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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 15519-2002

**Chemical conversion coatings -- Black oxide coating on iron
and steel -- Specification and test methods**

(English Translation)

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Foreword

This standard adopts ISO 11408.1999 "Chemical conversion coatings - Black oxide coating on iron and steel - Specification and test methods" (English version).

This standard was redrafted in accordance with ISO 11408.1999 with the following modifications.

- REFER to Chinese standards which adopt international standards;
- USE "this standard" to replace "this international standard";
- In Appendix A.1, ADD a typical treatment process for acidic (normal temperature) oxidation of steel.

This standard replaces GB/T 15519-1995 "Chemical oxide film of steel iron".

Compared with GB/T 15519-1995, the main changes are as follows.

- MODIFY the content of heat treatment before and after oxidation of steel (5.2 and 7.1 of the 1995 edition; Chapter 6 of this edition)
- MAKE no specific requirements for the color of the black oxide film (8.1 of the 1995 edition; 7.1 of this edition);
- MODIFY the test method for porosity and continuity (8.3 of the 1995 edition; Appendix B.2 of this edition);
- ADD additional information (see 4.2);
- ADD the content of oxalic acid resistance test (see 7.2.2);
- ADD the typical treatment process for black oxidation of steel (see Table A.1);
- ADD the experimental methods for neutral surface reactions (see Appendix B.1);
- DELETE the contents of packaging, transportation and storage (Chapter

10 of 1995 edition).

Appendix A and Appendix B of this standard are informative appendices.

This standard was proposed by China Machinery Industry Federation.

This standard shall be under the jurisdiction of the National Technical Committee for Standardization of Metal and Nonmetallic Coatings.

Responsible drafting organization of this standard. Wuhan Institute of Material Protection.

Participated drafting organization of this standard. Changsha Institute of Military and Civilian Products.

1 Scope

This standard specifies the requirements for black oxide films on iron and steel (including cast iron, wrought iron, carbon steel, low alloy steel and stainless steel). Black oxide film can be used to reduce friction between sliding surfaces

or bearing surfaces, or for decoration, or to reduce light reflection.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 10125 Corrosion tests in artificial atmospheres - Salt spray tests

3 Terms and definitions

The terms and definitions as defined in GB/T 12334 as well as the following terms and definitions apply to this standard.

Certain coated or to-be-coated surfaces on a workpiece on which the coating is critical to its performance and / or appearance; the coating on the surface must meet all specified requirements.

4 Information that the purchaser shall provide to the supplier

When the purchaser requires the workpiece to be coated with a black oxide film in accordance with this standard, it shall provide the following information to the supplier.

5 Substrate

The surface roughness of the film depends on the original surface roughness of the substrate, so it shall not be the cause of rejection of the black oxide film.

6 Heat treatment of steel

The heat treatment before black oxidation shall be performed in accordance with ISO 9587. The heat treatment shall be performed before any pretreatment or cleaning process using an aqueous solution is started.

Heat treatment after black oxidation shall be performed in accordance with ISO

9588 Surface-hardened workpieces shall be heat treated at 190 °C ~ 220 °C

for not less than 2 h.

7 Requirements

The film layer should be free of red oxidation spots; the entire film layer shall not be reddish brown. Before any additional anticorrosive treatment is applied, the portion wiped by a clean Whatman40 filter paper (or other filter paper of the same quality) shall be free of reddish brown or green dirt.

8 Sampling

Samples shall be randomly selected from the inspection lot according to the sample size as specified in GB/T 12609. Each sample shall be checked for compliance with this standard; the lot shall be judged as meeting or not meeting the requirements in accordance with the rules of the sampling plan in GB/T 11609.

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