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National Iranian Gas Co.

مدیریت پژوهش و فناوری

Research and Technology Management

امور تدوین استانداردها

Standardization Division

IGS

Iranian Gas Standards

Specification for :

مشخصات فنی :

Filter - Separator

دستگاه سپراتور (جداکننده) گاز از ذرات

APPROVED

FOREWORD

This standard is intended to be mainly used by **NIGC** and contractors and has been prepared on interpretation of recognized standards , technical documents , knowledge ,backgrounds and experiences in gas industries at national and international levels.

Iranian Gas Standards (**IGS**) are prepared , reviewed and ammended by technical standard committees within NIGC Standardization Div. and submitted to the **NIGC's "STANDARDS COUNCIL"** for approval .

IGS Standards are subject to revision , amendment or withdrawal , if required , thus the latest edition of **IGS** shall be checked/inquired by **NIGC** users .

This standard must not be modified or altered by the end users within **NIGC** and her contractors. Any deviation from normative references and/or well known manufacturers specifications must be reported to Standardization div.

Any comments from concerned parties on **NIGC** distributed **IGS** are welcome to technical standards committees and will receive serious attention and consideration should a revision to standards is recommended .

GENERAL DEFINITIONS :

Throughout this standard the following definitions , where applicable , should be followed :

1- "**STANDARDIZATION DIV.**" has been organized to deal with all aspects of industrial standards in NIGC . Therefore , all queries for clarification or amendments are requested to be directed to the mentioned div.

2- "**COMPANY** " : refers to national iranian gas company .

3- "**SUPLIER**" : refers to a firm who will supply the service , equipment or material to igs specification whether as the prime producer or manufacturer or a trading firm .

4- "**SHALL**" : is used where a provision is mandatory.

5- "**SHOULD**" : is used where a provision is advised only.

6- "**MAY**" : is used where a provision is completely discretionary.

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پیشگفتار

- ۱- این استاندارد/دستورالعمل بمنظور استفاده اختصاصی در شرکت ملی گاز ایران و شرکتهای فرعی وابسته تهیه شده است.
- ۲- شرکت ملی گاز ایران در مورد نیازهای عمومی از استانداردهای وزارت نفت (IPS) و در مورد نیازهای اختصاصی از استانداردهای اختصاصی خود (IGS) استفاده می نماید.
- ۳- استانداردهای شرکت ملی گاز ایران (IGS) توسط کمیته های تخصصی استاندارد متشکل از کارشناسان بخش های مختلف و یا مشاور تهیه می شود و توسط شورای استاندارد (منتخب هیئت مدیره شرکت ملی گاز ایران) به تصویب میرسند.
- ۴- در تنظیم متن استانداردهای (IGS) از کلیه منابع شناخته شده استاندارد، اطلاعات فنی - تخصصی مربوط به صنایع گاز دنیا، مشخصات فنی تولیدات سازندگان معتبر جهانی و نیز از نتیجه تحقیقات و تجربیات کارشناسان و متخصصان داخلی بر حسب مورد استفاده می شود. همچنین بمنظور استفاده هر چه بیشتر از تولیدات داخلی قابلیت های سازندگان داخلی نیز مورد توجه قرار میگیرد.
- ۵- استانداردها از طریق پایگاه اینترنتی شرکت * و یالوح فشرده (CD) در اختیار واحدها و کاربران قرار می گیرد .
- ۶- استانداردها بطور متوسط هر ۵ سال یکبار و یادر صورت ضرورت زودتر، مورد بازنگری و بروزرسانی قرار میگیرند. بنابراین کاربران باید همیشه آخرین نگارش را مورد استفاده قرار دهند.
- ۷- هرگونه نظر و یا پیشنهاد اصلاح در مورد استانداردها مورد استقبال و بررسی قرار خواهد گرفت و در صورت تأیید، استاندارد مربوطه نیز مورد تجدیدنظر قرار خواهد گرفت .

تعاریف عمومی

در متن استانداردهای (IGS) از تعاریف و اصطلاحات زیر استفاده میشود.

