

Snamprogetti	CLIENTE - Customer NAGARIUNA FERTILIZERS & CHEM. Ltd.	COMMESSA - Job 808200	IMPIANTO - Unit 01
	LOCALITA' Plant location KAKINADA - INDIA	SPC. No MA-E 30311 6142	
	IMPIANTO - Unit KAKINADA FERTILIZERS COMPLEX	FG - Sh - DI - of 1 / 11	Rev 0 1 2 3 4 5

FOGLIO DATI PER POMPE CENTRIFUGHE ORIZZONTALI
HORIZONTAL CENTRIFUGAL PUMP DATA SHEET

1	SERVIZIO Service H.P. CARBONATE SOLUTION PUMP	SIGLA Item No 01 - P-102 A/B
2	FUNZIONAMENTO Operation CONT. class CONT. class	N. UNITA' PRINC./RISERVA No of units main/spare 1/1
3	COSTRUTTORE Pump Mfr SUNDSTRAND	MODELLO Type HMP 3512
4	ORDINE N° Purchase order No 808200/92/00026	TIPO MOTRICE PRINC./RISERVA Drvr type: main/spare elec. motor
		API 610 6TH ED (WITH EXCEPTIONS ATTACHED)

5	LIQUIDO POMPATO Liquid handled CARBONATE SOLUTION	PROG Rated 65 (1)
6	PORTATA Capacity m ³ /h 15	
7	COMP CORROSIVI/EROSIVI Corrosive/Erosive compounds <input checked="" type="checkbox"/> SI Yes <input type="checkbox"/> NO No	% SOLIDI % Solids NO
8	TEMPER POMP MIN./ESERCIZIO Suction temperature min./oper 60/72	
9	PESO SPECIFICO A TEMP. MIN./ESERCIZIO Specific gravity at min./oper temperature 0.93 ÷ 1	
10	VISCOSITA' CINEM A TEMP. MIN./ESERCIZIO Viscosity at min./oper temperature cps < 3	
11	PRESSIONE ALL'ASPIRAZIONE Suction pressure Kg/cm² abs. MIN 15 NORM 18 MAX 24 (2)	
12	PRESSIONE ALLA MANDATA Discharge pressure Kg/cm² abs. NORM 15.5 (4)	
13	TENSIONE VAPORE ALLA TEMP. ESERCIZIO Vap. pressure at operating temperature Kg/cm² abs.	
14	PRESSIONE DIFFERENZIALE Differential pressure Kg/cm² abs. 13.7	PREVALENZA m. 14.75
15	POTENZA ASSORBITA ALL'ASSE STIMATA Estimated BHP 450 (η = 0.53)	N.P.S.H. DISP N.P.S.H. avail m. 10
16	REGOLAZIONE PORTATA Flow control CONT. class	MONTE/DESCENTE AUTOMATICA Mount automatic
17	SISTEMA DI REGOLAZIONE Flow control type by throttling on discharge and by-pass	CAMPO Range 25 ÷ 100
18	TIPO TENUTA ESERC. Seal type operation mechanical (JOHN CRANE)	TIPO TENUTA AVVIAM Start-up mechanical
19	FLUIDO RISCALDANTE TIPO Heating fluid type L.P. steam	PRESS. NORM./PROG Press. norm./des Kg/cm² abs. 4.5
20	FLUIDO REFRIGERANTE TIPO Cooling fluid type C.W.	TEMP. Temp. °C 35/45
21	FLUIDO FLUSSAGGIO TIPO Flushing fluid type D.W.	AP max AP max Kg/cm²
22	RIACCELERAZIONE Reacceleration <input type="checkbox"/> SI Yes <input checked="" type="checkbox"/> NO No	AVV. AUTOMATICO Automatic start-up <input type="checkbox"/> SI Yes <input checked="" type="checkbox"/> NO No
23	MATERIALE LINEE MONTE/VALLE POMPA Piping material upstream/downstream ALSI 316 #	SUPPORTO Bracket <input type="checkbox"/> IN LINE <input type="checkbox"/>

