



Certificate of Certified Reference Material

NCS DC 11004a— NCS DC 11009a

Iron Ore

Issued in 2012

Approved by China National Analysis Center for Iron and Steel

(Beijing China)

**NCS TESTING TECHNOLOGY CO., LTD.
13, GAOLIANGQIAO XIEJIE, HAIDIAN DISTRICT,
BEIJING 100081, 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

Continue...

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.

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

U_{CRM} combined uncertainty; U_{bb} between bottle uncertainty;
 U_{lts} 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.



Certificate of Certified Reference Material

NCS DC 14009a

Sintered Ore

Issued in 2014

Approved by China National Analysis Center for Iron and Steel

(Beijing China)

NCS TESTING TECHNOLOGY CO., LTD.
13, GAOLIANGQIAO XIEJIE, HAIDIAN DISTRICT,
BEIJING 100081, CHINA

The Certified Reference Material is prepared in accordance with the ISO guides 30-35. The intended use for it is for the quality control in sintered ore analysis, the evaluating methods of analysis and the calibration of analytical instruments.

Certified Values and Extended Uncertainty (k=3)

(%)

No.		TFe	FeO	SiO ₂	Al ₂ O ₃	CaO	MgO	MnO
NCS DC 14009a	Certified Value	55.58	20.06	9.95	2.38	3.62	5.99	0.097
	Extended uncertainty	0.10	0.09	0.07	0.05	0.04	0.05	0.002
No.		P	TiO ₂	S	K ₂ O	Na ₂ O	Cu	Zn
NCS DC 14009a	Certified Value	0.017	0.266	0.106	0.316	0.068	0.017	0.011
	Extended uncertainty	0.002	0.007	0.003	0.009	0.003	0.002	0.002

Note:

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

U_{CRM} combined uncertainty; U_{bb} between bottle uncertainty;
 U_{lts} 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;

1. 8 independent laboratories take part in the analysis work.
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 0.080 mm packed in glass bottle. The minimum package is 50 grams.
4. The minimum weight for analysis is 0.2g.
5. The valid time of the sample is 10 years, although we reserve the right to make change as issue revisions.

Analytical Methods

Composition	Methods
TFe	TiCl ₃ -potassium dichromate volumetric method; HgCl ₂ -potassium dichromate volumetric method
FeO	Potassium dichromate volumetric method
SiO ₂	Gravimetric method after dehydration with perchloric acid; Silicon-molybdenum blue photometric method
Al ₂ O ₃	ICP-AES method; The chrome azul S photometric method; EDTA titrimetric method
CaO	EGTA-CyDTA titrimetric method ; EDTA titrimetric method; ICP-AES method
MgO	EGTA-CyDTA titrimetric method ; EDTA titrimetric method; ICP-AES method
MnO	Titrimetric method; ICP-AES method; Atomic absorption spectrometry
P	ICP-AES method; Bismuth-phosphorus-molybdenum blue photometric method
TiO ₂	ICP-AES method; Diantiprylmethane photometric method
S	Infrared absorption method; Gravimetric method; The combustion-potassium iodate volumetric method
K ₂ O, Na ₂ O	ICP-AES method; Atomic absorption spectrometry
Cu, Zn	ICP-AES method; Atomic absorption spectrometry

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

Jia Yunhai
Laboratory Director

/Дупекмоп 600



С.К. Белоусов

Certificate of Certified Reference Material

NCS DC 14010b

Iron Ore

Reissued in 2016

Approved by China National Analysis Center for Iron and Steel

(Beijing China)

Certified Values and Standard Deviation

		(%)						
No.		TFe	SiO ₂	Al ₂ O ₃	CaO	MgO	S	P
NCS DC 14010b	Certified Value	58.84	7.73	2.30	1.82	1.18	0.088	0.022
	Standard Deviation	0.10	0.04	0.04	0.05	0.03	0.002	0.002
		TiO ₂	Cu	Zn	Mn	K ₂ O	Na ₂ O	FeO
NCS DC 14010b	Certified Value	0.460	0.048	0.149	0.60	0.214	0.057	18.69
	Standard Deviation	0.005	0.003	0.006	0.01	0.004	0.003	0.11

Note:

1. Each certified value is the mean of analytical results of 6 independent laboratories.
2. The sample is powder with size less 0.08mm packed in glass bottle.
The minimum package is 50 grams.
3. The sample should be stored in drier. The sample should be stored at $105 \pm 5^\circ\text{C}$ before use.
4. The valid time of the sample is 10 years, although we reserve the right to make change as issue revisions.