- ۱- "شرکت" (COMPANY): منظور از شرکت "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۲- "فروشنده" (SUPPLIER/VENDOR): به فرد یا موسسه ای اطلاق میگردد که تعهدی رانسبت به شرکت تقبل نموده است.
- ۳- "خریدار" (PURCHASER): منظور از خریدار "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۴- "SHALL": در مواردی بکاربرده میشود که انجام خواسته مورد نظر اجباری است
- ۵- "SHOULD": در مواردی بکاربرده میشود که انجام خواسته مورد نظر ترجیحی و درعین حال اختیاری است
- ۶- "MAY": در مواردی بکاربرده میشود که انجام کار به شکل مورد بحث نیز قابل قبول میباشد

IGS-PM-103**1.0 SCOPE**

1.1 THIS SPECIFICATION, TOGETHER WITH THE RELEVANT DATA SHEETS AND DRAWINGS, COVERS THE GENERAL REQUIREMENTS FOR THE DESIGN, MATERIALS , FABRICATION , TESTING, INSPECTION AND PACKING FOR SHIPMENT OF A WELDED NATURAL GAS FILTER-SEPARATOR AND THE REQUIRED INSTRUMENTATION.

THE VENDOR SHALL FURNISH COMPLETE OPERATING UNIT INCLUDING ALL NECESSARY ITEMS SUCH AS D.P. GAUGE , VALVES , ETC. TO ENSURE SATISFACTORY OPERATION.

1.2 THIS SPECIFICATION IS PART OF THE ENQUIRY AND PURCHASE ORDER, IT SHALL BE THE SUPPLIER'S RESPONSIBILITY TO CLEARLY INDICATE ANY DEVIATION FROM THE SPECIFICATIONS, OTHERWISE IT IS UNDERSTOOD THAT THE EQUIPMENT CONFORMS TO THE REQUIREMENTS OF THIS SPECIFICATION.

1.3 THIS SPECIFICATION DOES NOT SUPERSEDE THE ACCEPTED PRESSURE VESSEL CODES BUT ONLY SUPPLEMENTS THEM WITH REGARD TO CERTAIN CONDITIONS NOT FULLY COVERED IN THE CODES.

1.4 THE EQUIPMENT SHALL BE DESIGNED FOR FULL LOAD , UNATTENDED CONTINUOUS AUTOMATIC CONDITIONS WITHOUT THE PROVISION OF SPECIAL HOUSING OR SHELTERS ETC.

1.5 THE UNIT SHALL BE COMPLETELY ASSEMBLED , TESTED AND PAINTED ACCORDING TO THE STANDARDS , CODES AND SPECIFICATIONS QUOTED HEREIN AND SHALL REQUIRE ONLY PIPE CONNECTIONS BEFORE BEING PLACED IN TO SERVICE.

2.0 REFERENCE CODES AND STANDARDS

2.1 THE LATEST EDITIONS AND REVISIONS OF ALL CODES AND STANDARDS AND THEIR SUBSEQUENT ADDENDAS ARE INTENDED.

- 2.2 ASME BOILER AND PRESSURE VESSEL CODE:
SECTION VIII DIVISION 1-“UNFIRED PRESSURE VESSELS”
SECTION LX” WELDING AND BRAZING QUALIFICATIONS”.
- 2.3 ANSI B.16.5 “ STEEL PIPE FLANGES AND FLANGED FITTINGS.”
- 2.4 ANSI B.16.11 “ FORGED STEEL FITTINGS, SOCKET-WELDING
AND THREADED”.
- 2.5 ANSI B.16.20 “ GASKETS”.
- 2.6 ANSI B.18.2.1 AND B.18.2.2 “BOLTING”.
- 2.7 ANSI B.31.8 “ GAS TRANSMISSION AND DISTRIBUTION PIPING
SYSTEM”.
- 2.8 ANSI B.31.3 “ PRESSURE PIPING”.

