# Analytical Reference Materials International

## Certificate of Analysis Certified Reference Material



### Grade: EnviroBrass 2-1 / UNS C89520

Part Number (Q.A. NO.): IARM 226A

Certificate Date: 08/12/2002

Certificate No.: 226A-08122002-IARM-F

Revision Date: 11/06/2007

#### **Interpretation of Data**

- 1. Certified values listed below reflect analysis results submitted by qualified analytical laboratories using a combination of methods and instrumentation that emulate actual methods and instrumental techniques currently utilized in the analytical community and are reported as % wt. unless otherwise noted.
- 2. Any data reported and enclosed by a **parentheses** () is a "best estimate" and is NOT CERTIFIED. This data could not be quantified sufficiently for certification. It was however, reported by enough laboratories to be considered as potentially present in the matrix of the material being examined.
- 3. The "Inter-laboratory Analysis Program" (ILAP) utilized in the establishment of the data are an ongoing program with permanent membership. Certain elements may be selected by a consensus of the members for more extensive testing. Therefore the data in **brackets** [ ] **indicates further testing is in process.**
- 4. The "**±Estimated Uncertainty**" is enclosed by a **parentheses** ( ) **below** the individual **element**'s **concentration** and is based on a Confidence Interval at 95%. Included in this estimated uncertainty, are the combined effects of method imprecision, material inhomogeneity, and any bias between methods.

Important: A "User Registration Card" accompanies all shipments. This card should be completed immediately upon receipt of materials with the appropriate user information. This is the only way in which ARMI can guarantee customer updates or possible data modifications!

| <u>Silver</u>              | <u>Aluminum</u>                | <u>Antimony</u>                 | <u>Arsenic</u>                       | <u>Bismuth</u>                  | <u>Carbon</u>              | <u>Cobalt</u>            |
|----------------------------|--------------------------------|---------------------------------|--------------------------------------|---------------------------------|----------------------------|--------------------------|
| 0.004                      | 0.002                          | 0.004                           | 0.003                                | 1.7                             | 0.003                      | 0.001                    |
| (0.001)                    | (0.0005)                       | (0.001)                         | (0.001)                              | (0.04)                          | (0.001)                    | (0.0003)                 |
| <u>Chromium</u><br>(0.001) | <u>Copper</u><br>86.7<br>(0.1) | <u>Iron</u><br>0.054<br>(0.002) | <u>Manganese</u><br>0.002<br>(0.001) | <u>Nickel</u><br>0.54<br>(0.01) | <u>Nitrogen</u><br><0.0005 | <u>Oxygen</u><br>(0.001) |
| Phosphorus 0.005 (0.002)   | <u>Lead</u>                    | <u>Sulfur</u>                   | <u>Selenium</u>                      | <u>Silicon</u>                  | <u>Tin</u>                 | <u>Zinc</u>              |
|                            | 0.040                          | 0.005                           | 0.93                                 | 0.002                           | 5.1                        | 4.8                      |
|                            | (0.002)                        | (0.001)                         | (0.02)                               | (0.001)                         | (0.05)                     | (0.03)                   |

The laboratories participating in the "Inter-Laboratory Analysis Program" (ILAP) and certification of this material are as follows:

Anderson Laboratories, Inc. - Greendale, WIAIAY Mc Donald Mfg. Co. - Dubuque, IABoColonial Metals Co. - Columbia, PACoGamma Foundries Co. - Richmond Hill, ONLNeptune Technology Group Inc. - Tallassee, ALNSSipi-Metals Corp - Chicago, ILSpThe Federal Metal Co. - Bedford, OH

Applied Research Laboratories - Dearborn, MI Bodycote Materials Testing - Portland, OR Concast Metal Products Co. - Mars, PA I. Schumann & Company - Bedford, OH NSL Analytical Services - Cleveland, OH Special Metals IncoTest - Hereford, UK

Laboratory Testing, Inc. - Hatfield, PA Riverside Brass & Aluminum Foundry Ltd. - New Hamburg, ON Stork Materials Testing and Inspection - Huntington Beach, CA