Analytical Methods

Composition	Methods
TFe	TiCl ₃ -potassium dichromate volumetric method; The mercury fluoride-stannous chloride potassium dichromate volumetric method
Al ₂ O ₃	Fluoride substitution-complexing volumetric method; EDTA volumetric method; ICP-AES method
SiO ₂	Gravimetric method after dehydration with perchloric acid
CaO	ICP-AES method; Atomic absorption spectrometry; EDTA volumetric method; Permanganate volumetric method
MgO	ICP-AES method; Atomic absorption spectrometry; EDTA volumetric method
Cu	Atomic absorption spectrometry; ICP-AES method
TiO ₂	Diantiprylmethane photometric method
Mn	Atomic absorption spectrometry; Potassium periodate photometric method.
P	ICP-AES method; Bismuth-phosphorus-molybdenum blue photometric method
S	Combustion-iodate volumetric method; Barium sulfate gravimetric method; Combustion- infrared absorption method
K ₂ O, Na ₂ O	Atomic absorption spectrometry; ICP-AES method
FeO	Potassium dichromate volumetric method
Zn	Atomic absorption spectrometry; ICP-AES method.

Директор БОО

Jia Yunhai

Jia Yunhai
Laboratory Director



С.Г. Сивоусов



Certificate of Certified Reference Material

NCS DC 18017— NCS DC 18020

Sintered Iron Ore

NCS TESTING TECHNOLOGY CO., LTD.
13, GAOLIANGQIAO XIEJIE WUJIAN DISTRICT,
BEIJING 100081, CHINA

Reissued in 2018

Approved by China National Analysis Center for Iron and Steel

(Beijing China)

Certified Values and Uncertainty


		(%)						
No.		SiO ₂	Al ₂ O ₃	CaO	MgO	TFe	MnO	FeO
NCS DC 18017	Certified Value	8.40	2.98	15.52	2.32	48.44	0.81	11.17
	Uncertainty	0.08	0.06	0.09	0.08	0.06	0.02	0.07
NCS DC 18018	Certified Value	5.81	2.34	10.36	2.41	54.90	0.29	7.87
	Uncertainty	0.04	0.03	0.10	0.07	0.05	0.01	0.06
NCS DC 18019	Certified Value	6.11	2.57	10.50	2.71	54.03	0.70	7.98
	Uncertainty	0.08	0.05	0.09	0.05	0.05	0.01	0.05
NCS DC 18020	Certified Value	10.21	3.23	18.30	4.85	41.81	1.80	21.87
	Uncertainty	0.07	0.03	0.09	0.12	0.10	0.02	0.13
		P	S	Pb	TiO ₂	Zn	As	
NCS DC 18017	Certified Value	0.065	0.155	0.061	0.23	0.13	0.030	
	Uncertainty	0.003	0.005	0.003	0.01	0.01	0.002	
NCS DC 18018	Certified Value	0.064	0.036		0.50			
	Uncertainty	0.002	0.002		0.02			
NCS DC 18019	Certified Value	0.073	0.027		0.24		0.021	
	Uncertainty	0.002	0.001		0.01		0.001	
NCS DC 18020	Certified Value	0.159	0.302	0.208	0.50	0.223	0.051	
	Uncertainty	0.004	0.006	0.002	0.02	0.008	0.002	

Note:

1. Each certified value is the mean of analytical results of 8 independent laboratories.
2. The sample is powder with size < 0.098mm, packed in glass bottle. The minimum package is 100 grams.
3. The sample should be stored at dry place.
4. The valid time of the sample is 10 years, although we reserve the right to make change as issue revisions.

Analytical Methods

Composition	Methods
TFe	Potassium dichromate volumetric method
FeO	Potassium dichromate volumetric method
SiO ₂	Gravimetric method after dehydration with perchloric acid; ICP-AES; Silicon-molybdenum blue photometric method
Al ₂ O ₃	ICP-AES
CaO	EDTA titrimetric method; ICP-AES
MgO	EDTA titrimetric method; ICP-AES
MnO	Potassium periodate photometric method; ICP-AES
P	Molybdenum blue photometric method; ICP-AES; Bismuth-phosphorus-molybdenum blue photometric method
S	Combustion-iodimetric method; Infrared absorption method
TiO ₂	Colorimetric method with diantipyrylmethane; ICP-AES
Pb	ICP-AES
Zn	ICP-AES
As	ICP-AES



Jia Yunhai
Laboratory Director

1/Дуплетар 600



С. К. Савицкий