

MOLYBDENUM ARC-CAST PRODUCTS

Number PD-7021
Issue 0-29.10.2003

MOLYBDENUM ALLOY TZM AFBT Arc-Cast Forging Billet

Description of Product This specification covers carbon-deoxidized TZM alloy. (Molybdenum + 0.5 % titanium + 0.08 % zirconium) wrought forging billets produced from ingots consolidated by the H.C. Starck consumable electrode vacuum-arc-casting process.

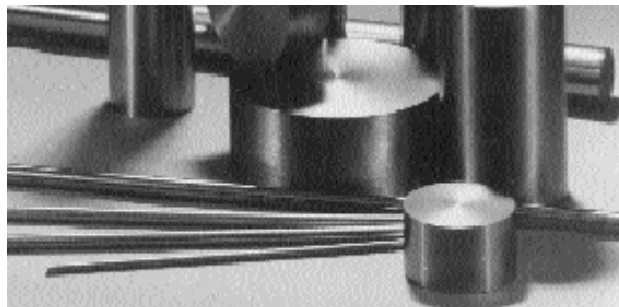
Chemical Characteristics¹⁾ (Mass fraction in % [cg/g]; ppm [μ g/g])

Mo(By Difference)	min.	99.25	%
Ni	max.	0.002	%
*N	max.	0.002	%
*O	max.	0.0025	%
Fe	max.	0.008	%
Si	max.	0.008	%
C	0.01 -	0.030	%
Zr	0.06 -	0.12	%
Ti	0.40 -	0.55	%

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

Mechanical Properties The billets will be supplied in the recrystallized condition, with a maximum hardness of 215 B.H.N. (10 mm ball/1500 kg/30 sec.). Material can be supplied in the stress-relieved condition upon request.

Dimensional Tolerance The diameter of each billet will be uniform along its length within $\pm 1/16$ inch. Any variation in diameter will be smoothly blended into adjacent areas.



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1) Information on testing methods on request.

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Surface Condition	Billets will be supplied with machined or chemically cleaned surfaces. Minor surface imperfections revealed by dye penetrant inspection may be removed by conditioning to a maximum depth of 0.090 inch. The internal integrity of all billets will be determined by ultrasonic inspection and shall satisfy H.C. Starck Ultrasonic Specification No. (latest revision).
Identification	All billets will be identified with an appropriate ingot 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	Shipments will be accompanied by documents which indicate the applicable specification number, purchase order number, ingot number, chemical analyses and hardness.
Rejection	H.C. Starck 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.

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