



Metal alloy proficiency testing program

quality control • laboratory compliance • accreditation • performance monitoring • method validation • quality control • laboratory compliance



The ARMI Metal Alloy Proficiency Testing Program (PTP) measures analytical performance against a CRM's actual certified value and against peer results. This two-pronged approach to proficiency testing is unique in the metals industry and has made the ARMI PTP the proficiency test of choice within the metals industry.

Typical proficiency testing protocol for the metals industry

Typically, PTPs use round-robin methodology which can take weeks or months after data submission to be compiled and compared. This process can create a long lag time between data submission and receipt of results. In the interim, any ongoing analytical errors continue without corrective action.

Benefits of participation in the ARMI PTP program:

- Receive fast, easy-to-interpret results
- Monitor & improve measurements processes
- Demonstrate analytical competency
- Method and instrument validation
- Satisfy third party accreditors needs



Benchmark Proficiency Testing

In more than 30 years of producing certified reference Materials (CRMs), we have amassed a data bank of chemical results for more than 380 ferrous and non-ferrous metal alloys. We use this data bank for comparison, which means we can offer alloys and compare elements not commonly available in other PT programs.

Our program compares participants' data to a benchmark-a CRM test sample traceable to NIST values which has been thoroughly examined for homogeneity and rigorously, statistically characterized during the certification process. Outliers have been identified and eliminated. For many of our CRM's we have combined data collected from our PTP testing program in prior rounds, resulting in an unparalleled comparison of our subscribers' analytical results. Our unique approach to proficiency testing has made the ARMI program the most accurate available to the metal alloy industry.

How the ARMI PT program works:

1. You select the date and frequency (monthly, quarterly, biannually or annually).
2. You choose the type of material and sample configuration (solids, chips or pins).
3. We provide you with a blind sample from our stock of CRMs based on your selection.
4. You analyze the blind sample, and email or fax your results to us.
5. You receive your report within 72 hours. All results are confidential.

Your report will include:

- A color-coded Certificate of Performance which compares your results with the results used to generate the value assignment of the CRM
- A color-coded control chart graphically depicting your data compared to the value assignment for each element examined
- A Certificate of Analysis of the reference material used.



Color-coding provides you with the instantaneous ability to determine the quality of your analytical performance.

Green — indicates data within the acceptable 2 Sigma range above or below the mean.

Yellow — indicates data that have fallen outside the 2 Sigma range but within the 3 Sigma range.

Red — indicates data that have fallen outside the 3 Sigma limit and are possibly out of control.

Note: Your color-coded hard copy will be sent to you by regular mail.

Commitment and Confidentiality

The sole goal of the ARMI Benchmark PTP is to provide impartial, accurate, and confidential assessment of your quality program. Your results will never be shared with anyone other than you. Whether you operate in a single instrument, multi-instrument and/or multi-technique environment, our proficiency testing program can be easily and economically integrated into your laboratory routine to greatly enhance your ongoing efforts to provide the highest quality products possible.



ANALYTICAL REFERENCE MATERIALS INTERNATIONAL

Proficiency Testing Program (PTP)

