

INTERNATIONAL

Cruise & Ferry

REVIEW



**Getting tough
on fire protection
by Belimo Automation AG**

Reprinted from International Cruise & Ferry Review Autumn/Winter 2004

Getting tough on fire protection

The technology behind fire protection at sea is highly advanced to ensure that if the unthinkable – a fire – happens, that it can be easily and safely contained

Barely noticed by the public, the area of fire protection plays a special role for ship owners, insurance companies, and ship chandlers. In the event of a fire the ship does not have the luxury of support from the fire services. Many of the newly revised fire protection guidelines for ship building are as a direct result of disastrous fires such as that experienced on the Scandinavian Star in 1990 on the Baltic Sea in which 156 souls perished.

Fire zones

As with buildings, ships are divided into fire

zones. As a rule, however, they are arranged vertically; in isolated cases they may be staggered. The main bulkheads of this partition may not be further apart than 40m in the case of passenger ships (the maximum admissible distance is 48m).

Unlike HVAC installations, where shut-off devices are used to bridge the firewalls, shipbuilding strictly does without ventilation ducts passing through these main bulkheads. For the ventilation system this means that the fire zones usually have to be individually air-conditioned.

Penetration of watertight bulkheads is also to be avoided since it would require expensive special dampers. Frequently, the ventilation ducts are



Luxury liner Mercury in the Meyer shipyard

therefore placed over the decks all the way to above the freeboard line. Mostly there are two to three of these watertight compartments per fire zone. Within each fire zone, automatically tripping thermal fire dampers are installed so as to completely seal off rooms with an increased fire risk from personnel quarters and escape routes.

Fire dampers

Upon publication of the amendments of SOLAS (Safety of Life at Sea) 74, rule II-2/6.11, all fire dampers used in ships are subject to certification and have to be tested in accordance with International Maritime Organization (IMO) Directive A.754 (18). Depending on the importance and the fire hazard, different categories of partitions are established.

Fire dampers are tested in the highest category type 'A' (test with temperature curve according to the unit temperature curve). The test times are 15, 30, or 60 minutes. The most frequently used dampers are classified A-60, and a further differentiation is made depending on the place where the damper is installed (deck or bulkhead).

Design of fire dampers

Fire dampers for naval vessels come in round (maximum diameter 140 cm) and rectangular design, some of them with a lamellar damper flap design.

Unlike the fire dampers according to DIN 4102/EN 1366, the damper blades are made of steel. To minimize distortion and temperature increases on the side away from the fire, the damper blades are usually of sandwich design.

In the event of a fire it must be possible to close the main intake and outlet openings of all ventilation installations also from outside of the rooms in question, the great majority of marine fire dampers are motorized. This gives the additional option of using signals from the fire alarm system to trigger the fire dampers and thus to prevent the spreading of smoke even before the thermo-elements respond.

The fire dampers equipped with Belimo safety actuators are shock and vibration tested and also meet the more stringent testing and approval criteria of the military.

Testing of fire dampers

Testing is done with the fire damper in horizontal (deck test) or vertical (bulkhead test) orientation

in the fire test oven. The bulkhead test is always the tougher one since the vertical temperature strata strain the damper very unevenly. In each case, the smallest and the largest fire damper of each type are tested.

For the classification "A-60" the average temperature increase must not surpass 140K or 180K on any one of the thermoelements, respectively, during 60 minutes of fire stress. To minimize the penetration of hot conflagration gases, the deformation of the damper is also being observed. Test mandrels are used to evaluate cracks and openings. Fire dampers are certified by organizations such as the German Lloyd, Lloyds Register, or local organizations.

Fire protection concepts

The motorization of fire dampers in ships allows having the dampers close automatically when the ventilation system is switched off. In most cases, mechanical smoke extraction is not requested. Merely the atria and theatres of large passenger ships with several decks need to have smoke extraction.

In many cases the escape and rescue routes are kept smoke-free by over-pressure ventilation. Another must for passenger vessels is the installation of a sprinkler system and smoke alarms.

Escape route guidance systems near the floor to help passengers find their way in case of fire have also proven to be highly useful.

Training of the crew is of particular importance; the great majority of naval accidents are due to human failure. To rescue passengers of other vessels, ferries have been equipped with stand-by emergency boats. Yearly inspections and unannounced, spontaneous visits guarantee the observation of safety provisions. To meet the recently enacted, more stringent requirements regarding fire protection, older vessels have been granted a delay for retrofitting by 2010. ■



Rectangular fire damper with spring return actuator

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