testing of several APF in one test run (parallel testing) is acceptable as long as the performance of the APF do not influence the performance of other APF in the same test run.
- c) APF fitted with appendages (Annex A, reg. 3.5)
Only when it has been determined, in consultation with the manufacturer, that an appendage will never have any influence on the test results, the RO may allow a single test of the APF with or without the appendage. In that case, a single type certificate will be issued with a notice that the device may be fitted with a particular appendage (Annex A, reg. 7.3).
- d) Maintenance free APF (Annex A, reg. 4.2)
The manufacturer shall specify the maintenance free period. During this period no maintenance or replacement of any part shall be necessary during normal use of the device. The RO may, during the type approval, communicate any possible doubts regarding the maintenance free period with the manufacturer. The manufacturer shall clarify any questions or doubts of the RO in this respect. If the manufacturer does not submit a maintenance/operation manual specifying the maintenance free period and associated manufacturer's recommendations for maintenance, the RO shall advise NSI not to issue a type approval certificate, and the RO shall advise the manufacturer not to start with the endurance test and submersion tests.
- e) Maintenance free APF (Annex A, reg. 4.2)
Where, during the annual inspections or other checks of the APF an unacceptable need of replacement on board the ship is notified to NSI (Annex B, reg.2.4), NSI may decide to withdraw a type approval if the product appears not to be maintenance free. (Annex A, reg. 7.6) In that case NSI will inform the involved RO and other RO's accordingly. APF's replaced or repaired by the ship operator after damage as a result of an accident, cargo handling or other known cause, directly after such an event, need not to be considered as 'not maintenance free' and need not to be reported to NSI.



f) Fool proof design (Annex A, reg. 4.3)

The design of the APF shall be fool proof. The housing, parts, mounting materials and appendages shall be designed such that it is not possible to mount, assemble or reassemble the device improperly. Examples of not fool proof designs:

- Visors which can be mounted upside down;
- Threaded holes for bolts through the housing, allowing free entrance of water when a bolt is missing;
- Loose (not fixated) plastic rings for galvanic separation of parts;
- Screw down devices that prevent the ball to move freely when partly closed;
- Appendage that render the device inoperable when mounted incorrectly;

f-1) Test pressure (Annex A, reg 5.2)

APF shall be tested under the prescribed pressure heads as prescribed in Annex A, regulation 5.2. The pressure shall be measured from the lowest point from which water may enter the device if the closing mechanism would fail. For the upright measurements, this point will in general be the upper edge of the seal. For the inclined measurements, this point is in general the lowest point where water may flow over the seal.

g) Communication about type test results (Annex A, reg. 3.6)

After completion of all prescribed tests and checks, the RO shall provide the following information in writing to NSI:

- Confirmation that the test laboratory is accredited or grounds on which the alternative quality system is accepted (A-2).
- Confirmation that the device complies with the required maintenance free period (A-4.2) and how long the device is guaranteed to be maintenance free by the manufacturer. This may be fulfilled by a manufacturer's statement.
- Confirmation that the device is of a fool proof design (A-4.3).
- Confirmation that the device is suitable for use in the intended environment (A-4.4).
- Confirmation that all non-metallic parts are constructed of suitable materials (A- 4.5).
- Confirmation that the design of the APF allows the required checks of the device without removal of parts (A-4.6).
- Confirmation that the device is permanently marked with the year of production and product name or type number (A-4.7).
- Confirmation that the test of A-5.1 is successfully passed.
- Results of the tests specified in A-5.2 and A-5.3.
- Confirmation that the results of the tests specified in A-5.2 and A-5.3 comply with the criteria of A-6.

h) Forms to be used (Annex B, reg.3.4)

In case non-compliant devices are detected during surveys as stipulated in Annex B, regulation 3.4, NSI shall be notified. The standard reporting form, also to be used by the RO's, shall be used. NSI shall make this form available on her web-site.



- i) Type certificate (Annex A, reg.7.1)
When a type of APF has been in production for a certain period before it is tested according to the guidelines, the Administration may consider to include a note on the type certificate that devices produced before the date of testing of the APF may be accepted on board of ships. The Administration may include conditions on the type certificate for this acceptance. This may facilitate that APF already fitted on board of ships before the date of testing may be accepted under the type approval. However, this procedure may only be considered if the manufacturer of the APF declares that the APF produced before type testing are identical to the tested device and when it is beyond doubt that devices produced before the testing are identical to the APF tested and all requirements referred to in regulation 3 and 4 of the guidelines shall be met. Procedures on board shall be applied according annex B of the guidelines.
- j) Withdrawal of type approval certificate (Annex A, reg. 7.6)
In case NSI has reason to believe that an APF does not meet the standards required by the guidelines, NSI shall thoroughly investigate the performance of that device. If proven to be non-compliant, NSI shall withdraw the type certificate, and inform the involved RO, other RO's and ship owners accordingly. Ships fitted with these devices may continue to use them until the device needs to be replaced or repaired due to malfunctioning; because the replacement is required at the end of the maintenance free period or at the first SOLAS renewal survey after withdrawal of the type certificate. In this case specific additional measures could be required by the manufacturer or NSI guaranteeing the correct functioning of the APF that may remain used on board under the conditions specified above.