3.0 MATERIALS & COMPONENTS – GENETAL REQUIREMENTS

THE SKID MOUNTED HORIZONTAL NATURAL GAS FILTER –
SEPARATOR SHALL BE EQUIPPED BUT NOT LIMITED WITH
THE FOLLOWING:

- 3.1 VANE SEPARATOR TO BE SO DESIGNED THAT LIQUID
ENTRAINMENT SHALL NOT EXCEED 0.1 GALLON PER NMSCF.
- 3.2 LIQUID LEVEL INDICATOR
- 3.3 FLANGED (R.F.) LUBRICATED PLUG VALVE CCARDING TO API 6
D FOR LIQUID DRAIN NOT SMALLER THAN 2” .
- 3.4 PRESSURE GAUGES AND DIFF. PRESSURE GAUGES.
- 3.5 GAS VENT AND DRAIN CONNECTIONS AND VALVES SHALL BE
FLNGED (R.F.) LUBRICATED PLUG ACCORDING TO API 6 D.
- 3.6 QUICK OPENING END CLOSURE.
- 3.7 FILTER SEPARATOR SHALL BE EQUIPPED WITH
APPROPERIATE SAFETY RELIEF VALVE BEARING ASME U
STAMP.
- 3.8 ALL GAUGES AND INSTRUMENTS SHALL BE COMPLETE WITH
ALL NECESSARY FITTINGS VALVES SUPPORTS, ETC.

4.0 TECHNICAL DATA

4.1 SUPPLIER SHALL KEEP RECORDS , AS OUTLINED BELOW AND IDENTIFIED WITH THE MATERIAL THEY REPRESENT, AVAILABLE FOR THE PURCHASER'S EXAMINATION AT THE WORKS. MILL TEST REPORTS SHALL SPECIFICALLY STATE THE SPECIFICATION TO WHICH THE MATERIAL COMPLIES, AND SHALL INCLUDE RESULTS OF CHEMICAL ANALYSIS AND PHYSICAL TEST , TOGETHER WITH SUCH HEAT TREATMENT AS MAY BE GIVEN TO THE MATERIAL.

4.1.1 MILL TEST REPORTS FOR SHELL , HEAT AND SADDLES.

4.1.2 MILL TEST REPORTS FOR ALL ALLOY OR NON-FERROUS MATERIAL IF USED.

4.1.3 MATERIALS CERTIFICATES PROVIDING PROOF THA THE MANUFACTURING STANDARDS MEET CODE REQUIREMENT , SHALL BE FURNISHED FOR CARBON STEEL FITTINGS , FLANGES WELDING NECKS AND APS ETC.

5.0 DESIGN

5.1 FILTER-SEPARATOR SHALL BE DESIGNED ,FABRICATED , INSPECTED AND STAMPED IN ACCORDANCE WITH THE LATEST EDITION OF THE ASME BOILER AND PRESSURE VESSEL CODE , SECTION VIII , DIVISION I , AND ITS SUBSEQUENT ADDENDA.

THE VESSELS WILL BE OPERATING IN OUTDOOR CONDITION , UNDER DIRECT SUN AND RAIN.

5.2 FILTER-SEPARATOR SHALL BE DESIGNED TO WITHSTAND THE LOADS EXERTED BY INTERNAL PRESSURE , WEIGHT OF THE VESSELS , WIND , EARTHQUAKE , REACTION OF SUPPORTS , IMPACT , AND TEMPERATURE .

5.3 SUPPLIER SHALL USE IMPINGEMENT AND DEFLECTION SURFACES TO KNOCKDOWN LIQUIDS ENTERING AS SLUG OR LARGE DROPS, ALLOWING ONLY SMALL DROPLETS TO BE EXTRACTED BY MIST EXTRACTORS.

REMOVAL EFFICIENCY OF LIQUID SHALL BE 100% DOWN TO 5 MICRONS.

REMOVAL EFFICIENCY OF GAS PARTICLE SHALL BE 100% DOWN TO 3 MICRONS.