23	CASSA TIPO SUPPORTAZIONE Casing Mounting <input type="checkbox"/> MEZZERIA Centerline <input type="checkbox"/> PIEDI Foot <input type="checkbox"/> TIPO DIVIS Split <input type="checkbox"/> ASSIALE Axial <input checked="" type="checkbox"/> RADIALE Radial	TIPO VOLUTA Volute <input type="checkbox"/> SINGOLA Single <input type="checkbox"/> DOPPIA Double <input checked="" type="checkbox"/> DIFFUSORE Diffuser	ASPIRAZIONE Suction <input checked="" type="checkbox"/> SINGOLA Single <input type="checkbox"/> DOPPIA Double
24	ATTACCHI PER CONNECTIONS for <input type="checkbox"/> DRENAGGIO Drain <input type="checkbox"/> SFIATI Vents <input type="checkbox"/> MANOMETRI Press gauges	GIOCHI API API Clearance <input type="checkbox"/> SI Yes <input type="checkbox"/> NO No	AUTOADESCANTE Selfpriming <input type="checkbox"/> SI Yes <input type="checkbox"/> NO No
25	ANELLI USURA Wear rings <input type="checkbox"/> LATO INGRESSO Suction side <input type="checkbox"/> LATO CASSA STOPPA Stuffing box side	SOVRASP CORROS Corros allowance mm 3	SOLO CASSA Casing only <input type="checkbox"/> CASSA E GIRANTE Casing & impeller <input type="checkbox"/>
26	ASPIRAZIONE LINEA DIAM. Suction line dia 8"	RATING ANSI ANSI rating 300 RF	BOCCHELLI Nozzle size 3"
27	MANDATA LINEA DIAM. Discharge line dia 6"	RATING ANSI ANSI rating NOTE (3)	BOCCHELLI Nozzle size 3"
28	GIRANTI TIPO Impellers type OPEN	DIAM. PROG. MIN/MAX Dia des./min./max. MM 101.6/151.45/175.26	MONTATE Mounting <input type="checkbox"/> TRA CUSCINETTI Between bearings <input checked="" type="checkbox"/> A SBALZO Overhung
29	CUSCINETTI RADIALI TIPO Bearings radial 4 RAIN JOURNALS	REGGIA TIPO Thrust LIMITED END FLORT	SEPARATO Separate <input type="checkbox"/> COMUNE A MOTRICE Common with drvr <input checked="" type="checkbox"/>
30	GIUNTO TIPO/COSTR. Coupling type/Mfr 35 JTNS/METASTREAM	TENUTA MECC Mech seal type/Mfr SIG 1: SINGLE JOHN COORSE Code: CRANE 8AB	ROTTING FACE - TUNGSTEN CARBIDE STATIC FACE - CARBON GRAPHITE PLAN 32, 61
31	VALV. AUTOM SFIORO Automatic relief valve	TIPO LUBRIFICAZIONE Lubrication type <input type="checkbox"/> A SBATTIM. Oil splash <input checked="" type="checkbox"/> FORZATA Forc'd	AD ANELLO Ring oil <input type="checkbox"/>

30	MATERIALE Material CODICE API 610 API 610 Code ASTM code 316 SS CONTAINS LESS THAN 0.03% C	31 MOTORE ELETTRICO Electric motor COSTR. Mfr POTENZA NOM. kW 450	32 TURBINA VAPORE Steam turbine COSTR. Mfr GIRI/1' r.p.m. 2
31	FORMA Frame TIPO ALIM Power lead <input checked="" type="checkbox"/> NORM. Norm. <input type="checkbox"/> PREF. Pref. <input type="checkbox"/> C.C. C.C. <input type="checkbox"/> D.C. D.C.	ESECUZIONE Execution B3	VAPORE INGR Inlet steam bar °C
32	DIFFUSER	VOLTS/FASI/CICLI Volts/Phases/Cycles 3300/3/50	TIPO CUSCINETTI Bearings bar °C
33	SLEEVE	TIPO OLIO Lube	TIPO OLIO Lube
34	ALBERO Shaft 4140	TIPO CUSCINETTI Bearings	TIPO OLIO Lube
35	SEAL PARTS 316 SS	FORNIT DA Supplied by OTHERS	FORNIT DA Supplied by

4	REVISED WHERE MARKED	G.T.	RWC	RWC	29-7-88
3	REVISED WHERE MARKED	C.S.B.	RWC	RWC	12-8-88
2	CLIENT COMMENTS ADDED	fw/k	9/3/88		
5	GENERAL REV - ISSUED FOR ORDER ON SUNDSTRAND	John Thomas			10-10-89
0	EMISSIONE - Issue				9/12/86

