

Industrial Coatings Information Note



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Revised International Standard for Protective Coatings ISO 12944

This note has been prepared by the BCF's High Performance Coatings committee (see below) as a response to questions posed in the market by customers regarding the changes to ISO 12944 introduced this year. This note provides further information on this new revision in a question and answer format, providing detail and clarification as to the differences between this version and the previous version of the standard (published in 1998), the impact on existing certificates and compliance, and commentary on how the new version relates to the Norsok M-501 standard.

This is a public note that may be openly shared with any organisations having an interest in this topic. If you require further information or have any comments on this document then please contact Trevor Fielding, Regulatory Affairs Manager at the BCF, trevor.fielding@bcf.co.uk.

Background

The ISO standards sub-committee TC35 / SC14 was tasked with revising the international standard ISO 12944 '*Paints and varnishes — Corrosion protection of steel structures by protective paint systems*' and they completed their work in the Autumn of 2017.

The new version of 12944 is composed of nine separate parts as follows:

- Part 1: General Introduction
- Part 2: Classification of environments
- Part 3: Design considerations
- Part 4: Types of surface and surface preparation
- Part 5: Protective paint systems
- Part 6: Laboratory performance test methods
- Part 7: Execution and supervision of paint work
- Part 8: Development of specifications for new work and maintenance
- Part 9: Protective paint systems and laboratory performance test methods for offshore and related structures (incorporation of ISO 20340)

These parts were published in several stages over the period November 2017 – April 2018. Details with regard to the new environmental categorisation system C1 – C5 and CX may be found in the BCF publication G 020 '*Classifying Environments*' (current version 2 published Sept 2017).

Q & A on BS EN ISO 12944:2017

1. What are the main differences between the new version (2017) and the previous version (1998)?

There are several major changes to the ISO 12944 standard that users (asset owners, specifiers, contractors, customers and manufacturers) should be aware of:

- i) Changes to the categorisation / classification of environments.

The traditional C1 to C4, C5I and C5M categorisation of environments has been changed to C1 to C5 plus a new category CX, along with a corrosivity label. C5 is the new category label for the previous C5I category, referring to the most severe category for general use, when referring to industrial and coastal land environments. CX is the new category label for the previous C5M category, designed for specifying highly corrosive off-shore marine environments and relating to part 9 of the standard (which incorporates ISO 20340).

Pre-2018 Categories	New Categories and Corrosivity	Typical exterior environment	Typical interior environment
C1	C1 Very Low	Not Applicable (there is no C1 exterior)	General heated buildings with clean, non-corrosive atmospheres
C2	C2 Low	Low pollution (e.g. rural areas)	Unheated buildings where condensation may occur
C3	C3 Medium	Moderate pollution (e.g. urban & industrial areas, also low salinity coastal areas)	Production rooms with high humidity and some air pollution
C4	C4 High	High pollution (e.g. industrial areas, coastal areas with moderate salinity)	Mild corrosive environments, e.g. swimming pools & chemical plants
C5I Industrial	C5 Very High	High humidity and aggressive atmospheres due to industry, coastal areas with high salinity	Buildings / areas with almost permanent condensation and with high pollution
C5M Marine	CX Extreme	Off-shore high salinity; extreme humidity & aggressive industrial atmospheres (e.g. tropical)	Industrial areas with extreme humidity and aggressive atmospheres

Further details and descriptions may be found in the BCF publication G020 mentioned.

In addition, a Very High durability classification has been introduced (25 years +), especially in order to cover marine environments Im4 (see part 9).

ii) Inclusion of part 9 for off-shore marine environments

The new version contains a new part 9, which is the incorporation of a revision of ISO 20340:2009, to cover protective coatings systems intended for use in off-shore marine environments.

iii) Change to Dry Film Thickness (DFT) and Minimum Number of Coats (MNOC) specifications

In the previous version the DFT and MNOC tables were 'informative'. This annex has now been redefined as 'normative' and hence a minimum requirement for compliance – see Part 5 Annex B, tables B.2 to B.5 for more details. This is to ensure that the minimum dry film thicknesses that have been technically established, to ensure sufficient corrosion performance, are respected throughout the sector during specification, procurement and application.

iv) Changes to the test methods and requirements for each category

Part 6 provides details on the test methods and regimes that need to be followed to confirm compliance with the new version for C1 to C5 categories. The key changes compared with the previous version are:

- the introduction of cyclic ageing testing (based on ISO 20340, see part 6 Annex B, optional for C4 Very High and C5 High, compulsory for C5 Very High)
- new parameters for rusting limits and scribe values (see table 4 and Annex A)
- removal of intercoat adhesion requirement and resetting of adhesion failure to 0%
- reduction of pre-test curing period from 3 to 2 weeks
- the requirement to include photos in test reports.