Certificate of Performance

Subscriber: **TQA Metals Laboratory**

Material Grade: **AISI 1018 / IARM 28B**

Code: **PT# 15155**

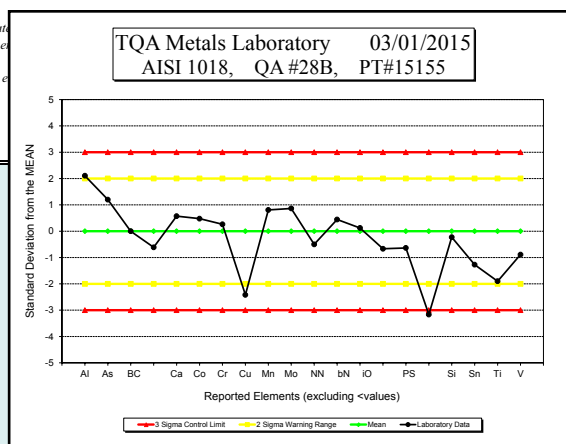
Sorted	Al	As	B	C	Ca	Co	Cr	Cu	Mn	Mo	N	Nb	Ni	O	P	S	Si	Sn	Ti	V
1	0.0004	0.0065	0.0001	0.1727	0.001	0.009	0.126	0.342	0.73	0.025	0.0078	0.0006	0.119	0.0066	0.008	0.0233	0.2	0.012	0.0001	0.001
2	0.0006	0.007	0.0001	0.175	0.0014	0.0094	0.126	0.349	0.73	0.026	0.00793	0.001	0.119	0.0068	0.0085	0.026	0.21	0.013	0.0003	0.001
3	0.001	0.007	0.0001	0.177	0.0015	0.0096	0.128	0.35	0.73	0.027	0.0087	0.001	0.1193	0.0068	0.0085	0.0261	0.216	0.013	0.0009	0.0012
4	0.0017	0.0077	0.0001	0.178	0.0018	0.0097	0.1289	0.351	0.7338	0.027	0.0089	0.0012	0.12	0.0068	0.0086	0.0272	0.217	0.0133	0.001	0.0015
5	0.002	0.0078	0.0001	0.1786	0.00185	0.0099	0.13	0.3549	0.7349	0.028	0.0089	0.002	0.1202	0.00703	0.0088	0.0277	0.2179	0.0136	0.001	0.0018
6	0.002	0.0078	0.00015	0.179	0.002	0.01	0.13	0.3557	0.74	0.028	0.009	0.002	0.121	0.0071	0.0089	0.028	0.221	0.0139	0.001	0.002
7	0.002	0.0078	0.00017	0.179	0.0024	0.01	0.13	0.357	0.744	0.0286	0.009	0.002	0.123	0.0074	0.009	0.028	0.222	0.014	0.0012	0.002
8	0.002	0.008	0.00019	0.18	0.0024	0.01	0.13	0.36	0.745	0.029	0.009	0.002	0.123	0.0075	0.009	0.028	0.2228	0.014	0.002	0.002
9	0.0028	0.0082	0.0002	0.18	0.0025	0.01	0.13	0.362	0.7453	0.029	0.0091	0.002	0.124	0.009	0.028	0.224	0.014	0.002	0.002	0.002
10	0.003	0.009	0.0002	0.18	0.0026	0.0108	0.1304	0.365	0.747	0.029	0.0091	0.0027	0.125	0.0091	0.0284	0.2244	0.014	0.002	0.002	0.002
11	0.0032	0.009	0.0002	0.183	0.0026	0.011	0.131	0.366	0.748	0.029	0.0092	0.003	0.126	0.0092	0.0286	0.2262	0.0141	0.0021	0.0022	0.002
12	0.0038	0.0092	0.00026	0.183	0.00274	0.012	0.1314	0.3687	0.748	0.0296	0.0093	0.003	0.1269	0.0095	0.029	0.229	0.0146	0.00219	0.0029	0.002
13	0.004	0.01	0.0003	0.1834	0.0035	0.012	0.133	0.369	0.75	0.03	0.0094	0.003	0.127	0.0096	0.029	0.23	0.0147	0.0022	0.003	0.003
14	0.004	0.01	0.00034	0.184	0.0035	0.013	0.133	0.369	0.751	0.03	0.0094	0.003	0.1286	0.01	0.0295	0.231	0.0148	0.0023	0.0034	0.0034
15	0.0043	0.01	0.00034	0.184	0.0035	0.015	0.134	0.3696	0.7526	0.0302	0.0095	0.003	0.13	0.01	0.03	0.235	0.015	0.00231	0.0035	0.0035
16	0.0043	0.01	0.00034	0.1846	0.0035	0.016	0.1343	0.37	0.7554	0.0303	0.0096	0.003	0.13	0.0105	0.0304	0.239	0.015	0.0024	0.0035	0.0035
17	0.005	0.01	0.00034	0.186	0.0035	0.016	0.1349	0.3708	0.756	0.031	0.0097	0.003	0.13	0.011	0.0307	0.24	0.0156	0.0025	0.004	0.004
18	0.0069	0.01	0.00034	0.1873	0.0035	0.016	0.139	0.372	0.757	0.0311	0.0099	0.003	0.1317	0.011	0.031	0.241	0.0158	0.00251	0.004	0.004
19	0.007	0.01	0.00034	0.188	0.0035	0.016	0.14	0.377	0.77	0.033	0.01	0.0102	0.132	0.0112	0.032	0.2411	0.016	0.004	0.004	0.004
20	0.0072	0.01	0.00034	0.189	0.0035	0.016	0.14	0.38	0.77	0.034	0.0102	0.0102	0.133	0.012	0.0328	0.244	0.016	0.004	0.004	0.004
Mean	0.0032	0.0080	0.0002	0.1817	0.0021	0.0110	0.1319	0.3640	0.7464	0.0291	0.0092	0.0016	0.1254	0.0070	0.0096	0.0290	0.2267	0.0144	0.0020	0.0023
Std Dev	0.0019	0.0010	0.0001	0.0044	0.0007	0.0021	0.0042	0.0091	0.0119	0.0022	0.0006	0.0009	0.0049	0.0003	0.0011	0.0018	0.0118	0.0011	0.0010	0.0009
Z-Score	2.11	1.20	0.00	-0.61	0.57	0.48	0.26	-2.42	0.81	0.86	-0.50	0.44	0.12	-0.67	-0.64	-3.17	-0.23	-1.27	-1.90	-0.89

