



Results and explanation on ISO 12944 results

D What is ISO?

The ISO (International Organization of Standardization) is the world's largest developer and publisher of International standards. ISO is a network of the national standards institutes of 162 countries, one member per country (see: http://www.iso.org/iso/iso_members), with a central secretariat in Geneva, Switzerland, that coordinates the system.

ISO is a non-governmental organization that forms a bridge between the public and private sectors. On the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.

Therefore, ISO enables a consensus to be reached on solutions that meet both the requirements of business and the broader needs of society.

II D What is ISO 12944?

The ISO 12944 standard is intended to assist engineers and corrosion experts in adopting best practice in corrosion protection of structural steel with coatings at new construction and repairs. ISO 12944 is progressively superseding regional standards to become a truly global benchmark in corrosion control (see also: http://www.iso.org/iso/catalogue_detail.htm?csnumber=41862).

Selecting specifications that comply with ISO 12944 provides:

- Confidence that the corrosion protection you specify will be fit for purpose
- An objective approach to coating selection
- A simplified matrix of coating systems to select from
- A meaningful coating design life
- A universally accepted standard

The properties of this ISO 12944 standard allow your customer (be it architects, engineers, corrosion experts or simply a customer wanting guidance) to know that what we present them is really tested and approved by an independent test centre according to an international and very complete standard.

III D Zingametall systems

Zingametall is testing its different systems (see 'Overview Available Systems') according the test specifications stipulated in ISO 12944-6 in independent accredited laboratories.

The results of the tests indicate its fitness for use in different environments as described in ISO 12944-5.

ZINGA 2 x 60 µm DFT

The system ZINGA 2 x 60 µm DFT is suitable for a C5I environment (atmospherically) with a Medium life expectancy and Im2 and Im3 environment (immersion) with a Medium life expectancy.

C5I-Medium (equals to C5M-Medium and C4-High) relates to real life situations as follows:

- C5I: industrial zones with high humidity and aggressive environment (continuous condensation and high pollution)
- C5M: Coastal zones and marine zones with high salinity (continuous condensation and high pollution)
- Medium: life expectation between 5 and 15 years
- C4: industrial or coastal (with moderate salinity) zones (chemical factories, swimming pools, shipyards)
- High: life expectation >15 years

Examples of existing systems for atmospheric conditions that fall into that same category are:

- 2 x 150 µm Epoxy paint or 3 x 100 µm Epoxy combination
Total thickness: 300 µm DFT
- 80 µm hot-dip
+ 1 x 80 µm DFT primer (Epoxy or Polyurethane)
+ 2 layers adding up to 160 µm DFT Epoxy or Polyurethane
Total thickness: 320 µm
- 100 µm metallisation
+ 1 sealer coat (Epoxy or Polyurethane)
+ 2 layers adding up to 320 µm DFT Epoxy or Epoxy combination
Total thickness: 420 µm

Im2-Medium and Im3-Medium relate to real life situations as follows:

- Im2: sea or brackish water (harbors with locks, jetties, offshore structures; make sure there is no stray current)
- Im3: soil (underground storage, iron poles)
- Medium: life expectation between 5 and 15 years

Example of existing system for immersion conditions that fall into that same category are:

- 1 x 80 µm DFT primer (Epoxy)
+ 1-3 layers adding up to 300 µm of Epoxy or Polyurethane
Total thickness: 380 µm DFT



Since 1988, several pulp and paper factories in Canada used ZINGA in 2 layers of 60 µm DFT to treat their structures. In 2005 (17 years after application), no touch-ups were necessary.

This agrees with the ISO 12944-6 test results for ZINGA 2 x 60 µm DFT predicting a life expectancy of >15 years in an industrial zone.

ZINGA 2 x 90 µm DFT

The system ZINGA 2 x 90 µm DFT is suitable for a C5I environment (atmospherically) with a High life expectancy and Im2 and Im3 environment (immersion) with a Medium life expectancy.

