

ITEMNR : 202 1501-02-03-04-05.06



1	Equipment name	: HFO Loading pump	Number required (incl. spare)	: 6 (six)
2	Liquid pumped	: Heavy Fuel Oil	Capacity	: 1000 m ³ /h
3	Operation	: Intermittent	Discharge pressure	: 9,8 barg
4	Solids:	: 0 %, max. size : - mm	Suction pressure min.	: -0,2 barg
5	Corrosive/Erosive service	: No	Suction pressure max.	: 1,6 barg
6	Pumping temperature (p.t.)	: 65 °C	Differential pressure	: 10,02 bar
7	Pumping temperature max.	: 120 °C	Differential head	: 104 t. liq.
8	Density at pumping temperature	: 981 kg / m ³	Shut-off head	: 136 m. liq.
9	Viscosity at pumping temperature	: 240 mPa.s	NPSH available	: 9 m. liq.
10	Vapour pressure at pumping temp.	: < 1 mbar	NPSH required	: 4,6 m. liq.
11	Area classification	: zone 2	Shut-off head max. allowable	: 146 m. liq.
12	* to be stated by vendor			

13	Manufacturer (MFR) * INGERSON DRESSE & FAMILIS		Nozzles	Nom. diam.	Rating	type/fac.	Pos.
14	Type	: API - 610	Suction	* 12"	300#	ANSURF	END
15	Model	*: 10 HAIN 27	Discharge	* 10"	300#	ANSURF	TOP
16	Location	: Outdoor, in pump shelter	Vent Plug	* 3/4" NPT			
17	Arrangement	: Horizontal	Drain Plug	* 3/4" NPT			
18	Rotation facing coupling	: CCW	Cooling				
19	Suction	: Single	Flushing	1/2" SW with flanges			
20	Number of stages	: One					
21	Self priming	: No	Hydraulic power	: 278			kW
22	Design pressure	*: 40 barg	Hydraulic efficiency	*: 63			%
23	Design temperature	*: 450 °C	Power required	*: 441			kW
24	Max. allow. operating pressure	*: 40 barg	Power installed	*: 480			kW
25	Casing split	: Radial	Pump speed	: ~ 1500			rpm
26	Impeller type	*: CLOSED	Driver speed	*: 1460			rpm
27	Impeller diameter supplied	*: 620 mm	Pump drive	: Direct			
28	Impeller diameter min	*: 508 mm max*: 648 mm	Driver type	: Electric motor KR 5430E			
29			Driver supply	: mounted			
30	Bearings	*: axial BALL type: 1Z 222	Weight pump	*: 1930			kg
31	Bearings	*: radial BALL type: 7320 BA	Weight base plate	*: 1100			kg
32	Bearings	: intermittent ; type: -	Weight driver	*: 4100			kg
33	Bearing lubrication	: Oil	Shipping weight	*: 7236			kg
34	Common base plate	required : Yes					
35	for pump and driver	by MFR : Yes	Test	Required	Witnessed		

