

MOLYBDENUM POWDER METALLURGY PRODUCTS

PURE MOLYBDENUM

Sheet Premium Grade PS-100-2

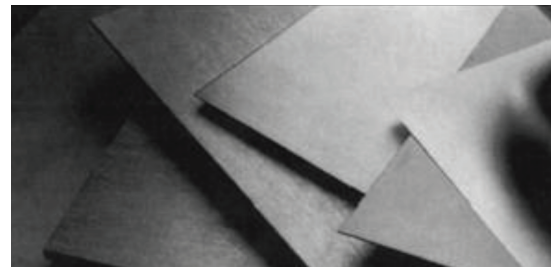
Rolled molybdenum sheet produced from pressed and sintered powder metallurgy sheet bar.

CHEMICAL CHARACTERISTICS¹

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

The chemical composition of the tungsten powder used in producing sheet bar shall conform to the following limits:

Molybdenum (By Difference)	min.	99.95 %
Mg	max.	0.001 %
Mn	max.	0.001 %
Ni	max.	0.002 %
Al	max.	0.002 %
Cu	max.	0.002 %
Pb	max.	0.002 %
Ti	max.	0.002 %
Ca	max.	0.003 %
Si	max.	0.003 %
Sn	max.	0.003 %
Cr	max.	0.005 %
C	max.	0.005 %
Fe	max.	0.005 %



PS-100-2

STRUCTURE

Sheet will be supplied in a stress-relieved condition unless otherwise requested.

MECHANICAL PROPERTIES

Tensile tests will be conducted at room temperature (65°F – 85°F) 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. Tensile properties will be determined on specimens taken transverse to the final rolling direction. Test specimens will be prepared and tested according to ASTM Specification No. E-8, utilizing a gage length of 2 inches.

¹ Information on testing methods on request.

PHYSICAL CHARACTERISTICS

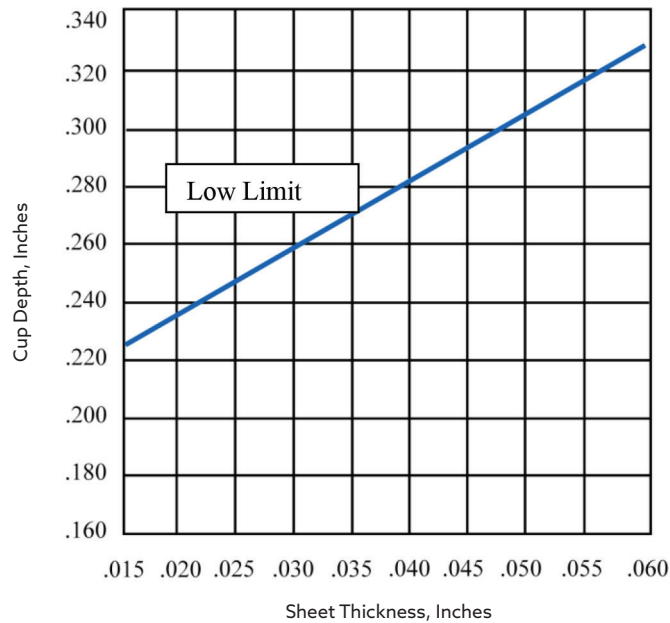
Tensile properties shall meet the following minimum values:

Thickness (inches)	Tensile Strength (psi Minimum)	Yield Strength (.2% Offset) (psi Minimum)	Elongation (% Minimum)
0.005 to 0.010	110,000	90,000	5
Over 0.010 to 0.020	110,000	90,000	6
Over 0.020 to 0.060	105,000	85,000	10
Over 0.060 to 0.100	100,000	80,000	14
Over 0.100 to 0.187	100,000	80,000	18

Bend tests will be conducted on specimens at least 1 inch wide x 2 inches long, taken from the sheet with the major axis transverse to the final rolling direction.

Bend Radius	Bend Severity	
	90°	180°
1T	to 0.125"	to 0.040"
2T	to 0.187"	to 0.080"

T indicates the sheet thickness. Bend radius is equivalent to one half of the mandrel (or insert) diameter. Testing is performed at room temperature (65°F - 85°F). Olsen Cup tests will be conducted at room temperature (65°F - 85°F) on samples of sheet 0.015 to 0.060 inch thick to ascertain conformance to the lower limit indicated below: (This lower limit applies to the average of four cup tests taken at random within any sheet or sheet lot.)