5.4 A FULL DIAMETER , QUICK OPENING AND CLOSURE SHALL BE FITTED FOR EASY ACCESS TO THE CARTRIDGE ELEMENTS.

5.5 THE FILTER- SEPARATOR SHALL BE DESIGNED TO GIVE A MINIMUM FLANGE TO FLANGE CLEAN PRESSURE DROP (NORMALLY LESSTHAN 2 PSI) AND THE ELEMENT SHALL BE CHANGED AT DIRTY PRESSURE DROP OF 10 PSI BUT BE CAPABLE OF WITHSTANDING UP TO 25 PSI DIFFERENTIAL PRESSURE WITHOUT ANY DAMAGE OCCURING.

5.6 CLEANABLE CARTRIDGE ELEMENT SHALL PERFERABLY BE OF THE OPENDED TYPE MANUFACTURED FROM EITHER A WOVEN POLYPROPELENE FIBER OR PHENOLIC RESIN BONDED GLASS FIBER OR SUITABLE EQUIBALENTS , ELEMENT SHALL BE FIRMLY CLAMPED ONTO THE BASKET SEAT TO PREVENT ANY POSSIBLE BY PASS OF PARTICLES OVER 5 MICRONS IN SIZE. CLEANABLE CARTRIDGE ELEMENT SHALL BE SUPPORTED BOTH INTERNALLY AND EXTERNALLY BY MILD STEEL CABMIUM PLATED DOUBLE WALLED BASKET.

5.7 THE MAXIMUM ALLOWABLE WORKING PRESSURE SHALL BE LIMITED BY THE SHELL OR HEAD.

5.8 FABRICATION OF FILTER-SEPARATOR SHALL NOT COMMENCE PRIOR TO RECEIPT OF DRAWING AND DESIGN CALCULATIONS APPROVAL FROM THE PURCHASER.

5.9 LIQUID HOLDING TIME SHALL BE SPECIFIED BY SUPPLIER.

5.10 VESSEL SHALL BE DESIGNED FOR FREE-STANDING.

5.11 OPENINGS ON THE VESSEL OF 1½ INCHES AND SMALLER SHALL BE 6000.POUND FORGED STEEL FULL OR HALF COUPLING.

OPENINGS ON THE VESSEL OF 2 INCHES AND LARGER SHALL BE FLANGED.

UNLESS OTHERWISE SPECIFIED.

- 5.12 ALL SURFACES OF PRESSURE PARTS , AND NON – PRESSURE PARTS DIRECTLY WELDED TO THE PRESSURE SHELL OR OTHERWISE NONREMOVABLE AND EXPOSED TO THE CONTAINED MEDIA SHALL HAVE EITHER THE SPECIFIED CORROSION ALLOWANCE ADDED, OR BE FABRICATE FROM CORROSION RESISTANT MATERIAL.
NO CORROSION ALLOWANCE SHALL BE ADDED TO REPLACEABLE NONPRESSURE PARTS UNLESS SPECIFIED ON THE VESSEL DATA SHEETS OR DRAWINGS.**
- 5.13 THE LOCATION AND MINIMUM SIZE OF ATTACHMENT WELD FOR NOZZLES AND OTHER CONNECTIONS SHALL CONFORM TO REQUIREMENTS DERINED IN THE APPLICABLE PARTS OF SECTION VIII OF THE ASME CODE FOR PRESSURE VESSELS. ANY NECESSARY CORROSION ALLOWANCE FOR THE OBOVE ATTACHMENTS SHALL GENERALLY CONFORM TO THE APPLICABLE PARTS OF THE ABOVE ASME CODE.**
- 5.14 ENINGS IN SHELLS AND HEADS SHALL BE STUDED IN ACCORDANCE WITH THE APPLICABLE CODE AND SHALL BE ADEQUATE FOR PRESSURE AND TEMPERATURE TO BE STAMPED ON THE VESSEL . VESSELS CORRODED THICKNESS IN EXCESS OF THE REQUIRED DESIGN OR MINIMUM CODE THICKNESS SHALL NOT BE CONSIDERED IN THE DESIGN OF OPENING REINFORCEMENT UNDER OPERATING CONDITIONS. EACH REINFORCEMENT PAD OR SEGMENT SHALL BE PROVIDE WITH A ¼” UNC “ TELL TALE “ HOLE.**
- 5.15 ABRICATED VESSELS AND HEABY SECTIONS OF VESSELS SHALL BE PROVIDED WITH SUITABLE LUGS OR EYE- RINGS TO RACILITATE HANDLING DURING TRANSPORT AND ERECTION.**
- 5.16 FILTER ELEMENT SURFACE AREA SHALL BE SPECIFIED BY MANUFACTURER.**
- 5.17 CAPACITY CURVES VS DIFFERENTIAL PRESSURE FOR MINIMUM INLET PRESSURE SHALL BE SPECIFIED.**

