

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

**RESEARCH DESIGNS AND STANDARD ORGANISATION
MANAK NAGAR, LUCKNOW-226011**

Document No. : BS-S-7.5.3.1-8

Document Title : **SPECIFICATION FOR NON-ELECTROLYTICALLY APPLIED ZINC FLAKE COATINGS FOR HSFG BOLTING ASSEMBLIES**

AMENDMENT HISTORY:

S.No.	Amendment Date	Version	Reasons for Amendments
1.	-	1.0	New Specification

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

SPECIFICATION FOR NON-ELECTROLYTICALLY APPLIED ZINC FLAKE COATINGS FOR HSFG BOLTING ASSEMBLIES

1.0 Scope:

This specification covers the requirements for non-electrolytically applied zinc flake coatings for steel fasteners. It applies to coatings with or without hexavalent chromium; with or without top coat; with or without lubricant (integral lubricant and/or subsequently added lubricant).

It applies to bolts, screws, studs and nuts with ISO metric thread, to fasteners with non-ISO metric thread, and to non-threaded fasteners such as washers, pins, clips, etc. It does not apply to mechanically applied zinc coatings.

This specification is intended to help better understanding of the codal provisions. For actual design/ use the relevant reference codes as given in para 2 below shall be referred to and followed. In case of any confusion, clarification or difference of opinion etc., the provisions given in the relevant reference codes as given in para 2 below shall prevail.

2.0 Reference Codes:

Following codes has been referred while preparation of this specification:

2.1 ISO 10683:2018

2.2 EN 14399 Series (High strength structural bolting assemblies for preloading)

3.0 General Characteristics of the Coating:

3.1 Zinc flake coating systems

Zinc flake coating systems are produced by applying zinc flake dispersion to the surface of a steel fastener, usually with the addition of aluminium flakes, in a suitable medium. Under the influence of heat (curing), a bonding amongst flakes and also between flakes and substrate is generated, thus forming an inorganic surface coating sufficiently electrically conducting to ensure cathodic protection. The coating may or may not contain hexavalent chromium, Cr(VI).

Special techniques may be necessary to avoid excessive or insufficient coating thickness. Special techniques may be necessary to prevent lightweight and/or flat fasteners from sticking together (e.g. washers, clips, fasteners with captive washer, flanged nuts).

An additional top coat can be applied to increase corrosion resistance and/or to achieve specific properties (e.g. torque/tension properties, chemical resistance, aspect, colour, electrical insulation/conductivity).

3.2 Functional properties

3.2.1 Assemblability and mountability

Clearance between assembly components (e.g. clearance hole), dimensional tolerances of the functional parts of the fasteners, tool gripping (e.g. for retaining rings), tool insertion (e.g. for recess and internal drives) and driving should not be impaired.

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 2 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

For dimensional requirements after coating for threaded fasteners, (see 5.2 of this document and Annex B of reference code at para 2.1).

The compatibility of the coating system with the tightening process, especially when high speed tightening is foreseen (risk of overheating, stick/slip, etc.) should be considered. The compatibility of the coated fasteners with the clamped parts, e.g. tapped holes, clamped parts in aluminium, magnesium, stainless steel, electrophoretically coated parts, hot dip galvanized parts, plastic, wood should be considered.

To achieve a specific clamp force and a consistent torque/clamp force relationship for fasteners with ISO metric thread, at least one of the mating threaded fasteners should be lubricated. Zinc flake coating systems provide lubricated solutions (see section 4.1 of this document). Torque/clamp force relationship can be determined in accordance with ISO 16047 and expressed as a coefficient of friction μ (or by K-factor).

3.2.2 Other properties of the assembly with coated fasteners

3.2.2.1 Chemical resistance

Organic top coats applied on zinc flake base coats are more resistant to acidic and alkaline chemicals than inorganic top coats.

3.2.2.2 Electrical conductivity

The electrical conductivity of zinc flake base coats with inorganic top coat is generally suitable for application of electrophoretic coatings and antistatic purposes. Zinc flake coating systems are not suitable for electrical grounding.

3.2.2.3 Galvanic corrosion

In order to reduce the risk of galvanic corrosion, all of the parts of the assembly should be considered (coated fasteners and clamped parts). A direct metal contact with non-coated clamped parts should be avoided, especially e.g. for stainless steel, magnesium, copper or copper alloys. Due to their insulating effect organic top coats improve the resistance against galvanic corrosion.