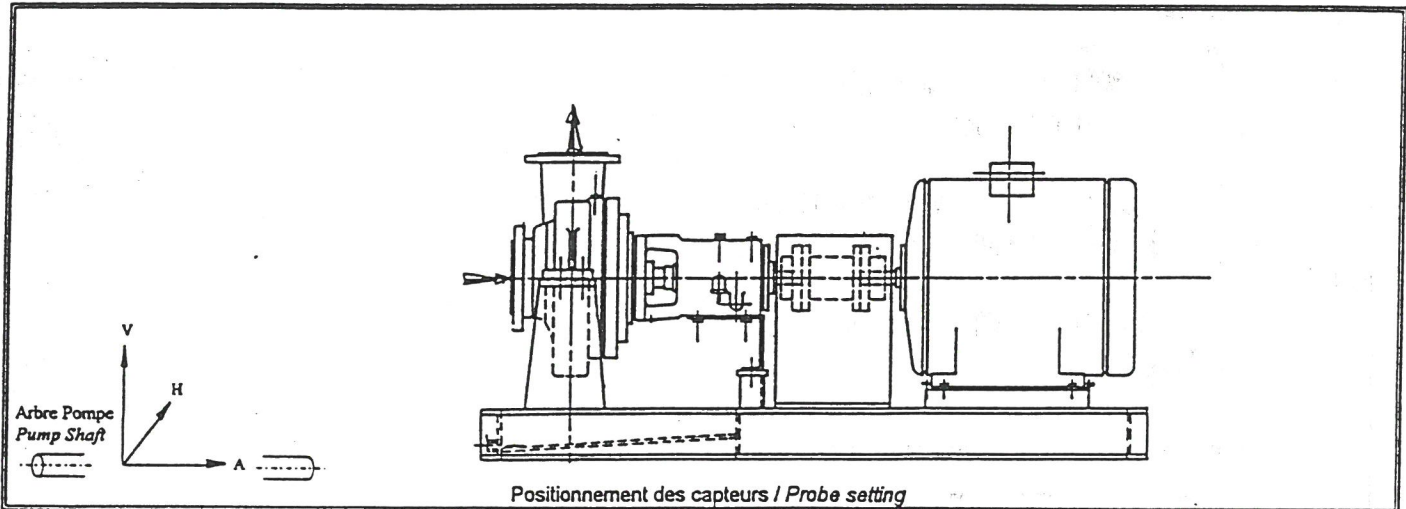
36	Coupling	: METASTREAM Type TSKS 0560	Performance	Yes	Yes
37	Coupling guard	: Yes Type *: N/S	Hydrostatic	Yes	No
38	Foundation bolts	: Yes by MFR : Yes	NPSH (4 POINTS)	Yes	Yes
39	Slide rails	: -			
40					
41	Smothering gland	: -	Mechanical seal data	Single * inside	
42	Shipment of seal	: Installed	MFR	: Durametallik	Type *: PTO
43	Cooling/ Heating	Casing / bearing / seals	NO	Flushing liquid	: HFO
44		Medium	: -	Flushing liquid flow rate	*: m ³ /h
45		Consumption	: - kg/h	Flushing liquid design pressure	*: barg
46		Design pressure	: - barg	Flushing system acc. API-610 plan no. *	: A1/G!
47	Stuffing box number of rings	: -	Auxiliary piping by pump MFR	: Yes	
			Seal by pump MFR	: Yes	
			* CORE = E45FFVV BSTFN		

48	Casing and cover	: CS A352 LCB	Packing	: -
49	Casing wearing	*: CAST IRON	Gland	: -
50	Impeller	: CS A216 WCB	Gaskets	*: Asbestos free SPIRAL WOUND
51	Impeller wearing	*: CAST IRON	O-ring	: -
52	Shaft	: CS 42 Cr Mo 4	Lantern ring	: -
53	Shaft sleeve	*: STAINLESS STEEL 316	Troat bushing	: -
54	Coupling guard	*: ALUMINIUM (non sparking)	Mechanical seal	*: DURAMETALLIC PTO
55	Base plate	*: FABRICATED STEEL	Auxiliary piping	*: STEEL

rev	Client	: Klaipeda State Oil Terminal	Project	: Oil Terminal Reconstruction	rev
	Client's Project No.	:	Location	: Klaipeda, Lithuania	

	Rev.	Date	Description/ Issued for:	By	Old	Approved
	0	120894	Quotation request	AdK		RL
Office: THE HAGUE			Document number: 19300 - 2474002	Sheet 1 of 1		

CLIENT : <u>TEBODIN</u> <i>Customer</i>	POMPE : <u>10HNN27</u> <i>Pump</i>	N° VENTE : <u>9853216X</u> <i>Sale Number</i>
REPERE : <u>P02 1502</u> <i>Mark</i>	TYPE : <u>-</u> <i>Size</i>	N° FABRICATION : <u>306902</u> N° <u>2</u> <i>Manufacture Number</i>
VITESSE de l'ESSAI : N = <u>956</u> tr/min <i>Test Speed</i>	SUIVANT - NF E 44-165 <input type="checkbox"/> <i>Based on</i> - API 610 7th <input checked="" type="checkbox"/> - AUTRE / Other <input type="checkbox"/> à définir / To be defined	



MESURES <i>Measurements</i>		①	②	③	④	⑤
Débit <i>Flow</i>	Q m ³ /h	696				
Température <i>Temperature</i>	θp °C	30,8				
Axe A <i>axis A</i>	d μm	57 μm p/p				
	v mm/s	2,4				
Axe H <i>axis H</i>	d μm	63 μm p/p				
	v mm/s	2,1				
Axe V <i>axis V</i>	d μm	55 μm p/p				
	v mm/s	1,7				

d = Amplitude de déplacement Crête à Crête (double amplitude) / Peak to Peak Displacement μm
v = Vitesse Efficace RMS / RMS Velocity mm/s
θp = Température de palier / Bearing Temperature °C