CARATTERISTICHE COSTRUTTIVE E MATERIALI
CONSTRUCTION FEATURES AND MATERIALS

FG	Sh	DI	of	Rev				
2	1	11		0	1	2	3	4
				5				

33 CURVA CARATTERISTICA DI OFFERTA N Offer characteristic curve No **H88047-BE** HEAD SALT ON PUMP 50/50 BETWEEN STAGES

34 NPSH RICHIESTO (ACQUA) m NPSH required (water) **8-4 RATED / 6-4 AT MIN FLOW** INDICE CAVITAZIONE Suction specific speed **18302 IN US UNITS**

35 N DI STADI No of stages **TWO** GIRI r.p.m. **13010** RENDIM. Efficiency **59.3** POTENZA ASSORBITA Absorbed power kW **408.4** rpm

36 PORTATA MAX CON GIRANTE PROGETTO Max BHP with design impeller kW **447.6** PREVAL MAX CON GIRANTE PROGETTO m **1603.40 @ 13010**

37 PORTATA MIN CONTINUA Min continuous capacity m³/h **34.7 PROCESS MIN FLOW** SEE NOTE 8 ROTATION VIEWED FROM COUPLING END CW

38 ACQUA RAFFREDDAMENTO Cooling water PER PUMP **16.6 M³/h** MATERIALE TUBAZIONI Piping material **304SS**

CUSCINETTI Bearings **5.7 M³** CAMERA TENUTA Stuffing box BASAMENTO Pedestal PREMISTOPPA Gland SCAMB FLUIDO FLUSSAGGIO Flushing fluid exchanger **10.9 M³/hr.**

VAP Steam GAS Gas ACQUA Water

39 TENUTA MECCANICA Mechanical seal SINGOLA Single DOPPIA Double TANDEM Tandem **2ND STAGE** TENUTA AUSILIARIA Auxiliary seal SI Yes NO No

40 FLUSSAGGIO TENUTA INTERNA Flushing int seal DALLA MANDATA From discharge nozzle ESTERNO External m³/h PRESS Press **Kg/cm²**

FLUSSAGGIO TENUTA ESTERNA Flushing ext seal CON BARILOTTO From reservoir ESTERNO External m³/h PRESS Press

41 CARICHI AMMISS SU FLANGE Allow loads on flanges PARALL ALBERO Parallel to shaft VERTICALE Vertical ORIZZ 90 ALBERO Horiz 90 to shaft

ASPIRAZIONE FORZA-MOMENTO Suction force-torque N Nm **1892** 1432 946

MANDATA FORZA-MOMENTO Discharge force-torque N Nm **1892** 1432 946

42 SPINTA ASSIALE SULL ALBERO Axial thrust on shaft **DIRECTION STG1 UNTIL RIMP DESIGN STG2 AWAY FROM INLET**

43 AREA OCCHIO GIRANTE Eye area **cm²** DIAMETRO Diameter mm

V ASSOLUTA Inlet Outlet abs vel m/sec INGRESSO USCITA V RELATIVA Inlet Outlet rel vel m/sec INGRESSO USCITA

VELOCITA SPECIFICA Specific speed

COPPIA ALL AVVIAM Starting torque NORM Norm N.m

PD WK N.m

44 COLLAUDI Shop tests **ACCORDING TO SPC QN-E-13415 REV1** RILIEVO CURVA Performance curve NPSH AT 4 POINTS MINIMUM YES

PRESENZIATI Witnessed YES

NON PRESENZIATI Non witnessed

PRESSIONE DI PROVA IDRAULICA Hydrostatic test pressure **Kg/cm² abs. 180**

TEMP PROG Des temp **148 °C**

PROVA IDRAUL Hydrostatic test SMONTAGGIO Sino-down

45 PESI Weights **kg** POMPA Pump **953** BASAMENTO Baseplate **1542** MOTORE Motor **BY OTHERS** TURBINA Turbine

46 DATI CON ACQUA (IN CASO DI LIQUIDO VISCOSO) Data with water (for viscous fluid)

CURVA OFFERTA N Offer curve No **H 88047-BE** VISCOSITA Viscosity cst

PORTATA Capacity m³/h PREVALENZA Head m FATTORI CORRET Correct factors CO CH CE

POTENZA ASS Absorbed power kW POTENZA MOTORE Motor power kW RENDIMENTO Efficiency