5.18 RIGINALL CATALOGUE FOR FILTER SEPARATOR AND 360 DEGREE , BAND QUICK OPENING CLOSURE SHALL BE SUPPLIED BY MANUFACTURER.

5.19 ILTER SEPARATOR SHALL BE SUPPLIED WITH COMMISSIONING AND TWO YEARS OPERATION SPARE PARTS.

6.0 FABRICATION WELDING

6.1 ALL WELDS SHALL BE MADE BY THE SHIELDED METAL ARE PROCESS USING ELECTRODES OF A COMPOSITION AND QUALITY COMPATIBLE WITH THE VESSEL MATERIALS, IN ACCORDANCE WITH SUBSECTION “B” PART UM OF THE ASME CODE, SECTION VIII DIVISION I.

6.2 THE SUPPLIER SHALL SPECIFY THE MAKE AND QUALITY OF THE ELECTRODES WHICH HE PROPOSES TO UTILIZE IN FABRICATION.

ALL WELDERS SHALL BE QUALIFIED UNDER SECTION IX OF THE ASME CODE.

WORK INVOLVING WELDING SHALL NOT BE SUBJECT TO ANY OTHER CODES WITHOUT THE PRIOR APROVAL OF PURCHASER.

6.3 WELDING BY AUTOMATIC OR SEMI-AUTOMATIC EQUIPMENT IS PERMITTED , GAS, BARE WIRE , CARBON – ARC OR FORGED WELDING WILL NOT BE PERMITTED UNLESS SPECIFIED BY THE PURCHASER.

6.4 ALL NOZZLES , MANHOLES AND SMALL CONNECTIONS AND THEIR REINFORCEMENTS SHALL BE ATTACHED TO THE VESSEL WITH FULL PENETRATION WELDS.

6.5 CIRCUMFERENTIAL WELDS SHALL BE SO LOCATED THAT VESSEL INSPECTION CAN BE MADE WITH ALL INTERNAL EQUIPMENT IN PLACE.

7.0 HEAT TREATMENT

7.1 HEAT TREATMENT INCLUDING PRE OR POST – WELD HEAT TREATMENT , OF VESSELS SHALL BE IN ACCORDANCE WITH ASME PRESSURE VESSEL CODE, SECTION VIII DIVISION I.

7.2 ALL FLANGED FACINGS AND THREADED CONNECTIONS MUST BE ADEQUATELY PROTECTED AGAINST OXIDIZATION DURING THE HEAT TREATMENT.

8.0 PAINTING

8.1 VESSEL AND PIPING SAND BLAST CLEANING SHALL CONFORM TO SWEDISH STANDARD S.I.S. 055900- LATEST EDITION FOR GRADE SA 2½ AND PROTECTIVELY COATED AS FOLLOWS:

ONE (1) COAT ZINC CHROMATE (PRIME COAT)

TWO (2) COAT ALUMINIUM . FILM THICKNESS 1.5 MILS PER COAT (FINISH).

9.0 INSPECTION

9.1 THE PURCHASER RESERVES THE RIGHT OF INSPECTION.

MANDATORY INSPECTION SHALL BE CARRIED OUT TO MEET THE REQUIREMENTS OF ASME CODE SECTION VIII DIVISION I.

9.2 IN ADDITION TO ANY MANDATORY CODE INSPECTIONS REQUIRED , ALL MATERIALS AND FABRICATION SHALL BE SUBJECT TO INSPECTION BY THE PURCHASER SO DESIRED.

