

BRAMMER STANDARD COMPANY, INC.

Data Sheet for Setting-up Sample BS SU P-20B

Setting-up Sample for AISI Grade P-20 Tool Steel - UNS Number T51620

| | Estimated Analysis ¹ | | Estimated Analysis ¹ |
|--------------------------------------|---------------------------------|----|---------------------------------|
| Analysis listed as percent by weight | | | |
| Al | 0.013 | Ni | 0.13 |
| As | 0.007 | P | 0.010 |
| B | <0.001 | Pb | <0.005 |
| C | 0.38 | S | 0.002 |
| Ca | 0.0022 | Sb | <0.01 |
| Co | 0.009 | Si | 0.58 |
| Cr | 1.74 | Sn | 0.007 |
| Cu | 0.105 | Ti | 0.004 |
| Mg | <0.0005 | V | 0.005 |
| Mn | 0.84 | W | 0.026 |
| Mo | 0.41 | Zr | 0.0032 |
| Nb | 0.003 | | |

¹ The above chemistry is supplied as an approximate guide to the composition of this setup sample and must not be regarded as a certified analysis. The analysis is based on the results of the homogeneity testing performed on the sample lot. This sample was found to be suitable for use as a setting-up sample and may be used for instrument drift control. It must not be used for instrument calibration.

The requirements of ISO Guides 30, 31, and 35 were followed for the preparation of this setting-up sample and data sheet.

Homogeneity: This setting-up sample (SUS) was tested for homogeneity using ASTM Standard Method E 826 and found acceptable. It was also examined by spark atomic emission spectrometry and found to be compatible with the following Reference Materials — BAS 112, 404/1; BS CSN 2-1, CSN 4, 55D, 1962, 1982; ECRM 096-1, 184-1; SRM 346A, 1225.

Validity statement: ISO Guide 31 states that the data sheet should contain an expiration date for all samples where instability has been demonstrated or is considered possible, after which the stated values are no longer guaranteed by the producing body. The stated values for BS SU P-20B are valid indefinitely. However, they are nullified if this SUS is damaged, contaminated, or otherwise modified.

Storage: This CRM must be stored in a cool, dry, non-corrosive environment.

Source: The bar stock for this SUS was produced by Crucible Service Centers; Solvay, NY.

Form: This SUS is machined in the form of a disc, approximately 38 mm in diameter and 40 mm thick by Brammer Standard Company, Inc.

Use: This SUS is intended for use in spark atomic emission and x-ray spectrometric methods of analysis. Refer to ISO Guide 33 for information about the use of setting-up samples. It is intended as a setup standard to be used for controlling instrument drift.

Analytical Area: The entire depth of the SUS may be used.

Caution: As with any bar sample, avoid spark atomic emission spectrometric burns in the center of the SUS (5 mm radius), as some segregation may be present.

Sample Preparation: For best analytical results, use the same method for preparing the analytical surface on all setting-up samples as you use for production specimens. Avoid overheating the sample during surface preparation.

Caution: SUS contains significant insoluble soft metal inclusions. Surface smearing may occur. Spark atomic emission spectrometers may require extended preburns to compensate.

Data Sheet Number: The unique identification number for this data sheet is SU P-20B-030918. You may obtain information on revisions of data sheets from the internet at www.brammerstandard.com.

Safety Notice: A Material Safety Data Sheet (MSDS) is not required for this sample. This sample will not release or otherwise result in exposure to a hazardous chemical, under normal conditions of use. Inquiries concerning this setting-up sample should be directed to:

| | | |
|--------------------------------------|------------------------------|--|
| Brammer Standard Co., Inc. | Phone: (281) 440-9396 | Web: www.brammerstandard.com |
| 14603 Benfer Road | | |
| Houston, Texas 77069-2895 USA | Fax: (281) 440-4432 | Email: contact@brammerstandard.com |

Brammer Standard Company, Inc., is accredited by the American Association For Laboratory Accreditation (A2LA) to ISO Standard 17034 as a Reference Material Producer for the production of Certified Reference Materials and Reference Materials (Certificate Number 656.02)

Brammer Standard Company's Chemical Laboratory is accredited by A2LA to ISO Standard 17025. (Certificate Number 656.01)

References:

Versions used were those available at the time of testing and characterization

- E 826 Standard Practice for Testing Homogeneity of a Metal Lot or Batch in Solid Form by Spark Atomic Emission Spectrometry
- E 1019 Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Fusion Techniques
- E 1806 Standard Practice for Sampling Steel and Iron for Determination of Chemical Composition

ISO Standard 17025:2005 General requirements for the competence of testing and calibration laboratories

ISO Standard 9001:2015 Quality Management Systems - Requirements

ISO Guide 30:2015 Terms and definitions used in connection with reference materials + 2008 amendment

ISO Guide 31:2015 Reference materials - Contents of certificates and labels

ISO Guide 33:2015 Uses of certified reference materials

ISO Guide 35:2006 Reference Materials - General and statistical principles for certification

ASTM documents available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

ISO Guides and Standards available from Global Engineering - www.global.ihs.com

Other useful documents available from NIST, U.S. Department of Commerce, Gaithersburg, MD 20899.

NIST Special Publication 260-100, Handbook for SRM Users

NIST Special Publication 829, Use of NIST Standard Reference Materials for Decisions on Performance of Analytical Chemical Methods and Laboratories

Certified by: _____ on March 8, 2018.

Beau R. Brammer

President