GUJARAT GAS

TECHNICAL SPECIFICATION

FOR

STUD BOLTS, NUTS & GASKETS

Document No.: GGL/TS/SPEC/STUD-NUT-GASKET/004,REV-00

GUJARAT GAS

Table of Contents

1. SCOPE 1
2. DEFINATIONS: 1
3. REFERENCE DOCUMENTS 1
4. MATERIALS 2
5. DESIGN AND MANUFACTURE 2
6. INSPECTION AND TESTING 3
7. TECHNICAL NOTES FOR GASKETS 3
8. DESIGN AND MANUFACTURE 3
9. TESTING 4
10. ENCLOSURE 4

1. SCOPE

This specification provides minimum requirement for design, manufacturing, inspection, testing and supply of Nuts, Bolts and Gaskets covering sizes NPS ½" through NPS 36" for ANSI pressure classes # 150 through # 900 to be used in cross country Gas pipeline(onshore) and City Gas distribution for handling non-sour hydrocarbon in liquid or gaseous phase.

2. DEFINATIONS:

Purchaser/Owner: The Company which makes purchase order.

Manufacturer: Manufacturer who receives the purchase order.

TPI: "Third Party Inspection Agency" appointed by Manufacturer and approved by Purchaser/Owner

Shall: This verbal form indicates requirements strictly to be followed in order to confirm to the standards and form in which no deviation is permitted.

Should: This verbal form indicates that among several possibilities one is particularly suitable without mentioning or excluding others or that a certain course of action is preferred but not necessarily required.

May: This verbal form indicates a course of action permissible within the limits of this standard.

Can: This verbal form used for statements of possibility & capability, whether material, physical or casual

3. REFERENCE DOCUMENTS

The following Codes and Standard includes provision which, through reference in this text constitute provision of this Standard. Latest revision of this standard shall be used unless otherwise specified.

ASME B 31.8	-	Gas Transmission and Distribution Piping Systems
ASME B 1.1	-	Unified Screw and Pipe Threads
ASME Sec VIII/IX	-	Boiler and Pressure Vessel Code
ASME B18.2.1	-	Square, Hex, Heavy Hex, and Askew Head Bolts and
ASME B18.2.2	-	Nuts for General Applications
ASTM A 307	-	Specification for Carbon Steel Bolts, Studs, and Threaded Rod
ASTM A 370	-	Standard Test Methods and Definitions for Mechanical Testing of Steel Products

ASTM A 193/193 M	-	Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or high pressure service
ASTM A 194	-	Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service
ASTM A 320	-	Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service
ASME B 16.5	-	Pipe Flanges and Flange Fittings
ASME B 16.20	-	Metallic Gaskets for Pipe Flanges
ASTM A 449	-	Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated

In case of codes indicated without the year of publication, the latest edition of the code shall be taken into consideration. In case of conflict between the requirements of this specification and reference standard mentioned above, the more stringent requirement shall apply.

4. MATERIALS

The process of manufacture, heat treatment, chemical & mechanical requirements and marking for all stud bolts, bolts, jack screws & nuts shall be in accordance with the codes/standards and specifications as given in Purchase order. The applicable identification symbol in accordance with the material specification shall be stamped on each bolt and nut. Manufacturer shall strictly comply with Purchase order and no deviations shall be permitted.

5. DESIGN AND MANUFACTURE

5.1 All bolting shall be as per ASME B 18.2.1 for studs, M/C bolts and jackscrews and ASME B 18.2.2 for nuts.

5.2 Threads shall be unified (UNC for 1" dia and 8UN for > 1" dia.) as per ASME B 1.1 with class 2A fit for studs, M/c bolts and jackscrews and class 2B fit for nuts.

5.3 Stud bolts shall be threaded full length with two heavy hexagonal nuts. Length tolerance shall be in accordance with the requirements of ASME B 16.5.

5.4 The nuts shall be double chamfered, semi-finished, heavy hexagonal type and shall be made by the hot forged process and stamped as per respective material specification.

