PURE MOLYBDENUM AB
Arc-Cast Bar

Description of Product This specification covers carbon-deoxidized molybdenum wrought bar produced from ingots consolidated by the H.C. Starck consumable electrode vacuum-arc-casting process.

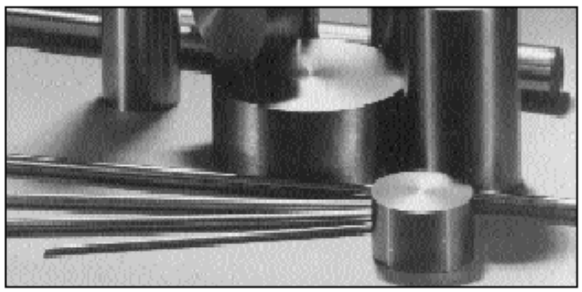
Chemical Characteristics[1)]
(Mass fraction in % [cg/g]; ppm [µg/g])

The chemical composition of the billet used for producing the wrought bar shall conform to the following limits:

Mo(By Difference)	min.	99.95	%
*O	max.	0.002	%
Ni	max.	0.002	%
*N	max.	0.002	%
Fe	max.	0.010	%
Si	max.	0.010	%
C	max.	0.030	%

*Unless method of analysis is agreed upon, deviations from these limits alone shall not be cause for rejection.

Structure Material can be supplied in the recrystallized condition upon request.



Arc-Cast Products

1) Information on testing methods on request.

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Mechanical Properties The hardness will be determined to conform to the following (measured at mid-radius location):

Diameter Inches	Diameter mm	Hardness, DPH (10 kg) Minimum	Hardness, DPH (10 kg) Maximum
Over 1/8 to 7/8	3.2 - 22.2	230	280
Over 7/8 to 1 1/8	22.2 - 28.6	225	270
Over 11/8 to 1 7/8	28.6 - 47.6	215	260
Over 17/8 to 2 7/8	47.6 - 73.0	210	250
Over 27/8 to 3 1/2	73.0 - 88.9	205	240

All sizes of recrystallized bar shall exhibit mid-radius hardness of 200 DPH maximum.

Tensile tests are conducted at room temperature (65°F to 85°F) with test specimens made and tested to ASTM Specification 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.

Tensile properties in the longinudinal 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 Inches	Diameter mm	Tensile Strength Minimum KSI	Tensile Strength Minimum MPa	Yield Strength (0.2 % Offset) Minimum KSI	Yield Strength (0.2 % Offset) Minimum MPa	Elongation % Minimum
1/8 to 13/32	3.2 - 10.3	75	515	55	380	15
Over 13/32to 7/8	10.3 - 22.2	90	620	75	515	15
Over 7/8 to 11/8	22.2 - 28.6	85	585	70	485	15
Over 11/8 to 17/8	28.6 - 47.6	75	515	65	450	10
Over 17/8 to 27/8	47.6 - 73.0	70	485	60	415	10
Over 27/8 to 31/2	73.0 - 88.9	65	450	55	380	10

Diameter Inches	Diameter mm	Diameter Variation Inches		Diameter Variation mm		Out-of-Round Inches	Out-of-Round mm
1/8 to 9/32	3.2 - 7.1	+0.002	-0.002	+0.05	-0.05	0.004	0.10
Over 9/32to 13/32	7.1 - 10.3	+0.003	-0.003	+0.07	-0.07	0.006	0.15
Over 13/32to 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 13/8 to 11/2	34.9 - 38.1	+0.020	-0.015	+0.51	-0.38	0.020	0.51
Over 11/2 to 15/8	38.1 - 41.3	+0.025	-0.015	+0.64	-0.38	0.020	0.51
Over 15/8 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 21/2 to 31/2	63.5 - 88.9	+0.032	-0.032	+0.81	-0.81	0.027	0.69

Special finished bars can be supplied with a tolerance of ± 0.002 inch for 2 inches diameter or smaller sizes, and ± 0.003 inch for larger size bars.

Maximum variation from straightness will be 0.050 inch per foot.

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

Surface Bars will be supplied with chemically or mechanically cleaned surfaces.

Internal Condition Minor surface imperfections, revealed by dye penetrant inspection, may be removed by conditioning, provided such removal does not reduce dimensions below specified tolerance limits. Special finished bars will be supplied with a surface finish of 90 RMS or better.
The internal integrity of bar >2.0 diameter will be determined by ultrasonic inspection and shall satisfy H.C. Starck Ultrasonic Specification No. H.C. Starck QC-32 (latest version).

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.

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.

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

Rejection H.C. Starck must receive written notification of rejected material with the resaon 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.

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