



شرکت ملی گاز ایران

مدیریت پژوهش و فناوری

امور تدوین استانداردها

IGS

Iranian Gas Standards

مشخصات فنی خرید

دستگاه بودار کننده گاز، نوع تزریقی

Odorizer , Injection Type

Odorizer , Injection Type

1. SCOPE

- 1.1 THIS SPECIFICATION COVERS THE MIN. REQUIREMENTS FOR DESIGN , MATERIAL , FABRICATION , INSPECTION , MARKING , PACKING AND SHIPPING OF PACKAGED ELECTRONIC INJECTION TYPE GAS ODORIZER AND THE REQUIRED INSTRUMENTATION TO BE USED IN NATURAL GAS PRESSURE REDUCING STATIONS . IN CASE OF ANY DEVIATION FROM THIS SPECIFICATION IT SHALL BE CLEARLY STATED ON TECHNICAL QUOTATION .
- 1.2 WHENEVER NECESSARY ADDITIONAL PROVISIONS TO THE FOLLOWING STANDARDS AND CODES ARE STATED WHICH SHALL BE CONSIDERED AS INTEGRAL PARTS OF THIS SPECIFICATION .
- 1.3 ODORIZERS SHALL BE DESIGNED TO BE OPERATED UNATTENDEDLY FOR THE FULL RANGE OF GAS FLOW AS STIPULATED IN DATA SHEET .

2. CODES & STANDARDS

WHERE THE FOLLOWING STANDARDS ARE REFERRED TO ONLY THE LATEST EDITION OF EACH STANDARD STANDS VALID FOR APPLICATION .

1. PIPE FLANGES & FLANGED FITTINGS : ANSI B 16.5
2. FORGED STEEL FITTINGS , THREADED ANSI B 16.11
3. FORGED STEEL FITTINGS , SOCKET WELDING ANSI B 16.9
4. GASKETS : ANSI B 16.20
5. BOLTING : ANSI B 18.2 AND B 2.2
6. GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEM ASME / ANSI B 31.8
7. PRESSURE PIPING : ANSI B 31.3
8. PRESSURE VESSEL : ASME SECTION VIII DIV . I
9. ELECTRICAL APPARATUS FOR POTENTIALLY EXPLOSIVE ATMOSPHERES : BS 5501 PART 6

3. GENERAL REQUIREMENTS

- 3.1 THE ODORIZER SHALL BE DESIGNED AND FABRICATED TO BE SUITABLE FOR OUT DOOR INSTALLATION AND FOR THE MOST ADVERSE ENVIROMENTAL CONDITION OF OPERATION THROUGH OUT THE YEAR .
- 3.2 ODORANT TANK SHALL BE MADE OF CARBON STEEL ASTM A 516 , GR. 70 INTERNALLY COATED WITH MIN 300 MICRONS OF EPOXY (PRIMER + UNDERCOAT + 2 FINISH COATS) ACCORDING TO N.I.O.C STANDARDS : IPS - M - TP - 215 , 220 & 225 (1993) .
- 3.3 ALL ODORIZER UNITS SHALL BE ACCOMODATED WITH LIFTING FACILITIES FOR HANDLING AND TRANSPORTATION PURPOSES .
- 3.4 FABRICATION OF ODORIZER SHALL NOT BE COMMENCED PRIOR TO RECEIPT OF DRAWING AND DESIGN CALCULATIONS APPROVAL FROM THE PURCHASER .
- 3.5 ALL PRESSURE PARTS AND NON - REMOVABLE AND EXPOSED TO THE CONTAINED MEDIA SHALL HAVE THE CORROSION ALLOWANCE OF 3/16 IN . ADDED .
- 3.6 STORAGE TANK WILL BE FABRICATED & SUPPLIED LOCALLY AS PER PARA 2.
- 3.7 SUPPLIER OF ODORIZER SHALL PROVIDE THE CLIENT WITH ALL DRAWINGS AND TECH . INFORMATION REQUIRED FOR FABRICATION OF ODORANT STORAGE TANK , ATTACHMENTS , FITTINGS ETC . PRIOR TO START OF MANUFACTURING THE ODORIZER UNIT .
- 3.8 ODORANT TANK SHALL HAVE A DEPRESSURIZING VALVE AND AN APPROPRIATE CHARCOAL FILTER .
- 3.9 THE LOCATION AND MINIMUM SIZE OF ATTACHMENT WELD FROM NOZZELS AND OTHER CONNECTIONS SHALL CONFORM TO REQUIREMENTS DEFINED IN THE APPLICABLE SPECIFIED CODES IN THIS STANDARD AND ANY NECESSARY CORROSION ALLOWANCE FOR THE ABOVE ATTACHMENTS SHALL GENERALLY CONFORM TO THE APPLICABLE PARTS OF THE SAME CODES .
- 3.10 OPENINGS IN SHELL AND HEAD SHALL BE CONSIDERED IN ACCORDANCE WITH THE APPLICABLE CODES AND SHALL BE ADEQUATE FOR PRESSURE AND TEMPERATURE

