SERIAL NUMBER: U-384 COOK DATE: _____

MOLD SIZE _____ BY _____ PO _____

ORDER DATE 10-15-24 SHIP DATE: 10-16-24

FOR: Yellow jacket

SIZE 4.625 x 4.0 TYPE SXDS

THREAD _____ OTHER Thor Pipe

MATRIX (H) _____ WEIGHT _____

MATRIX (S) 36701 WEIGHT _____

BINDER 335231 WEIGHT _____

BLANK MM 1810 1983 TJ _____

BILLET _____ TUBE _____

WELD JM MPI LB MPI PIC LB BRAZE _____

THREAD GAGE _____ STAND OFF _____

FINAL DIAMOND GRIND SIZE 4.625 x 4

LENGTH TO WELD _____ / _____

FINISHED PIC TAKEN BY LB CRATED BY LB DATE: _____

International _____ domestic _____

SHORT BIT & TOOL CO
225 GOLD STREET
GARLAND TX 75042
972-205-1011
shortbits@gmail.com

Certificate of Conformance

Serial Number	Size	Type	Steel or Matrix	Shank Diameter	Bore
U-384	4.625 X 4.0	SXDS	Matrix		

Component	Material	Vender	Lot or Heat Number
Blank	8620	RHW	MM18101983
Hard Powder			
Soft Capping Powder	W2	SURFACE	36701
Tool Joint			
MIG Weld			
Tubing			

Inspection			
Diamond Grinding To Size			
Weld MPI			
Thread Gaging			

Signed By: P Beggs date: 10/21/2024

SURFACE ENGINEERING
Wear Resistance Specialists

Surface Engineering Powders
Certified Material Test Report

Company _____ P.O.#: _____

Alloy Type: CTPM001 Size: 80/325 Mesh: 80/325 Micron: -180/+45um

Description Crystalline Tungsten Powder Quantity: _____

Specification N/A Type/Class: N/A

Heat Number SE-36701

Chemical Analysis Actual: X Nominal: _____

The data contained herein were obtained from samples considered to be representative of the products in the subject shipment and are believed to be reliable. All operations performed comply with the material specification and the purchase order.

Element Concentrations (Weight Percent)

Al:	**B:**	**Be:**	**C:** 0.006	**Co:**	**Cr:**	**Cu:**	**Fe:** 0.0011	
Mn:	**Mo:** 0.007	**N2:**	**Nb:**	**Ni:**	**O2:** 0.015	**P:**	**S:**	
Si:	**Ta:**	**Ti:**	**V:**	**W:** 99.9	**Wc:**	**TAO:** 0.03		

Oth: _____ Analytical Process(es): _____

Sampling Procedure / Spec: ASTM B215-10
Hall Flow / Spec: ASTM B213-13

Powder Mesh / Spec: ASTM B214-07-2011
Apparent Density / Spec: ASTM B212-13

Physical Properties

Material Hardness Scale: ☑ Rc: NA ☐ HB: ☐ Hv: ☐ Hk:

Hall Flow 10 **Sec./50g Apparent Density:** 8.16 **g/cm3**

Particle Size Distribution: **Size Microns(um)/U.S. Sieve (mesh)**

180/80: 0.1	**150/100:**	**125/120:**	**106/140:**
90/170:	**75/200:** 49.9	**63/230:** 0.00	**53/270:**
45/325: 41.2	**38/400:** 8.7	**32/450:**	**25/500:**
20/635:	**15/800:**	**+10:**	**+5:**

Other: _____

Surface Engineering Alloy Company hereby certifies the above listed material meets all requirements of the above listed specifications in addition to the confirmation that during the manufacturing process, testing, and inspection, the product was completely void of contact with the element Mercury or any of its compounds. In addition, this certification validates that all test results and operations performed by Surface Engineering Alloy Company, or its subcontractors are in compliance with the material specification and the specific applicable material requirements of ASME SFA 5.21, of ASME Section II. The requirements of Federal Law, Title 18, Chapter 47apply to this order and to subtier suppliers.

SM-1000-CERT-P Rev A 4/18/2023

Reporting Officer
Dylan Marhafer

9/16/2024
Date

2895 46th Ave North
St. Petersburg, FL
Main Office: 727.528.7998
www.surfaceengineering.com

NUCOR
NUCOR STEEL MEMPHIS, INC.

