

### R207 Rev B – Low Alloy Steel for Sealrings – Nominal Grade AISI 4140

Rev	Date	ECN	Issue	Prepared by	Check/Approved
B	10.01.08	262	Revised/Re-issued	T.S.	J.S.
A	27.07.92	----	Revised/Re-issued	A.K.	D.R.L.

Product Form	Standard	Grade	Acceptable Class
Forged Bar	AISI	4140	-
Blank	AISI	4130	-
Ring	BS970	709M40 – Note 4	-
Closed Die Forgings	BS970	708M40 – Note 4	-
Seamless Tubing			
Rolled Bar			

<b>Scope</b>	This specification outlines the modifications and additional requirements to the relevant AISI / BS Specifications for the supply of raw material to manufacture Vector International Sealing products.								
<b>Other Applicable Specifications</b>	NACE MR-01 75(Latest Issue) ASTM A370 (Latest Issue) ASTM A788 (Latest Issue)								
<b>Heat Treatment</b>	Austenitise, Quench and Temper. <i>Note: Full Heat treatment Temperatures and Times to be reported.</i>								
<b>Chemical Analysis % (Heat)</b>		<b>AISI 4140</b>		<b>AISI 4130</b>		<b>BS970 709M40<sup>(4)</sup></b>		<b>BS970 708M40<sup>(4)</sup></b>	
		<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>
	<b>C</b>	0.38	0.43	0.28	0.33	0.36	0.44	0.36	0.44
	<b>Si</b>	0.15	0.35	0.15	0.35	0.10	0.35	0.10	0.35
	<b>Mn</b>	0.75	1.00	0.40	1.00	0.70	1.00	0.70	1.00
	<b>P</b>	-	0.035	-	0.035	-	0.040	-	0.040
	<b>S</b>	-	0.040	-	0.040	-	0.040	-	0.040
	<b>Cr</b>	0.80	1.10	0.80	1.10	0.90	1.20	0.90	1.20
<b>Mo</b>	0.15	0.25	0.15	0.25	0.25	0.35	0.15	0.26	
	<i>Note: Supplier to state applicable grade on certification – see Note 4.</i>								
<b>Mechanical Properties</b>		<b>Min</b>			<b>Max</b>				
	<b>Tensile(R<sub>m</sub>):</b>	100000psi (690MPa)			-				
	<b>Yield (R<sub>p0.2</sub>):</b>	75000psi (517MPa)			-				
	<b>Elongation (A %):</b>	18			-				
	<b>R. of A (Z %):</b>	35			-				
<b>Hardness:</b>	-			237HB or 22HRC					

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	<i>Note: Mechanical Testing to be carried out after final heat treatment.</i>
<b>Impact Properties</b>	Charpy V. 27J (Ave), 20J (Min) at -46°C Lateral Expansion to be reported.
<b>Test Sampling</b>	Test coupons must be taken from prolongations or suitable test coupon, and must be representative of the finished forging. Test coupon must be of the same cast/heat and must be heat treated with the production forgings. Forgings shall be stacked in the furnace in accordance with good practice to ensure even heat treatment. The test coupons must receive essentially the same forging reduction ratio as the production forgings.
<b>Surface Finish and Quality</b>	Forgings to be of sufficient quality for MPI check. MPI on finished machined parts to be undertaken by Vector International Ltd.
<b>Repair of Defects</b>	Weld repair is not acceptable.
<b>Marking</b>	Forgings to be marked with the Heat Number, Material Grade, and Vector Specification.
<b>Certification</b>	Certification to be in accordance with EN10204-3.1: Chemical Analysis, Mechanical Analysis, Heat Treatment Report / Graphs Mill Certificate (Wet Stamped).
<b>Notes</b>	<ol style="list-style-type: none"><li>1. Suppliers are asked to keep certification packages as concise as possible.</li><li>2. Refer to PO for supplemental details.</li><li>3. Any deviation from this specification must be formally raised as a concession request prior to delivery. Certification must include concession documentation.</li><li>4. Equivalent European Standards for the above grades are also acceptable provided all other aspects of this specification are met.</li></ol>