OBSERVATIONS : _____ <i>Remarks</i>	
DATE : <u>08.12.95</u> CHEF des ESSAIS : _____ <i>Test Supervisor</i>	DATE : <u> / / </u> INSPECTEUR : _____ <i>Inspector</i>



Ingersoll-Dresser Pumps

P.V. d'ESSAI de N.P.S.H.
N.P.S.H. TEST (Net Positive Suction Head)

N° PV
9512 08/07

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CLIENT : <u>TEBODIN</u> Customer	POMPE : <u>6HNN 27</u> Pump	ROUE : <u>Ø602</u> Impeller	N° VENTE : <u>9853216x</u> Sale Number
REPERE : <u>P02 1502</u> Mark	TYPE : <u>-</u> Size	INDUCER : _____ Inducer	N° FABRICATION : <u>306902</u> N° <u>2</u> Manufacture Number
CAPTEUR 0 - 2 bars Pressure sensor CAP : <u>CAP 18</u>	FLUIDE - EAU <input checked="" type="checkbox"/> Fluid Water	Ø ASPIRATION : Ø Suction Dna = <u>300</u> mm	
VITESSE de l'ESSAI : N ₁ = <u>996</u> tr/min Test Speed	TEMP. FLUIDE : θf = <u>23</u> °C Fluid Temp	Ø REFOULEMENT : Ø Discharge Dnr = <u>200</u> mm	
VITESSE du CLIENT : N ₂ = <u>1460</u> tr/min Customer Speed	TENSION de VAPEUR : pv = _____ bars Vapor Pressure pv = <u>0,2871</u> mCE		
NPSH NPSH - par VANNAGE <input checked="" type="checkbox"/> by valve regulation - par POMPE à VIDE <input type="checkbox"/> by vacuum pump	MESURE Mesure - 1 POINT <input type="checkbox"/> - 2 POINTS <input type="checkbox"/> - 5 POINTS <input type="checkbox"/> - AUTRE / Other <input checked="" type="checkbox"/>	<input type="checkbox"/> CONTRACTUEL / Rated <input type="checkbox"/> NOMINAL et CONTRACTUEL / Optimal & Rated <input type="checkbox"/> Mini Continu, Intermediaire, Contractuel, Nominal, 110% Nominal Mini Continuous, Intermediary, Rated, Optimal, 110% Optimal <input checked="" type="checkbox"/> à définir / To be defined	

$NPSH_{(H-3\%)} = (p_b - p_v) + p_1 + \frac{v_1^2}{2g} + \Delta z$ (3% Head Drop)	p _b , Pression atmosphérique / Atm. pressure pv, Tension de vapeur / Vapor pressure p ₁ , Pression à l'aspiration / Suction pressure $\frac{v_1^2}{2g}$, Energie cinétique à l'aspiration Kinetic energy at Inlet Δz, Distance entre axe manomètre Aspiration / axe Pompe (+/-) Distance between Inlet manometer axls / Pump axls	pression absolue / abs. (+), pression absolue / abs. (+), pression relative / gauge (+/-), energie / energy (+),	mCE mCE mCE mCE m
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valeurs unités/units	CAVITATION cavitation		VITESSE speed	ASP. inlet	FLUIDE fluid		VITESSE speed	DEBIT Flow	NPSH (H-3%)	NPSH (H-3%)	NPSH requis
	Q m ³ /h	H-3% mCE	$\frac{v_1^2}{2g}$	p ₁ mCE	θf °C	pv mCE	N1 tr/min	Q m ³ /h	(3% Head Drop)	(3% Head Drop)	required
repère mark	①	②	③	④	⑤	⑥			3 + 4 - 6	$\frac{N_2}{N_1}$	
POINT de MESURE measured point	fixe	calculé	calculé	mesuré	mesuré	absolu	mesuré	ramené à la vitesse N2 reel et speed N2	mesuré à la vitesse N1 measured at speed N1	ramené à la vitesse N2 reel et speed N2	garanti guaranteed
1	695,7	48,7	0,38	1,44	23	0,2871	996	1019,8	1,53	3,28	460
2	897,7	40,7	0,63	1,87	24	0,3050	996	1316	2,19	4,70	
3	503,2	54,17	0,20	2,05	25	0,3239	998	736,1	1,92	4,12	
4	809,2	44,15	0,51	1,65	25	0,3239	998	1186,2	1,84	3,95	
5											
6											
7											
8											

OBSERVATIONS :
Remarks

DATE : 08/12/95

CHEF des ESSAIS :
Test Supervisor

DATE : / /

INSPECTEUR :
Inspector

Customer : TEBODIN

Order No :

