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INTERNATIONAL COUNCIL OF MARINE INDUSTRY ASSOCIATIONS

51-18 ICOMIA Technical Guideline

Acceptance Criteria Guidelines for the Finish and Appearance for Super Yacht Coatings

This document has been created by a consensus group consisting of experts from paint manufacturers, yards, applicators and surveyors. This guideline supersedes a document issued in 2011. The 2011 document was created in response to industry demand for standards and accompanying minimum acceptance criteria for assessment of yacht coatings.

The 2018 revision takes a new approach to the development of 'acceptance criteria'. Rather than providing acceptance criteria through Pass/Fail values, this document will instead serve as a structured guide to assist contractual parties in constructing their own project-specific and fit-for-purpose acceptance criteria document. Criteria parameters and Pass/Fail values may consider any of the following client requirements: materials, equipment, processes, timelines, application facilities and specific paint system variables.

This approach should encourage early definition of acceptance criteria parameters and engage all contractual parties to discuss and agree on the final measurable and/or visual result of a paint system topcoat. It is recommended that this acceptance criteria definition be conducted at the pre-project stage. Contractual parties should have a procedure for hold points, time limits and sign off by the client or their experts at each stage in the preparation and paint process and against samples that are prepared and signed off.

Annex I offers a template for paint acceptance criteria.

1 **Definitions** ISO 11347, ISO 4618 and ISO 19494 shall be used as the reference for all definitions. The full names and definitions from these standards are available online under https://www.iso.org/obp/ui/#home

2 General Requirements

The following general requirements are stated with respect to an acceptable finish and appearance of coatings of super yachts:

- The surfaces of the vessel to be assessed may be divided into areas of importance prior to starting work and agreed within the contract for example

    - HVA: High Visibility Area
    - LVA: Low Visibility Area
    - For clarity, the areas can be marked on the vessel's general arrangement

- Measurements and visual inspections shall be carried out in accordance with ISO 11347

- Measuring instruments used to determine the acceptable finish and appearance for super yacht coatings are specified in ISO 11347

- For visual inspections, contractual parties should define the parameters within which the inspection is carried out. These can include:
    - Time and location of the inspection
    - Lighting conditions
    - When using artificial light, the light source is recommended to have a minimum of 750 lx (ISO 13076 can be used)
    - Viewing distance and angle

- Specific project reference panels/areas, should be of a reasonable size and shape which shall have the entire paint system applied as specified in the contract or technical specification. If the yacht has multiple colours then consideration should be given to preparing additional references, being for example of HVA or LVA quality as appropriate.

- Inspection equipment; It is recommended to define during the pre - project meetings the make and model of equipment and the tests to be conducted. Considerations should be taken when multiple parties are undertaking coating condition evaluations, equipment used should be such that all results obtained are directly comparable. The calibration should be in accordance with manufacturers guidelines and wherever possible comply with applicable ISO standards. All results should be recorded.

3 Measurements

3.1 Fairing

Any fairing acceptance criteria should be defined in the contract. The assessments of the fairing should be in accordance to ISO 11347 Annex D Depending on the area of assessment, battens with differing characteristics (such as length, material and thickness) may be defined. In each case, measured value should not exceed the maximum agreed deviation value for fairness. The lower the value, the fairer the surface is.

3.2 DOI (distinction of image)

Measurements of DOI should be included in the assessment of yacht coatings using an optoelectronic measurement device (such as wave-scan, gonio-photometer, or equivalent). To provide the required level of clarity, the measurement of DOI should include definitions of:

- the make and model of equipment,
- format of DOI
- values defined by:
    - minimum average
    - range of single results from the obtained average (to achieve uniform consistent appearance)

Measured value should meet or exceed minimum agreed value. The higher the value, the better the distinction of image is.

3.3 Orange peel

Orange Peel can be measured using an optoelectronic measurement device and should include definitions of:

- make and model of equipment
- values defined through Wa to We or Rspec by:
    - maximum average
    - range of single results from the obtained average (to achieve uniform consistent appearance)

Measured values should not exceed the agreed maximum value for orange peel. A lower value indicates less orange peel

3.4 Microstructure

BYK Gardner Wavescan = dullness
Rhopoint IQ = haze value

The term “microstructure” refers to structures smaller than 0.1mm within the paint film that influence the visual perception.

Microstructure can be measured using an optoelectronic measurement device and should include definitions of:

- make and model of equipment
- values defined through *dullness* or *haze value* by:
    - maximum average
    - range of single results from the obtained average (to achieve uniform consistent appearance)

Measured value should not exceed the agreed minimum value for micro-structure. A lower value indicates less micro-structure.

3.5 Colour

To assist in ensuring consistent colour, contractual parties should agree on colour codes to be used. Where possible, topcoats used should come from a single batch. Before beginning the coating activities, the colour chosen shall be applied and measured on a reference to be recorded as a standard. ISO 19494 gives further guidance.

Colour shade may be measured by use of a colour spectrophotometer. Acceptance criteria should include the following definitions:

- the make and model of equipment
- values for allowable deviations

Value should not exceed the agreed minimum deviation value (dE) for colour. A lower value indicates a more consistent and closer matched colour.

3.6 Gloss

Gloss can be measured using a glossmeter. Acceptance criteria should include the following definitions:

- the make and model of equipment,
- optional additional geometry
- minimum values for:
    - average
    - single readings
    - for some finishes (semi-gloss, satin, matt), a range from the obtained average may be specified

For gloss finishes, value should meet or exceed minimum value agreed for gloss. The higher the value, the glossier the coating is. For semi-gloss, satin or matt finishes, value should be within the range of two agreed values

4 Visual inspection

It may be helpful to define during contractual discussions at what distance (light and angle) visual inspections should be carried out.

4.1 Particulate contamination

Inclusions in paint may include but are not limited to:

- Dust
- Hair
- Fibres

Inclusion shape and size may be assessed by its total impact on the coating. Hairs and fibres may be assessed differently to dust and other smaller particulate matter. Consult ISO 11347 for additional test methods.

Contractual parties should agree on:

- Number and size of sample areas
- Number particles within sample areas
- Size of the total impact of the particle on the surrounding paint surface

NOTE: A distinction can be made between surface dust that may be washed off during normal cleaning procedures and dust or particulate matter embedded within the paint film

4.2 Sags/runs

Small runs and sags may in certain circumstances be acceptable and should be defined.

4.3 Other Effects

Contractual parties should agree on the effects that may negatively impact the visual appearance, such as but not limited to:

- Brush marks
- Tape marks
- Sanding marks
- Wipe marks
- Polishing marks
- Blushing
- Solvent popping
- Blistering
- Bubbling
- Print through of underlying structure
- Print through of effects in underlying substrates (such as coating layers)
- Overspray
- Cissing
- Cratering
- Fisheyes
- Cut lines
- Clouding
- Striping