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Ships and marine technology — Marine electric window wipers

Navires et technologie marine — Essuie-glaces marins électriques

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Foreword

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ISO 17899 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 5, *Ships' bridge layout*.

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Introduction

A good standard of wiping needs to be ensured for ships' safety but there is currently no performance standard for heavy-duty marine electric window wipers.

ISO 8468 calls for heavy-duty wipers to be fitted and applies to all sea-going ships where bridge duty is regularly maintained. This International Standard specifies the requirements for heavy-duty wipers and goes beyond the guidelines in 4.2.3 of ISO 8468 which are confined to the need for

— an interval function,

— fresh water wash,

— capability to operate independently, and

— a clear view in all operating conditions.

This International Standard includes criteria for wiper operating speeds, durability, ruggedness and environmental compatibility for the complete wiper system. i.e. control system, motors, mechanisms and the wiper blade itself.

ISO 3904 has been used as a guideline for this International Standard.

Equipment meeting these requirements is currently available commercially. This International Standard provides important benchmarks against which independent classification societies can certify.

This International Standard embraces all the common wiper types used, i.e. straight line, pendulum and pantograph, and includes wiper systems with drive motors mounted either inside or outside the ship's bridge.

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Ships and marine technology — Marine electric window wipers

1 Scope

This International Standard specifies requirements for marine electric window wipers. It covers the required features, performance, constructional materials and electrical equipment for wiper systems for sea-going vessels where bridge duty is regularly maintained. It covers the performance, materials and electrical equipment for wipers required to meet the needs of ISO 8468 where such wipers are specified.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6361 (all parts), *Wrought aluminium and aluminium alloy sheets, strips and plates*

ISO 6362 (all parts), *Wrought aluminium and aluminium alloy extruded rods/bars, tubes and profiles*

ISO 6363 (all parts), *Wrought aluminium and aluminium alloy cold-drawn rods/bars and tubes*

ISO 8468:1990, *Ship's bridge layout and associated equipment — Requirements and guidelines*

ISO/TR 15510, *Stainless steels — Chemical composition*

IEC 60529:2001, *Degrees of protection provided by enclosures (IP Code)*

IEC 60945:2002, *Maritime navigation and radiocommunication equipment and systems — General requirements — Methods of testing and required test results*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply

3.1
wiper
unit comprising a drive motor and mechanism, arms and wiping blades

3.2
wiper system
system comprising the wiper and its control system

4 Requirement

The purpose of a heavy-duty electric window wiper is to ensure clear vision in any weather and sea condition, with the ship operating up to its maximum speed in all climatic conditions.