5.5 Heads of jackscrews and M/c bolts shall be heavy hexagonal type. Jackscrew end shall be rounded.

5.6 The heat treatment for stud bolts and nuts shall be as per code unless otherwise specified.

5.7 All austenitic stainless steel bolts, nuts, screws shall be supplied in solution annealed condition unless

otherwise specified.

5.8 Bolts/nuts of material of construction B7/2H shall be 100% hardness tested as per the requirements of ASTM A 193. Bolts/nuts of material of construction Gr.L7/Gr.7 shall be 100% hardness tested as per requirement of ASTM A 320

5.9 The studs, M/c bolts and nuts shall be hot dipped zinc coated in accordance to the requirements of class C of ASTM A 153.

6. INSPECTION AND TESTING

6.1 Test reports shall be supplied for all mandatory tests as per the relevant material specifications.

6.2 Material test certificate shall also be furnished. (Heat Analysis, Product Analysis and Mechanical Requirement)

6.3 PMI shall be performed as per the scope and procedures defined in the Specification for PMI at manufacturer's Works.

6.4 Stress Rupture Test as detailed in ASTM A453 shall be carried out for all ASTM A453 bolting material irrespective of the temperature.

7. TECHNICAL NOTES FOR GASKETS

7.1 The process of manufacture, chemical & mechanical requirements and marking for gaskets shall be in accordance with the codes/standards and specifications as given in Purchase order. All gaskets shall conform to the codes/standards. Manufacturer shall strictly comply with technical specification and no deviation shall be permitted.

7.2 Process of manufacture, dimension and tolerances not specified in specification shall be in accordance with the requirements of the manufacturer's standard.

8. DESIGN AND MANUFACTURE

8.1 Full face gaskets shall have holes punched out.

8.2 Filler material for spiral wound gaskets shall not have any color or dye

8.3 All spiral wound gaskets shall be supplied with outer ring. Outer centring ring and inner compression ring of all spiral wound gaskets shall be of S.S.

8.4 For spiral wound gaskets material of inner compression ring shall as same as spiral strip material. In addition to the requirements as per code and standards as specified.

8.5 Inner ring and outer ring of SS316 shall be provided in all gaskets.

8.6 Spiral wound gasket as per ASME B 16.20 shall be compatible with flanges conforming to ASME B 16.5 up to 24" (except 22" size) and to ASME B 16.47 above 24" unless specified otherwise. For 22" size the matching flange standard shall be ASME B 16.47 unless specified otherwise.

8.7 Gaskets for Raised Face flanges shall be spiral wound, RPTFE or non-asbestos filled with SS 316 spiral in accordance with ASME B16.20.

9. TESTING

9.1 Test report shall be supplied for all mandatory tests for gaskets as per codes and standards.

9.2 for spiral wound material following shall be furnished:

a) Manufacturer's test certificate for raw material and spiral material as per the relevant material specification.
b) Manufacturer's test certificate for raw material and tests for compressibility / seal ability & recovery as per the relevant material specification.

Note: The certificates shall be valid only when approved / certified by **OWNER / TPI.** Only those fittings, which have been certified by **OWNER / TPI,** shall be dispatched from **Manufacturer's** works. All documents shall be in English language only.