The items listed in 3.2.2 are not exhaustive. All the specific service conditions should be considered when selecting a coating system.

3.2.2.4 Cleanliness

For cleanliness requirements, the suitability of the zinc flake coating system should be checked (e.g. dust, particle size, particle type, number of particles).

3.3 Mechanical and physical properties and curing

The coating process shall not adversely influence the mechanical and physical properties of the fasteners.

Depending on the zinc flake coating system, the curing temperatures can be up to 320 °C. The curing temperature shall not be above the tempering temperature of quenched and tempered fasteners.

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 3 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

WARNING: The curing process (especially with higher temperature and/or longer duration) may affect the fatigue limit of fasteners with thread rolled after heat treatment. Curing process (especially with higher temperature and/or longer duration) may have an effect on the properties/performances of fasteners:

- When the curing temperature is above the tempering temperature, reduction of hardness may affect the performances of case hardened or nitrocarburised fasteners (e.g. for thread forming or selfdrilling screws), or elastic and plastic deformation (e.g. for clips);
- For cold worked fasteners or fasteners with thread rolled after heat treatment, residual stresses may be reduced.

3.4 Avoidance of internal hydrogen embrittlement

A characteristic of zinc flake coating systems is that hydrogen is not generated during the deposition process.

Pre-treatment processes using alkaline/solvent cleaner followed by mechanical cleaning do not generate hydrogen, thus eliminating all risk of internal hydrogen embrittlement (IHE). Cathodic cleaning processes are not permitted.

NOTE: Zinc flake coatings have a high permeability for hydrogen which, during the curing process, allows outward diffusion of hydrogen which may have been absorbed during the pre-treatment process as specified in this subclause.

4.0 Zinc flake coating systems and coating processes

4.1 Coating systems:

There are four basic zinc flake coating systems as shown in Figure 1.

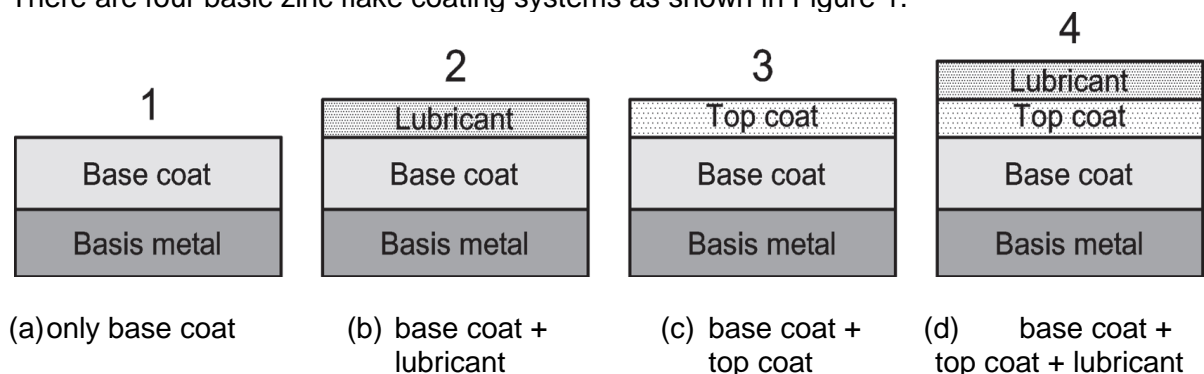


Figure 1 – Basic zinc flake coating systems

Base coat and top coat can be with integral lubricant, see detailed possible combinations in Figure 2 below.

Before selecting a coating system, all functions and conditions of the assembly should be considered and not just the fastener (see 3.2 above). The purchaser should consult the supplier to determine the appropriate choices for a given application. An integral lubricant

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 4 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

may be chosen to achieve torque/tension properties. An additional top coat may be chosen to increase corrosion resistance and to achieve other specific properties (e.g. torque/tension properties, resistance to chemicals, mechanical resistance, aspect, colour, thermal resistance, electrical insulation/conductivity, UV resistance). The selection of the nature of the top coat should be based on desired additional properties (i.e. Organic top coat: electrical insulation, high resistance to chemicals or colouring possibilities, etc. and Inorganic top coat: impact/abrasion resistance or thermal resistance, etc.). An additional lubricant may be chosen to adjust torque/tension relationship.

