

# IARM FSiP-20 – Ferrosilicon Powder

## SUMMARY

The application note summarizes the digestion of IARM FSiP-20 a ferrosilicon powder Certified Reference Material using ColdBlock™ Digestion Pro Series Technology.

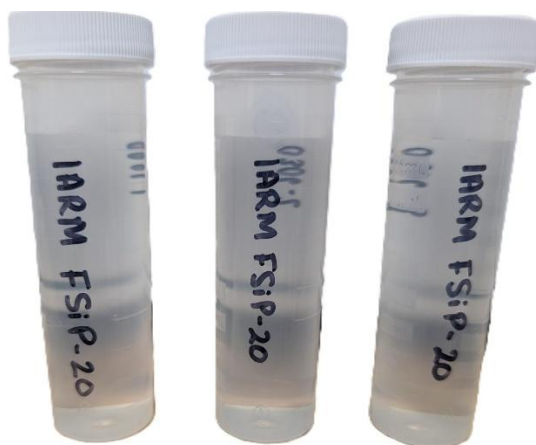
<b>Instrument:</b>	ColdBlock CBM sample digester, chiller, HF inserts, ICP-OES
<b>Published:</b>	March 2026
<b>Digestion Time:</b>	20 Minutes
<b>Acid Used:</b>	HNO <sub>3</sub> , HF
<b>Average ColdBlock Recovery vs. CRM:</b>	<ul style="list-style-type: none"> <li>• 101% Aluminum</li> <li>• 98% Calcium</li> <li>• 100% Silicon</li> </ul>

## METHODOLOGY

1. The chiller temperature was set to -5 °C.
2. Approximately 0.250 g of each sample was accurately weighed and transferred into a ColdBlock digestion vessel.
3. A reagent mixture of 20mL of 1:1 HNO<sub>3</sub> + 7mL HF was added to each vessel
4. Samples were digested at 100 % power for 5 minutes, followed by 50% power for 15 minutes.
5. Digestates were allowed to cool, then quantitatively diluted to a final volume of 50mL using a solution of 2 % HNO<sub>3</sub> v/v.

## DISCUSSION

- HF handling requires appropriate safety controls and compatible labware.
- An optional addition of boric acid (4% v/v H<sub>3</sub>BO<sub>3</sub>) can be used to complex residual fluoride ions, which stabilizes the solution and enables safe analysis on sample introduction systems that are not equipped with inert HF kits.



**RESULTS**

IARM FSiP-20 - Ferrosilicon Powder									
Method:	0.25g	20mL 1:1 HNO <sub>3</sub> + 7mL HF - 100% for 5 minutes, then decrease to 50% for 15 minutes							
Element	Certified Value (wt.%)	+/-	Sample A	Sample B	Sample C	Average (ppm)	Stdev	RSD	Recovery
Al	0.31	0.01	0.32	0.31	0.31	0.31	0.002	0.5%	101%
Ca	0.17	0.01	0.17	0.16	0.16	0.17	0.003	1.5%	98%
Co	0.0019	0.0008	0.0019	0.0020	0.0020	0.0020	0.00005	2.4%	104%
Cr	0.068	0.004	0.067	0.066	0.067	0.066	0.0005	0.8%	98%
Cu	0.052	0.002	0.050	0.051	0.050	0.050	0.0001	0.2%	97%
Fe	21.8	0.8	22.0	22.4	22.4	22.3	0.2	0.8%	102%
Mg	0.008	0.001	0.009	0.009	0.009	0.009	0.00005	0.5%	108%
Mn	0.186	0.005	0.183	0.187	0.184	0.185	0.002	1.0%	99%
Mo	0.0082	0.0004	0.0090	0.0087	0.0082	0.0086	0.0003	3.8%	105%
Nb	0.0018	0.0001	0.0018	0.0021	0.0020	0.0020	0.0001	6.3%	109%
Ni	0.02	0.001	0.021	0.021	0.021	0.021	0.0001	0.7%	105%
P	0.015	0.002	0.015	0.015	0.014	0.015	0.0007	4.7%	98%
Si	77.0	1.0	75.1	77.6	77.8	76.8	1.2	1.6%	100%
Ti	0.057	0.003	0.056	0.056	0.057	0.056	0.0007	1.3%	99%
W	0.0019	0.0007	0.0018	0.0019	0.0019	0.002	0.00005	2.5%	98%
Zn	0.0022	0.0009	0.0022	0.0023	0.0021	0.002	0.0001	3.7%	100%
Zr	0.0043	0.0004	0.0042	0.0039	0.0041	0.004	0.0001	3.1%	95%

IARM FSiP-20; Ferrosilicon Powder; Analytical Reference Materials International; Manchester, NH 03103 (Oct 2020)

LGC Standards (ARMI MBH). (2020). IARM FSiP-20 Ferrosilicon Powder Certified Reference Material, Certificate of Analysis. United States.