Mill Certification
4/5/2018

MTR # G1-181659

Sold To

Ship To

Customer P.O.	72109	Sales Order	162657.5
Product Group	Special Bar Quality	Part Number	30005500R20NTE0
Grade	AISI 8620H/8622H (S .015-.025% DI 1.9-2.3) MAC, MECH, MIC,GS	Lot #	MM1810198301
Size	5-1/2" (5.5000) Round	Heat #	MM18101983
Product	5-1/2" (5.5000) Round 20' R/L 8620-C2Q3	B/L Number	G1-331970
Description	8620-C2Q3	Load Number	G1-181659
Customer Spec		Customer Part #	

I hereby certify that the material described herein has been manufactured in accordance with the specifications and standards listed above and that it satisfies those requirements.

Roll Date: 3/23/2018 Melt Date: 3/11/2018 Qty Shipped LBS: 36,405 Qty Shipped Bundles: 20

SP	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Al
0.03%	0.22%	0.82%	0.011%	0.020%	0.25%	0.27%	0.41%	0.51%	0.19%	0.002%	0.027%
B	Sn	Ti	Cb	Co	Ca	Pb	As	N	H		
0.0000%	0.009%	0.0018%	0.004%	0.0099%	0.0009%	0.0000%	0.005%	0.0070%	2.0 ppm		

SP: sp formula

DI value: 2.22

Simulated Hardenability Band

J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32
46	46	43	37	32	27	26	25	24	23	22	21	20	20	19	19	18	18	17	17	16	16	15	15

E381 Surface (Back): 1

Oxide Cleanliness, SAE J422: 0.0

Brinell: 179.000bhn

Grain Size per ASTM E112 = 7

E381 Mid Radius (Back): 1

Silicate Cleanliness, SAE J422: 0.0

Brinell Converted Mid-Radius: 187.0bhn

Reduction Ratio: 6.0 :1

E381 Center (Back): 1

Total Oxygen per ASTM E1019 = 11.2000ppm

Brinell Converted Surface: 179.0bhn

ASTM E381
Surface: 1 Mid Radius: 1 Center: 1

ASTM E45 Method A (Worst)
Sulfides: T: 1.5 H: 1.5 Alumina: T: 0.0 H: 0.0 Silicates: T: 0.0 H: 0.0 Globular: T: 0.5 H: 0.5

Specification Comments: EAF, LMF, VACUUM DEGASSED, CONTINUOUSLY CAST HOT ROLLED AS ROLLED TO PUR-407 11/25/08, JDM A0 QL2 ASTM A322, ASTM A304, ASTM A29

Steven Gage
Division Metallurgist

NORTH AMERICAN METALS, INC.

NRMG-10 October 1, 2017

NUCOR

NUCOR STEEL MEMPHIS, INC.

Mill Certification

4/5/2018

MTR # G1-181659

Sold To

Ship To

Customer P O	72109	Sales Order	162657 5
Product Group	Special Bar Quality	Part Number	30005500R20NTE0
Grade	AISI 8620H/8622H (S .015-.025% DI 1 9-2 3) MAC MECH, MIC,GS	Lot #	MM1810198301
Size	5-1/2" (5 5000) Round	Heat #	MM18101983
Product	5-1/2" (5 5000) Round 20' R/L 8620-C2Q3	B L Number	G1-331970
Description	8620-C2Q3	Load Number	G1-181659
Customer Spec		Customer Part #	

I hereby certify that the material described herein has been manufactured in accordance with the specifications and standards listed above and that it satisfies those requirements

1 All manufacturing processes, including melting have been performed in the U S A
2 No mercury, mercury compounds or mercury containing devices came into contact with this product
3 Welding or weld repair was not performed on this material
4 This material conforms to the specifications described on this document and may not be reproduced except in full without written approval of Nucor Corporation
5 This product is NAFTA certified under Paragraph "B" of the NAFTA rule of origin
6 Material is Free of Radioactive Contamination
7 This document is in compliance with EN 10204 "type 3 1"
8 Test procedures followed with asterisk(*) are outside of NSMEM - ISO17025 Accreditation scope
9 Results reported for ASTM E45 (Inclusion content) and ASTM E112 (Grain size) are provided as interpretation of ASTM procedures