9.3 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 CARRIED OUT TO THE BEST ADVANTAGE.

9.4 ALL MANHOLE COVER HINGES AND HINGE BOLTS MUST BE IN PLACE BEFORE THE VESSEL IS TESTED. THE HINGE BOLTS SHALL FIT SO THAT CAN BE TURNED FREELY BY HAND. COVERS SHALL BE SWUNG OPEN TO ENSURE THAT NO BINDING TAKES PLACE.

9.5 FOLLOWING INSPECTION , ANY DEFECTS SHALL BE REPAIRED AND THE REPAIR WELD SHALL BE RE-HEAT TREATED , IF ORIGINALLY REQUIRED , ARE REEXAMINED BY THE PRESCRIBED METHOD FOR FREEDOM FROM DEFECTS. IF CORRECTION IS REQUIRED AND INVOLVES SERIOUS ALTERATION , THE WRITTEN APPROVAL OF THE PURCHASER

SHALL BE OBTAINED BEFORE PROCEEDING WITH SUCH CORRECTIONS.

10.0 TESTING

10.1 ALL VESSELS AND PIPING SYSTEM SHALL BE TESTED IN ACCORDANCE WITH THE ASME CODES , RULES OR REGULATIONS.

10.2 ALL WELDED ATTACHMENTS PROVIDED WITH “TELL –TALE “ HOLES SHALL BE TESTED BY PNEUMATIC OR HYDROSTATIC PRESSURE PRIOR TO THE THERMAL STRESSRELIEF AND FINAL HYDROSTATIC TEST.

10.3 VESSELS OR PARTS THEREOF AND MATERIALS ENTERING THEREIN INDICATING IRREMEADIABLE OR INJURIOUS DEFECTS , IMPROPER FABRICATION, EXCESSIVE REPAIRS , OR THAT THEY ARE NOT IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATION AND APPLICABLE CODE SHALL BE SUBJECT TO REJECTION. VESSELS SHALL ALSO BE SUBJECT TO REJECTION IF SUCH CONDITIONS ARE DISCOVERED AFTER ACCEPTANCE OF THE ITEMS AT THE SUPPLIER’S WORKS.

10.4 ALL TEST CERTIFICATES MUST BEAR THE PURCHASER’S NAME AND ORDER NUMBER WHETHER THEY EMENATE DIRECTLY FROM THE MAIN SUPPLIER OR A SUB-CONTRACTOR.

10.5 TEST CERTIFICAT MUST BE APPROVED BY THE PURCHASER BEFORE DESPATCH INSTRUCTIONS ARE GIVEN.

11.0 MISCELLANEOUS

11.1 RADIOGRAPHIC EXAMINATION SHALL BE PERFORMED WHEN REQUIRED BY THE ASME CODE.

11.2 THE COMPLETED VESSEL SHALL BE PROVIDED WITH A NAME PLATE SECURELY ATTACHED TO THE VESSEL BY WELDING.

11.3 IF THE VESSEL IS POST – WELD HEAT-TREATED , NO WELDING IS PERMITTED AFTER STRESS RELIEVING.

11.4 REMOVABLE INTERNALS SHALL BE INSTALLED AFTER STRESS RELIEVING.

11.5 THE LOCATION OF ALL VESSEL COMPONENTS OPENINGS , SEAMS , INTERNALS,ETC. , OF THE VESSELS SHALL BE INDICATED ON THE SHOP DRAWINGS BY THE DISTANCE TO A COMMON REFERENCE LINE.

11.6 THE REFERENCE LINE SHALL BE PERMANENTLY MARKED ON THE SHELL.

12.0 INSPECTION NOTICE

12.1 THE SUPPLIER SHALL GIVE ADEQUATE NOTICE TO THE PURCHASER PRIOR TO ALL INSPECTION TEST VISITS REQUIRED BY THE SPECIFICATION AND DESIGN CODES.

12.2 WHERE THE PURCHASER DESIRES TO VISIT THE WORKS TO INSPECT THE WORK OR WITNESS TESTS , ADEQUATE NOTICE SHALL BE GIVEN IT THE SUPPLIER.

