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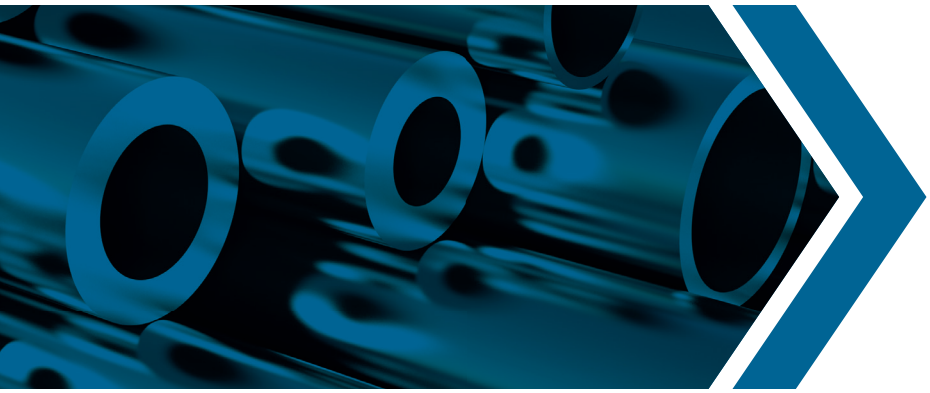

ELMET TECHNOLOGIES

MOLYBDENUM POWDER METALLURGY PRODUCTS

MOLYBDENUM HAFNIUM CARBIDE Powder Metallurgy Alloy Bar MHC

This specification covers molybdenum alloy (Molybdenum + 1.2 % Hafnium) wrought bar produced from pressed and sintered powder metallurgy billet.

CHEMICAL CHARACTERISTICS[1]

(Mass fraction in % [cg/g]; ppm [µg/g])

The chemical composition of the molybdenum blended powder used for manufacturing the wrought bar shall conform to the following limits:

Mo *(Balance)*		
Ni	max.	0.005 %
Si	max.	0.005 %
Fe	max.	0.010 %
C	.05 –	0.15 %
Hafnium	.8 –	1.4 %

STRUCTURE

The MHC alloy bars can be supplied in the recrystallized condition upon request. Die applications require special processing. Please inform Elmet Technologies representative of application.

MECHANICAL PROPERTIES

The hardness of stress-relieved material shall conform to the following range, as measured at mid-radius location:

Diameter		**Hardness**	**DPH (10 kg)**
Inches	**mm**	**Minimum**	**Maximum**
1/4 to 3 1/2	3.2 - 88.9	255	320

All sizes of recrystallized bar shall exhibit hardness (mid-radius) of 215 DPH maximum.

Tensile tests are conducted at room temperature (65°F to 85°F) [20°C – 30°C] with test specimens made and tested to Specification ASTM E-8 using a strain rate of 0.002 to 0.005 in/in/min through 0.6 % offset and 0.02 to 0.05 in/in/min to fracture.

[1] Information on testing methods on request.

Tensile properties in the longitudinal direction, using such specimens taken from the center of round bars up to 1 ¼ inch diameter and from mid-radius location for larger bars, shall meet the following minimum values:

Diameter		Tensile Strength Minimum		Yield Strength (.2% Offset) Minimum		Elongation % Minimum
inches	mm	KSI	Mpa	KSI	Mpa	%
1/8 to 3 1/2	3.2 - 22.2	100	690	85	590	5

DIMENSIONAL TOLERANCES

Diameter		Diameter Variation		Out-of-Round	
Inches	mm	Inches	mm	Inches	mm
1/4 to 9/32	3.2 - 7.1	+0.002 -0.002	+0.05-0.05	0.004	0.10
Over 9/32 to 13/32	7.1 - 10.3	+0.003 -0.003	+0.07-0.07	0.006	0.15
Over 13/32 to 5/8	10.3 - 15.9	+0.010 -0.005	+0.25-0.13	0.012	0.30
Over 5/8 to 7/8	15.9 - 22.2	+0.015 -0.005	+0.38-0.13	0.015	0.38
Over 7/8 to 1	22.2 - 25.4	+0.020 -0.005	+0.51-0.13	0.015	0.38
Over 1 to 1 3/8	25.4 - 34.9	+0.020 -0.010	+0.51-0.25	0.018	0.46
Over 1 3/8 to 1 1/2	34.9 - 38.1	+0.020 -0.015	+0.51-0.38	0.020	0.51
Over 1 1/2 to 1 5/8	38.1 - 41.3	+0.025 -0.015	+0.64-0.38	0.020	0.51
Over 1 5/8 to 2	41.3 - 50.8	+0.030 -0.020	+0.76-0.51	0.025	0.64
Over 2 to 2 1/2	50.8 - 63.5	+0.032 -0.032	+0.81-0.81	0.025	0.64
Over 2 1/2 to 3 1/2	63.5 - 88.9	+0.032 -0.032	+0.81-0.81	0.027	0.69

Maximum variation from straightness will be 0.050 inch per foot.

Maximum variation in cut length will be + ¼ inch, -0.

SURFACE CONDITION

Bars will be supplied with chemically or mechanically cleaned surfaces. Minor surface imperfections, revealed by dye penetrant inspection, may be removed by conditioning, provided such removal does not reduce dimensions below specified tolerance limits.

IDENTIFICATION

Bar will be identified with an appropriate lot number. Each shipping container will be marked with the name of the customer and the purchase order number.

REPORTS
A product certification report that details pertinent chemical, mechanical, structural and physical integrity features will be provided.

Hazards identification in Advertising (Directive 67/548/EEC Article 26, Directive 1999/45/EC Article 13 and REGULATION (EC) No 1272/2008 Article 48) none.

REJECTION
Elmet Technologies must receive written notification of rejected material with the reason for rejection. The right is reserved to inspect rejected material at customer plant for claim validation. The material may be returned only after proper authorization.

SHAPES
Bar, discs or rings. Special processing associated with material for extrusion die applications.

ELMET TECHNOLOGIES

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