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ASSOCIATION STANDARD

T/CSAE 56-2017

Bulletproof steel sheet and strip for automobile use

汽车用防弹钢板和钢带

(English Translation)

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Foreword

In order to meet the design and development needs of China 's national defense bulletproof car products, according to the production of hot rolled bulletproof steel plates and steel belts for automobiles at home and abroad, with reference to the current development status of bulletproof steel of foreign advanced enterprises such as SSAB, combined with the actual situation in the country, according to the rules given in GB/T 1.1-2009.

Appendices A and C of this standard are normative appendixes, and appendixes B and D are informative appendixes.

This standard is proposed by the Automotive Lightweight Technology Innovation Strategic Alliance.

This standard was approved by the Chinese Society of Automotive Engineers.

This standard was first issued in November.2017.

4 Grades, types and uses

The steel plate and steel strip are distinguished according to their uses as shown in Table 1.

Table 1 Grades and uses of steel plates and strips

Types of steel

SHR900FD (1) Hot rolled material SHR900FD (1) thickness 3.00mm, A, for Class B Protected Vehicles SHR900FD (2) Hot rolled material SHR900FD (2) thickness 3.00mm, A, for Class B Protected Vehicles SHT1600FD Heat-treated material Class B protective vehicle SHT1900FD Heat-treated material for Class C protective vehicles

5.1 Production process conditions

Steel plates and strips should be produced by arc furnace or converter smelting, refining outside the furnace, vacuum degassing (VD or RH), and heat treatment it is recommended to use flat die pressure quenching to obtain a fully martensitized matrix structure. The relevant heat treatment process parameters are based on product size, Product user performance requirements, supplier technical conditions and so on. In addition, after consultation between the supply and demand sides, it can also be used to ensure the quality of this standard.

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Other production processes and process methods required and specified in the contract.

5.2 Chemical composition

The chemical composition of each steel grade should meet the requirements of Tables 2 and 3. If the purchaser proposes more stringent requirements, it should negotiate with the supplier.

It shall be agreed upon in the contract and specified in the contract. The supplier shall produce and supply the product in accordance with the stricter requirements of the contract. Steel mills are also available in this Based on the standard composition control requirements, it is subdivided to form the corresponding steel seed grade series. In addition, after consultation between the supply and demand parties, Under the premise of relevant product quality requirements of this standard, other alloy composition designs can also be used.

Table 2 Composition requirements for hot-rolled bulletproof steel plates and strips

the unit is%

Grade

chemical composition C Si Mn PS Ti Cr Cu Mo Ni V Nb Al SHR900FD (1) 0.15 ~ 0.20 0.60 0.80 1.50 2.00 <= 0.025 <= 0.010 <= 0.15 0.20 ~ 0.30 0.20 ~ 0.30 0.15 ~ 0.20 0.15 ~ 0.25 <= 0.10 SHR900FD (2) 0.17 ~ 0.21 0.60 0.80 1.50 2.00 <= 0.025 <= 0.010 <= 0.15 0.20 ~ 0.30 0.20 ~ 0.30 0.15 ~ 0.20 0.15 ~ 0.25 <= 0.10 Note. The allowable deviation of the chemical composition of the finished steel product shall meet the requirements of GB/T 222.

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Table 3 Composition requirements for heat-treated bulletproof steel plates and strips

the unit is%

Grade

chemical composition C Si Mn PS Al Cr Ni Ti VB SHT1600FD 0.27 ~ 0.32 0.28 ~ 0.34 1.10 ~ 1.20 <= 0.025 <= 0.010 >= 0.020 0.70 ~ 0.80 0.30 ~ 0.38 <= 0.20 <= 0.05 0.0015 ~ 0.0035 SHT1900FD 0.36 ~ 0.42 0.31 ~ 0.37 1.15 ~ 1.25 <= 0.025 <= 0.010 >= 0.020 0.70 ~ 0.80 0.30 ~ 0.38 <= 0.20 <= 0.05 0.0015 ~ 0.0035 Note. The allowable deviation of the chemical composition of the finished steel product shall meet the requirements of GB/T 222.

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5.3 Delivery status

Delivery in hot rolled or heat treated state.

Can be negotiated between the supplier and the buyer to determine whether the product needs to be pickled (shot blasted), oiled and rust-proofed before the product is delivered, and it is stated in the supply contract.

5.4 Mechanical properties

The range of mechanical properties and process performance indicators shall meet the requirements specified in Table 4.

Table 4 Range of mechanical properties and process performance indicators

Grade yield strength ReL/MPa Tensile strength Rm/MPa Rockwell hardness/HRB Brinell hardness/HB Elongation after breaking /% 180 ° cold roll A80 A50 SHR900FD (1) >= 700 >= 900 27 ~ 35 270 ~ 330 >= 9 >= 13 D = a SHR900FD (2) >= 700 >= 900 27 ~ 35 270 ~ 330 >= 9 >= 13 D = a SHT1600FD >= 1100 >= 1600 49 ~ 52 470 ~ 520 >= 6 >= 8 SHT1900FD >= 1300 >= 1900 54 ~ 57 550 ~ 600 >= 4 >= 6

Note 1: The bending test parameter D is the bending indenter diameter (mm), and a is the specimen thickness (mm).

Note 2: The tensile test and bending test are transverse samples, the tensile sample L is 80 mm or 50 mm, b is 20 mm, and the width of the bending sample is >= 35 mm; the rest are the dimensions shall meet the requirements of GB/T 228.1 and GB/T 232. In addition, when the material yield phenomenon is not obvious, Rp0.2 should be used instead of ReL.

5.5 Anti-elasticity

Each batch of steel plate and steel strip products shall be subjected to a shooting range test to assess its anti-elastic performance.

Please refer to Appendix C for inspection methods and evaluation standards.

5.6.1 Standard thickness specifications

The nominal thickness specifications of steel plates and strips can be implemented by referring to the requirements of SAE-China J2205-2013 (Table 5).

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Table 8 Product inspection requirements

No. Inspection item Inspection category Sampling quantity Sampling method

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