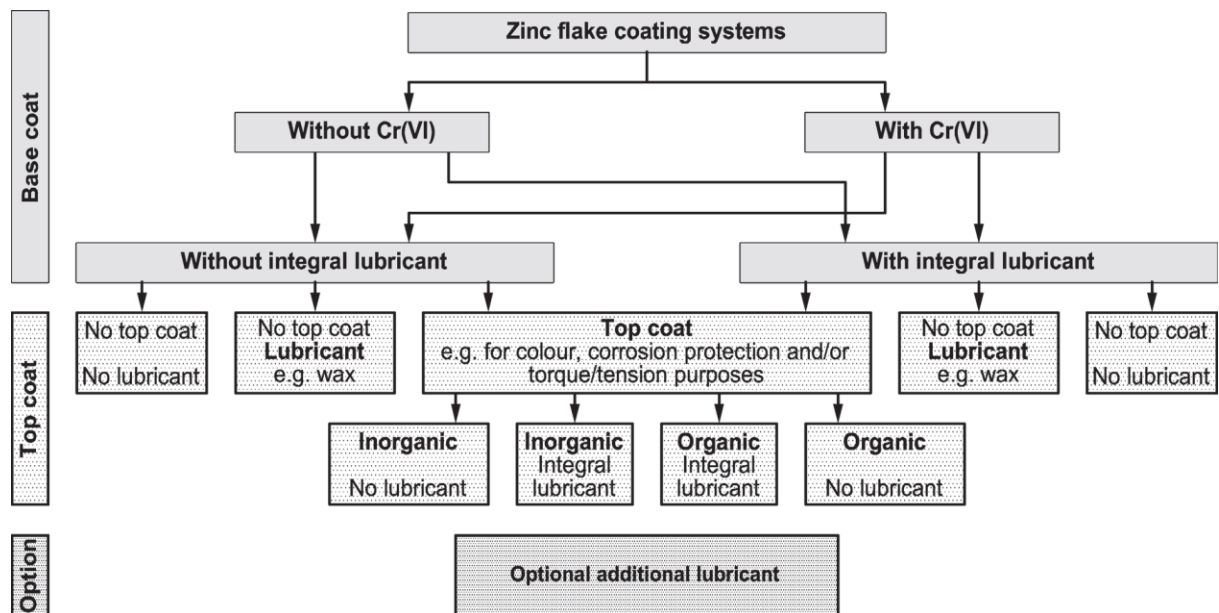


Figure 2 – Typical zinc flake coating systems

4.2 Coating process

Zinc flake coating systems can be applied in bulk or rack process using dip-spin or spray process.

Zinc flake coating is generally a mass process. When lots of small quantity have to be coated, a suitable coating line and/or process may be necessary in order to achieve the required properties and performances for the coated fasteners. For fasteners of large size or mass or when the risk of thread damage has to be reduced, rack instead of bulk process may be considered.

5.0 Dimensional requirements and its testing

5.1 General

Before coating, fasteners shall be within the specified dimensions. For ISO metric threads special requirements may apply, (For details see 5.2 below and Annex B of reference code at para 2.1).

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 5 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

5.2 Bolts, screws, studs and nuts with ISO metric threads

5.2.1 Coating thickness

When considering the coating thickness related to the desired corrosion resistance, the dispersion of the thickness of the coating system shall be taken into account, (see B.3 of Annex B of reference code at para 2.1).

Coating thickness has a significant influence on gaugeability, therefore thread tolerance and clearance in the thread shall be taken into account. The coating shall not cause the zero line (basic size) to be exceeded in the case of external threads; nor shall it fall below in the case of internal threads, (see B.4 of Annex B of reference code at para 2.1).

NOTE: For standard bolts, screws, studs and nuts not specifically manufactured to accommodate zinc flake coatings, (see B.4 and B.5 of Annex B of reference code at para 2.1).

5.2.2 Gaugeability and Assemblability

Coated ISO metric screw threads shall be gauged in accordance with ISO 1502 with a GO-gauge of tolerance position h for external threads and H for internal threads.

When gauging a coated external thread, a maximum torque of $0.001 d^3$ (Nm) is acceptable, where d is the nominal thread diameter in millimetres, see Table 1 below.

