



石家庄创谱科技有限公司

SHIJIAZHUANG TRUMP SCIENTIFIC CO., LTD.

Certificate of Analysis

GSB03-2863-12/3

Chill-cast Iron

Element	Certified Value	U _c
B	0.056	0.003
C	3.32	0.02
Cr	0.49	0.01
Cu	0.62	0.01
Mn	1.27	0.01
Mo	0.313	0.005
Ni	2.01	0.01
P	0.115	0.004
S	0.049	0.002
Si	2.27	0.02
Ti	0.176	0.004
V	0.45	0.01

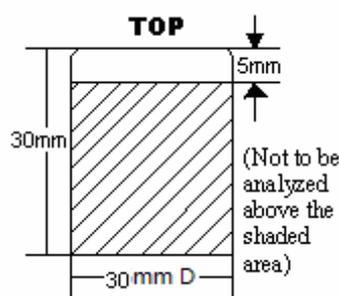
Certified values listed in mass%

* Reference Values

$$U_c = \sqrt{u_{char}^2 + u_{bb}^2}, \text{ thus, } u_{char} = \frac{S}{\sqrt{n}}$$

S is standard deviation and **n** is the number of determinations. The number of determinations is 8. u_{bb} is uncertainty of homogenization in samples.

Manufacture and Certified Area Cast This material was chill-cast white by a rapid unidirectional solidification procedure with the addition of inoculants. The certified portion for each disc is the portion extending upward 25 mm from the down surface.



Analysis Chemical analyses were made on solid pieces and chips from representative samples of the certified portion of the lot in accordance with ASTM Standard Practice E 1806. The laboratories participating in the testing followed the requirements of ISO Standard 17025. Methods of analysis used were listed below.

Analytical Method

Ele.	Method	Ele.	Method
B	Photometric; ICP Atomic Emission	P	Gravimetric; Photometric; Titrimetric
C	Pipe Combustion; Infrared Absorption		ICP Atomic Emission
Cr	Titrimetric; Photometric; ICP Atomic Emission	S	Infrared Absorption; Titrimetric
Cu	Photometric; ICP Atomic Emission; Titrimetric	Si	Photometric; Gravimetric; ICP Atomic Emission
Mn	Titrimetric; Photometric; ICP Atomic Emission	Ti	Photometric; ICP Atomic Emission
Mo	Photometric; ICP Atomic Emission	V	Photometric; ICP Atomic Emission; Titrimetric
Ni	Photometric; Gravimetric; Titrimetric; ICP Atomic Emission		

ICP: Inductively coupled Plasma

Cooperating Laboratory

CRM Research Institution, Shandong Province Metallurgy Scientific Research Institution, Jinan, China

Analysis Center, Shanghai Research Institute of Materials, Shanghai, China

Chemical Testing Institute of Technical Center, Taiyuan Iron & Steel (Group) Co., T016d., Taiyuan, China

Physical and Chemical Testing Institute of Technical Center, Chongqing Iron & Steel (Group) Co., T016d., Chongqing, China

Analysis Center of Research Institute ,Pangang Group Company T016D. , Panzhihua, China

BAO STEEL Special Material Analysis Center Iron and Steel, Shanghai, China

Quality Inspection Center, Shanghai Baosteel Industrial Inspection Company ,Shanghai, China

Analysis Center, Wuhan University of Science and Technology ,Wuhan , China

Hebei Iron and Steel Products Quality Supervision and Inspection Station, Shijiazhuang, China

Technical Center, Sinosteel Xingtai Machinery & Mill Roller Co.,T016d. Xingtai , China

Traceability The following Certified Reference Materials were used to validate the analytical data listed ahead—
GSB03-1567-2003,GSB03-1813-2005.

Homogeneity This Reference Material was tested for homogeneity using ASTM Standard Methods E 826 and found acceptable for all certified elements. It was also examined by optical emission spectrometry and found to be compatible with the following Certified Reference Materials: GBW 01131a-01137a, GSB 03-1813-2005.

Use This CRM is intended for use in spark atomic emission and x-ray spectrometric methods of analysis. Refer to ISO Guide 33 for information about the use of Certified Reference Materials.

Sample Preparation For best analytical results, use the same method for preparing the analytical surface on all reference materials as you use for production specimens. Avoid overheating the sample during surface preparation.

Validity statement ISO Guide 31 states that the certification should contain an expiration date for all materials where instability has been demonstrated or is considered possible, after which the certified value is no longer guaranteed by the certifying body. The CRM is valid indefinitely. The certification is nullified if this CRM is damaged, contaminated, or otherwise modified.

Safety Notice A Material Safety Data Sheet (MSDS) is not required for this material. This material will not release or otherwise result in exposure to a hazardous chemical, under normal conditions of use.

Producer

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Certified by: _____ in August 2011

张增坤