MATERIAL SPECIFICATION FOR INCOLOY 825 NICKLE BASE ALLOY SPIN CAST FOR RING JOINT GASKET

1.0 PURPOSE

1.1 It is the purpose of this material specification to list in concise form of the material requirement for INCOLOY 825.

1.2 This material specification is intended to aid the purchasing department in procuring and the vendor in supplying a material which meets the needs of its intended use, and the quality control department in the inspection and release of incoming material.

2.0 REQUIREMENTS

2.1 The requirements of specification SES 26-590, SES 26-740 & SES 26-744 shall apply in addition to the following specific requirements.

2.2 It is the responsibility of raw material/metal supplier/machined parts supplier of carbon, low alloy and martensitic stainless steel to have practices and procedures in place to assure that raw materials/parts delivered to FMC do not have excessive amounts of residual magnetism. Excessive residual magnetism is defined as greater than 3 gauss. Residual magnetism can occur due to factors such as lifting with magnets, magnetic particle inspection or stray welding current. The supplier's procedures/testing methods will be subject to verification during supplier audits.

2.3 The raw material supplier shall assure that SARA SAE does not receive material with greater than background level of radioactivity.

3.0 Chemical composition: Chemical composition limits are listed below. An analysis of each heat of steel is made by the manufacturer, preferably from a ladle sample taken at or near the time of pouring. The listed elements shall be reported in weight percent. Reporting of residual elements is not required, but total residuals must not exceed 1%.

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ELEMENTS	COMPOSITION RANGE (%)
Carbon (C)	0.05 (max.)
Manganese (Mn)	1.00 (max.)
Silicon (Si)	0.50 (max.)
Sulphur (S)	0.03 (max.)
Nickel (Ni)	38.0 – 46.0
Chromium (Cr)	19.5 – 23.5
Molybdenum (Mo)	2.5 – 3.5
Aluminum (Al)	0.20 (max.)
Titanium	0.6 – 1.2
Copper (Cu)	1.5 – 3.0
Iron (Fe)	Balance

3.1 Elements that are not included in the application material specification but that may have been intentionally added by the mill are limited as follows:

ELEMENTS	COMPOSITION RANGE (%)
Vanadium (V)	0.08 (max.)
Aluminum (Al)	0.055 (max.)
Nitrogen (N)	0.010 (max.)
Hydrogen (H)	0.010 (max.)
Niobium(Columbium)+Titanium +Vanadium	0.12 (max.)
Boron	0.0005 (max.)

4.0 **HEAT TREATMENT:** - Heat treatment shall also apply in addition to the following specific requirements.

PROCESS	ATMOSPHERE/MEDIA	TEMPERATURE	TIME AT TEMPERATURE
Annealing	Air	1700-1950 °F (927-1065 °C)	½ hour per inch of maximum through thickness. One hour minimum.
Note: Maximum holding time shall not exceed Five times (5X) the minimum holding time. In all case, holding time shall not start until parts or materials have reached specified heat treatment temperature. The 5X rule does not apply to the separate QTC (e.g. ER 5")			
Quenching	Water	100 °F (38 °C) Max at the start of quench	120°F (49 °C) Max. at the completion of the quench

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4.1 HARDNESS:

Rockwell "B" Hardness	– 83 HRB Max
Brinell Hardness	–160 BHN Max

5.0 MARKING: Each Piece or component shall be identified with the heat number or traceability marked on the exterior with low stress dot stamps. When used for Ring Gaskets, each piece shall also be stamped with the designation "I - 825".

6.0 DOCUMENTATION REQUIRED:-

6.1 Each shipment shall be accompanied by material certifications for each lot of material, certifications must be positively relatable to the lot of material represented

6.2 Recheck of Chemical properties to be carried out by SARA SAE.