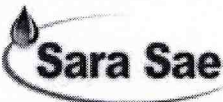
	<b>SARA ENGINEERING SPECIFICATION</b>	
	<b>Section:</b> SES 26 – 182	
	<b>Issue:</b> “B”	<b>REV-</b> “1”
	<b>Effective Date:</b> 19.1.2016	<b>Page:</b> 1 of 3

**Material Specification for Alloy Steel ASTM A182 Grade F-5  
for Ring Joint Gasket (Forging) as per API 6A.**

Rev	Reason of change	Date	Made By	Reviewed By	Approved By	Status
0	---	16-09-99	SK	KCR	SD	Released
1	Material Hardness Amended	19-01-16	MN	AS	KKD	



	<b>SARA ENGINEERING SPECIFICATION</b>	
	<b>Section:</b> SES 26 – 182	
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	<b>Effective Date:</b> 19.1.2016	<b>Page:</b> 2 of 3

## 1.0 SCOPE

This specification covers material requirements for Alloy Steel ASTM A182 Grade F5 at a 0° F to 250° F of operating temperature. This material meets the requirements of API 6A.

## 2.0 REFERENCES.

- 2.1 API Spec. 6A - 20<sup>th</sup> Edition, February 1, 1996.
- 2.2 ASTM E 10 - Standard test method for Brinell hardness of metallic materials.
- 2.3 ASTM E 29 - Standard practice for using significant digits in test data to determine conformance with specification.
- 2.4 ASTM A 182 - Standard specification for forged or rolled Alloy Steel pipe Flanges, Forged Fittings and Valves and parts for high temperature service.

## 3.0 MATERIAL AND MANUFACTURE.

### 3.1 CHEMISTRY.

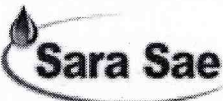
Chemical composition shall be limited to the following grade with the accompanying ranges:

ASTM-A182 F5	C %	Mn %	P %	S %	Si %	Ni %	Cr %	Mo %
Grade 4 to 6 % Chromium (Cr)	0.15 Max.	0.3 to 0.6	0.03 Max.	0.03 Max.	0.5 Max.	0.5 Max	4.0 to 6.0	0.44 to 0.65

### 3.2 HOT WORKING PRACTICES.

Forging shall be mechanically hot worked by a press or hammer of sufficient capacity to work the metal throughout its section above the re-crystallization temperature. Forging shall be free from cracks, flakes, bursts, laps, seams, piping, tears or other injurious imperfections.



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#### **4.0 HEAT TREATMENT.**

Ring Joint Gasket forging shall be either annealed or normalized as the last stage of material processing prior to final machining; to meet the hardness requirement of Sec.5.1.

#### **5.0 MECHANICAL PROPERTIES.**

5.1 All material supplied under this specification shall meet following properties.

Material with grade	Tensile Strength	Hardness Max
		HRB (100 Kg. load and 1/16” ball dia.)
ASTM A182 F5 (4 To 6 % Chromium	--	72

5.2 Hardness of heat treated material shall be (maximum) 55 HRB or 100 BHN when tested in accordance with ASTM E-10 and SARA instruction SWI 27-2J.

#### **6.0 CERTIFICATE.**

6.1 Certificate for chemical analysis with Heat No. as per Section 3.1

6.2 Certificate of Heat treatment and hardness as per Section 4.0

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