

RESOLUTION MSC.41(64)
adopted on 5 December 1994
INTERIM STANDARD FOR MEASURING SMOKE AND
TOXIC PRODUCTS OF COMBUSTION

ANNEX 5

**RESOLUTION MSC.41(64)
adopted on 5 December 1994**

**INTERIM STANDARD FOR MEASURING SMOKE AND
TOXIC PRODUCTS OF COMBUSTION**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO that the International Code of Safety for High Speed Craft (HSC Code) requires, in paragraph 7.4.3.6, that materials used in the craft should not, when exposed to fire, emit smoke or toxic gases in quantities that could be dangerous to human beings as determined in tests of a standard developed by the Organization,

RECALLING FURTHER that the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, and the Torremolinos Protocol of 1993 relating to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977, restrict the use of combustible materials,

RECALLING FURTHER that the Assembly, by resolution A.166(ES.IV) drew the attention of Member Governments to the hazards of smoke and toxicity caused by combustible materials in fires,

BEARING IN MIND that smoke and toxic products generated by combustible materials are extremely hazardous for human beings during fires on board,

RECOGNIZING the urgent necessity to develop fire test procedures and criteria on smoke and toxicity caused by combustible materials in fires,

RECOGNIZING ALSO the need to provide internationally uniform test procedures and criteria for smoke and toxicity,

1. **ADOPTS** the Interim Standard for Measuring Smoke and Toxic Products of Combustion, set out in the Annex to the present resolution;
2. **INVITES** Governments to apply the Interim Standard when implementing the HSC Code to ensure compliance with the criteria specified therein;
3. **AGREES** to continue its work on the development of further test procedures, as may be appropriate.

ANNEX

INTERIM STANDARD FOR MEASURING SMOKE AND TOXIC PRODUCTS OF COMBUSTION

This standard specifies a procedure for qualifying smoke generation and toxic potency of materials used on board ships, and materials other than fire-restricting materials used in high speed craft, as meeting the requirements of regulations of the International Convention for the Safety of Life at Sea, 1974, as amended; the Torremolinos Protocol of 1993 relating to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977, the International Code of Safety for High Speed Craft, and related codes and guidelines developed by the Organization.

1 GENERAL

Smoke generation tests should be conducted, in general, in accordance with ISO 5659 Part-2 and additional test procedures as described in this standard. In order to carry out the tests in accordance with this standard, modifications of the arrangements and procedures to the ISO standards should be made, if necessary.

2 TEST SPECIMEN

Preparation of test specimen should be in accordance with the practice outlined in Assembly resolution A.653(16) for surface finish materials for bulkheads, decks and ceilings, Assembly resolution A.687(17) for primary deck coverings, and Assembly resolution A.753(18) for plastic pipes. In the case of cables, only specimens of those with maximum insulation thickness need be tested.

3 TEST CONDITIONS

Irradiance to the specimen during the test should be kept constant. Three specimens should be tested under each of the following conditions:

- .1 irradiance of 25 kW/m² in the presence of pilot flame;
- .2 irradiance of 25 kW/m² in the absence of pilot flame; and
- .3 irradiance of 50 kW/m² in the absence of pilot flame.

4 DURATION OF TESTS

The test should be carried out for at least 10 min. If the minimum light transmittance value has not been reached during the 10-minute exposure, the test should be continued for a further 10-minute period.

5 TEST RESULTS

5.1 Specific optical density of smoke as defined below should be recorded during the test period at least every 5 s:

$$Ds = (V/(A*L)) * \log_{10}(I_o/I)$$

where:

V = total volume of the chamber (m³)

A = exposed area of the specimen (m²)

L = optical length (m) of smoke measurement.

5.2 When making toxicity measurements, the sampling of fumes should be made during the testing of the second or the third specimen at each test condition, from the geometrical centre of the chamber within 3 min of the time when the maximum specific optical density of smoke is reached. The concentration of each toxic gas should be determined as ppm in the chamber volume.

6 CLASSIFICATION CRITERIA

6.1 Smoke

An average (Dm) of the maximum of Ds of three tests at each test condition should be calculated.

- .1 For materials used as surface of bulkheads, linings or ceilings, the Dm should not exceed 200 in any test condition.
- .2 For materials used as primary deck covering or surface of floor, the Dm should not exceed 400 in any test condition.
- .3 For plastic pipes and electric cables, the Dm should not exceed 400 in any test condition.

6.2 Toxicity

The gas concentration measured at each test condition should not exceed the following limits:

CO	1450 ppm	CO ₂	60000 ppm
HCl	310 ppm	HBr	50 ppm
HF	590 ppm	HCN	140 ppm
NO _x	350 ppm	SO ₂	120 ppm
Acrolein	1.7 ppm	Formaldehyde	3.2 ppm

7 TEST REPORT

A test report should contain the following information:

- .1 type of the material, i.e. surface finish, floor covering, primary deck covering, pipes, etc.;
- .2 trade name of the material;
- .3 description of the material;
- .4 construction of the specimen;
- .5 name and address of the manufacturer of the material;
- .6 Dm at each heating and ignition condition;
- .7 concentrations of toxic gases in ppm, if applicable;
- .8 judgement according to 6;
- .9 name and address of the testing laboratory; and
- .10 date of testing.

RESOLUTION MSC.41(64)
adopted on 5 December 1994
INTERIM STANDARD FOR MEASURING SMOKE AND
TOXIC PRODUCTS OF COMBUSTION