AND BE STAMPED ON THE VESSEL . VESSELS CORRODING THICKNESS IN EXCESS OF THE REQUIRED DESIGN OR MINIMUM CODE THICKNESS SHALL NOT BE CONSIDERED IN THE DESIGN OF OPENING REINFORCEMENT UNDER OPERATING CONDITIONS . TELL TALE HOLES SHALL BE PROVIDED IN ACCORDANCE WITH ASME SECTION VIII DIVISION IUG 25 (e).

- 3.11 INSPECTION DOOR TO BE PROVIDED FOR ODORANT TANK .
- 3.12 THE ODORIZER SHALL BE SELF SUPPORTING BY MEANS OF EITHER SKID MOUNTED OR LEGS SUPPORTED PROVISIONS WHICHEVER MOST APPROPRIATE .
- 3.13 A 316 STAINLESS STEEL SEAMLESS TUBING SHALL BE USED THROUGHOUT THE UNIT
- 3.14 ODORANT TANK SHALL BE SIZED BIG ENOUGH TO HOLD THE FULL QUANTITY OF ODORANT REQUIRED FOR ONE MONTH CONTINUOUS OPERATION OF CITY GATE STATION AT MAX. FLOW RATE AS STATED IN THE DATA SHEET . (MIN. TANK CAPACITY = 300 LITERS)
- 3.15 THE ODORIZER SHALL BE DESIGNED TO INJECT THE SPECIFIED DOZE OF ODORANT INTO GAS LINE PROPORTIONAL TO THE FLOW RATE FOR FULL RANGE OF OPERATION .
- 3.16 MAXIMUM WORKING PRESSURE OF ODORANT TANK SHALL BE 30 PSI .
- 3.17 ALL ODORIZERS SHALL BE SUPPLIED COMPLETE WITH VALVES , FITTINGS ODORANT LOADING FACILITIES AS SCHEMATICALLY SHOWN IN APPENDIX “ B “ .
- 3.18 ALL CONTROLS COMPONENTS OF ODORIZERS SHALL BE FITTED IN AN EXPLOSION PROOF CONTROL BOX.
- 3.19 FOR INSTALLATION AND OPERATION PURPOSES UP TO 7 METERS FROM THE MANI LINE , APPROPRIATE ST.STL.TUBES AND FITTINGS SHOULD BE SUPPLIED .
- 3.20 FIVE MICRON FILTER SHALL BE PROVIDED UPSTREAM THE INJECTION PUMP .
- 3.21 EACH ODORIZER SHALL BE ACCOMODATED WITH A MEASURING BURRETTE SUITABLE FOR PUMP CALIBRATION AND ALSO TANK LEVEL INDICATION . IT SHALL