Table 1 – Maximum torque for gauging of coated ISO metric screw threads

Nominal thread diameter, d mm	Maximum torque for gauging ^a Nm
4	0.06
5	0.13
6	0.22
8	0.51
10	1.0
12	1.7
14	2.7
16	4.1
18	5.8
20	8.0
22	11
24	14
27	20
30	27
33	36
36	47
39	59

^a For other diameters, the torque shall be calculated in accordance with $0,001 d^3$ (Nm) and rounded to 2 digits.

Acceptance procedures for assemblability may be applied by agreement between supplier and purchaser:

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 6 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

- For external thread, use of a suitable nut or the original mating fastener;
- For internal thread, use of a suitable mandrel (e.g. the mandrel specified for proof load in accordance with ISO 898-2) or the original mating fastener.

6.0 Mechanical and physical properties and testing

6.1 Appearance

The colour of a zinc flake coating is originally silver-grey. Other colours can be obtained by using a top coat. Variation in colour shall not be cause of rejection unless otherwise agreed.

The coated fastener shall be free from blisters and uncoated areas which can adversely affect the corrosion protection. Local excess of coating shall not impair functional properties (see Clause 5 and 3.2 of this document).

6.2 Corrosion resistance related to temperature

Elevated temperature can affect the corrosion protection of the coated fasteners. This test is specified for in-process control; it is not intended to check the behaviour of the coated fasteners together with the assembled parts.

After heating the coated fasteners for 3 h at 150 °C (part temperature) the corrosion resistance requirements as specified in Clause 7 of this document shall still be met.

Other specifications may be agreed at the time of the order.

6.3 Test methods for thickness or coating weight determination

Coating thickness or coating weight shall be determined using one of the following test methods:

- Magnetic inductive techniques (determination of the total local thickness, on measuring areas);
- X-ray techniques (this method is only capable to determine the local thickness of the base coat, on measuring areas);
- Chemical or mechanical removal of the coating system (determination of the average total coating weight of the fastener);
- Microscopic method in accordance with ISO 1463 (determination of the total local thickness, on any area(s) of the fastener).

In case of dispute, the microscopic method in accordance with ISO 1463 shall be used. The thickness shall be measured on the reference areas specified in Figure 3 below, unless otherwise agreed.

6.4 Ductility

Zinc flake coating systems are generally not very ductile, i.e. corrosion performance can be affected when deformation occurs after coating. Ductility shall be compatible with the elastic deformation occurring during assembly of the fastener, e.g. tightening of threaded fasteners, flattening for conical washers, bending for clips during installation.

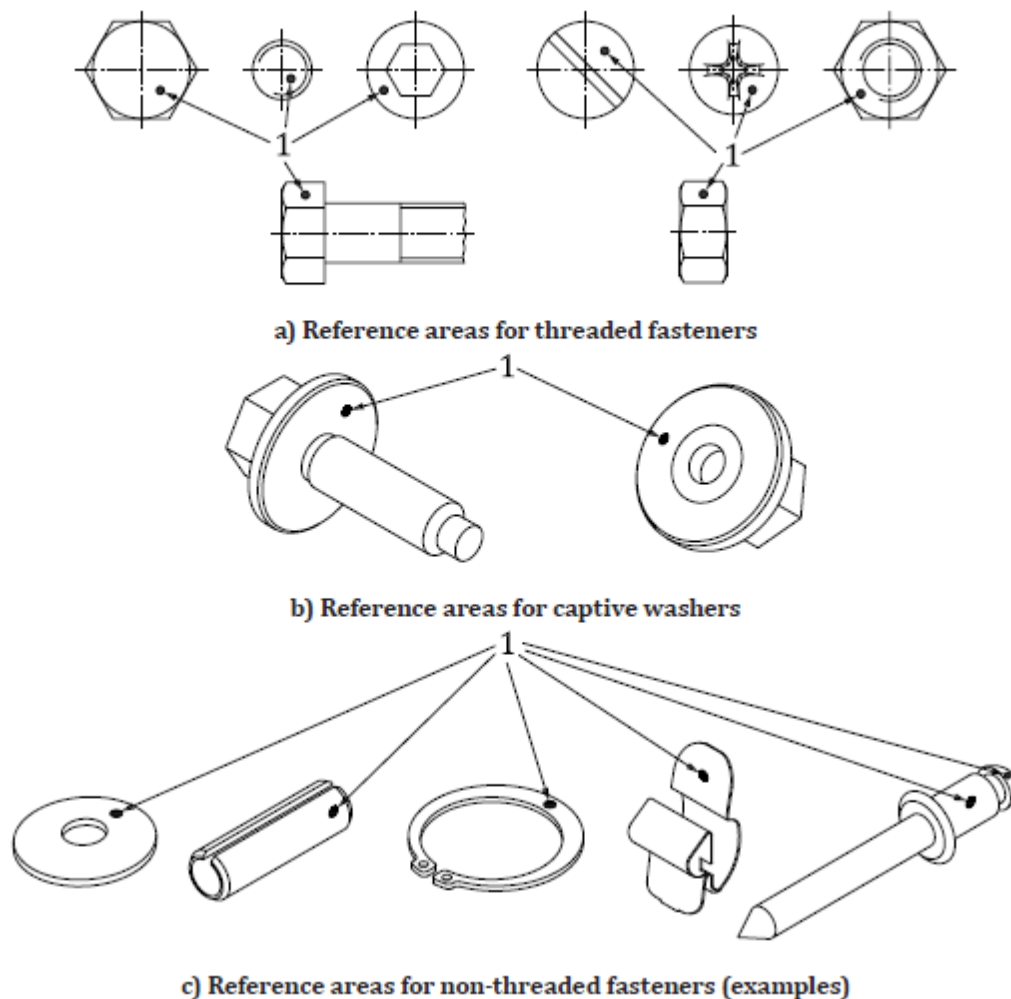
The ability of the zinc flake coating system to deform should not cause impairment of the performance of the fastener, e.g. corrosion resistance, torque/clamp force relationship