10. Enclosure:

I. Quality Assurance plan for Gasket
II. Quality Assurance plan for Stud Bolt & Nuts

MANUFACTURER		QUALITY ASSURANCE PLAN					QAP NO: GGL/GASKET/001 REV: 00 DT:			
CONTRACTOR :				PO NO :		DT:				
ITP CLAUSE	ACTIVITY DESCRIPTION	CHARACTERISTICS	ACCEPTANCE CRITERIA	REFERENCE DOCUMENT	METHOD OF INSPECTION	EXTENT OF INSPECTION	FORMAT OF RECORD	INSPECTION AGENCY		
								MANUFACTURER	TPI	CLIENT
A	RAW MATERIAL STAGE									
A.1	WINDING MATERIAL SS316/316L (0.2 mm)	PHYSICAL & CHEMICAL	ASTM A 240	ASTM A 240	SPECTRO ANALYSIS	PER HEAT/ BATCH NO	NABL LAB TC/ INSPECTION REPORT	P	R	R
A.2	OUTER RING MATERIAL CARBON STEEL	PHYSICAL & CHEMICAL	ASTM A 240	ASTM A 240	SPECTRO ANALYSIS	PER HEAT/ BATCH NO	NABL LAB TC/ INSPECTION REPORT	P	R	R
A.3	FILLER MATERIAL GRAPHITE (0.60mm)	PHYSICAL & CHEMICAL	MFG,S STD	MFG,S STD	VERIFICATION OF TEST REPORT	PER BATCH NO	LAB TC	P	R	R
B	IN PROCESS INSPECTION									
B.1	VISUAL EXAMINATION	VISUAL	PO/ASME B16.20	PO/ASME B16.20	VISUAL	100%	INSPECTION REPORT	P/W	W	R
B.2	DIMENSION EXAMINATION	DIMENSION	PO/ASME B16.20	PO/ASME B16.20	MEASUREMENT	100%	INSPECTION REPORT	P/W	W	R
B.3	COMPRESSION & RECOVERY TEST	TESTING	PO/ASME B16.20	PO/ASME B16.20	TESTING	ONE PER SIZE	INSPECTION REPORT	P/W	W	R
C	MARKING									
C.1	IDENTIFICATION	AS PER STD	ASME B16.20	ASME B16.20	VISUAL	VISUAL	INSPECTION REPORT	P/W	W/R	R
D	FINAL INSPECTION									
D1	VISUAL EXAMINATION	VISUAL	PO/ASME B16.20	PO/ASME B16.20	VISUAL	5 % RANDOM@ LOT OTY	INSPECTION REPORT	P/W	W	-
D.2	DIMENSION MEASUREMENT	DIMENSION	PO/ASME B16.20	PO/ASME B16.20	MEASUREMENT	5 % RANDOM@ LOT OTY	INSPECTION REPORT	P/W	W	-
D.3	COMPRESSION & RECOVERY TEST	TESTING	PO/ASME B16.20	PO/ASME B16.20	TESTING	ONE NO PER RATING	INSPECTION REPORT	P/W	W	-
E	PACKING LABEL									
E.1	IDENTIFICATION TAG	TAGGING WITH PO.NO./SIZ	PO//ASME B16.20	PO//ASME B16.20	100%	VISUAL	TAGS	P/W	R	
F	DOCUMENTATION									
F.1	FINAL DOCUMENTATION (ISSUE OF IRN AND ENDORSEMENT)	PO/SPEC/QAP	PO/SPEC/QAP	PO/SPEC/QAP	100%	PO/SPEC	IRN	R	W/R	H

