

Advanced Research Systems  
905 Harrison St. Suite 109  
Allentown IPA 18103

System Type: DE202

Order #: 03-A162

Coldend Type: DE202

Serial #: 03-C255

Test Compressor Model#: ARS-4W Serial#: HC002

Gas Lines Used For Test: 15' Flex (1/2")

System Equalization Pressure: 200 psig

Thermometry System:

Temperature Controller, Make / Model / Serial# : Lakeshore / 331S / ARS Test Controller

Initial Temperature Readings - T1: 295.51K

Minimum Temperatures - T1: 8.74K

Cooldown Time: 45 Min. < 20K

Comments: T1 is the control sensor mounted to the cold tip.  
System tested with an ARS test shroud and shield.

Tested By: *James R. Rife* 10/21/03

10 Pin      Instrumentation Receptacle Pin-Out

Work Order #.            03-A162

Customer.                Argonne Natl Lab

System Type.            DE202

Controller Type/Sn.    Lakeshore / 331S / ARS Test Controller

Connector Pin

Function (Connection)

A	Control Sensor I+	DT-670A-SD
B	Control Sensor V+	
C	Control Sensor I-	
D	Control Sensor V-	
E	Heater	DT-670B-SD
F	Heater	
G	Free Length Sensor I+	
H	Free Length Sensor V+	
J	Free Length Sensor I-	
K	Free Length Sensor V-	

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Allentown IPA 18103

System Type: DE202K Order #: 03-A162

Coldend Type: DE202K Serial #: 03-C263

Test Compressor Model#: ARS-4W Serial#: HC002

Gas Lines Used For Test: 15' Flex (1/2")

System Equalization Pressure: 200 psig

Thermometry System:

Temperature Controller, Make / Model / Serial# : Lakeshore / 331S / ARS Test Controller

Initial Temperature Readings - T1: 295.44K

Minimum Temperatures - T1: 8.70K

Cooldown Time: 40 Min. < 20K

Comments: T1 is the control sensor mounted to the cold tip.

Tested By: *Joseph C. Ruffalo* 10/21/03

10 Pin      Instrumentation Receptacle Pin-Out

Work Order #.      03-A162

Customer.      Argonne Natl Lab

System Type.      DE202K

Controller Type/Sn.      Lakeshore / 331S / ARS Test Controller

Connector Pin

Function (Connection)

A	Control Sensor I+	DT-670A-SD
B	Control Sensor V+	
C	Control Sensor I-	
D	Control Sensor V-	
E	Heater	DT-670B-SD
F	Heater	
G	Free Length Sensor I+	
H	Free Length Sensor V+	
J	Free Length Sensor I-	
K	Free Length Sensor V-	

44036 S. Grimmer Boulevard, Fremont, CA 94538  
Phone: 510-623-1500 ; Fax: 510-623-7600

Advanced Research Systems  
Suite 109  
905 Harrison Street  
Allentown PA 18103

**Material Certificate**

## Date

09/11/2003

## Purchase order item/date

P03844 / 07/21/2003

## Delivery item/date

80207763 000010 / 09/11/2003

## Order item/date

123008 000010 / 07/21/2003

## Customer nbr Customer part nbr

16165

## Customer spec

Rev

Type

Comp

Class

Grade

Our Material: UHV0010 PS-200 Beryllium Metal UHV Assembly

Brush Wellman testing for chemical composition (by Optical Emission Spectrometry), is conducted at our Elmore, OH Laboratories. Testing of mechanical, or physical properties is conducted at Laboratories which are accredited by American Association for Laboratory Accreditation.

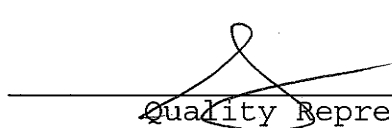
This material was inspected and tested for conformity as required in accordance with the noted part, specification, and revision number. The quantitative test data obtained from these tests are available for review by the buyer.

Batch 0000328290 / Quantity 1 PC

Batch Text

Zyglo and X-ray waived per sales.

Characteristic	Unit	Value	Specification Lower	Limits Upper
<u>Lot Identification</u>				
Lot Number	-	5138		
<u>Chemistry Composition</u>				
Beryllium Assay	%	98.90	98.50	-
Beryllium Oxide	%	1.10	-	1.50
Iron Content	%	0.1100	-	0.1300
Aluminum	%	0.05	-	0.10
Magnesium Content	%	< 0.0100	-	0.0800
Silicon Content	%	0.0400	-	0.0600
Carbon Content	%	0.06	-	0.15
Other Metallic-Ea.	%	< 0.0400	-	0.0400

  
Quality Representative

44036 S. Grimmer Boulevard, Fremont, CA 94538  
Phone: 510-623-1500 ; Fax: 510-623-7600

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Allentown PA 18103

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Customer nbr Customer part nbr

16165

Customer spec

Rev	Type	Comp	Class	Grade
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Our Material: UHV0010 PS-200 Beryllium Metal UHV Assembly

Brush Wellman testing for chemical composition (by Optical Emission Spectrometry), is conducted at our Elmore, OH Laboratories. Testing of mechanical, or physical properties is conducted at Laboratories which are accredited by American Association for Laboratory Accreditation.