13.0 PLANT ACCESS

13.1 THE SUPPLIER SHALL ALLOW FREE ACCESS TO THE PURCHASER TO ALL PARTS OF HIS OR HIS SUB-CONTRACTORS WORKS , FOR THE URPOSE OF CARRYING OUT ANY INSPECTION OR WITNESSING TESTS , ETC.

14.0 ACCEPTANCE

14.1 THE PURCHASER'S APPROVAL OF WORK AND ACCEPTANCE OF SHOP TESTS, ETC. AND / OR HIS RELEASE OF VESSELS FOR SHIPMENT SHALL IN NO WAY RELEASE THE SUPPLIER OR RELIEVE HIM OF HIS RESPONSIBILITY FOR CARRYING OUT ALL PROVISIONS OF THE SPECIFICATION , CODES AND/OR FULFILMENT OF THE GUARANTEE. NOR DOES THE PURCHASER BY SUCH APPROVAL AND/OR RELEASE , ASSUME ANY RESPONSIBILITY WHATSOEVER FOR SUCH PROVISIONS AND/OR GUARANTEE.

14.2 RELEASE NOTES SHALL BE ISSUED BY THE PURCHASER FOR EACH VESSEL AFTER FINAL INSPECTION AND TESTING AT THE

WORKS AND VESSELS SHALL NOT BE DESPATCH UNTILL SUCH RELEASE NOTES HAVE BEEN ISSUED.

15.0 SHIPMENT

15.1 PRIOR TO SHIPMENT , THE VESSEL SHALL BE THOROUGHLY CLEANED AND ALL WATER, DIRT , SAND , WELD MATERIAL SPATTER AND OTHER FOREIGN MATTER SHALL BE REMOVED.

15.2 ALL TESTING LIQUIDS SHALL BE REMOVED AND UNITS DRIED BEFORE PACKING.

15.3 ALL FLANGED OPENINGS PROPERLY PROTECTED WITH SUITABLE STEEL COVERS. TAPPED OPENINGS SHALL BE PROTECTED WITH THREADED STEEL PLUGS SCREWED IN.

15.4 ALL LOOSE GASKETS SHALL BE PACKED IN A SEPARATE WOODEN CASE.

15.5 BEFORE SHIPMENT IS MADE , THE PURCHASER'S WRITTEN APPROVAL AT THE PROPOSED METHOD OF SHIPMENT MUST BE OBTAINED.

15.6 PRIOR TO SHIPMENT ALL INSTRUMENTS , VALVES , STUD BOLTS WITH NUTS , GASKETS AND SPOOL PIECES OF PIPES SHALL BE PACKED SEPARATELY AND TAGED FOR EASY INSTALLATION AT SITE.

15.7 EXPORT PACKING SHALL BE CARRIED OUT IN ACCORDANCE WITH GOOD PRACTICE , THE MINIMUM ACCEPTABLE STANDARD SHALL BE AS DEFINED IN THE APPLICABLE PARTS OF BS.1133 " PACKAGING CODE ". THE PACKAGING SHALL BE APPROPRIATE FOR STORAGE WITHOUT COVER ON SITE FOR UP TO THREE MONTHS PRIOR TO INSTALLATION.

16.0 REPORTS & DATA SHEETS ETC.

THE FOLLOWING SHALL BE FURNISHED TO THE PURCHASER AT QUOTATION AND ORDERING STAGES BY THE SUPPLIER.

17.0 PROGRESS REPORTS

17.1 A PROGRESS REPORT COVERING THE RELEVANT ASPECTS OF THE PRODUCTION PROGRAMME , SHALL BE MADE

FORTNIGHTLY , IN ADDITION PERIODIC MEETINGS SHALL BE HELD AT THE WORKS, COVERING ALL ASPECTS OF PROGRESS. ADVISED INSPECTION DATES MUST BE MAINTAINED.