- STAND CLEAR AGAINST ODORANT EFFECTS AND SUN RAY AND BE PROTECTED BY A PROPER GUARD .
- 3.22 ALL ASSOCIATED COMPONENTS IN CONTACT WITH ODORANT SHALL BE RESISTANT TO ODORANT .
- 3.23 THE PUMP SHALL BE SO SIZED AS TO MEET THE MAX. INJECTION RATE OF 25 MG. OF ODORANT PER STANDARD CUBIC METER OF GAS FLOW .
- 3.24 CONTROL SHALL BE MADE BY USING SIGNALS , RECEIVED FROM THE METER (TURBINE OR ORIFICE AS SPECIFIED IN DATA SHEET) TO CONTROL THE PUMP . EACH ODORIZER SHALL BE ACCOMODATED WITH AN EMERGENCY PULSE GENERATING UNIT IN CASE OF ANY FAILURE DEVELOPED IN THE MAIN PULSE GENERATION SYSTEM THE EMERGENCY PULSE GENERATING UNIT WILL UNDERTAKE THE DUTY BY MANUAL STARTING OF THE UNIT .
- 3.25 THE PUMP SHALL BE SOLENOID DRIVEN GLANDLESS HYDRAULIC DIAPHRAGM TYPE .
- 3.26 AN INJECTION NOZZLE , TO BE FITTED TO THE MAIN LINE , MADE FROM ST.STL. SHALL BE PROVIDED FOR EACH UNIT .
- 3.27 THE NOZZLE SHALL BE SUPPLIED TOGETHER WITH A $\frac{3}{4}$ " (FOR FLOW RATE OF 50000 SCMH PLUS) OR $\frac{1}{2}$ " (FOR FLOW RATE OF 50000 SCMH MINUS) BALL TYPE NONRETURN VALVE AND A SUITABLE STOP VALVE AND AN INJECTION PERFORATED TUBE FILLED WITH FELT OR ST.STL. GAUZE TO ALLOW A UNIFORM DISPERSION OF ODORANT INTO GAS FLOW .
- 3.28 PUMP , CONTROL CABINET AND AUTOMATIC / MANUAL CHANGE OVER SWITCH SHALL BE SUPPLIED EXPLOSION PROOF IN ACC. WITH CLASS EEX e II T4 .
- 3.29 THE CONTROL SYSTEM SHALL INCORPORATE BUT NOT LIMITED TO , THE FOLLOWING ITEMS .
- PULSE DIVIDER (IF NECESSARY) .
 - CHANGE OVER SWITCH FOR SWITCHING OVER SIGNALS FROM FLOW METER TO THE EMERGENCY PULSE GENERATOR .
 - EMERGENCY PULSE GENERATOR .

- 3.30 THE SYSTEM SHALL BE DESIGNED & SUPPLIED TO BE POWERED BY USER'S 220 +/- %10 V.AC. 50 HZ. 1 PH. FEED.
- 3.31 POWER CONTINIUTY WILL BE ACCOMPLISHED BY FACILITIES PROVIDED BY USER OF THE ODORIZER SYSTEM .
- 3.32 UPS SYSTEM IS DESIGNED & SUPPLIED BY LOCAL SOURCES ON THE BASIS OF THE DATA GIVEN BY ODORIZER'S SUPPLIER .
- 3.33 UPS WILL BE DESIGNED & SUPPLIED IN ACCORDANCE WITH THE IRANIAN PETROLUM STANDARD , SPECIFICATION NO. IPS – M – EL – 176 (0) DATED JULY 1994 .
- 3.34 RANGE OF AMBIENT WORKING TEMP. SHALL BE -29 TO +60 °C UNLESS SPECIFIED IN DATA SHEET .

