



Approved by State Bureau of Technical Supervision
The People's Republic of China
GBW01651—GBW01653



Certificate of Certified Reference Material

10Mn Nb RE Steel



Sample Number

Date of Certification



Iron & Steel Research Institute of Shanghai No. 1 Iron &
Steel Works of the Ministry of Metallurgy
Shanghai China



The Certified reference material herein is one of the basic standard in laboratories. It can be mainly used for the quality control of iron and steel analysis, the evaluation, test and verification of accuracy of measurement, the calibration of analytical instruments and the determination of characteristic value of materials.

1. Preparation

Electric furnace smelting and ingot casting—rolling to 95x130mm billet—rolling to 20x100mm flat—initial segregation examining—machining on plane—grain grinding and screening—mixing up, filling in bottle—homogeneity testing—Composition quantifying—data gathering and statistical Processing—certificating and final quantifying.

2. Certified Value and Standard Deviation

No	Item	Chemical Composition (Weight Percent)					
		C	S	P	Si	Mn	Cr
GBW 01651	Certified Value	0.073	0.0053	0.0253	0.438	0.675	0.090
	S	0.005	0.0004	0.0006	0.005	0.003	0.002
	N	11	11	11	11	11	11
GBW 01652	Certified Value	0.069	0.0076	0.0135	0.715	0.991	0.228
	S	0.003	0.0007	0.0007	0.007	0.007	0.002
	N	11	11	11	11	11	11
GBW 01653	Certified Value	0.124	0.0045	0.0125	0.674	0.821	0.127
	S	0.005	0.0005	0.0007	0.008	0.008	0.005
	N	11	11	11	11	11	11
GBW 01651	Certified Value	Ni	Cu	Nb	RE	Al(s)	N
	S	0.096	0.089	0.044	0.048	0.093	0.013
	N	0.002	0.002	0.003	0.002	0.004	0.001
GBW 01652	Certified Value	11	11	10	10	10	10
	S	0.071	0.075	0.076	0.018	0.123	0.014
	N	0.002	0.003	0.003	0.001	0.006	0.002
GBW 01653	Certified Value	11	11	10	10	10	10
	S	0.055	0.094	0.122	0.098	0.177	
	N	0.002	0.002	0.004	0.004	0.007	

NoLe: S is Standard Deviation, N is Number of Measurement

3. Analysis Methods

Item	Analysis Method
Carbon	The Gaseous Volumetric Method; The Infrared Method
Sulfur	The Aluminum Oxide Separated-Barium-Sulfate Gravimetric Method; The Ion-Selective Electrode Method; The Infrared Method.
Phosphorous	The Butyl Acetate Extraction Photometric Method; JISG-1214 The Spectrophotometry Method- The Cupferron Separation Photometric Method
Silicon	The Perchloric Acid Dehydration Gravimetric Method; The Oxalic Acid Ferrous Sulfate Molybdsilicate Blue Complex Photometric Method.
Manganese	The Potassium Periodate Photometric Method; The Sodium Nitrite Sodium Arsenite Volumetric Method.
Copper	The Neocuproine-Chloroform Extraction Photometric Method; The Atomic Absorption Method.

Nickel	The Diacetyldioxime - Chloroform Extraction Photometric Method; JISG1257 - 79 The Atomic Absorption Method.
Niobium	The Sulphochlorophenol S Photometric Method; The Chromium Acetate Blue K Photometric Method. The Dimethylphenol Orange Photometric Method.
Rare Earth	The Chlorophosphonazo mA Photometric Method; The Arsenazo III Photometric Method.
Alumium	The Chromazurol S Phptometric Method- The Sodium Carbonate Separation Volumetric method.
Nitrogen	The Volumetric Method after Distillation Separation Method; The Indolphenol Blue Photometric Method after Dislillation Separation.

4. Homogeneity Test and Stability Test

Homogeneity test is done by means of 2- & % random sampling, the sample is based on minimal packing unit. The test is using variance (F) method, the result is $F < F_{\alpha}$, that means the sample is homogeneous. Stability of the CRM's is examined once every two years after Certification. If Changes take Place in stability, we shall let user konw at once.

5. Participating Units

Iron & Steel Research Institute of Anshan Iron & Steel Corporation Iron & Steel Research Institute of Taiyuan Iron & Steel Corporation Iron & Steel Research Institute of Chongqing Special Steel Works Iron & Steel Research Institute of Wuhan Iron & Steel Corporation Shanghai Material Research Institute Shanghai Iron & Steel Research Institute Shanghai No. 5 Iron & Steel Works Shanghai Baoshan Iron & Steel Complex Beijing Iron & Steel Research Head Institute Shanghai No. 1 Iron & Steel Works

6. Package and Storage

The Certified reference material is kept in bottles, net weight is 150 g. Keeping in dry.