PESO SPECIFICO Spec gravity

47 ESTENSIONE FORNITURA Supply limits (INCLUSIONI INCLUDED)

BASAM COM A POMPA MOT VARIATORE Common baseplate for pump driver & gear

GIUNTI Couplings WITH SPACER

SPECIAL TOOLS LISTED IN QUOTE

SUCTION SPOOL PIPES AND CROSSOVER RING

AVVIAM AUTOM POMPE RISERVA E EMERGENZA Automatic starting for spare emergency pumps

SEPARATORI SU FLUSSAGGIO Flushing separator system **REFER TO P. 8 OF THIS SPEC AND SUNDSTRAND P4 ID PROIFA26**

PREFABB TUBAZIONI OLIO Shop-fabrication of lube oil piping

ATTREZZI E CHIAVI SPECIALI Special tools and wrenches

LIBRETTO ISTRUZ No. COPIE IN LINGUA english

ACCOPP POMPA MOTORE Assem pump-driver IN OFFIC In factory IN CANT In field

TENUTE MECCANICHE Mechanical seals

AUSILIARI TENUTE MECCANICHE Auxiliaries for mechanical seals

MANOMETRO Pressure indicator VALV SICUREZZA Safety valve VALV DI SFIORO Relief valve

PRESSOSTATO Pressure switch INTER DI LIVELLO Level switch INDICATORE DI LIVELLO Level indicator

TERMOMETRO Temperature indicator

REFER TO SUNDSTRAND DRG PROIFA26

MOTICI Driver **(IN FIELD) (SEE NOTE 5)**

BULLONI DI FONDAZIONE SECONDO Foundation bolts in accordance STD SP 8500-84 + RUGMENT DEVICES

PROT GIUNTI Coupling guards ANTISC Non-sparking SI Yes NO No

FILTRI TEMPOR ASPIRAZIONE Temporary suction filters

SISTEMA DI LUBRIFICAZIONE Lube oil system **REFER TO P.8 OF THIS SPEC AND SUNDSTRAND P4 ID PROIFA26**

ACCUSTIC ENCLOSURE 0.75 KW MOTOR WITH BLOWER

TUBAZIONE COLLEGAMENTO CENTRALINA LUBRIF E POMPA Connect piping between lube console and pump

COLLAUDI OFFICINA (ACCORDING TO QN-E-13415) Shop tests

PARTI RICAMBIO PER N Spare parts for **COMMISSIONING / 2 YEARS**

ALL RELEVANT PIPE SUPPORTS WITHIN THE PACKAGE CONFINES

SS CONDENSATE RESERVOIR WITH ASSOCIATED SS PIPING

47a PUMP / GEAR, MOTOR AND ALL ANCILLARY SYSTEMS CONTAINED WITHIN CONFINES OF BASEPLATE

48 NOTE 1. Capacity is based on suction conditions 2. This figure is only for mechanical reason. The max value for process condit. is 19 Kg/cm² abs.