4. ODORANT

THE ODORANT TO BE USED WILL BE MERCAPTAN MAKING A CONCENTRATION OF 10 TO 25 MG. PER STANDARD CUBIC METER WHEN INJECTED TO GAS FLOW . THE COMPOSITION OF MERCAPTAN IS AS UNDER :

- | | | |
|---|---------------------------|--------------|
| - | ISOPROPYLE MERCAPTAN | 80 % APPROX. |
| - | N – PROPYLE MERCAPTAN | 10 % MAX. |
| - | TERITIARY BUTYL MERCAPTAN | 10 % APPROX. |

5. INSPECTION

- 5.1 IN ADDITION TO ALL MANDATORY CODED PROVISIONS , ALL MATERIALS AND FABRICATION SHALL BE ACCORDING TO INSPECTION TERMS PROVIDED BY PURCHASER IF NECESSARY .
- 5.2 PRIOR TO FINAL INSPECTION ALL SLAG , LOOSE SCALE , DIRT , GRIT , WELD SPATTER , PRINT , OIL AND OTHER FOREIGN MATTER SHALL BE THOROUGHLY REMOVED SO THAT INSPECTION MAY BE PERFECTLY CARRIED OUT .
- 5.3 THE SUPPLIER SHALL NOTIFY THE PURCHASER OF READINESS FOR INSPECTION TESTS REQUIRED BY THE SPECIFICATION AND DESIGN CODES REASONABLY PRIOR TO INSPECTION TEST VISITS .

5.4 WHERE THE PURCHASER DESIRES TO VISIT THE WORKS TO INSPECT THE WORK OR WITNESS TESTS , ADEQUATE NOTICE TIME IS GIVEN TO THE SUPPLIER .

5.5 THE SUPPLIER SHALL ALLOW FREE ACCESS TO THE PURCHASER TO ALL PARTS OF THEIR OWN , OR THEIR SUBCONTRACTOR'S WORK FOR THE PURPOSE OF CARRYING OUT INSPECTION OR TEST WITNESS .

6. TESTING

6.1 ALL TEST CERTIFICATES MUST BEAR THE PURCHASER'S NAME AND ORDER NUMBER WHETHER THEY EMANATE DIRECTLY FROM THE MAIN SUPPLIER OR A SUBCONTRACTOR .

6.2 TEST CERTIFICATE MUST BE APPROVED BY THE PURCHASER BEFORE DESPATCH INSTRUCTION IS GIVEN .

6.3 INJECTION TYPE ODORIZERS SHALL BE TESTED AS FOLLOWS :

6.3.1 VISUAL INSPECTION .

VISUAL INSPECTION SHALL INCLUDE , BUT NOT LIMITED TO :

- 1st. WORKMANSHIP
- 2nd. PAINTING
- 3rd. ASSEMBLY AND FABRICATION

6.3.2 TEST CERTIFICATES :

- 1st. EXPLOSION PROOF CERTIFICATE FOR PUMP , CONTROL BOX , SWITCHES AND OTHER ELECTRICAL PARTS .
- 2nd. CERTIFICATE FOR CONTROL COMPONENTS
- 3rd. CERTIFICATE FOR SAFETY RELIEF VALVE

6.3.3 PERFORMANCE AND FUNCTIONAL TEST

- A. PERFORMANCE AND FUNCTIONAL TEST SHALL BE CARRIED OUT FOR ENTIRE REQUIRED CAPACITY RANGE AND SPECIFIED PRESSURE . THIS TEST SHALL BE WITNESSED BY N.I.G.C. REPRESENTATIVE AND TEST CERTIFICATE SHALL BE APPROVED BY N.I.G.C.

- 2nd. SAFETY RELIEF VALVE TEST
- 3rd. FITLER PERFORMANCE TEST

7 MARKING

7.1 EACH ODORIZER SHALL BE IDENTIFIED BY PERMANENTLY ATTACHED CORROSION RESISTANT NAMEPLATE . NAMEPLATE SHALL BE LOCATED ON THE CONTROL CABINET SO THAT IT IS EASILY VISIBLE AFTER INSTALLATION . THE PUMP SHALL BEAR A NAMPLATE TO MANUFACTURERS STANDARDS .

