

ICS 77.140.50

CCS H 46



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

GB/T 20564.3-2017

Replacing GB/T 20564.3-2007

**Continuously cold-rolled high strength steel sheet and strip for
automobiles - Part 3: High strength interstitial free steel**

汽车用高强度冷连轧钢板及钢带 第3部分: 高强度无间隙原子钢

Issued on: September 7, 2017

Implemented on: June 1, 2018

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine;
Standardization Administration of the PRC**

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Foreword

GB/T 20564 Continuously Cold Rolled High Strength Steel Sheet and Strip for Automobile can be divided into 11 parts.

- Part 1. Bake Hardening Steel;
- Part 2. Dual Phase Steel;
- Part 3. High Strength Interstitial Free Steel;
- Part 4. High Strength Low Alloy Steel;
- Part 5. Isotropic Steel;
- Part 6. Transformation Induced Plasticity Steel;
- Part 7. Martensitic Steel;
- Part 8. Complex Phase Steel;
- Part 9. Quenching and Partitioning Steel;
- Part 10. Twinning Induced Plasticity Steel;
- Part 11. Carbon Manganese Steel. This Part belongs to Part 1 of GB/T 20564. This Part was drafted as per the rules specified in GB/T 1.1-2009. This Part replaced GB/T 20564.3-2007 Continuously Cold Rolled High Strength Steel Sheet and Strip for Automobile

- Part 3. High Strength Interstitial Free Steel. Compared with GB/T 20564.3-2007, this Part has the major technical changes as follows:

--- Modify the nominal thickness range (see Clause 1 of this Edition; Clause 1 of Edition 2007);

--- Add risk warning for non-oiled products and regulations on production completion date (see

1 Scope

China's national standard for high strength interstitial free steel sheet for automotive use. It is Part 3 of GB/T 20564 and specifies the terms and definitions, the classification and grade designation, the dimensions, shape and weight, the technical requirements, the test methods, the inspection rules, and the packaging, marking and quality certificate. Interstitial free steel is the deepest drawing steel there is, and the name describes how it is made: carbon and nitrogen, the interstitial atoms that sit between the iron atoms and pin the dislocations, are removed almost completely by vacuum degassing and what remains is tied up as stable carbides and nitrides by adding titanium or niobium. With the interstitials gone the steel has an exceptionally high plastic strain ratio, which is the property that lets a blank draw into a deep shape by thinning in the plane rather than through the thickness, and it has no yield point elongation at all, so it never shows stretcher strain. That is why the difficult pressings on a car - the inner panels, the wheel housings, the complex reinforcements - are made from it. The difficulty is that removing the interstitials also removes most of the strength. High strength IF steel restores it by solid solution strengthening with phosphorus, manganese and silicon, and the whole art of the product is adding enough of those to reach a useful strength grade without losing the formability that was the point of the steel in the first place. Phosphorus in particular strengthens efficiently but embrittles the grain boundaries if it segregates there, which limits how far the trade can be pushed. The standard therefore grades the material by strength while specifying the plastic strain ratio and the work hardening exponent as requirements rather than as information. Issued on 7 September 2017 and in force since 1 June 2018, it replaces GB/T 20564.3-2007.

This Part of GB/T 20564 specifies the terms and definitions, classification and grade expression method, ordering contents, dimension, appearance, weight, technical requirements, test methods, inspection rules, package, mark and quality certificate of cold rolled high strength interstitial free steel sheet and strip. This Part is applicable to the steel sheet and strip with thickness of 0.50mm ~ 3.00mm (hereinafter referred to as "steel sheet and strip") used for manufacturing automobile external and internal plates and partial structures.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 223.5 Steel and Iron - Determination of Acid-Soluble Silicon and Total Silicon Content - Reduced Molybdosilicate Spectrophotometric Method

GB/T 223.9 Iron Steel and Alloy - Determination of Aluminum Content - Chrom Azurol S Photometric Method

GB/T 223.14 Methods for Chemical Analysis of Iron, Steel and Alloy - The N-Benzoy-N-Phenylhydroxylamine Extraction Photometric Method for the Determination of Vanadium Content

GB/T 223.16 Methods for Chemical Analysis of Iron, Steel and Alloy - The Chromotropic Acid Photometric Method for the Determination of Titanium Content

GB/T 223.40 Iron, Steel and Alloy - Determination of Niobium Content by the Sulphochlorophenol S Spectrophotometric Method

GB/T 223.59 Iron, Steel and Alloy - Determination of Phosphorus Content - Bismuth Phosphomolybdate Blue Spectrophotometric Method and Antimony Phosphomolybdate Blue Spectrophotometric Method

GB/T 223.64 Iron, Steel and Alloy - Determination of Manganese Content - Flame Atomic Absorption Spectrometric Method

GB/T 223.78 Methods for Chemical Analysis of Iron, Steel and Alloy - Curcumin Spectrophotometric Method for the Determination of Boron Content

GB/T 223.86 Steel and Iron-Determination of Total Carbon Content-Infrared Absorption Method after Combustion in an Induction Furnace

GB/T 228.1-2010 Metallic Materials - Tensile Testing - Part 1. Method of Test at Room Temperature

GB/T 247 General Rule of Package Mark and Certification for Steel Plates (Sheets) and Strips

GB/T 708 Dimension, Shape, Weight, and Tolerance for Cold-Rolled Steel Plate and Strip

GB/T 2523 Measuring Method of Surface Roughness and Peak Count for Cold- Rolled Metal Sheet (Strip)

6 Dimension, Appearance, Weight

The dimension, appearance, weight and allowable tolerance of steel sheet and strip shall conform to the provisions of GB/T 708.

7 Technical Requirements

7.1 Chemical compositions The reference values for the chemical compositions (smelting analysis) of steel can refer to Appendix A. If the purchaser has the requirements for the chemical compositions; it shall be negotiated when ordering. Approximate comparison between domestic and foreign standard grades can refer to Appendix B.

7.2 Smelting method The steel used for steel sheet and strip shall be smelted by oxygen converter or electric furnace; unless otherwise specified, the smelting method shall be selected by the supplier.

7.3 Delivery state

7.3.1 Steel sheet and strip shall be delivered in a flat state after annealing.

7.3.2 Steel sheet and strip are usually supplied with oil; the applied oil film shall be removed by aqueous alkaline solution or conventional solution; under general packaging, transporting, loading/unloading, storing conditions, the supplier shall guarantee that the steel sheet and strip surface shall not become rusty within 6 months since the completion date of the production. If the purchaser request that the product shall be supplied without oil, it shall be negotiated when ordering. NOTE. for the non-oiled products required by the purchaser, they may become rusty, or the surface may be slightly scratched during the transporting, loading/unloading, storing and using period.