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 7 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

when specified. Therefore, suitable tests for particular applications shall be agreed between the purchaser and the supplier.

NOTE: Lack of ductility can generate cracks/chips of the coating thus impairing corrosion resistance.



Key

1 reference area for local coating thickness determination

Figure 3 - Reference areas for fasteners

6.5 Adhesion/cohesion

This test may be carried out at each step of the application process.

When an adhesive tape with 25 mm width with an adhesive strength of (7 ± 1) N is firmly pressed by hand on to the surface and is subsequently pulled off rapidly and

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 8 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

perpendicularly to the surface, the coating shall not be peeled off the basis metal. Small amounts of the coating material left sticking to the tape are acceptable.

NOTE: Coating material visible on both surfaces of the fastener and adhesive tape usually results from lack of cohesion. Visible basis metal and coating material on the adhesive tape usually result from lack of adhesion.

6.6 Sacrificial cathodic protection

The sacrificial cathodic protection ability of the coating may be tested as follows:

The fastener shall be scratched down to the basis metal, using a tool with a nominal width of 0.5 mm. After a neutral salt spray test of 72 h duration in accordance with Clause 7 of this document, there shall be no red rust in the scratched area.

6.7 Torque/clamp force relationship

When specified, the torque/clamp force relationship may be determined for fasteners with external ISO metric thread and nuts with zinc flake coating systems including integral lubricant and/or subsequently added lubricant.

The test method shall be agreed between the supplier and the purchaser, in accordance with ISO 16047 or other relevant technical specifications. The requirements for torque/clamp force relationship shall be agreed between the supplier and the purchaser.

Storage conditions shall not impair the torque/clamp force performance of the coated fasteners (see para 11.10 of this document).

6.8 Determination of hexavalent chromium

The presence or absence of Cr(VI) may be determined. In this case, the determination shall be done in accordance with clause 5.5.2 of ISO 3613:2010.

7.0 Corrosion protection and its testing

7.1 General

Corrosion resistance in accelerated corrosion tests cannot be directly related to corrosion protection behaviour in particular service environments. However, accelerated tests are used to evaluate the corrosion resistance of the coating.

7.2 Neutral salt spray test

The neutral salt spray test (NSS) in accordance with ISO 9227 shall be used to evaluate the corrosion resistance of the coating systems.

When evaluation of the cabinet corrosivity is requested, it should be performed in accordance with Annex C of ISO 10683:2018.

The neutral salt spray test shall be carried out on fasteners alone, no sooner than 24 h after coating in the "as-coated" condition, i.e. before sorting, packaging and/or assembling. After the neutral salt spray test using test duration of Table 2 below, there shall be no

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 9 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

visible basis metal corrosion (red rust). The contact points of fasteners with a holding fixture shall not be considered in the evaluation of corrosion protection.

NOTE: Guidance for the selection of coating thickness in relation to corrosion protection is given in Annex B of ISO 10683:2018.