7.2 NAME PLATE SHALL BEAR THE FOLLOWING INFORMATION :

- MANUFACTURER'S NAME.
- YEAR OF MANUFACTURING
- SERIAL NUMBER
- PUMP TYPE AND MODEL NO.
- MAXIMUM CAPACITY OF PUMP (L/H)
- MAX. PUMP SWEEP VOLUME PER STROKE (CM3)
- PUMP SPEED (NUMBER OF MAX.STROKE / H)
- PUMP MAX. INJECTION PRESSURE (BAR)
- POWER SUPPLY VOLTAGE AND FREQUENCY
- GAS FLOW RATE (SCM/H)
- ACTUAL MAX. OPERATING PRESSURE
- NIGC PURCHASE ORDER NO. AND ITEM NO.

7.3 FLOW DIAGRAM AND OPERATING INSTRUCTION SHALL BE INDELIBLY PRINTED ON A PERMANENT METAL PLATE AND FITTED ONTO THE CONTROL BOX TO THE PURCHASER'S STANDARD / SELECTION .

8 SHIPMENT

8.1 ALL FLANGED OPENINGS SHALL BE PROPERLY PROTECTED BY SUITABLE CAPS . TAPPED OPENINGS SHALL BE PROTECTED WITH THREADED STEEL PLUGS SCREWED IN .

8.2 RELEASE NOTES WILL BE ISSUED BY THE PURCHASER FOR THE ODORIZER AFTER FINAL INSPECTION AND TESTING AT THE WORKS AND ODORIZERS SHALL NOT BE DESPATCHED UNTIL SUCH RELEASE NOTES HAVE BEEN ISSUED .

- 8.3 PRIOR TO SHIPMENT , THE ODORIZER SHALL BE THOROUGHLY CLEANED AND ALL WATER , DIRT , SAND , WELD METAL SCALE AND OTHER SUNDRY MATTERS SHALL BE REMOVED .
- 8.4 ALL TESTING LIQUIDS SHALL BE REMOVED AND UNITS BE DRIED BEFORE PACKING .

9 GUARANTEE

- 9.1 MANUFACTURER SHALL GUARANTEE THE COMPLIANCE OF MATERIAL AND PERFORMANCE OF THE SUPPLIED EQUIPMENTS WITH THIS SPECIFICATION .
- 9.2 THE PERIOD OF GUARANTEE SHALL BE ONE YEAR AFTER EQUIPMENT GOES ON STREAM OR EIGHTEEN MONTHS FROM DATE OF SHIPMENT , WHICHEVER OCCURS FIRST .
- 9.3 SUPPLIER SHALL AGREE TO REPAIR OR REPLACE ANY UNIT , EQUIPMENT OR PART WHICH PROVES TO BE DEFECTIVE DURING THE ABOVE MENTIONED PERIOD .

10. PACKING

FOR EACH ODORIZER , PACKING SHALL BE IN ACCORDANCE WITH N.I.G.C PROTECTION , PACKING , MARKING AND DISPATCHING INSTRUCTIONS .

