



Certificate of Certified Reference Material

NCS DC 11004a— NCS DC 11009a

Iron Ore

Reissued in 2021

Approved by China National Analysis Center for Iron and Steel

(Beijing China)

This Certified Reference Materials is prepared in accordance with the ISO guides 30-35. The intended use for this CRM is for the quality control in Iron ore analysis, the evaluating methods of analysis and the calibration of analytical instruments.

Certified Values and Extended Uncertainty (%)

No.		TFe	SiO ₂	Al ₂ O ₃	CaO	MgO	P	S	FeO	Cu	C
NCS DC 11004a	Certified Value	54.86	8.27	2.85	0.630	0.524	0.119	0.258	1.17	0.066	0.310
	Extended Uncertainty	0.10	0.06	0.03	0.005	0.008	0.004	0.006	0.06	0.002	0.006
NCS DC 11005a	Certified Value	63.34	3.36	0.52	0.12	0.146	0.016	0.107	0.07#	0.034	0.119
	Extended Uncertainty	0.08	0.03	0.01	0.01	0.004	0.001	0.004		0.001	0.005
NCS DC 11006a	Certified Value	54.74	8.53	1.48	1.02	0.657	0.036	0.439	3.90	0.102	0.227
	Extended Uncertainty	0.09	0.05	0.02	0.02	0.004	0.001	0.006	0.05	0.002	0.004
NCS DC 11007a	Certified Value	52.24	10.20	6.84	0.561	0.606	0.346	0.094	4.21	0.015	0.549
	Extended Uncertainty	0.11	0.06	0.03	0.007	0.008	0.004	0.003	0.08	0.001	0.008
NCS DC 11008a	Certified Value	57.54	7.08	2.14	1.25	0.75	0.073	0.442	8.42	0.095	0.204
	Extended Uncertainty	0.10	0.06	0.02	0.02	0.01	0.002	0.007	0.08	0.002	0.005
NCS DC 11009a	Certified Value	61.96	4.92	0.914	0.375	0.364	0.027	0.212	15.13	0.063	0.128
	Extended Uncertainty	0.10	0.03	0.006	0.006	0.006	0.002	0.005	0.08	0.002	0.003

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No.		Pb	Zn	Na ₂ O	K ₂ O	MnO	As	TiO ₂	BaO	Co
NCS DC 11004a	Certified Value	0.101	0.144	0.047	0.26	1.04	0.096	0.120	0.86*	0.0054
	Extended Uncertainty	0.003	0.005	0.003	0.01	0.02	0.003	0.003		0.0003
NCS DC 11005a	Certified Value	0.035	0.026	0.020	0.070	0.84	0.0044	0.034	0.62*	0.0031
	Extended Uncertainty	0.002	0.002	0.003	0.002	0.02	0.0004	0.002		0.0006
NCS DC 11006a	Certified Value	0.182	0.30	0.048	0.214	1.31	0.215	0.154	1.08*	0.0086
	Extended Uncertainty	0.003	0.01	0.002	0.005	0.02	0.004	0.006		0.0007
NCS DC 11007a	Certified Value	0.034	0.066	0.093	0.61	0.194	0.051	0.237	0.028*	0.0043
	Extended Uncertainty	0.002	0.002	0.003	0.02	0.004	0.003	0.006		0.0003
NCS DC 11008a	Certified Value	0.192	0.362	0.042	0.24	0.623	0.291	0.199	0.42*	0.011
	Extended Uncertainty	0.005	0.005	0.003	0.02	0.007	0.005	0.006		0.001
NCS DC 11009a	Certified Value	0.042	0.054	0.024	0.093	0.947	0.011	0.447	0.71*	0.0061
	Extended Uncertainty	0.001	0.002	0.003	0.002	0.006	0.001	0.007		0.0005

Note: Value with * is for reference only; Value with # is information value.

$$\text{Extended Uncertainty: } U = k u_{\text{CRM}}; \quad u_{\text{CRM}} = \sqrt{u_{\text{char}}^2 + u_{\text{bb}}^2 + u_{\text{ts}}^2 + u_{\text{sts}}^2}; \quad u_{\text{char}} = s / \sqrt{n}$$

U_{CRM} combined uncertainty; U_{bb} between bottle uncertainty;
 U_{ts} long time stability uncertainty, neglectable;
 U_{sts} short time stability uncertainty, neglectable;
 U_{char} standard uncertainty of analysis;
 s standard deviation;
 n number of data;
 k cover factor; For TFe、FeO、Co $K=3$, for others $k=2$.

1. Each certified value is the mean of analytical results of 8 independent laboratories.
2. The sample should be stored at 105°C for 1 hour before using and stored in drier.

3. The sample is powder with size less 0.088mm packed in glass bottle.
The minimum package is 50 grams.
4. The minimum weight for analysis by XRF is 0.2g, for Sulphur by infrared absorption method, the minimum weight is 0.5g.
5. The valid time of the sample is 10 years, although we reserve the right to make change as issue revisions.

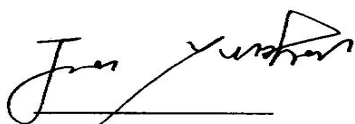
Analytical Methods

Composition	Analytical method
TFe	Potassium dichromate titrimetric method
SiO ₂	The perchloric acid dehydration-gravimetric method; Molybdenum blue photometric method; ICP-AES
Al ₂ O ₃	EDTA titrimetric method; EDTA titrimetric method after separation with cupferron; The chrome azuol S photometric method
CaO	Atomic absorption spectrophotometric method; ICP-AES method; Calcium oxalate permanganate titrimetric method
MgO	EDTA titrimetric method; ICP-AES; Atomic absorption spectrophotometric method
P	Bismuth-phosphorus-molybdenum blue photometric method; ICP-AES
S	Combustion-iodimetric method; Combustion-infrared absorption method; ICP-AES The aluminum oxide chromatographic separation– BaSO ₄ gravimetric method
Cu	Atomic absorption spectrophotometric method; BCO photometric method; ICP-AES
Pb	ICP-AES method; Atomic absorption spectrophotometric method
Zn	Atomic absorption spectrophotometric method; ICP-AES method
Na ₂ O	Atomic absorption spectrophotometric method; ICP-AES method
K ₂ O	Atomic absorption spectrophotometric method; ICP-AES method
MnO	Potassium periodate oxidation photometric method; Atomic absorption spectrophotometric method; ICP-AES method
As	The silver diethyl dithiocarbamate photometric method; AFS, ICP-AES Molybdenum blue photometric method after distillation separation
TiO ₂	ICP-AES method; Colorimetric method with diantipyrylmethane
C	Gas volumetric method, Infrared absorption method
BaO	ICP-AES
Co	ICP-AES

Statement:

This material is used only in labs and for analysis work, producer will be not responsible for any problem caused by misuse or not properly store.

Please check carefully the package, quantity and type of the material after receiving it. Related compensation is only limited in the certified materials, any other losses will be not included.



Jia Yunhai

Laboratory Director