C5I-High (equals to C5M-High) relates to real life situations as follows:

- C5I: industrial zones with high humidity and aggressive environment (continuous condensation and high pollution)
- C5M: Coastal zones and marine zones with high salinity (continuous condensation and high pollution)
- High: life expectation >15 years

Examples of existing systems for atmospheric conditions that fall into that same category are:

- 60 µm zinc rich primer (Epoxy or Polyurethane)
+ 2 to 3 layers adding up to 340 µm DFT Epoxy combination
Total thickness: 400 µm
- 80 µm hot-dip
+ 1 x 80 µm DFT primer (Epoxy or Polyurethane)
+ 2 layers adding up to 240 µm DFT Epoxy or Polyurethane
Total thickness: 400 µm
- 100 µm metallisation
+ 1 sealer coat (Epoxy)
+ 2 layers adding up to 450 µm DFT Epoxy or Epoxy combination
Total thickness: 550 µm

Im2-Medium and Im3-Medium relate to real life situations as follows:

- Im2: sea or brackish water (harbors with locks, jetties, offshore structures; make sure there is no stray current)
- Im3: soil (underground storage, iron poles)
- Medium: life expectation between 5 and 15 years

Example of existing system for immersion conditions that fall into that same category are:

- 1 x 80 µm DFT primer (Epoxy)
+ 1-3 layers adding up to 300 µm of Epoxy or Polyurethane
Total thickness: 380 µm DFT



The phosphate Mine in Togo (Office Togolais des Phosphates) was treated in 1994 with 2 layers of ZINGA. In 2006 (12 years after application), no trace of rust was found.

This agrees with the ISO 12944-6 test results for ZINGA 2 x 90 µm DFT predicting a life expectancy of >15 years in an industrial zone with high humidity and aggressive environment.

ZINGA 1 x 60 µm DFT + Alufer N 1 x 80 µm DFT

The system ZINGA 1 x 60 µm DFT + Alufer N 1 x 80 µm DFT is suitable for a C5I environment (atmospherically) with a High life expectancy.

C5I-High (equals to C5M-High) relates to real life situations as follows:

- C5I: industrial zones with high humidity and aggressive environment (continuous condensation and high pollution)
- C5M: Coastal zones and marine zones with high salinity (continuous condensation and high pollution)
- High: life expectation >15 years

Examples of existing systems for atmospheric conditions that fall into that same category are:

- 60 µm zinc rich primer (Epoxy or Polyurethane)
 + 2 to 3 layers adding up to 340 µm DFT Epoxy combination
 Total thickness: 400 µm
- 80 µm hot-dip
 + 1 x 80 µm DFT primer (Epoxy or Polyurethane)
 + 2 layers adding up to 240 µm DFT Epoxy or Polyurethane
 Total thickness: 400 µm
- 100 µm metallisation
 + 1 sealer coat (Epoxy)
 + 2 layers adding up to 450 µm DFT Epoxy or Epoxy combination
 Total thickness: 550 µm



Since 2006, Shell Morocco uses the system ZINGA 1 x 60µm DFT + Alufer N 1 x 80µm DFT as a basis to protect its hydrocarbon storage tanks.

Not a small defect was detected and Shell is continuing to use the system because of high satisfaction. There is no doubt that this system will provide a protection that agrees with the ISO 12944-6 test results predicting a life expectancy of >15 years in an industrial zone with high humidity and aggressive environment.

ZINGA 1 x 60 µm DFT + PU Tarfree MIO 2 x 100 µm DFT

The ZINGA 1 x 60 µm DFT + PU Tarfree MIO 2 x 100 µm DFT is suitable for a Im2 (immersion in salt water) and Im3 (immersion in soil) environment with a High life expectancy.

Im2-High and Im3-High relate to real life situations as follows:

- Im2: sea or brackish water (harbors with locks, jetties, offshore structures; make sure there is no stray current)
- Im3: soil (underground storage, iron poles)
- High: life expectation of more than 15 years

Example of existing system for immersion conditions that fall into that same category are:

- 60 µm DFT zinc rich primer (Epoxy)
 + 2 to 4 layers adding up to 480 µm DFT Epoxy or Polyurethane combination
 Total thickness: 540 µm DFT



Since 2009, the electricity company ICE (Costa Rica) uses the system ZINGA 1 x 60 µm DFT + PU Tarfree MIO 2 x 100 µm DFT as a basis to protect the underground parts of high tension pylons. This system will provide a protection that accords to the ISO 12944-6 test results predicting a life expectancy of >15 years on structures immersed in soil or salt water.

ZINGA 1 x 60 µm DFT + Zingaceram ZM EP MIO HS 1 x 120 µm DFT

The system ZINGA 1 x 60 µm DFT + Zingaceram ZM EP MIO HS 1 x 80 µm DFT is suitable for a C5I environment (atmospherically) with a High life expectancy.