7.3 Sulfur dioxide test (Kesternich test)

This test is only intended for outdoor building fasteners. The sulfur dioxide test with general condensation of moisture in accordance with ISO 6988 shall be used to evaluate the corrosion resistance of the coating systems; for outdoor building fasteners, the test shall be carried out with two litres of SO₂.

The sulfur dioxide test shall be carried out on fasteners alone, no sooner than 24 h after coating in the “as-coated” condition, i.e. before sorting, packaging and/or assembling.

The minimum number of cycles shall be agreed between the supplier and the purchaser at the time of the order, i.e. 2 cycles, 3, 5, 8, 10, 12, 15 cycles, etc.

The contact points of fasteners with a holding fixture shall not be considered in the evaluation of corrosion protection.

Table 2 — Standard categories for neutral salt spray test

Neutral salt spray test duration (without red rust)	Reference thickness of the coating system ^a
240 h	4 µm
480 h	5 µm
600 h	6 µm
720 h	8 µm
960 h	10 µm
^a The reference thickness includes base coat(s) and top coat(s) if any, with or without Cr(VI). The corrosion resistance shall be decisive for acceptance, the reference thickness is given for guidance only. The composition of the system (base coat only, base coat + top coat, etc.) shall be specified at the time of the order.	

7.4 Bulk handling, automatic processes such as feeding and/or sorting, storage and transport

Bulk handling, automatic processes such as feeding and/or sorting, storage and transport can cause a significant reduction of corrosion protection depending on the coating system and type and geometry of the fasteners. This can especially occur for Cr(VI)-free coating systems where less self-healing effect takes place and/or where top coats are sensitive to impact damage and/or abrasion.

When necessary, an agreement should be reached between the supplier and the purchaser, e.g. by reducing the minimum duration of neutral salt spray test and/or by increasing the thickness of the coating system.

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 10 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

8.0 Applicability of tests

8.1 General

All requirements specified in para 5, 6 and 7 apply as far as they are general characteristics of the coating or are separately specified by the purchaser.

8.2 Tests mandatory for each lot

The following tests shall be carried out for each lot of fasteners (see ISO 3269).

- Gauging of thread (see 5.2.2).
- Appearance (see 6.1).

8.3 Tests for in-process control

The following tests are not intended to be applied for each fastener lot, but shall be used for in-process control (see ISO 16426), when relevant:

- Corrosion resistance: neutral salt spray test (see 7.2) or, alternatively and only when specifically required, sulfur dioxide test (see 7.3).
- Temperature resistance (see 6.2).
- Coating thickness or coating weight (see 6.3).
- Adhesion/cohesion (see 6.5).

8.4 Tests to be performed when specified by the purchaser

The following tests are performed when specifically required by the purchaser; (see ISO 3269). In-process test results for that lot (see 8.3) may be used to supply test results to the purchaser.

- Corrosion resistance: neutral salt spray test (see 7.2) or, alternatively and only when specifically required, sulfur dioxide test (see 7.3). Significant areas may be specified for the evaluation of the corrosion resistance.
- Coating thickness or coating weight (see 6.3).
- Torque/clamp force relationship (see 6.7 and Table 4).
- Ductility (see 6.4).
- Cathodic protection (see 6.6).
- Presence or absence of Cr(VI) (see 6.8).

9.0 Designation

9.1 Designation of zinc flake coating systems for the order

The designation of the coating shall be added to the fastener designation in accordance with the designation system specified in ISO 8991. The zinc flake coating system shall be designated in accordance with Table 4 below and in the same order. A slash (/) shall be used to separate data fields in the coating designation.

9.2 Designation of zinc flake coating systems for labelling

At least the following information shall be added on the label, separated by a slash (/):

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 11 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

- fIZn for the zinc flake coating (base coat);
- yc for coating with Cr(VI), or nc for Cr(VI) free coating;
- Minimum duration of corrosion resistance (neutral salt spray) in hours.

10.0 Ordering requirements

When ordering a zinc flake coating system for fasteners in accordance with this specification, the following information shall be supplied:

- Reference to this document or ISO 10683.
- The coating designation.
- The material properties of the fastener that may be influenced by the coating process, e.g. tempering temperature, hardness or other properties.
- Torque/clamp force requirements, if any, including specification and related test method (e.g. ISO 16047).
- Other requirements, if any (e.g. resistance to chemicals, suitability for adhesives, electrical conductivity/insulation).
- Tests to be carried out, if any (see Clause 8).
- Sampling.
- Colour if different from silver-grey.
- Cosmetic appearance, if any.

