

Rev	Date	ECN	Issue	Prepared by	Check/Approved
C	03.01.08	253	Revised/Re-issued	T.S.	J.S.
B	12.03.02	55	Revised/Re-issued	J.S.	A.K.
A	15.02.01	51	Revised/Re-issued	A.K.	J.S.

Product Form	Standard	Grade	Acceptable Class
Forged bar Blank Ring	AISI 4130	-	-

Scope	This specification outlines the modifications and addition requirements to the relevant National specifications for the supply of wrought forgings to manufacture Vector International products to API 6A PSL3 temperature class 'L' requirements, and NACE MR01-75.								
Other Applicable Specifications	API 6A ASTM A370 / A788 NACE MR01-75								
Steel Making	Material to be Electrically Melted and Vacuum Degassed.								
Manufacturing Process	Material to be Manufactured and Heat Treated fully in accordance with API 6A. The forgings shall be hot worked and must exhibit a fully wrought structure. The forging shall be subject to a minimum reduction ratio of 3:1 from ingot.								
Heat Treatment	Austenitise at above the upper transition temperature (1hr/in, 1hr min) Quench in water Temper between 650°C and lower transition temperature (1hr/in, 1hr min) Cool in still air. <i>Note: Heat Treatment Times and Temperatures to be reported. Heat Treatment furnace and Quench tank to be calibrated in accordance with API 6A.</i>								
Chemical Analysis % (Heat)		Min	Max		Min	Max		Min	Max
	C	0.28	0.33	P	-	0.025	Mo	0.15	0.25
	Si	0.15	0.35	S	-	0.025			
	Mn	0.40	0.60	Cr	0.80	1.10			
Mechanical Properties					Min		Max		
	Tensile(R_m):				100000psi (690MPa)		-		
	Yield (R_{p0.2}):				75000psi (517MPa)		-		
	Elongation (A %):				17		-		
	R. of A (Z %):				35		-		
	Hardness:				200HB		235HB		

	<i>Note: 100% hardness check shall be performed, each value to be reported on certification.</i>
Impact Properties	Charpy V. 27J (Ave), 20J (Min) at -46°C. Lateral expansion to be reported. <i>Note: Impact specimen size to be 10x10mm. Specimen to be sampled from a location such that the notch is within the 1/4 T envelope.</i>
Test Sampling	Test coupons must represent production forgings (bars and open die) and should be heat treated with the forgings. Test coupon and forgings to be stacked in the furnace in accordance with good practice to ensure even heat treatment. The test coupons receive essentially the same forging reduction ratio as the production forgings. Test coupons must be taken from the production forging when closed die forgings are used. Test coupons must comply with API 6A. Mechanical Tests to ASTM A370 after final heat treatment.
N.D.E	100% UT on forgings (after final heat treatment) by supplier in accordance with API 6A.
Surface Finish and Quality	Forgings to be of sufficient quality for MPI check. MPI on finished machined parts to be undertaken by Vector International Ltd.
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 / Graphs, N.D.E. Report, Mill Certificate (Wet Stamped). Certification to provide test coupons details and to state compliance with API 6A.
Notes	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.