Atlas Pacific Corporation - Colton, CA

California Metal-X - Los Angeles, CA

Crucible Research - Pittsburgh, PA

Traceability: All members of the "Inter-Laboratory Analysis Program" (ILAP) listed above validate test methods and instrument performance utilizing SRMs produced by the National Institute of Standards and Technology, (NIST) as well as other CRMs and RMs produced by recognized Certifying Bodies from around the world. The specific SRMs, CRMs, and RMs applicable to the material covered by this certificate are: NIST 131G, LECO 501-550, 502-403, BAM 376, BAS 54.03-4, BNF C11.02-1, C11.03-0, BS 903, 903B, 314B, CC0905, CKD 320, 321, CTIF 4583, 4873, UE14, UE15.1, UE40, Federal STD-1, STD-2, STD-3, MBH 14953-C, 14954-B, 14956-B, 14958-B, 17866-K, 17868-S, 17869-R, 17870-K, 17870-S, 32X/BB5-H, 32X/SEB1-A, 32X/SEB3-A, 32X/SEB3-A, 32X/SEB3-A, 32X/SEB4-A, 32X/SEB5-B, 33X/GM7-D, NIST 124B, IARM 86B, 92B, MBH 32X/SEB3-A, 32X/SEB5-A, 32X/SEB5-A, 32X/SEB5-A, 32X/SEB6-A, NIST 124B, IARM 86B, 92B, MBH 32X/SEB1-A, 32X/SEB3-A, 32X/SEB5-A, 32X/SEB5-A, 32X/SEB6-A, NIST 124A, 13F, C1252, BAM 222, MBH 178700, BCS 207/2, IARM 92A, CTIF VE10-VE51, BNFC 71.31, 71.32, 71.33, 71.34, MBH 32X/SEB5-A, 32X/SEB6-A, NIST 124A, 13F, C1252, BAM 222, MBH 178700, BCS 207/2, IARM 92A, CTIF VE10-VE51, BNFC 71.31, 71.32, 71.33, 71.34, MBH 32X/SEB5-A, 32X/SEB6-A, NIST 124A, 13F, C1252, BAM 222, MBH 178700, BCS 207/2, IARM 92A, CTIF VE10-VE51, BNFC 71.31, 71.32, 71.33, 71.34, MBH 32X/SEB5-A, 32X/SEB6-A, NIST 124A, 13F, C1252, BAM 222, MBH 178700, BCS 107/2, IARM 92A, CTIF VE10-VE51, BNFC 71.31, 71.32, 71.33, 71.34, MBH 32X/SEB5-A, 32X/SEB6-A, S09012, NIST 3101A, 3102A, 3103A, 3105A, 3106, 3113, 3126A, 3122, 3136, 3139A, 3149, 3161A, 3168A, BCS 301/1, 304/1, 374, 385, 642, BAM 376, BS 932E, CTIF CA-27, SPEX 3112A, VHG 3101A, 3106, 3113, 3126A, 3132, 3136, 3139A, 3128, 3149, 3161A, 3168A, FISHER 3150, LECO 502-148, 501-553, BS 314B, 32X/SEB3-A, 32X/SEB6-A, 32X/SEB5-A, 32X/SEB5-A

A specific line of traceability is established to NIST and other Certifying Bodies for those elements that are noted as "Certified Values" on the Certificates of Analyses referenced above.

#### See Reverse Side for Statistical Data and Additional Information Regarding this Material.

### The following data and accompanying statements represent all pertinent information reported in the ILAP as it applies to the chemical characterization of this material as of 11/06/2007.

