

Certificate of Certified Reference Material

NCS HS 11011b

Pure Iron

Issued in 2018

Approved by China National Analysis Center for Iron and Steel

(Beijing China)

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

Certified Values and Uncertainty (%)

No.		C	Si	Mn	P	S	Cr	Mo
NCS HS 11011b	Certified Value	0.0023	0.0023	0.013	0.0014	0.0014	0.0066	0.00030
	Extended uncertainty	0.0003	0.0002	0.001	0.0002	0.0001	0.0002	0.00003
		Ni	Cu	Zn	Sb	Sn	As	B
	Certified Value	0.0027	0.0045	0.00015	0.00029	0.00015	0.0026	0.00023
	Extended uncertainty	0.0001	0.0002	0.00005	0.00004	0.00002	0.0002	0.00004
		Ca	Co	N	V	Al	Bi	Mg
	Certified Value	0.0003	0.0012	0.0045	(<0.0001)	(<0.0001)	(<0.00001)	(0.00006)
	Extended uncertainty	0.0001	0.0001	0.0003				
		Ti	Pb	Nb	W	Ta	Ce[#]	Hf[#]
	Certified Value	(<0.0001)	(0.00002)	(0.00004)	(0.00004)	(<0.00001)	<0.00001	<0.00002
	Extended uncertainty							
		La[#]	Se[#]	Cd[#]	Te[#]	Zr[#]		
	Certified Value	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
	Extended uncertainty							

Value in () is for reference only, value with # is information value, Fe ≥ 99.958%

Note:

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,
 U_{sts} short time stability uncertainty, neglectable;
 U_{char} standard uncertainty of analysis;
 s standard deviation;
 n number of data;
 k cover factor; $k=2$

1. Each certified value is the mean of analytical results of 8 independent laboratories.
2. The sample is cylinder with size D38x40mm packed in bottle.
3. The sample should be stored at dry place.

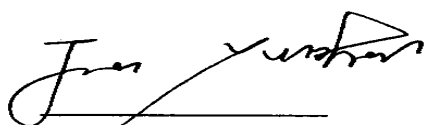
Analytical methods

Element	Analytical method
C,S	Combustion-infrared absorption method
Si	Molybdenum blue photometric method; ICP-AES, ICP-MS
Mn	Periodate oxidation photometric method; ICP-AES, ICP-MS
P	Butyl acetate extraction photometric method; ICP-AES, ICP-MS N-butyl alcohol-chloroform extraction molybdenum blue photometric method
Cr	Sodium carbonate separation-diphenylcarbazide photometric method; ICP-AES, ICP-MS
Mo, Al, Sn, Ca, Ta	ICP-AES, ICP-MS
V	ICP-AES after ethyl ether extraction, ICP-AES, ICP-MS N-benzoyl phenylhydroxylamine extraction photometric method
Ni	Dimethylglyoxime photometric method; ICP-AES, ICP-MS
Cu	Neocuproine extraction photometric method; ICP-AES, ICP-MS
Ti	Dianthipyryl methane extraction ICP-AES, ICP-AES, ICP-MS
Zn	AAS, ICP-AES, ICP-MS
Sb	Hydride generation- ICP-AES, Photometric method with malachite green with benzene extraction, ICP-MS
As	Molybdenum blue photometric method after distillation, AFS, Hydride generation- ICP-AES, ICP-AES, ICP-MS
B	Curcumin photometric method after methanol distillation, ICP-AES, ICP-MS
Bi	Hydride generation-ICP-AES, AFS, ICP-MS
Cd, Pb, Nb,Ce,Hf, La, Zr	ICP-MS
Co	5-Cl-PADAP photometric method; ICP-AES, ICP-MS
Mg	ICP-AES after ethyl ether extraction, ICP-AES, ICP-MS
N	Impulse heating-thermal conductivity method; ICP-AES, Coloric method after distillation
Se, Te	AFS
W	ICP-AES after ethyl ether extraction, ICP-AES, ICP-MS

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