

H521 Rev C – A182-F51 (UNS S31803)

Rev	Date	ECN	Issue	Prepared by	Check/Approved
C	02.01.08	249	Revised/Re-issued	T.S.	J.S.
B	14.03.05	119	Revised/Re-issued	N.R.	T.K.
A	01.02.05	116	Revised/Re-issued	A.K.	N.R.

Product Form	Standard	Grade	Acceptable Class
Forged Bar Blank Ring Closed Die Forgings	ASTM A182	F51 (UNS S31803)	-

Scope	This specification outlines the modifications and additional requirements to the relevant ASTM Specifications for the supply of raw material to manufacture Vector International products.								
Other Applicable Specifications	ASTM A370 / A388 / E562 / G48 (Latest Issues)								
Steel Making	Manufacture to be in accordance with ASTM A182 (Latest Issue).								
Heat Treatment	Solution Anneal (1050°C min for 1hr min) in accordance with ASTM A182 (Latest Issue). Furnaces shall be calibrated with certificates being available for review upon request.								
Chemical Analysis % (Heat)		Min	Max		Min	Max		Min	Max
	C	-	0.03	S	-	0.02	N	0.15	0.20
	Si	-	1.00	Ni Cr	4.50	6.50			
	Mn	-	2.00	Mo	21.00	23.00	PREN	35	-
	P	-	0.03		2.50	3.50			
<i>Note: PRE'N = Cr + 3.3Mo + 16N</i>									
Mechanical Properties				Min		Max			
	Tensile(R_m):			98600psi (680MPa)		-			
	Yield (R_{p0.2}):			65250psi (450MPa)		-			
	Elongation (A %):			25		-			
	R. of A (Z %):			45		-			
Hardness:			-		28HRC				
<i>Note: Mechanical Testing to ASTM A370 after final heat treatment. Mechanical Testing required for each heat and heat treatment lot.</i>									
Impact Properties	Charpy V. 70J (Ave), 65J (Min) at -50°C. Lateral Expansion to be 0.38mm min.								

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Corrosion Testing	Corrosion test to be in accordance with ASTM G48 Method A (Latest Issue) for 24 hours at a temperature of NOT less than 30°C. The acceptance criteria is NO pitting.
Micrographic Examination	A Micrographic examination shall be carried out at X400 magnification. The structure shall consist of 40%-60% ferrite measured in accordance with ASTM E562 (Latest Issue) and shall be free from grain boundary carbides, sigma, chi and laves phases.
Test Sampling	Test Coupons (test bars may be used) shall be representative of production forgings and shall be heat treated with the forgings in accordance with ASTM A182 (Latest Issue). Test coupons shall also receive essentially the same forging reduction ratio as the production forgings. Test coupons must be taken from production forgings when closed die forgings are used.
N.D.E	100% UT on Open Die Forgings and Bar (after final heat treatment) in accordance with ASTM A388, to be undertaken by supplier. Acceptance criteria to ASME VIII.
Surface Finish and Quality	Forgings to be of sufficient quality for LPI check. LPI on finished machined parts to be undertaken by Vector International Ltd. Forgings to be supplied free of defects (Slag inclusions, scale, laps, cracks).
Repair of Defects	Weld repair is not acceptable.
Marking	Forgings to be marked with Heat Number, Material Grade, and Vector Specification.
Certification	Certification to be in accordance with EN10204-3.1: Chemical Analysis, Mechanical Analysis, Heat Treatment Report (soak times and cooling medium), Mill Certificate (Wet Stamped).
Notes	<ol style="list-style-type: none">1. Refer to PO for supplemental details.2. Any deviation from this specification must be formally raised as a concession request prior to delivery. Certification must include concession documentation.