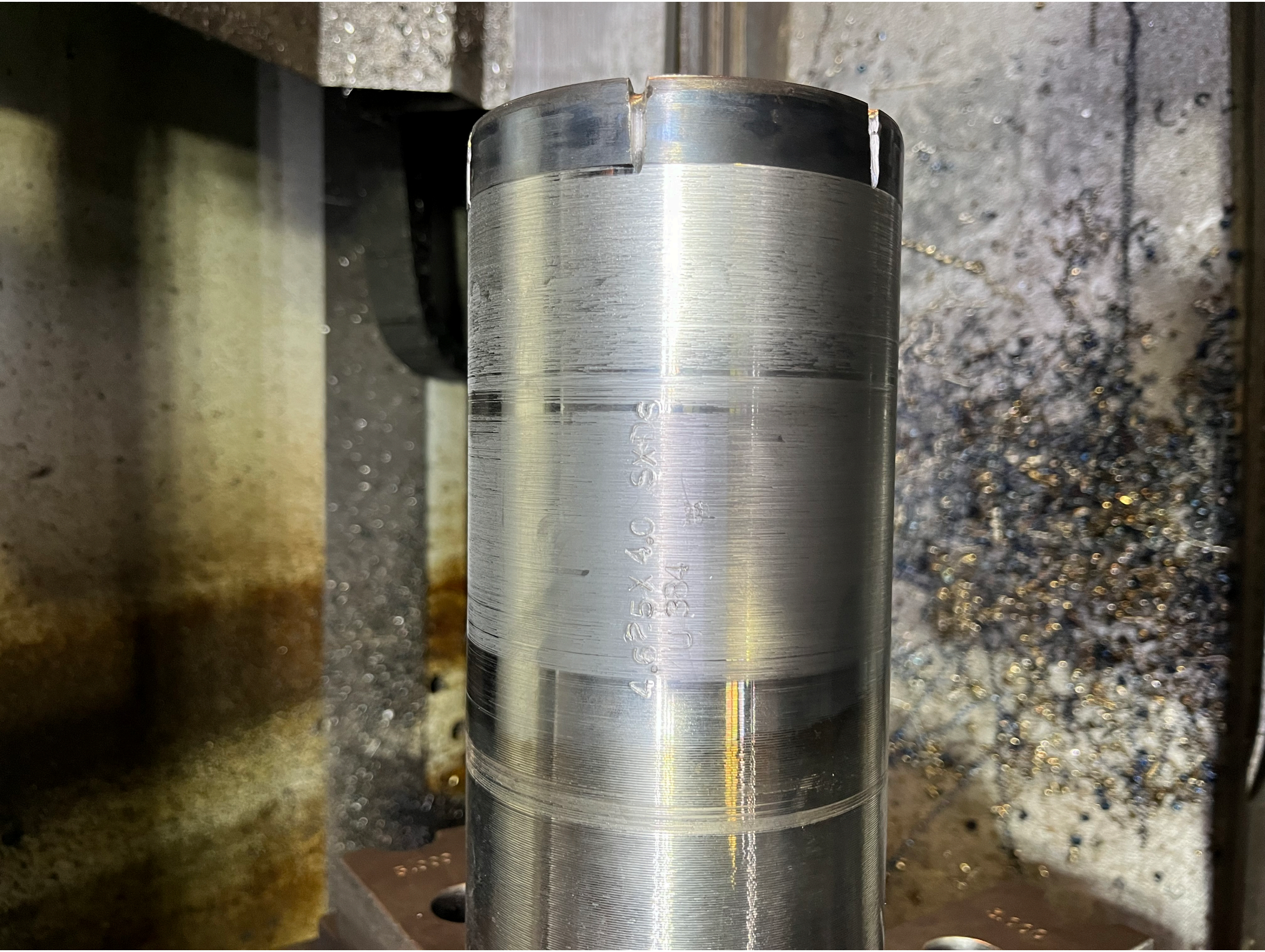
10 Test procedures performed in compliance with the following ASTM standards Chemical Analysis E415, Total Oxygen E1019, Grain Size E112, Macroetch E381, Tensile and Hardness Testing A370, Charpy Impact E23, Decarburization Depth E1077 Microcleanliness E45
11 ASTM E23 tests conducted with 8mm striker radius upon 10mm x 10mm V notch specimen
12 Export Country USA email Memphis Sales@nsmem nucor com

Steven Gage

Division Metallurgist

NORTH AMERICAN METALS, INC.