Note 1: Subscriber data is inserted and sorted without recalculation of the mean and standard deviation.

Note 2: In order to provide PTP subscribers with a larger population of data for comparison, effective June 15, 1994, the "Certificate of Performance" data acquired during the ARMI certification process as well as data that has been submitted by PTP subscribers.

CAUTION! Since the test samples are actual Certified Reference Materials, they may also be used for calibrations, type standards, etc.

Prepared By: Sheryl Lucas



ISO 17043:2010, Annex A Compliant,
Model 2 Scheme



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Brazil

Tel: +55 12 3302 5880
Email: bz@lgcstandards.com

Bulgaria

Tel: +359 (0)2 971 4955
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Tel: 800 810 4630 (toll-free)
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France

Tel: +33 (0)3 88 04 82 82
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Germany

Tel: +49 (0)281 9887 0
Email: de@lgcstandards.com

Hungary

Tel: +49 (0)281 9887 0
Email: de@lgcstandards.com

India

Tel: +91 (0)80 6701 2000
Email: in@lgcpromochem.com

Ireland

Tel: +44 7879556983
Email: ire@lgcstandards.com

Italy

Tel: +39 02 2247 6412
Email: it@lgcstandards.com

Middle East

Tel: +49 (0)281 9887 0
Email: de@lgcstandards.com

Netherlands

Tel: +31 (0)643 775 422
Email: nl@lgcstandards.com

Nordic countries

Tel: +49 (0)281 9887 0
Email: de@lgcstandards.com

Poland

Tel: +48 22 751 31 40
Email: pl@lgcstandards.com

Romania

Tel: +40 364 116890
Email: ro@lgcstandards.com

Russia

Tel: +7 812 777 04 88
Email: ru@lgcgroup.com

South Africa

Tel: +27 (0)11 466 4321
Email: info@industrialanalytical.co.za

Spain + Portugal

Tel: +34 (0)93 308 4181
Email: es@lgcstandards.com

Turkey

Tel: +90 216 360 0870
Email: tur@lgcstandards.com

United Kingdom

Tel: +44 (0)20 8943 8480
Email: uksales@lgcstandards.com

USA + Canada

Tel: +1 603 935-4100
Email: sales@armi.com



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