|  |  |  |  | -  |   |  |                   |   |  | -                 |                  |   | _                                     |  |                   |
|--|--|--|--|--|---|--|-------------------|---|--|-------------------|------------------|---|---------------------------------------|--|-------------------|
| 226A   | Ag<br>0.0052   | AI<br>0.0030   | As<br>0.0042   | Be<br><0.0010  | Bi<br>1.66  | 0.0012   | Co<br>0.0016      | Cr<br>0.0020  | Cu<br>86.73  | Fe<br>0.06        | Mn<br>0.0017     | Ni<br>0.54                                      | P<br>0.0085                           | Pb<br>0.038  | S<br>0.0055       |
| 2  | 0.0052   | 0.0030   | 0.00042  | <0.0010  | 1.82  | 0.0012   | 0.0016            | 0.0020  | 86.81  | 0.050             | 0.00003          | 0.54  | 0.0085                                | 0.038  | 0.0055            |
| 3  | 0.0032   | 0.00046  | 0.00094  | 0.001  | 1.79  | 0.0029   | 0.0018            | 0.001   | 86.818   | 0.0534            | 0.00003          | 0.5253  | 0.010                                 | 0.042  | 0.0055            |
| 4  | 0.003  | 0.001  | 0.004  | 0.0004   | 1.629   | 0.0024   | 0.0018            | 0.0004  | 86.9   | 0.0610            | 0.0010           | 0.5233  | 0.0024                                | 0.039  | 0.0045            |
| 5  | 0.0027   | 0.0025   | 0.0007   | < 0.001  | 1.709   | 0.0020   | 0.0011            | 0.0015  | 86.85  | 0.060             | 0.0001           | 0.5355  | 0.0053                                | 0.042  | 0.0058            |
| 6  | 0.004  | 0.0014   | 0.005  | < 0.0002   | 1.78  | 0.0038   | 0.0015            | 0.0006  | 86.53  | 0.050             | 0.0044           | 0.54  | 0.001                                 | 0.048  | 0.0047            |
| 7  | 0.006  | 0.001  | 0.0050   | < 0.0001   | 1.742   | 0.0031   | 0.001             | 0.002   | 86.90  | 0.0587            | 0.002            | 0.542   | 0.0018                                | 0.0443   | 0.0063            |
| 8  |  | 0.0020   | 0.0010   |  | 1.763   |  | 0.001             |   | 87.035   | 0.0471            | 0.0019           | 0.550   | 0.013                                 | 0.043  | 0.0042            |
| 9  |  | 0.001  | 0.0021   |  | 1.78  |  |                   |   | 86.42  | 0.055             | 0.0009           | 0.543   | 0.0032                                | 0.041  | 0.006             |
| 10   |  | 0.0015   | 0.0017   |  | 1.630   |  |                   |   | 86.528   | 0.052             | 0.0005           | 0.532   | 0.002                                 | 0.0374   | 0.0050            |
| 11   |  | 0.0018   | 0.0032   |  | 1.590   |  |                   |   | 86.64  | 0.045             | 0.0032           | 0.570   | 0.0060                                | 0.043  | 0.0039            |
| 12   |  | 0.003  | 0.0053   |  | 1.82  |  |                   |   |  | 0.055             | 0.001            | 0.520   | 0.0024                                | 0.0330   | 0.005             |
| 13   |  | 0.0020   | 0.0036   |  | 1.742   |  |                   |   |  | 0.0555            | 0.004            | 0.539   | 0.003                                 | 0.038  | 0.0052            |
| 14   |  | 0.0020   |  |  | 1.78  |  |                   |   |  | 0.055             | 0.0010           | 0.559   | 0.005                                 | 0.036  | 0.0053            |
| 15   |  | 0.0015   |  |  | 1.58  |  |                   |   |  | 0.056             |                  | 0.535   | 0.0063                                | 0.0405   | 0.003             |
| 16   |  | 0.0015   |  |  | 1.702   |  |                   |   |  | 0.055             |                  | 0.532   | 0.002                                 | 0.039  | 0.0030            |
| 17   |  | 0.004  |  |  | 1.73  |  |                   |   |  | 0.045             |                  | 0.527   | 0.0065                                | 0.038  | 0.008             |
| 18   |  | 0.0017   |  |  | 1.753   |  |                   |   |  | 0.0530            | <b> </b>         | 0.5412  | 0.0035                                | 0.0363   | 0.005             |
| 19<br>20   |  | 0.0039   | <u> </u>   | <u> </u>   | 1.70<br>1.515   |  |                   | <u> </u>  |  | 0.052 0.055       | <u> </u>         | 0.544   | 0.004 0.0114                          | <u> </u>   | 0.00708<br>0.0035 |
| 20   |  |  |  |  | 1.515   |  |                   |   |  | 0.055             |                  | 0.535   | 0.0114                                |  | 0.0035            |
| 21   | 1  | 1  | 1  | 1  | 1.52  | 1  | 1                 | 1   | 1  | 0.05904           |                  | 0.5288  |                                       | 1  |                   |
| 22   | 1  | 1  | 1  | 1  | 1.704   |  |                   | 1   |  | 0.0364            | 1                | 0.506   |                                       | 1  |                   |
| 20   |  |  |  |  |   |  |                   |   |  | 0.0400            |                  | 0.000   |                                       |  |                   |