5 Guidance for implementation on board of ships

- a) Type of ship (article 2.1)
APF are only accepted as means to prevent downflooding on cargo ships for which a SOLAS probabilistic damage stability calculation is required. Ships built and certified according instruments referred to in SOLAS CH II-1 regulation 4, such as special purpose ships, oil tankers, gas tankers and chemical tankers, shall not use the principles outlined in the guidelines.
- a-1) Use of APF to comply with SOLAS CH II-1 reg. 9 requirements (article 2.2)
The use of APF is limited to CH II-1 of SOLAS. For general cargo ships for which the probabilistic damage stability calculation is made according to SOLAS CH II-1 part B-1, openings fitted with APF need not to be considered as weathertight opening in calculations made for compliance with SOLAS CH II-1 reg. 9. When no damage stability calculation need to be made, or where another standard is used as accepted in SOLAS CH II-1 reg. 4.1, compliance with SOLAS CH II-1 reg. 9 shall be proven without the use of APF.
- b) Relation between APF and other openings in the damage stability calculation (article 2.3)
In general, by using APF, the draught of a ship may increase compared to ships not fitted with APF. As a result other openings such as doors and hatches may become immersed sooner after damage of the ship. Moreover, as air pipes are generally fitted on the freeboard deck next to hatchway coamings, the air pipes are the first openings to become submerged. When submersion of air pipes is allowed when APF are fitted, the immersion of other openings may be limiting for the damage stability calculation. Therefore special attention during approval of the damage stability calculation for these other openings is necessary.



- c) Maximum allowable submersion of APF (article 2.4)
The APF are tested for a maximum pressure of 100 kPa (10 metres of water). For a normal ship configuration a damage scenario with such an immersion still contributing to the Attained Index is considered exceptional. However, for extreme long or otherwise unconventional shaped vessels, a larger immersion in a damage scenario contributing to the index may occur. In those cases the RO shall require proof that the immersion of the air pipe heads of intact spaces does not exceed 10 metres in those damage cases that contribute to the Attained Index.
- d) APF in sea areas where icing may occur (article 2.6)
Ships operating regularly in sea areas where icing may occur shall have systems in place preventing the APF to get clogged with ice. Where such devices or systems are not fitted operational measures shall be prescribed in the ships ISM system to ensure the uninterrupted performance of the APF.
- e) Novel, special design and strength of structures. (article 2.5)
In case any doubts arises about the application of the APF principle on ships of novel design or ships where the proper working of APF may be doubtful, NSI shall be contacted for guidance.
- e-1) APF on openings other than air pipes on existing ships (article 3.3)
On existing ships (ships for which the first CSSC is issued before 01-06-2016), the principle of APF may be applied on ventilation openings of stores, CO₂ rooms and comparable spaces. Application of APF compliant with the guidelines may in these cases be accepted by the RO and NSI shall be informed in writing about such applications. If required by SOLAS, a separate fire damper shall be fitted. For new ships, application of APF on ventilation openings is not allowed.
- e-2) APF on openings of non accessible voids (article 3.3)
Following the definition of APF in article 3.3 and of 'automatic closing device' in article 3.2 of the guidelines, the use of APF is limited to de-aeration openings of tanks. Both for new and existing ships the use of APF on the de-aeration openings of normally not accessible voids, such as cofferdams and pipe ducts can be accepted.
- e-3) Notification on damage control plan for existing ships (Annex B reg. 1.2)
On existing ships where the damage control plan does not yet contain a reference to separate air pipes, a reference as stipulated in Annex B reg. 1.2 in the damage control booklet may be accepted in lieu of a reference on the damage control plan.
- e-4) Notification of defects during inspection to NSI (Annex B, reg. 3.4)
In case the RO finds any device not in accordance with the applicable requirements the RO shall inform NSI. The standard reporting form, also to be used by shipowners, shall be used. NSI shall make this form available on her web-site.
- f) Notification on ships certificate and documentation (article 4)
For every ship where APF are fitted and openings are not taken into account in the probabilistic damage stability calculation, all openings fitted with APF shall be clearly identified in the damage stability booklet. The following reference to circular letter 3573 as a SOLAS equivalent arrangement shall be made on the ship's Cargo Ship Safety Certificate (HSCC) or Safety Construction Certificate: 'Air pipe automatic closing devices fitted as per IMO Circ letter 3573.'



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g) Spare parts (Annex B reg. 2.3)

The ship owner shall ensure that sufficient spare parts are carried on board. In this respect, the following is considered sufficient:

- For each type and size of APF fitted on board at least one spare floatation device and one seal, if these can be replaced by the crew.
- If the manufacturer of the APF specifies a detailed replacement set, one of such a set for each size and type of APF is considered sufficient.
- If the producer does not allow replacement of parts by the crew, no spare parts need to be carried, but a complete reserve APF shall be available for each size and type of APF fitted on board.

However, the ship owner shall note that the ship will only be allowed to sail if all APF are in good working condition. When not all defect APF can be repaired due to a shortage of spares or any other reason, the ship shall not leave port.

h) Inspection of APF once every 5 years (Annex B, reg. 3.2)

In case the yearly inspection of APF by the RO is dispensed with, Annex B, reg. 3.2 shall be applied. The 20% of the APF checked yearly shall be chosen such that after 5 years all APF are checked. The sixth and following years, the same rotation scheme as the first five years shall be used so that an APF is checked at least once every five years.