NRMS-10 October 1, 2017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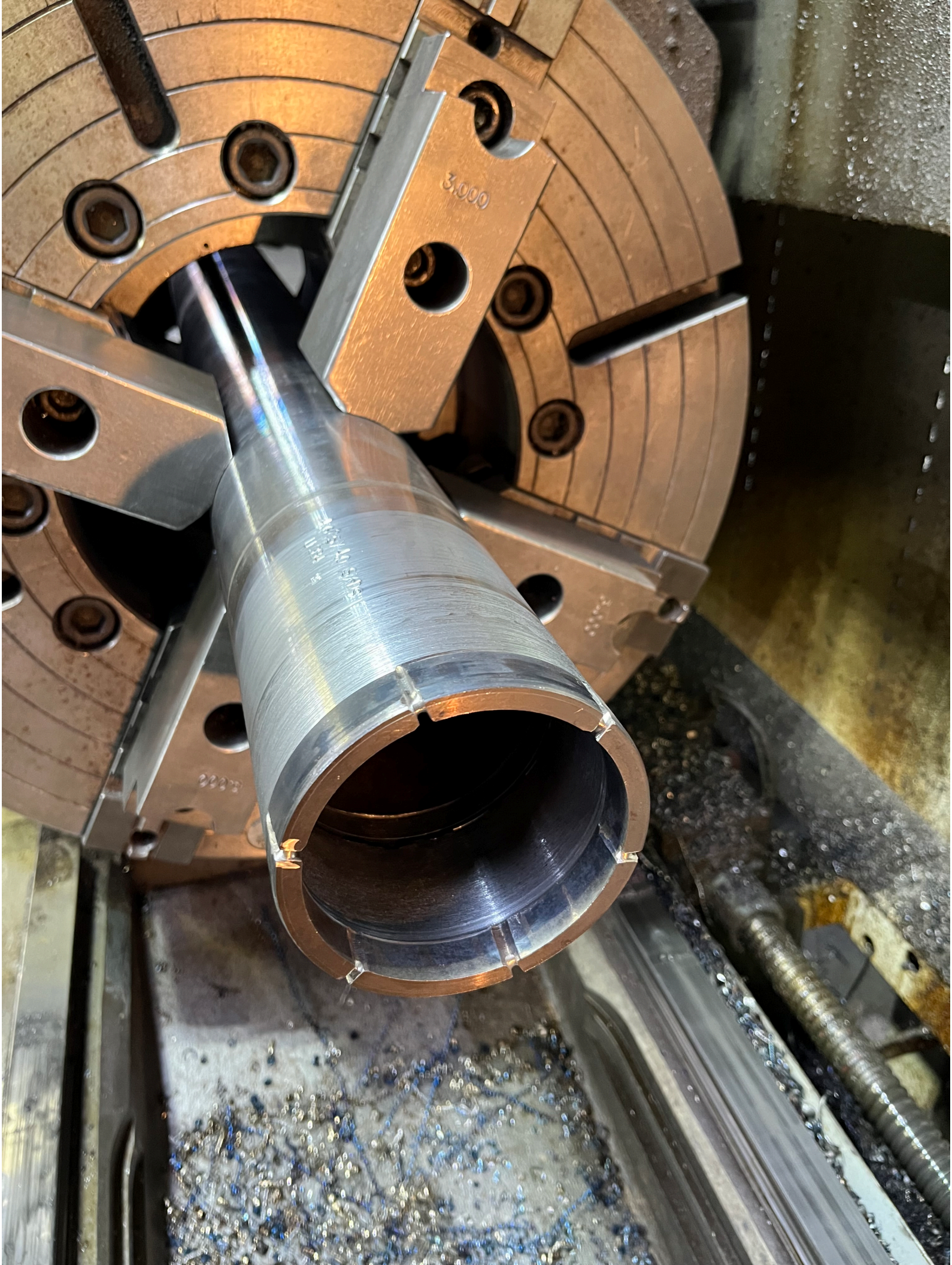
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