| Mean   | 0.0041   | 0.0019   | 0.0030   | 0.0008   | 1.7054  | 0.0027   | 0.0014            | 0.0012  | 86.7419  | 0.0537            | 0.0016           | 0.5379  | 0.0050                                | 0.0397   | 0.0051            |
| STDV.  | 0.0041   | 0.0019   | 0.0030   | 0.0008   | 0.0922  | 0.0027   | 0.0014            | 0.0012  | 0.1905   | 0.0037            | 0.0016           | 0.5379  | 0.0050                                | 0.0397   | 0.0051            |
| Certified  | 0.0012   | 0.0010   | 0.0017   | 0.0004   | 1.7   | 0.0009   | 0.0004            | (0.001)   | 86.7   | 0.0048            | 0.0014           | 0.0140  | 0.0034                                | 0.0038   | 0.0012            |
| 95% C.I.   | 0.001  | 0.0005   | 0.000  |  | 0.04  | 0.000  | 0.0003            | (0.001)   | 0.1  | 0.004             | 0.002            | 0.04  | 0.003                                 | 0.002  | 0.003             |
| Methods  | X,I,O  | X,I,O  | 1.0  |  | X,W,A,I,O   | C.I  | X.I.O             | X,D,I,O   | X,W,I,O  | X,W,I,O           | X.I.O            | X,W,I,O   | X.I.O                                 | X,W,I,O  | X,C,I,O           |
|  |  | .,,,=  | 1-   | V = Classical  | C = Combustion  | - 1  | 11-               |   |  |                   | 11-              |   |                                       |  |                   |
| 226A   | Se   | Si   | Sn   | Zn   | Cd  | Mg   | Mo                | 0   | N  | В                 | Ti               | Те  | Zr                                    | Sb   |                   |
| 1  |  |  |  |  |   |  |                   |   |  |                   |                  |   |                                       |  |                   |
|  | 0.87   |  |  | 4 79   |   |  | <0.0010           | 0.0012  |  | <0.0001           | <0.005           | <0.0001   |                                       |  |                   |
|  | 0.87   | 0.0025   | 5.28   | 4.79<br>4.76   | 0.001   | <0.0010  | <0.0010           | 0.0012  | 0.0001   | <0.0001           | <0.005           | <0.0001   | <0.0010                               | 0.0025   |                   |
| 2  | 0.89   | 0.0025   | 5.28<br>5.17   | 4.76   | 0.001<br>0.0004   | <0.0010<br><0.001  | < 0.0001          | 0.0013  | 0.0001 0.0003  | < 0.001           | < 0.0001         | < 0.001   | <0.0010<br>0.0012                     | 0.0025   |                   |
|  |  | 0.0025   | 5.28   |  | 0.001   | <0.0010  |                   |   | 0.0001   |                   |                  |   | <0.0010                               | 0.0025   |                   |
| 2<br>3   | 0.89 1.008   | 0.0025<br>0.0010<br>0.003  | 5.28<br>5.17<br>5.040  | 4.76<br>4.6513   | 0.001<br>0.0004<br><0.001   | <0.0010<br><0.001<br><0.0001   | < 0.0001          | 0.0013<br>0.0010  | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003                                 | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055   |                   |
| 2<br>3<br>4  | 0.89<br>1.008<br>0.906   | 0.0025<br>0.0010<br>0.003<br>0.001   | 5.28<br>5.17<br>5.040<br>5.031   | 4.76<br>4.6513<br>4.853  | 0.001<br>0.0004<br><0.001<br>0.00032  | <0.0010<br><0.001<br><0.0001<br><0.001   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023   |                   |
| 2<br>3<br>4<br>5   | 0.89<br>1.008<br>0.906<br>0.955  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.001<br>0.001<br>0.0025   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07   | 4.76<br>4.6513<br>4.853<br>4.804   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8  | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.001<br>0.0025<br>0.0019  | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17  | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017  | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005   |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.001<br>0.001<br>0.0025<br>0.0019<br>0.0011   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11  | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.780  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.001<br>0.0025<br>0.0019<br>0.0011<br>0.0020  | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21  | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.780<br>4.765   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028  | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.21  | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.780<br>4.765<br>4.835  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.001<br>0.001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.063<br>5.15   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.780<br>4.765<br>4.835<br>4.678   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.946<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.063<br>5.15<br>5.04   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.804<br>4.761<br>4.891<br>4.765<br>4.835<br>4.678<br>4.91   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14  | 0.89<br>1.008<br>0.906<br>0.855<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.001<br>0.001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.063<br>5.15<br>5.04<br>5.143  | 4.76<br>4.6513<br>4.853<br>4.804<br>4.761<br>4.761<br>4.780<br>4.765<br>4.835<br>4.678<br>4.91<br>4.66   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>12<br>13<br>14<br>15   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.946<br>0.946<br>0.947<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.928  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.063<br>5.15<br>5.04<br>5.143<br>5.320   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.780<br>4.765<br>4.835<br>4.678<br>4.91<br>4.66<br>4.734  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.928<br>1.048   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.063<br>5.15<br>5.04<br>5.143<br>5.320<br>5.11   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.765<br>4.835<br>4.678<br>4.91<br>4.66<br>4.734<br>4.72   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>12<br>13<br>14<br>15   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.946<br>0.946<br>0.947<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.928  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.063<br>5.15<br>5.04<br>5.143<br>5.320   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.780<br>4.765<br>4.835<br>4.678<br>4.91<br>4.66<br>4.734  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.922<br>1.048<br>0.935<br>0.935   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.063<br>5.15<br>5.04<br>5.143<br>5.320<br>5.143<br>5.320<br>5.11<br>4.97<br>5.03   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.761<br>4.761<br>4.780<br>4.765<br>4.835<br>4.678<br>4.91<br>4.66<br>4.734<br>4.72<br>4.655<br>4.69   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.922<br>1.048<br>0.925<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.947<br>0.947<br>0.947<br>0.946<br>0.946<br>0.947<br>0.947<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.947<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.947<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.926<br>0.946<br>0.926<br>0.935<br>0.946<br>0.935<br>0.946<br>0.935<br>0.946<br>0.935<br>0.946<br>0.935<br>0.946<br>0.935<br>0.947<br>0.936<br>0.937<br>0.936<br>0.937<br>0.937<br>0.936<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937<br>0.937 | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.063<br>5.15<br>5.04<br>5.143<br>5.320<br>5.143<br>5.320<br>5.11<br>4.97<br>5.03<br>5.295  | 4.76<br>4.6513<br>4.853<br>4.804<br>4.761<br>4.891<br>4.780<br>4.765<br>4.835<br>4.678<br>4.91<br>4.66<br>4.734<br>4.72<br>4.655   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.922<br>1.048<br>0.935<br>0.935   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.063<br>5.15<br>5.04<br>5.143<br>5.320<br>5.143<br>5.320<br>5.11<br>4.97<br>5.03   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.891<br>4.780<br>4.765<br>4.835<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.655<br>4.691   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.928<br>1.048<br>0.935<br>0.97<br>0.8619<br>0.956   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.21<br>5.21<br>5.21<br>5.21<br>5.15<br>5.04<br>5.15<br>5.143<br>5.320<br>5.15<br>5.143<br>5.320<br>5.15<br>5.043<br>5.320<br>5.25                      | 4.76<br>4.8513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.780<br>4.765<br>4.835<br>4.678<br>4.785<br>4.678<br>4.734<br>4.72<br>4.665<br>4.655<br>4.69<br>4.79079<br>4.87  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002   | <0.0010<br><0.001<br><0.0001<br><0.001<br>0.0003<br>0.0056   | < 0.0001          | 0.0013<br>0.0010<br>0.00074   | 0.0001<br>0.0003<br>0.0001   | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>21                                     | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.946<br>0.947<br>1.00<br>0.895<br>0.94<br>0.947<br>0.895<br>0.94<br>0.94<br>0.920<br>0.922<br>0.928<br>1.048<br>0.935<br>0.97<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.927<br>0.926<br>0.927<br>0.926<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.928<br>0.927<br>0.928<br>0.927<br>0.927<br>0.928<br>0.927<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.92   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0011<br>0.0020<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.031<br>5.141<br>5.25<br>5.17<br>5.11<br>5.063<br>5.143<br>5.043<br>5.143<br>5.504<br>5.143<br>5.514<br>5.514<br>5.525<br>5.225<br>5.22   | 4.76<br>4.6513<br>4.853<br>4.804<br>4.804<br>4.804<br>4.761<br>4.809<br>4.765<br>4.835<br>4.678<br>4.911<br>4.835<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.69<br>4.784<br>4.784<br>4.784<br>4.784<br>4.7847<br>4.855<br>4.855<br>4.873<br>4.7847  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.0017<br><0.0002<br><0.0020   | <0.0010<br><0.001<br><0.001<br><0.001<br><0.001<br>0.0056<br><0.0001                                 | <0.0001<br>0.0001 | 0.0013<br>0.0010<br>0.00074   | 0.0001 0.0003 0.0001 0.0003  | < 0.001           | <0.0001<br>0.002 | <0.001<br>0.003<br><0.001<br><0.0030<br><0.0030 | <0.0010<br>0.0012<br><0.001<br><0.004 | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.006<br>0.0006<br>0.0006<br>0.0006   |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>Mean                                   | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.946<br>0.946<br>0.947<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.928<br>1.048<br>0.920<br>0.928<br>0.928<br>0.928<br>0.928<br>0.926<br>0.928<br>0.926<br>0.928<br>0.925<br>0.928<br>0.925<br>0.925<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8925<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8925<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.9315<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.9315<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921<br>0.8921  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0001<br>0.0025<br>0.0025<br>0.0025<br>0.0025<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0038<br>0.0001<br>0.0021<br>0.0028<br>0.0038<br>0.001<br>0.0028<br>0.0038<br>0.001<br>0.0028<br>0.001<br>0.0028<br>0.001<br>0.0028<br>0.001<br>0.0028<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.001<br>0.0025<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0021<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0028<br>0.0011<br>0.0028<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.0018<br>0.001 | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.17<br>5.17<br>5.17<br>5.11<br>5.063<br>5.16<br>5.04<br>5.04<br>5.143<br>5.10<br>5.143<br>5.25<br>5.20<br>5.25<br>5.22<br>5.22<br>5.1459                                       | 4.76<br>4.8513<br>4.853<br>4.804<br>4.80<br>4.761<br>4.801<br>4.780<br>4.776<br>4.780<br>4.776<br>4.776<br>4.776<br>4.776<br>4.774<br>4.774<br>4.774<br>4.772<br>4.675<br>4.69<br>4.794<br>4.794<br>4.797<br>4.877<br>4.747<br>4.747   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002<br><0.0020<br><0.0020<br>0.0020<br>0.0009 | <pre>&lt;0.0010 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.003 0.0056 &lt;0.0001 </pre> | < 0.0001          | 0.0013 0.0010 0.0007 0.0 | 0.0001 0.0003 0.0001 0.0003  | < 0.001           | < 0.0001         | <0.001<br>0.003<br><0.001                       | <0.0010<br>0.0012<br><0.001           | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.0044<br>0.0058<br>0.005<br>0.006<br>0.004<br>0.004  |           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| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>                                       | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.946<br>0.947<br>1.00<br>0.895<br>0.94<br>0.947<br>0.895<br>0.94<br>0.94<br>0.920<br>0.922<br>0.928<br>1.048<br>0.935<br>0.97<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.926<br>0.927<br>0.926<br>0.927<br>0.926<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.927<br>0.928<br>0.927<br>0.928<br>0.927<br>0.927<br>0.928<br>0.927<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.928<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.9288<br>0.92   | 0.0025<br>0.0010<br>0.003<br>0.0001<br>0.0001<br>0.0001<br>0.0011<br>0.0025<br>0.0011<br>0.0020<br>0.0021<br>0.0028<br>0.0020<br>0.0021  | 5.28<br>5.17<br>5.040<br>5.031<br>5.031<br>5.141<br>5.25<br>5.17<br>5.11<br>5.063<br>5.143<br>5.043<br>5.143<br>5.504<br>5.143<br>5.514<br>5.514<br>5.525<br>5.225<br>5.225  | 4.76<br>4.6513<br>4.853<br>4.804<br>4.804<br>4.804<br>4.761<br>4.809<br>4.765<br>4.835<br>4.678<br>4.911<br>4.835<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.69<br>4.784<br>4.784<br>4.784<br>4.784<br>4.7847<br>4.855<br>4.855<br>4.873<br>4.7847  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.0017<br><0.0002<br><0.0020   | <0.0010<br><0.001<br><0.001<br><0.001<br><0.001<br>0.0056<br><0.0001                                 | <0.0001<br>0.0001 | 0.0013 0.0010 0.0007 0.0007   | 0.0001 0.0003 0.0001 0.0003  | < 0.001           | <0.0001<br>0.002 | <0.001<br>0.003<br><0.001<br><0.0030<br><0.0030 | <0.0010<br>0.0012<br><0.001<br><0.004 | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.004<br>0.0058<br>0.006<br>0.006<br>0.006<br>0.0006<br>0.0004<br>0.0006<br>0.0004<br>0.0004<br>0.00058<br>0.0004<br>0.00058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0.0058<br>0 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0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.946<br>0.941<br>0.879<br>1.00<br>0.895<br>0.94<br>0.943<br>0.943<br>0.943<br>0.943<br>0.94<br>0.920<br>0.928<br>1.048<br>0.920<br>0.928<br>1.048<br>0.955<br>0.946<br>0.920<br>0.928<br>1.048<br>0.935<br>0.955<br>0.888<br>0.946<br>0.946<br>0.945<br>0.946<br>0.946<br>0.946<br>0.946<br>0.947<br>0.946<br>0.946<br>0.947<br>0.946<br>0.947<br>0.946<br>0.947<br>0.946<br>0.947<br>0.947<br>0.946<br>0.947<br>0.946<br>0.947<br>0.946<br>0.947<br>0.946<br>0.947<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.947<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.946<br>0.948<br>0.946<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.948<br>0.956<br>0.957<br>0.955<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.935<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955<br>0.955  | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.0001<br>0.0001<br>0.0011<br>0.0025<br>0.0011<br>0.0025<br>0.0025<br>0.0011<br>0.0028<br>0.0028<br>0.0028<br>0.0028   | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.25<br>5.04<br>5.15<br>5.04<br>5.143<br>5.20<br>5.143<br>5.20<br>5.143<br>5.21<br>5.21<br>5.22<br>5.22<br>5.22<br>5.22<br>5.22<br>5.22         | 4.76<br>4.6513<br>4.853<br>4.804<br>4.804<br>4.761<br>4.780<br>4.761<br>4.780<br>4.765<br>4.780<br>4.765<br>4.773<br>4.66<br>4.734<br>4.66<br>4.734<br>4.72<br>4.655<br>4.79079<br>4.87<br>4.747<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.765<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.775<br>4.7757<br>4.7757<br>4.7757<br>4.77577<br>4.775777<br>4.7757777777777  | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002<br><0.0020<br><0.0020<br>0.0020<br>0.0009 | <pre>&lt;0.0010 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.003 0.0056 &lt;0.0001 </pre> | <0.0001<br>0.0001 | 0.0013 0.0010 0.0007 0.0007   | 0.0001 0.0003 0.0001 0.0003 0.0001 0.0003 0.000 0.0002 0.0002  | < 0.001           | <0.0001<br>0.002 | <0.001<br>0.003<br><0.001<br><0.0030<br><0.0030 | <0.0010<br>0.0012<br><0.001<br><0.004 | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.004<br>0.004<br>0.0058<br>0.006<br>0.0006<br>0.0006<br>0.00060<br>0.00041   |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>Mean<br>STDV.<br>Certified             | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.913<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.928<br>1.048<br>0.935<br>0.97<br>0.8921<br>0.9315<br>0.9315<br>0.9484<br>0.933   | 0.0025<br>0.0010<br>0.003<br>0.001<br>0.001<br>0.001<br>0.0011<br>0.0025<br>0.0011<br>0.0022<br>0.0038<br>0.0022<br>0.0038<br>0.002<br>0.0021  | 5.28<br>5.17<br>5.040<br>5.031<br>5.031<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.04<br>5.043<br>5.043<br>5.04<br>5.043<br>5.15<br>5.04<br>5.205<br>5.25<br>5.25<br>5.25<br>5.25<br>5.25<br>5.22<br>5.1459<br>0.0996<br>5.1459 | 4.76<br>4.6513<br>4.853<br>4.804<br>4.804<br>4.761<br>4.804<br>4.780<br>4.780<br>4.780<br>4.780<br>4.780<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.69<br>4.7907<br>4.87<br>4.727<br>4.87<br>4.747<br>4.7688<br>0.0765<br>4.8   | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002<br><0.0020<br><0.0020<br>0.0020<br>0.0009 | <pre>&lt;0.0010 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.003 0.0056 &lt;0.0001 </pre> | <0.0001<br>0.0001 | 0.0013 0.0010 0.0007 0.0007   | 0.0001 0.0003 0.0001 0.0003 0.0001 0.0003 0.000 0.0002 0.0002  | < 0.001           | <0.0001<br>0.002 | <0.001<br>0.003<br><0.001<br><0.0030<br><0.0030 | <0.0010<br>0.0012<br><0.001<br><0.004 | 0.0025<br>0.0023<br>0.0055<br>0.0023<br>0.004<br>0.004<br>0.0058<br>0.006<br>0.006<br>0.0006<br>0.0006<br>0.0004<br>0.0006<br>0.0004<br>0.0006<br>0.0004<br>0.0004<br>0.0004<br>0.0004<br>0.00034<br>0.00038<br>0.0017<br>0.00038  |                   |
| 2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>Mean<br>STDV.<br>Certified<br>95% C.L. | 0.89<br>1.008<br>0.906<br>0.955<br>0.888<br>0.946<br>0.960<br>0.971<br>0.879<br>1.00<br>0.895<br>0.94<br>0.920<br>0.922<br>1.048<br>0.935<br>0.97<br>0.8619<br>0.9356<br>0.8921<br>0.9315<br>0.0484<br>0.9315<br>0.0484<br>0.9315<br>0.02  | 0.0025<br>0.0010<br>0.003<br>0.0001<br>0.0001<br>0.0001<br>0.0025<br>0.0019<br>0.0025<br>0.0012<br>0.0028<br>0.0028<br>0.0038<br>0.0028<br>0.0001<br>0.0001<br>0.0001<br>0.0001<br>0.00018<br>0.00018  | 5.28<br>5.17<br>5.040<br>5.031<br>5.07<br>5.141<br>5.25<br>5.17<br>5.11<br>5.21<br>5.04<br>5.15<br>5.04<br>5.143<br>5.20<br>5.143<br>5.20<br>5.143<br>5.21<br>5.143<br>5.225<br>5.22<br>5.22<br>5.22<br>5.22<br>5.22<br>5.22<br>5. | 4.76<br>4.6513<br>4.853<br>4.804<br>4.804<br>4.761<br>4.780<br>4.761<br>4.780<br>4.765<br>4.780<br>4.775<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.678<br>4.655<br>4.69<br>4.734<br>4.734<br>4.734<br>4.734<br>4.765<br>4.655<br>4.807<br>4.747<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.734<br>4.765<br>4.767<br>4.765<br>4.767<br>4.765<br>4.767<br>4.767<br>4.765<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.767<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.777<br>4.776<br>4.777<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.776<br>4.777<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.7777<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.776<br>4.7777<br>4.7777<br>4.77777<br>4.7777777777 | 0.001<br>0.0004<br><0.001<br>0.00032<br><0.001<br>0.0017<br><0.0002<br><0.0020<br><0.0020<br>0.0020<br>0.0009 | <pre>&lt;0.0010 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.001 &lt;0.003 0.0056 &lt;0.0001 </pre> | <0.0001<br>0.0001 | 0.0013<br>0.0010<br>0.00074<br>0.0007   | 0.0001<br>0.0003<br>0.0001<br>0.0003<br>0.0003<br>0.0003<br>0.0003<br>0.0002<br>0.0001<br><0.0005<br>F | <0.001<br><0.0003 | <0.0001<br>0.002 | <0.001<br>0.003<br><0.001<br><0.0030<br><0.0030 | <0.0010<br>0.0012<br><0.001<br><0.004 | 0.0025<br>0.0025<br>0.0055<br>0.0023<br>0.004<br>0.004<br>0.004<br>0.0058<br>0.006<br>0.0006<br>0.0006<br>0.0006<br>0.0006<br>0.0004<br>0.0004<br>0.00038<br>0.0017<br>0.0004<br>0.0017  |                   |