3. DISCHARGE FLANGES SHALL BE OF SPECIAL LENS DESIGN TO SP STD TB 5002.84

4. Safety valve setting: Kg/cm²g 180. SHALL NOT BE EXCEEDED

5. Pump baseplate to be undrilled

6. MINIMUM FLOW AT WHICH THE PUMP CAN OPERATE IS 34.7 M³/hr.

7. Seal flushing D.W. flow shall not exceed 70l Kg/hr. CONFIRMED BY SUNDSTRAND

8. CONTROL VALVE, FV-06 SHALL BE SUPPLIED BY SP AND POSITIONED NOT MORE THAN 2.13M FROM THE PUMP

COMMESSA No.	808200	IMP. No. / U.	01
SPC. N° MA-E-30311			
FG	3	11	5
Rev.	0	1	2
		3	4

REFER TO SUNDSTRAND DRG-PROIFA21 FOR TOTAL SCOPE

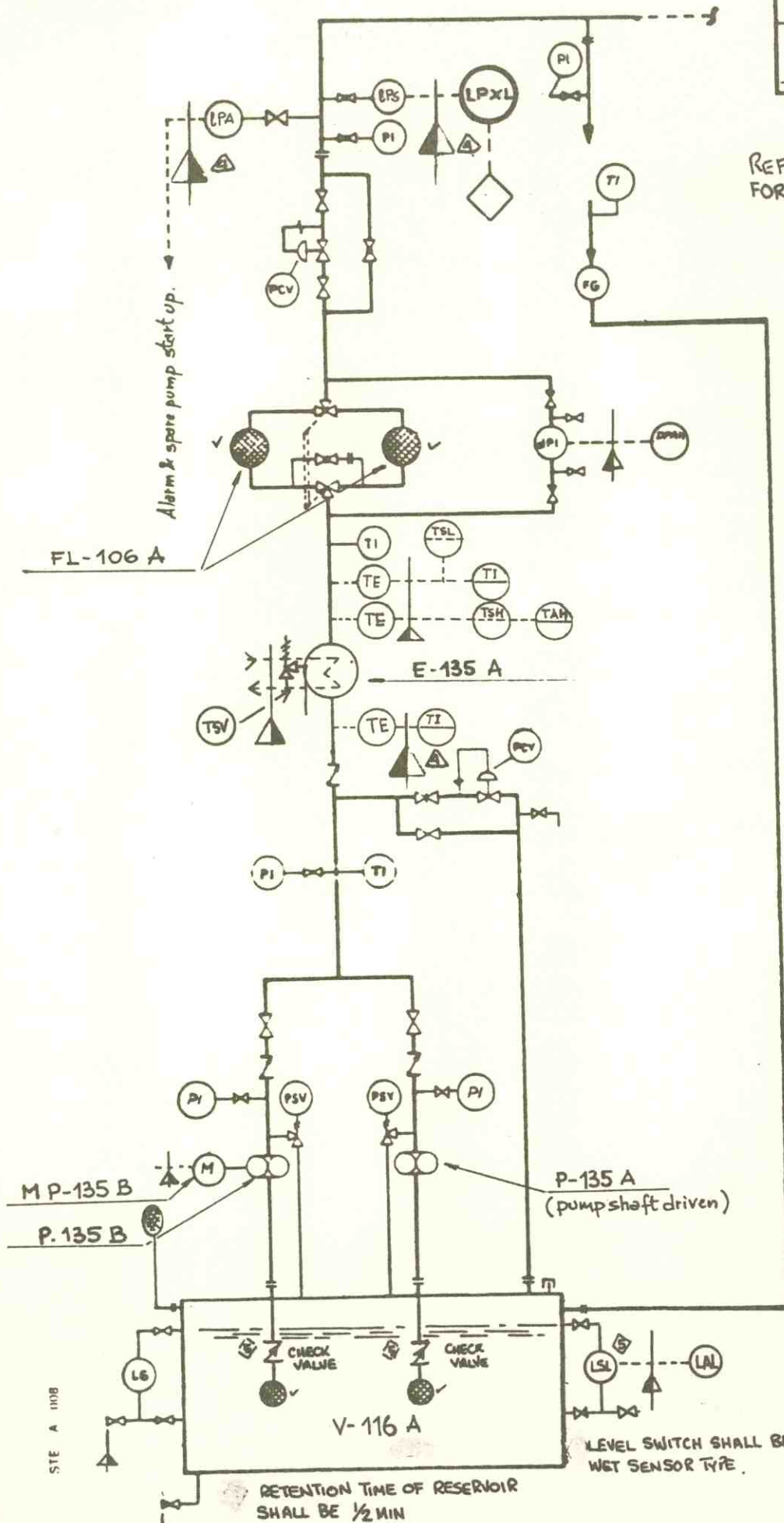
VALID FOR ONE PUMP

THE LUBE OIL SYSTEM SHALL BE TESTED DURING THE PUMP PERFORMANCE TEST

SUMP HEATER NOT REQUIRED

ALL WIRING OF SWITCHES SHALL TERMINATE AT JUNCTION BOXES

VENDOR | OTHERS



STE A 1108

RETENTION TIME OF RESERVOIR SHALL BE 1/2 MIN

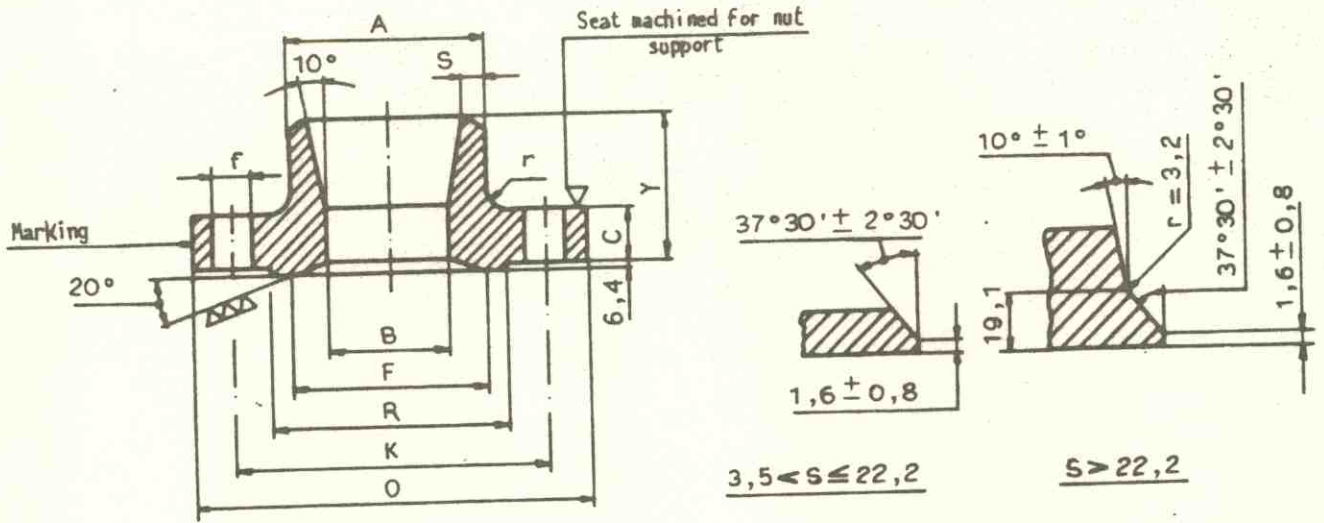
LEVEL SWITCH SHALL BE WET SENSOR TYPE.

MATERIALS FOR UREA
STAINLESS STEEL WELDING NECK FLANGES

Fig. - 08. / di - of

4 / 11

Rev.				
0	1	2	3	4
5				



EXAMPLE OF DESIGNATION : Flange. DNP 4" x (1), per Snamprogetti Std. TB.5002, Sheet 11.
ASTM A 182 F 316L, per SPC. G510.