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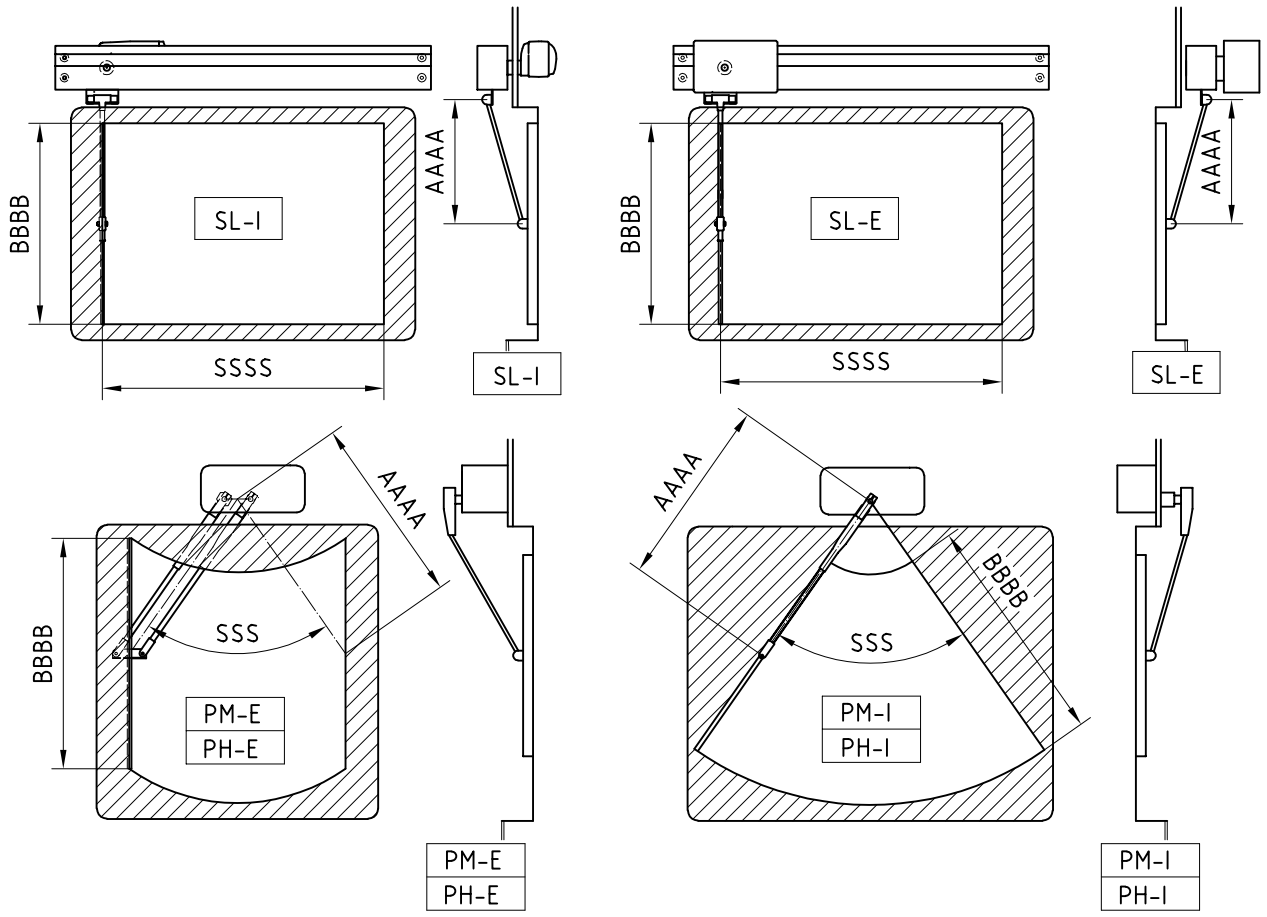
5 Wiped area

This should be maximized by the choice of wiper type, size and specification, see Clause 19.

6 Design and construction

Wipers shall include types with drive motors mounted inside the bridge and with drive motors mounted outside the bridge. Clause 19 gives designations for each type.

Figure 1 shows a typical arrangement for each type.



For an explanation of key dimensions, refer to Clause 19.

Figure 1 — Typical wiper drive arrangements

7 Speeds

The wiper system shall be capable of wiping the central part of its stroke at a rate of at least 50 wipe cycles per minute, i.e. 100 actual wipes per minute. In the case of straight-line wipers, the linear speed of the blade shall not be less than 68 m/min.

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8 Wipe quality

Wiper blades should clear the windscreen without leaving streaks and should not damage the glass. Sufficient pressure should be applied to the wiper blade to ensure that, even in severe weather conditions and/or high ship speeds, the blade is kept in contact with the screen over its length and over the whole area of wipe.

9 Materials

With the exception of those parts of the wiper system mounted inside the bridge, the metallic parts shall be of corrosion-resistant materials as follows:

— high strength aluminium alloy with good corrosion resistance according to at least the standard of ISO 6361, ISO 6362 and ISO 6363;

— corrosion-resistant steel according to ISO/TR 15510, Cr Ni Mo composition.

Alternatively, high quality ozone and ultraviolet-resistant structural plastics may be used.

Anti-corrosion material coatings which crack, chip or scale with age shall not be used.

10 Electrical equipment

10.1 Low voltage safety

The safety of low voltage electrical equipment shall be in accordance with IEC 60945:2002, 4.6.

10.2 Electromagnetic compatibility

Electromagnetic compatibility shall be in accordance with IEC 60945:2002, 4.5.1.