The International Standards Organization (ISO) definitions, expressed in ISO Guide 30-1981-(E) list the following:

<u>Certifying Body:</u> A technically competent body (organization or firm, public or private) that issues a Reference Material Certificate. The only generally accepted certifying body in the United States is the U. S. Department of Commerce, National Institute of Standards & Technology, (NIST), Gaithersburg, MD.

**<u>Reference Material (RM)</u>**: A material or substance with one or more properties, which are sufficiently well established to be used for calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials.

<u>Certified Reference Material (CRM)</u>: A reference material with one or more properties whose values are certified by a technically valid procedure accompanied by or traceable to a certificate or other documentation, which is issued by a Certifying Body.

Inter-Laboratory Analysis Program (ILAP): Although ASTM Standard E691-87 applies to inter-laboratory studies to "Determine the Precision of a Single Test Method", it is also a well thought out and logical plan for conducting an inter-laboratory program involving multiple techniques. Therefore, the planning, conducting, analyzing, protocol, and treatment of data resulting from this inter-laboratory program were performed utilizing the guidelines established in ASTM E691-87.

<u>Methods of Analysis:</u> In view of the fact, that the "Inter-Laboratory Analysis Program" entails a wide variety of materials, no single analytical method would provide optimum data results. Therefore, the methods utilized were a combination of ASTM Standard Methods for classical wet chemistry, ICP, AA, Optical Emission, and X-Ray spectrometric methods. The determinations for Carbon, Sulfur, Nitrogen, and Oxygen are the result of combustion instrument procedures.

Selection of Materials: A "batch" or "series" is defined as a single bar of one continuous length and heat. The majority of materials are in wrought condition; other methods of manufacture are utilized as a less desirable resort. ILAP samples are taken by removing a section, a minimum of, every one-twelfth of total length from the entire bar. A portion of the section is converted to chips and thin (pin) disk for analysis by classical wet chemistry, ICP, AA, and combustion procedures, and the balance remains as a thick disk for OES and X-Ray analysis. Each member of the ILAP is furnished a sample pack from a specific location on the batch bar. This systematic sampling procedure results in the homogeneity being reflected as a product of the overall statistics and certified data. This method of homogeneity testing is in accordance with ISO Guide 34, regarding the systematic selection and testing of a representative number of units for the assessment of homogeneity.

Certified by:

William D. Britt, President/General Manager Analytical Reference Materials International

Certificate No.: 226A-08122002-IARM-F Certificate Date: 08/12/2002 Revision Date/No.: 11/06/2007