11. DRAWINGS & DATA

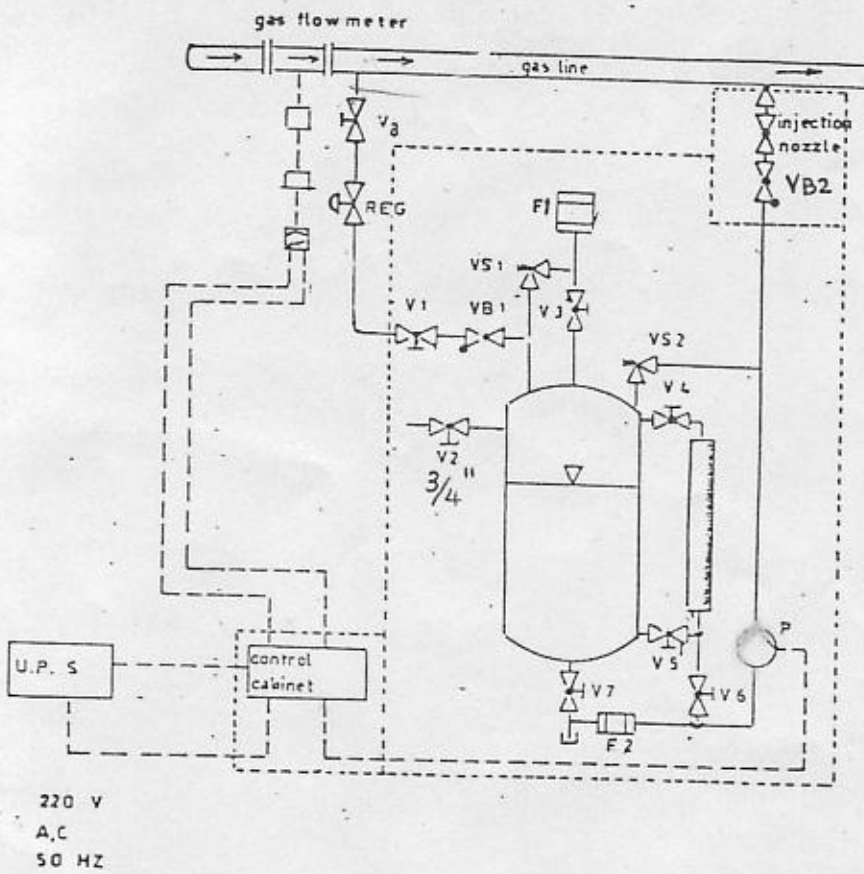
FULL SETS OF DRAWINGS AND DATA SHEETS SHALL BE FURNISHED TO THE PURCHASER AT QUOTATION AND ORDER ACKNOWLEDGEMENT STAGES AS FOLLOWS :

- 1st. AT QUOTATION STAGE (3 COPIES)
- 2nd. AT ORDER ACKNOWLEDGEMENT STAGE (5 COPIES)
- 11.1 GENERAL ARRANGEMENT AND DETAIL DRAWINGS SHOWING OUTLINE DIMENSIONS , CALCULATION AND TECHNICAL DATA AND WEIGHTS .
- 11.2 COMPLETEE SPECIFICATION , ORIGINAL CATALOGUES AND FUNCTIONAL DESCRIPTION OF ALL COMPONENTS , INSTRUMENTS , VALVES AND PARTS LIST .
- 11.3 RECOMMENDED SPARE PARTS LIST WITH UNIT PRICES FOR COMMISSIONING AND TWO YEARS OPERATION .

11.4 COMPLETE INSTRUCTION MANUAL FOR INSTALLATION , COMMISSIONING AND MAINTENANCE OF ODORIZER .

APPENDIX " A "

SCHEMATIC DIAGRAM



V₁, V₂, V₃, V₄, V₅, V₆, V₇, V₈

VS₁, VS₂

REG.

VB₁, VB₂

F₁

F₂

P

MANUAL VALVE

SAFETY RELIEF VALVE

PRESSURE REGULATOR

CHECK VALVES

CHARCOAL FILTER

ODORANT FILTER

SELENOID DRIVEN PUMP



APPENDIX “B” ODORANT LOADER SPECIFICATION

1. OPERATING METHOD AND DESCRIPTION :

ODORIZING AGENT USED FOR ODORIZATION (MERCAPTAN) IS USUALLY SUPPLIED IN 200 – LT STANDARD STEEL BARRELS . DUE TO THE FACT THAT THE ODORIZING AGENT HAS A CHARACTERISTIC PENETRANT OFFENSIVE , SMELL IT IS NECESSARY TO FILL THE LIQUID INTO THE ODORANT TANK BY SPECIAL DEVICE TO PREVENT POLLUTION .