This material was inspected and tested for conformity as required in accordance with the noted part, specification, and revision number. The quantitative test data obtained from these tests are available for review by the buyer.

Batch 0000328290 / Quantity 1 PC

Batch Text

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Characteristic	Unit	Value	Specification Lower	Limits Upper
<u>Lot Identification</u>				
Lot Number	-	5138		
<u>Chemistry Composition</u>				
Beryllium Assay	%	98.90	98.50	-
Beryllium Oxide	%	1.10	-	1.50
Iron Content	%	0.1100	-	0.1300
Aluminum	%	0.05	-	0.10
Magnesium Content	%	< 0.0100	-	0.0800
Silicon Content	%	0.0400	-	0.0600
Carbon Content	%	0.06	-	0.15
Other Metallic-Ea.	%	< 0.0400	-	0.0400

  
Quality Representative

## TERMS AND CONDITIONS OF SALE

1. Agreement: The provisions on the packing list, all drawings and specifications expressly agreed to in writing by Brush Wellman Inc. and Brush Wellman Inc.'s Terms and Conditions of Sale set forth herein constitute the entire contract between Brush Wellman Inc. and Buyer (collectively, the "Agreement") and supersede all prior communications, whether written or oral, between Brush Wellman Inc. and Buyer. No statement, representation, covenant or warranty not contained in this Agreement shall be binding on Brush Wellman Inc. No provisions of this Agreement may be changed or waived in any respect except in writing signed by an authorized representative of Brush Wellman Inc. Brush Wellman Inc.'s failure to object to any provision in conflict with this Agreement, whether contained in Buyer's purchase order or otherwise, shall not be construed as an acceptance thereof or as a waiver of any provision of this Agreement. Buyer's acceptance of Goods listed on the bill of lading, and any packing or other list of materials attached thereto (collectively, the "Goods") shall occur upon receipt of the Goods and this Agreement.

2. Delivery; Payment; Risk of Loss: Delivery of the Goods shall be F.O.B. Brush Wellman Inc. or supplier's plants, and risk of loss shall pass to Buyer upon Brush Wellman Inc.'s delivery to the first carrier or shipper. Brush Wellman Inc. shall use its best efforts to meet specified shipment or delivery dates, but such dates are estimates only. All transportation and insurance charges relating to shipment shall be paid by Buyer, unless otherwise previously agreed to between Brush Wellman Inc. and Buyer. Subject to Section 5 herein, if Buyer refuses to accept delivery of the Goods, then Buyer shall be responsible for all transportation, insurance and storage charges relating to the shipment. Unless different dates are expressly stated on the packing list, Goods subject to release at Buyer's request will be ordered shipped by Buyer not later than six months from the date hereof. If Buyer fails to order such release, Buyer shall in any event pay Brush Wellman Inc. for such Goods on or before the end of such six month period and Brush Wellman Inc. may, at its option, either ship the Goods to Buyer or hold them for Buyer at Buyer's risk and expense. Brush Wellman Inc. shall in no event be liable for failure or delays due to fire or other casualty or accident, strikes, lock out or labor disputes, riot or other disorder, act of God, car shortages or other transportation difficulties, governmental restrictions or priorities, shortages of labor, materials or parts, or any other cause, whether or not similar to the foregoing, beyond its reasonable control. Whether or not a delay or failure on Brush Wellman Inc.'s part is excused, Brush Wellman Inc. shall in no event be liable for any incidental or consequential damage or loss incurred by Buyer, including, without limitation, losses or damages of the type referred to in the second paragraph of Section 3.