DIMENSIONAL TOLERANCES

THICKNESS TOLERANCE:

Thickness (inches)	Up to 12 inches wide (inches)	Over 12 - 24 inches wide (inches)
0.005 to 0.007	± 0.0005	± 0.0006
Over 0.007 to 0.008	± 0.0006	± 0.0007
Over 0.008 to 0.010	± 0.0007	± 0.0008
Over 0.010 to 0.018	± 0.0008	± 0.0009
Over 0.018 to 0.025	± 0.0010	± 0.0015
Over 0.025 to 0.030	± 0.0012	± 0.0015
Over 0.030 to 0.187	± 4%	± 5%

WIDTH TOLERANCE:

Thickness* (inches)	Slit (inches)				Sheared (inches)	
	over .250 - .500	over .500 - 6	over 6-12	over 12-24	.500 - 12	over 12-24
0.005 to 0.009	± 0.005	± 0.005	± 0.010	± 0.031	± 0.31	± 0.062
0.010 to 0.019	± 0.010	± 0.010	± 0.010	± 0.031	± 0.31	± 0.062
0.020 to 0.034		± 0.015	± 0.015	± 0.031	± 0.031	± 0.062
0.035 to 0.059		± 0.031	± 0.031	± 0.031	± 0.062	± 0.062
0.060 to 0.069			± 0.031	± 0.031	± 0.062	± 0.062
0.070 to 0.187					± 0.062	± 0.062

*For thickness 0.070 to 0.187 inches; sheet will be sheared, abrasive cut, band saw cut, or water jet cut to the tolerances shown.

Bedsheet is sold as a useable width, therefore any cracks or delaminations on the edges are acceptable as long as a 6, 12 or 24 inch minimum width can be yielded from the material after the cracks are removed.

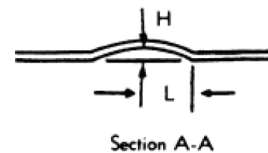
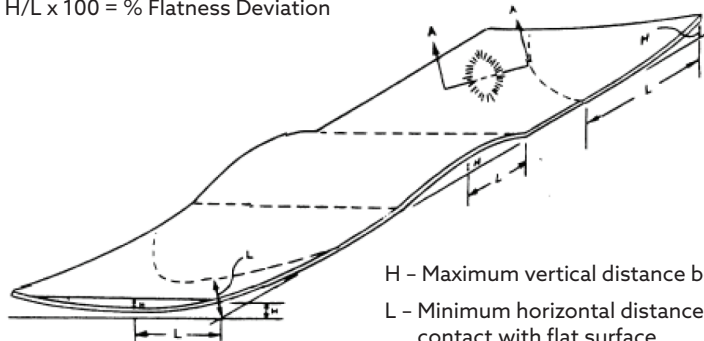
LENGTH TOLERANCE

For specified lengths, the tolerance for all sizes is + .0625-0 inch per foot of length. Edge Straightness-Maximum camber is .0625 inch per foot of length.

FLATNESS TOLERANCE

The total deviation from flatness will not exceed 3 % maximum, as determined by the following formula:

$$H/L \times 100 = \% \text{ Flatness Deviation}$$



- H - Maximum vertical distance between flat surface and lower surface of sheet.
- L - Minimum horizontal distance between highest point on sheet and point contact with flat surface.

SURFACE CONDITION

Sheet is supplied with a bright finish to 0.060 inch thickness. A matte finish will normally be supplied for sheet greater than 0.060 inch. The sheet will be of uniform quality, clean, and free from foreign matter. It will be free from edge delaminations as determined by visual examination, with the exception of bedsheet width. Normal shear tears are not considered delaminations.

IDENTIFICATION

The material will be identified with appropriate specification number, ingot or lot number, and nominal size. Packaging will be marked with the name of the customer and the purchase order number.

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. Elmet Technologies reserves the right to inspect rejected material at the customer's plant for claim validation. The material may be returned only after proper authorization.



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