EACH ODORANT LOADER SHOULD BE CONSISTING OF :

- A PRESSURE SUPPLY UNIT
- A SEPARATE LANCE THROUGH WHICH THE ODORANT IS DISCHARGED .

1.1 PRESSURE SUPPLY UNIT

THE PRESSURE SUPPLY UNIT IS NECESSARY TO LOAD THE BARREL WITH A SLIGHT OVERPRESSURE . THIS UNIT IS CONSISTING OF :

- A QUICK RELEASE SELF SEALING COUPLING ¾” NPT (6) .
- A FILTER (5) .
- A PRESSURE CONTROLLER OF OUTLET 5 PSIG (4) .
- A ¾” BACK PRESSURE VALVE (3) .
- FULL CAPACITY SAFETY RELIEF VALVE ¾” (2) .
- MANUAL SHUT – OFF VALVE ¾” (1) .
- PRESSURE GAUGE (9) .
- FLEXIBLE HOSE ST.STL. PTFE LINED ¾” (10) .

THE QUICK COUPLING CAN BE CONNECTED TO A SUITABLE SOURCE OF PRESSURIZED GAS . THE GAS IS PASSING THE PRESSURE CONTROLLER , WHERE IT IS REDUCED TO A PRESSURE OF MAX. 250 MBAR .

THE OPENING PRESSURE OF THE SAFETY RELIEF VALVE IS 250 MBAR AND PROTCTS THE BARREL AGAINST NON PERMITTED OVERPRESSURE .

THE GAS PRESSURE CAN BE INTERRUPTED BY THE BUILT – IN SHUT – OFF VALVE .

- SEALING PARTS SHALL BE RESISTANT AGAINST MERCAPTAN ADVERSE EFFECTS .

1.2 LANCE

THE LANCE , WHICH MUST BE SEPARATELY INSTALLED IN THE 200 – LT STEEL BARREL SHOULD BE CONSISTING OF :

- A PIPE WITH 2 INCH THREAD CONNECTION (11).
- A ¾" SHUT – OFF VALVE (8).
- A ¾" BUILT – IN BACK PRESSURE VALVE (7).
- A ¾" QUICK COUPLING WITH A 5 METER PTFE FLEXIBLE TUBE ST.STL. WIRE PROTECTED .

THE BUILT – IN BACK PRESSURE VALVE (7) PROTECTS THE BARREL AGAINST WRONG OPERATING PROCEDURE .

- SEALING PARTS SHALL BE RESISTANT AGAINST MERCAPTAN ADVERSE EFFECTS .

APPENDIX “ C “**DATA SHEET**

1. MAX. & MIN. LINE PRESSURE KG/CM2 PSIA .
2. MAX. & MIN. GAS TEMP DEG.C.
3. MAX. GAS FLOW SCM/H
4. DIAMETER OF GAS LINE INCH
5. TYPE OF THE GAS METER : () TURBINE () ORIFICE
6. ODORANT : MERCAPTAN
7. ODORANT CONCENTRATION 10 -25MG. PER SCM
8. INSTALLATION : OUTDOOR
9. INPUT SIGNAL (DIGITAL :) , (ANALOG :)
10. RELIEF VALVE SET PRESSURE 2.4 KG/CM2 = 35 PSIA
11. MAX. DISTANCE FROM GAS METER TO CONTROL CABINET METERS
12. MAX. AMBIENT TEMP. DEG.C.
13. MIN. AMBIENT TEMP. DEG.C.
14. MAX. SUN TEMP. DEG.C.
15. MAX. RELATIVE HUMIDITY %
16. MAX. WIND VELOCITY KM/H
17. TOTAL ANNUAL RAINFALL MM
18. INDENT NO.ITEM NO.