MANUFACTURER			QUALITY ASSURANCE PLAN			QAP NO: GGL/STUD NUTS/001 REV: 00 DT:			
CONTRACTOR :				PO NO :	DT:				
SR. NO	COMPONENTS & (	RAW MATERIAL	QUANTAM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMET OF RECORD	INSPECTION MANUFACTURER	TPI	CLIENT
1	RAW MATERIAL								
	RAW MATERIAL	1. MANUFACTURING PROCESS OF STEEL	PER HEAT	MOC	MOC	PER HEAT	P	R	R
		2. CHEMICAL COMPOSITION	PER HEAT	MOC	MOC	MTC / LAB TEST REPORT	R	R	R
		3. MECHANICAL PROPERTIES	PER HEAT	MOC	MOC	INSPECTION REPORT	R	R	R
		4. VISUAL	100%	MOC	MOC	INSPECTION REPORT	P	W	R
2	INPROCESS INSPECTION.								
	1. MFG. OF BOLT & NUT	1.CUTTING , GRINDING, FORGING, THREADING ETC.	100%	VENDOR DRG./ MOC	VENDOR DRG./ MOC	DIMENSION REPORT	P	R	R
		2. PRODUCT DIMENSIONS	100%	VENDOR DRG./ MOC/ ASME B18.2.1&2.2	VENDOR DRG./ MOC / ASME B18.2.1&2.2	DIMENSION REPORT	P	R	R
	2. HEAT TREATMENT	1. HEAT TREATMENT CYCLE	TEMP. / TIME	ASTM A 370 / MOC/ TENDER SPEC.	ASTM A 370 / MOC / TENDER SPEC.	HT GRAPH / INSPECTION REPORT	P	R	R
	3.STAMPING OF SAMPLE FOR	1. STAMPING OF TEST SAMPLE	100%	ASTM A 370 / MOC/ TENDER SPEC.	ASTM A 370 / MOC / TENDER SPEC.	INSPECTION REPORT	P	W	R
	4. MECHANICAL TESTING	1. TENSILE TESTING (TS,YS,EL%)	ONE / HEAT/LOT	ASTM A 370 / MOC/ TENDER SPEC.	ASTM A 370 / MOC / TENDER SPEC.	INSPECTION REPORT	P	W	R
		2. PROOF LOAD TEST	ONE / HEAT/LOT	ASTM A 370 / MOC/ TENDER SPEC.	ASTM A 370 / MOC / TENDER SPEC.	INSPECTION REPORT	P	W	R
		3. HARDNESS TESTING	ONE / HEAT/LOT	ASTM A 370 MOC/ TENDER SPEC.	ASTM A 370 / MOC / TENDER SPEC.	INSPECTION REPORT	P	W	R
		4. IMPACT TEST AT - 0° C NOTE - 4	ONE / HEAT/LOT	ASTM A 370 / MOC/ TENDER SPEC.	ASTM A 370 / API 6 D / TENDER SPEC.	INSPECTION REPORT	P	W	R
	5. PRODUCT CHEMICAL CHECK ANALYSIS	1. CHEMICAL ANALYSIS	ONE / HEAT/LOT	ASTM A 370 / MOC/ TENDER SPEC.	ASTM A 370 / MOC / TENDER SPEC.	INSPECTION REPORT	P	W	R
		2. PMI TEST	ONE / HEAT/LOT	ASTM A 370 / MOC/ TENDER SPEC.	ASTM A 370 / MOC / TENDER SPEC.	INSPECTION REPORT	P	W	R
3	FINAL INSPECTION								
	FINAL INSPECTION	1. VISUAL\ STAMPING \ MARKING	100%	MOC	MOC	INSPECTION REPORT	P	W	R
		2. DIMENSIONS	100%	MOC	MOC	INSPECTION REPORT	P	W	R
4	FINAL DOCUMENTS								
	FINAL DOCUMENTS	1. QAP / PO / MTC / IR / COMPLIANCE CERTIFICATES	100%	AS PER TENDER SPEC / AS PER APPR. DRG. & QAP	AS PER TENDER SPEC / AS PER APPR. DRG. & QAP	COMPLIANCE CERTIFICATE	P	R	R
		2. INSPECTION RELEASE NOTE	100%	AS PER TENDER SPEC / AS PER APPR. DRG. & QAP	AS PER TENDER SPEC / AS PER APPR. DRG. & QAP	COMPLIANCE CERTIFICATE	H	P	R

Legend: P-Perform, R-Review, W-Witness, H-Hold TPIA-Third Party Inspection Agency

NOTE:

1. **TPIA SHALL ISSUE 3.2 CERTIFICATE AS PER BS EN 10204**
2. **MATERIAL & TYPE SHALL BE AS PER TENDER SPECS/DATA SHEET**
3. **SAMPLE FROM ANY ONE LOT/HEAT SHALL BE TESTED BY CLIENT (GGL) UNDER THEIR WITNESS THIRD PARTY LAB AT DISCRETION**
4. **AVERAGE J VALVE (27 J) AND ONE SPECIMEN 'J' VALUE (20J) SHALL BE MAINTAINED.**