3. Warranty; Disclaimers; Remedy: Brush Wellman Inc. warrants that the Goods will upon shipment be in substantial conformity with the description on the packing list and applicable written specifications, if any, furnished or accepted by Brush Wellman Inc., and free from defects in materials and workmanship. **THIS SECTION 3 SETS FORTH THE ONLY WARRANTY APPLICABLE TO THE GOODS PURCHASED HEREUNDER AND NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR BUYER'S APPLICATION, SHALL APPLY TO THE GOODS, ALL SUCH WARRANTIES BEING HEREBY DISCLAIMED.** Brush Wellman Inc.'s warranty shall be effective for a period of 60 days after the Goods are shipped and all claims must be made in writing to Brush Wellman Inc. within such 60 day period or be barred. The warranties described in this Section 3 extend only to the Buyer and are contingent upon proper use of the Goods. Buyer shall permit Brush Wellman Inc. to inspect any Goods claimed defective wherever they are located, and no returns will be made to Brush Wellman Inc. without its prior consent. Any returns to Brush Wellman Inc. shall be shipped postage or freight prepaid. Should Brush Wellman Inc. detect any defect in the Goods, Brush Wellman Inc. shall notify Buyer and request Buyer to return the Goods; and Brush Wellman Inc. shall pay postage or freight charges. Where timely claim is made, Brush Wellman Inc. shall at its option and expense either replace or repair any goods which are defective or nonconforming under its warranty or refund to Buyer the purchase price. Brush Wellman Inc. shall ship repaired Goods or replacements to Buyer without charge. No other transportation charges, or any reworking or repair charges, removal or installation charges, inspection charges, packing charges or other charges shall be assumed by Brush Wellman Inc.

The foregoing sets forth Buyer's sole remedy for any breach of Brush Wellman Inc.'s warranty and for any other defect, deficiency or nonconformity in the Goods sold by Brush Wellman Inc., whether or not attributable to Brush Wellman Inc.'s negligence. Without limiting the generality of the foregoing, Brush Wellman Inc. shall in no event have any liability in respect of downtime of any machinery or equipment, production delays or stoppages, shipping delays or cancellations, loss of business or profits, or any incidental or consequential damage or loss, whether or not similar to the foregoing. Technical or otherwise advice is furnished by Brush Wellman Inc. solely as an accommodation and shall not increase the scope of Brush Wellman Inc.'s responsibility or liability as provided in this Section 3. **Brush Wellman Inc. shall have no liability in respect of any loss or damage caused by reliance on such advice, whether or not negligent, unless furnished by Brush Wellman Inc. in bad faith.** 4. Patents: Brush Wellman Inc. shall defend any suit or proceeding brought against Buyer and will pay all damages and costs awarded against Buyer in such suit or proceeding insofar as the same is based on a claim that the sale of any Goods of Brush Wellman Inc.'s standard product line constitutes an infringement of any United States Patent; provided that Brush Wellman Inc. is notified promptly in writing thereof; that such alleged infringement is not the result of the application or use to which the Goods are put by Buyer or others; and that Brush Wellman Inc. is given exclusive control of such suit or proceeding and all negotiations for its settlement or compromise. Buyer agrees to protect Brush Wellman Inc. and save it harmless from all loss, cost, expense and damage which result from any claim based upon Buyer's use or application of the Goods or upon the manufacture, sale, use or application of Goods produced by Brush Wellman Inc. according to Buyer's design or specifications; and Buyer shall defend any suit or proceeding brought against Brush Wellman Inc. insofar as the same is based on such claim. **The foregoing states the entire liability of either party to the other in respect of infringements of patents, copyrights and other intellectual property rights by the Goods or any part of them or by their operation.** In no event shall Brush Wellman Inc. be liable for any incidental or consequential damage or loss incurred by Buyer, including, without limitation, losses or damages of the type referred to in the second paragraph of Section 3.

5. Quantity; Acceptance: All claims for shortages or differences in the Goods shipped must be made by Buyer to Brush Wellman Inc. in writing to the address set forth on the respective bill of lading within 10 days of receipt of shipment. Buyer shall not return any Goods without Brush Wellman Inc.'s consent or reject or revoke acceptance of any nonconforming shipment until Brush Wellman Inc. has had a reasonable time in which to cure such nonconformity or effect a mutually satisfactory adjustment. Brush Wellman Inc. reserves the right to ship, and Buyer shall accept and pay for, up to 10% over or under the quantity of parts ordered or the weight of products ordered.

6. Special Tooling: Any tooling charge listed separately represents the total cost of special tooling required to produce the Goods ordered. Special tooling shall be and remain the property of Brush Wellman Inc., but for a reasonable period shall be maintained in good condition for use without additional charge in connection with subsequent orders by Buyer to Brush Wellman Inc. for similar Goods.

7. Cancellation: This Agreement may not be cancelled in whole or in part without Brush Wellman Inc.'s written consent. Such consent shall in no event be given unless Buyer pays to Brush Wellman Inc. its costs and expenses (including, without limitation, engineering expense, overhead, and all commitments to its suppliers and subcontractors) plus profit, all as determined by Brush Wellman Inc.

8. Miscellaneous: Captions have been inserted solely for convenient reference and shall not limit or affect the scope of meaning of any provision contained herein. Any notices required to be sent under this Agreement shall be mailed via certified mail to Brush Wellman Inc. and the Buyer at the addresses set forth on the respective bill of lading. This Agreement shall be governed in all respects by the laws of the State of Ohio.