EXAMPLE OF MARKING : 4 - (1) / 316L - G510 / TB.5002-11.

DNP	A	B ^{+0,5} ₋₀	O	K	R	F	C	Y	f	r	S	N° of holes	Stud Bolts		Mass Kg
													DN"	Length	
3/4	26,7	14,7	100	64	44	22,0	25	93,6	15,9	2	to suit pipe wall thickness	4	1/2	100	1,8
1	33,4	19,2	105	68	46	29,5	30		19,1				5/8	120	2,4
1 1/2	48,3	30,5	135	95	70	43,5	35		22,2	3/4			130	4,4	
2	60,3	39,3	155	110	82	53,0	45	25,4	5	7/8			160	6,9	
3	88,9	58,4	200	145	115	79,0	60		6	190		15,4			
4	114,3	77,2	250	185	150	103,0	75	143,6	31,8	7		8	1 1/8	235	26,5
6	168,3	116,4	330	255	210	152,0	100		41,3				1 1/2	325	55,5
8	219,1	153,1	410	320	265	196,0	120	173,6	50,8				1 7/8	370	109,0
10	273,0	190,0	480	380	321	241,0	140	203,6	55,0		2		430	161,0	

Dimensions in mm.

DNP, DN" = Nominal Size, Inches.

- DIMENSIONS : As shown in Table.
- CONSTRUCTION : Forged.
- TOLERANCES : ANSI B 16.5
- MATERIALS & TESTS : Per SPC. G510 and as specified in P.O.
- DESIGN CONDITIONS : 292 bars at 80°C
258 bars at 150°C
221 bars at 250°C
- STUD-BOLTS : Per ENI STD 0368.00

NOTES FOR PURCHASE ORDER AND MANUFACTURER

- 1) - State "S" thickness as specified each time.
- 2) - Each piece to be marked by its marking.

TUB.1