11 Provision for de-icing

11.1 General

For vessels designed to operate in low temperatures, de-icing equipment shall be fitted which shall allow operation at – 25 °C with chill factors. Both the mechanisms of the wiper and the arms and blades need to be kept ice-free. For safety reasons, if electrical power is used for the heating of removable components, like the arms and blades, then a maximum of 24 V should be used.

11.2 Straight-line wipers

The heater output shall be fitted to the main casing which maintains operation of the wiper even in the ship's lowest specified operational temperatures and with high wind chill factors.

11.3 Pendulum and pantograph

For pendulum and pantograph wipers, heaters shall be fitted either in the arms or in the driving shafts of the arms or in the casings surrounding the driving shafts and these should maintain operation of the wiper even in the ship's lowest specified operational temperatures and with high wind-chill factors.

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12 Durability

12.1 As a measure of the durability of the complete system, the wiper system shall remain operational after an accelerated life test. This test shall comprise 3 000 h continuous operation on a dry window and with no water on the mechanism. Damage to a standard wiper blade within that timescale is highly likely, so the blade can be replaced for this test by a heavy-duty blade or a frictional pad with the same frictional properties as the blade and mounted on the arm of the wiper in the normal way.

12.2 As a measure of the durability of the wiper blade in conditions of inadvertent use on windows that are or have become dry, there shall be no degradation of wiping quality from running the wiper system on a dry window for 10 periods of 1 h in a total test period of 100 h. During the rest of the test, the window should be wet in a normal simulation of rain/seawater spray.

12.3 The wiper system shall endure so as not to require maintenance nor replacement of any component in one year containing a minimum of 3 000 h total of normal (i.e. wet window) operation. The maintenance period for the system must be not less than 1 year and shall be stated.

13 Salt mist test

The parts of the system mounted outside the bridge, shall meet the requirements of the salt mist test defined in IEC 60945:2002, 8.12.

14 Temperature tests

The system shall be capable of running continuously for 24 h, otherwise as in IEC 60945: 2002, 8.2, 8.3 and 8.4.

15 Salt water test

Any electrical parts of the system shall be sealed against sea water ingress. The system shall be capable of running continuously for 3 000 h at normal ambient temperature whilst the system is exposed to salt water. The IP ratings, in accordance with IEC 60529, shall be as follows:

The sealing shall be watertight and airtight to IP 67.

Control systems should be sealed to a minimum of IP 30.

16 Resistance to mechanical shock

The system shall be capable of withstanding the following shocks without failure:

10 shocks in both directions on 3 mutually perpendicular axes to a level of 10 g (11 ms 1/2 sine wave)
i.e. 60 shocks in total.

17 Vibration

The system shall be tested in accordance with IEC 60945:2002, 8.7.

18 Compass safe distance

Motors shall be tested in accordance with IEC 60945:2002, 11.2, and the certified distances stated.

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19 Designation

Wiper systems shall be designated as follows:

Type specification is: TT - L - SSS(S) - AAAA- BBBB - VVV - TTN-FF

Where

TT	Type	SL = Straight line; PH = Pantograpgh; PM = Pendulum.
L	Location	I = Internal motor drive; E = External motor drive.
SSS	Stroke	If pantograph or pendulum, angle in degrees pendulum, e.g. 060.
or SSSS		If straight line, stroke length in mm, e.g. 0915.
AAAA	Arm	Arm length in mm, e.g. 0900;
BBBB	Blade	Wiper blade length in mm, e.g. 0850;
VVV	Supply	Supply voltage (nominal) 024, 100, 115, 220/230, 380 and 440;
Supply		If DC then TTN-FF = DC, If AC then TT = AC.
		N = Number of phases, 1 = phase and neutral, 2 = phase with phase,
		3 = 3 phase;
		FF = frequency Hz ; 50, 60, or 50/60.

EXAMPLES

Internal motor drive straight-line wiper, 1 050 mm stroke, 800 mm arm, 900 mm blade, 220 V 3 phase 60 Hz A.C. supply = SL-I-1050-0800-0900-230-AC3-60.

External pantograph wiper, 90° stroke, 650 arm, 500 blade, 115 V 1ph 50/60 A.C., phase with phase = PH-E-090-0650-0500-115-AC2-50/60.

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