18.0 GUARANTEE

18.1 THE SUPPLIER SHALL PROVIDE THE FOLLOWING SPARES, SUITABLY BOXED AND DELIVERED WITH THE VESSELS.

18.1.1 5% OF NUMBER OF BOLTS AND NUTS REQUIRED FOR EACH SIZE BUT NOT LESS THAN 2 OFF FOR INITIAL QUANTITIES OF LESS THAN 40 .

18.1.2 3 COMPLETE SETS OF UNUSED GASKETS FOR EACH VESSELS, SUITABLE MARKED FOR IDENTIFICATION.

18.1.3 3 SETS OF SPARE FILTER CARTRIDGES.

19.0 GUARANTEE

19.1 THE SUPPLIER SHALL GUARANTEE THAT ALL ARTICLES, MATERIALS AND WORK COVERED BY THE ORDER WILL CONFORM WITH THE SPECIFICATION ETC. , AND WILL BE NEW , FIT AND SUFFICIENT FOR THE PURPOSE FOR WHICH THEY ARE INTENDED, OF GOOD MATERIAL DESIGN AND WORKMANSHIP AND FREE FROM DEFECT.

19.2 IN ADDITION , AT THE REQUEST OF THE PURCHASER , THE SUPPLIER SHALL REPAIR OR REPLACE AT THE SITE ON INSTALLATION FREE OF COST, ANY EQUIPMENT OR PARTS WHICH , IN NORMAL USE AND SERVICE , AND UNDER PROPER OPERATION , FAIL BECAUSE OF FAULTY WORKMANSHIP OR DESIGN OR DEFECTIVE MATERIALS , DURING THE PERIOD SPECIFIED IN THE PURCHASE ORDER.

19.3 SUPPLIER SHALL CONFIRM ALL SIZES AND DIMENSIONS GIVEN IN THIS SPECIFICATION AND GUARANTEE THE DESIGN PERFORMANCE OF THE EQUIPMENT.

A AT QUOTATION STAGE

- 1- GENERAL ARRANGEMENT DRAWINGS SHOWING OUTLINE DIMENSIONS AND WEIGHT. (TWO SETS).
- 2- LIST OF RECOMMENDED SPARE PARTS WITH UNIT PRICES TO COVER INITIAL COMMISSIONING AND TWO YERS OPERATION .
- 3- ORIGINAL CATALOGUES
- 4- MAINTENANCE , COMMISSIONING INSTALLATION AND OPERATION MANUAL.
- 5- ALL DOCUMENTS SHALL BE IN ENGLISH.

B AT ORDERING STAGE

- 1- FINAL GENERAL ARRANGEMENT DRAWINGS SHOWING OUTLINE DIMENSIONS SUCH AS SADDLES, NOZZLES ORIENTATION , WEIGHT , FOUNDATION BOLT HOLES , ALL PIPING SYSTEMS SHOWN ON THE DATA SHEET , INTERNAL PARTS, ETC. (TRANSPARENCIES)
- 2- CERTIFICATES OF INSPECTION, WELD PROCEDURE, WELDER AND WELDING QUALIFICATION , MATERIALS , NON-DESTRUCTIVE TESTS, HYDROSTATIC TEST , HEAT TREATMENT AND SPECIFIED SAFETY RELIEF VALVE CAPACITY.(7 SETS)
- 3- FACSIMILE OF NAMEPLATE AND HARD STAMPING. (7SETS)
- 4- ASME , U-1 FORMS. (7 SETS).
- 5- THE SUPPLIER SHALL ALSO FORWARD TO THE PURCHASER, SEVEN COPIES OF ALL SUB-ORDERS. THIS , SHALL BE ENDORSED WITH THE PURCHASER'S NAME AND ORDER NUMBER.
- 6- ILLUSTRATED SPARE PARTS LIST WITH PRICES.(SEVEN SETS).
- 7- OPERATING AND INSTALLATION INSTRUCTIONS (SEVEN SETS).
- 8- MAINTENANCE MANUAL . (SEVIN SETS)

20.0 DEFINITION OF PURCHASER

20.1 ALL REFERENCE MADE TO PURCHASER IN THIS SPECIFICATION INCLUDE HIS ACCREDIATED REPRESENTATIVE AND/OR INSPECTOR.