There have also been changes to ISO 20340 introduced into the new part 9 of the standard for off-shore systems (e.g. scribe creep test limits and pull-off test strengths specified). Users are recommended to carefully review these changes in part 6 to understand the details.

v) New technology routes

Part 5 clause 4.1 contains recommendations as to what should be provided when introducing new innovative coating technologies into the market, or well-established proven systems that do not meet the minimum DFT and MNOC requirements specified in part 5. This includes the importance of referring to formal reported independent testing results to testing under part 6 of the standard, or to track record / in-the-field performance data respectively, to justify compliance.

2. What is the status of existing certificates for compliance with ISO 12944?

Are these still valid despite the possibility that the systems tested may not meet the new normative rules on DFT and MNOC?

Existing certificates will state compliance with BS EN ISO 12944:1998 and should be referred to as such. Products that have been tested under this previous version of the standard may still meet most or even all of the performance requirements as in the new 2017 revision, however it may be possible that they may not meet the new specified minimum DFTs or MNOCs. For this reason, it would not be correct to state that these products meet all the requirements of BS EN ISO 12944:2017, unless proved otherwise through documentation.

3. *What is the expected transition timing for introducing ISO12944:2017 into regular testing?*

It is expected that all paint manufacturers will introduce the new revision into their testing protocols and systems during the course of 2018, and for coating systems to start being tested to the new standard as soon as publication of all the parts has been completed in April 2018. It is not expected for any coating systems to be requested to be tested to the old 1998 version after the end of 2018, although ISO 12944:1998 certificated products will of course be expected to remain in the market for the foreseeable future (this depends on individual company product portfolio management decisions).

4. *What is the status of systems that comply with ISO 12944:1998? Do these need to be retested?*

Product tested and certified to ISO 12944:1998 will have the appropriate certificate with 1998 referenced. It will not be necessary to re-test these products to ISO 12944:2017 unless the detailed differences mentioned in question 1 above are deemed relevant to the specific requirements of the job under discussion. i.e. Retesting should be considered only if there are concerns over the minimum DFT, MNOC requirements, or the test method changes (such as rusting limits and scribe values) mentioned above are deemed relevant.

5. *How do the new categories compare with the Norsok Standard M-501? Can test results to one standard be used as a basis for justification to claim compliance to the other?*

Coating systems with Norsok System 1 approval, which have passed cyclic testing to 25 cycles, may be considered as meeting the cyclic accelerated weathering performance test requirements of the ISO 12944 C5 Very High, which requires cyclic testing of 16 cycles (2688 hours). However, it should be noted that the Norsok M-501 standard does not stipulate the same requirements as ISO 12944:2017 with regard to minimum number of coats or dry film thickness (note that there are separate different minimum DFT requirements for Norsok System 1, see for example table A1 in the standard M-501). It should also be noted that the Norsok M-501 standard does not contain a durability rating.

It can be assumed that a coating system approved to Norsok System 1 requirements complies with C5 (appropriate durability) requirements if the dry film thicknesses and number of coats meet the minimum requirements stipulated in ISO 12944:2017. The test certificates for the coating system should provide such confirmation if all the ISO 12944:2017 requirements have been met by such a coating system. The coating manufacturer will be able to provide further details and clarification on this for specific coating systems.

The testing requirements under ISO 12944:2017 remain lower than those stipulated for System 1 in Norsok M-501, so products complying with ISO 12944 may not be automatically assumed to be compliant with Norsok requirements and separate testing will be required.

Note:

This information note has been approved by the members of the BCF High Performance Coatings group, which includes representatives from the following companies:

AkzoNobel Protective Coatings (International Paint)

Axalta Coating Systems UK

Belzona Polymerics

Dacrylate Paints

Firwood Paints

HMG Paints

Hempel UK

Jotun Paints (Europe)

Newpaintco

PPG Protective & Marine Coatings

Pronto Industrial Paints

Sherwin Williams Protective and Marine Coatings

Tor Coatings