C5I-High (equals to C5M-High) relates to real life situations as follows:

- C5I: industrial zones with high humidity and aggressive environment (continuous condensation and high pollution)
- C5M: Coastal zones and marine zones with high salinity (continuous condensation and high pollution)
- High: life expectation >15 years

Examples of existing systems for atmospheric conditions that fall into that same category are:

- 60 µm zinc rich primer (Epoxy or Polyurethane)
 + 2 to 3 layers adding up to 340 µm DFT Epoxy combination
 Total thickness: 400 µm
- 80 µm hot-dip
 + 1 x 80 µm DFT primer (Epoxy or Polyurethane)
 + 2 layers adding up to 240 µm DFT Epoxy or Polyurethane
 Total thickness: 400 µm
- 100 µm metallisation
 + 1 sealer coat (Epoxy)
 + 2 layers adding up to 450 µm DFT Epoxy or Epoxy combination
 Total thickness: 550 µm



In 2012-2013, the 6 penstocks and hoist crane of the Akasombo Dam have been treated with the system ZINGA 1 x 60 µm DFT + Zingaceram ZM EP MIO HS 1 x 120 µm DFT + Zingaceram ZM PU 1 x 60 µm DFT.

This system will provide a protection that accords to the ISO 12944-6 test results predicting a life expectancy of >15 years in an industrial zone with high humidity and aggressive environment.

ZINGA 1 x 60 µm DFT + Zingaceram ZM EP MIO HS 1 x 120 µm DFT + Zingaceram ZM EP TOP 1 x 60 µm DFT

The system ZINGA 1 x 60 µm DFT + Zingaceram ZM EP MIO HS 1 x 80 µm DFT + Zingaceram ZM EP TOP 1 x 60 µm DFT is suitable for a C5I environment (atmospherically) with a High life expectancy.

C5I-High (equals to C5M-High) relates to real life situations as follows:

- C5I: industrial zones with high humidity and aggressive environment (continuous condensation and high pollution)
- C5M: Coastal zones and marine zones with high salinity (continuous condensation and high pollution)
- High: life expectation >15 years

Examples of existing systems for atmospheric conditions that fall into that same category are:

- 60 µm zinc rich primer (Epoxy or Polyurethane)
 + 2 to 3 layers adding up to 340 µm DFT Epoxy combination
 Total thickness: 400 µm
- 80 µm hot-dip
 + 1 x 80 µm DFT primer (Epoxy or Polyurethane)
 + 2 layers adding up to 240 µm DFT Epoxy or Polyurethane
 Total thickness: 400 µm
- 100 µm metallisation
 + 1 sealer coat (Epoxy)
 + 2 layers adding up to 450 µm DFT Epoxy or Epoxy combination
 Total thickness: 550 µm



In April 2005, the interior of 22 wind mills have been treated with the system ZINGA 1 x 60 µm DFT + Zingaceram ZM EP TOP 2 x 100 µm DFT.

ZINGA 1 x 60 µm DFT + Zingaceram ZM EP MIO HS 1 x 120 µm DFT + Zingaceram ZM PU 1 x 60 µm DFT

The system ZINGA 1 x 60 µm DFT + Zingaceram ZM EP MIO HS 1 x 80 µm DFT + Zingaceram ZM PU 1 x 60 µm DFT is suitable for a C5I environment (atmospherically) with a High life expectancy.

C5I-High (equals to C5M-High) relates to real life situations as follows:

- C5I: industrial zones with high humidity and aggressive environment (continuous condensation and high pollution)
- C5M: Coastal zones and marine zones with high salinity (continuous condensation and high pollution)
- High: life expectation >15 years

Examples of existing systems for atmospheric conditions that fall into that same category are:

- 60 µm zinc rich primer (Epoxy or Polyurethane)
+ 2 to 3 layers adding up to 340 µm DFT Epoxy combination
Total thickness: 400 µm
- 80 µm hot-dip
+ 1 x 80 µm DFT primer (Epoxy or Polyurethane)
+ 2 layers adding up to 240 µm DFT Epoxy or Polyurethane
Total thickness: 400 µm
- 100 µm metallisation
+ 1 sealer coat (Epoxy)
+ 2 layers adding up to 450 µm DFT Epoxy or Epoxy combination
Total thickness: 550 µm



Over the period of 2013-2017 the Izmit Bay Suspension Bridge (Marmara Bridge), the fourth longest suspension bridge, will be treated with the system ZINGA 1 x 60 µm DFT + Alufer N 1 x 80 µm DFT + Zingaceram ZM PU 1 x 60 µm DFT.