Table 4 — Designation for zinc flake coating systems for the order

Zinc flake coating system				Neutral salt spray test duration (red rust)	Torque/ tension requirement, if any
Base coat	Hexavalent chromium Cr(VI)	Organic or inorganic top coat	Additional lubricant, if any		
without integral lubricant = fIZn or with integral lubricant = fIZnL	No specification: may be delivered with or without Cr(VI) at the choice of the supplier or With Cr(VI) = yc or Without Cr(VI) = nc	With integral lubricant in the top coat = TL or Without integral lubricant in the top coat = Tn	L	e.g. 480 h	C^a
^a Range of μ or K values to be specified at the time of the order.					

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

11.0 Some more issues related to fasteners and coating processes

11.1 General

The type of fasteners should be considered when choosing a coating system and related coating process. Para 11.2 to 11.10 list the main issues for each type of fasteners. When 100 % sorting is required for specific characteristic(s), agreement should be reached between the supplier and the purchaser at the time of the order. Suitable measures should be taken into account for the following potential issues.

11.2 Fasteners with ISO metric thread

- Thread damages (the heavier the part, the more sensitive it is).
- Filling of drive/recess.
- Retention of particles in threads.
- For fasteners to be coated and with pitch $P < 1$ mm, a special agreement between supplier and purchaser should be reached.
- Contamination with foreign parts.

11.3 Fasteners with captive washers

- Retention of particles (e.g. when shot blasting is used).
- Free rotation of the washer.
- Contamination with foreign parts.

11.4 Fasteners with adhesive or patch

Applicability on zinc flake coating systems and functional properties should be evaluated.

11.5 Nuts

- Retention of particles in threads.
- For fasteners to be coated and with pitch $P < 1$ mm, a special agreement between supplier and purchaser should be reached.
- Contamination with foreign parts.

11.6 Prevailing torque nuts

For all metal prevailing torque nuts, zinc flake coating systems in combination with silicate based top coat may cause scratching of the coating, fouling or even galling during tightening. In this case, an alternative top coat or additional lubricant should be used.

For prevailing torque nuts with non-metallic insert, the effect of the curing temperature should be considered.

11.7 Fasteners with recess, internal drive or cavities

Special techniques can be necessary to prevent retention of particles (e.g. when shot blasting is used as pre-treatment) and excess of coating in recesses or internal drives or cavities.

11.8 Screws which form their own mating threads

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 13 of 14

ISO9001:2015	Doc No. BS-S-7.5.3.1-8	Ver. No.: 1.0	Date Effective: 04.12.2019
Document Title: Specification for Non-Electrolytically Applied Zinc Flake Coatings for HSFG Bolting Assemblies			

When selecting zinc flake coating systems, the requirements for thread-forming properties should be considered.

NOTE: It includes thread forming and thread cutting screws, tapping screws, drilling screws, chip board screws, screws for plastics and similar fasteners.

11.9 Clips and retaining rings

Plastic deformation and tangling of clips and retaining rings should be avoided during the coating process.

Special techniques can be necessary to prevent excess of coating in retention zones.

11.10 Storage of coated fasteners

During storage and before installation, direct contact with water or other liquid, condensation, exposure to dust, etc. should be avoided; such conditions can impair torque/clamp force relationship and/or corrosion resistance.

12.0 RESPONSIBILITY AND AUTHORITY:

The following table indicates responsibility related to this document:-

Activity	Responsible	Approver	Supporting	Consulted	Informed
Creation, maintenance of this document	DBS-II	ED/B&S	ADE/Insp. and Staff of Insp. unit	-	Through intranet/soft copy.
Compliance of Directive contained in this document	ADE/Insp.	DBS-II	Directorate staff	-	-
Requirement of Deviation from Directive	DBS-II	ED/B&S	ADE/Insp	-	Through intranet/soft copy

13.0 ABBREVIATION:

ED	=	Executive Director/B&S
DBS	=	Director/Joint Director (B&S)
DD	=	Deputy Director (B&S)
ADE	=	Assistant Design Engineer (B&S)
SE	=	Section Engineer (B&S)

ADE/Insp.	DBS-II	Printed on 04.12.2019
Prepared by	Issued by	Page 14 of 14