Item : P02 1502

Motor type : NA 355M

Suct. pipe diam. : +300

Disch. pipe diam. : +200

Flowmeter : 3

PUMP TEST SHEET

Type : 10 HNN 27

Stages : 1

Max. Imp. diam. : +675

Imp. clear. suction side

Suction side gauge

Disch. side gauge

Report numb. : 951208/07

Manufact. No : 306 902/2

Real. Imp. diam. : +602

Imp. clear. disch. side

Level Z1 : +1

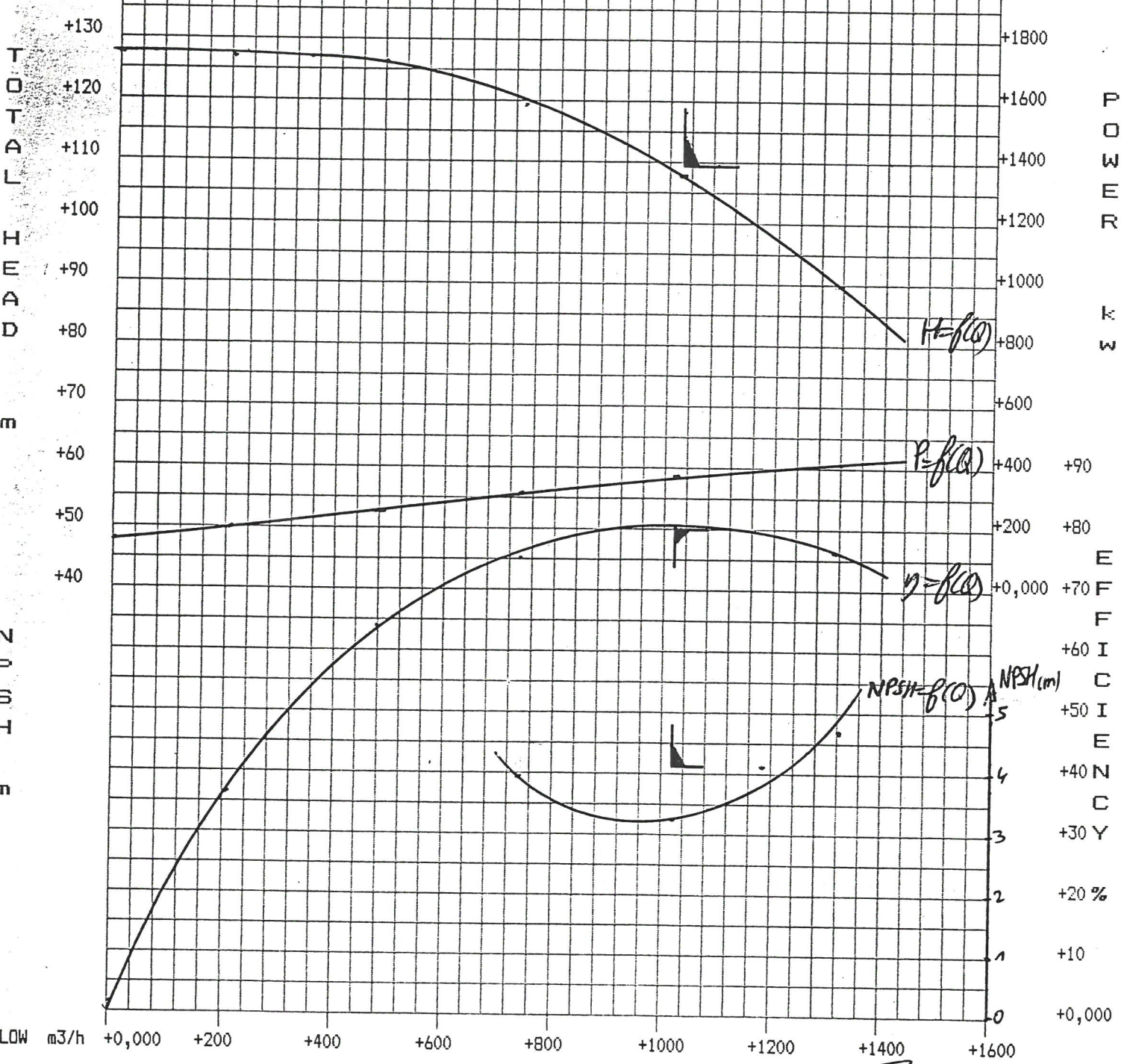
Level Z2 : +1

1/2

Results at test speed

r.p.m : +1460 d : +0,981

Number	T. water degre	Speed r.p.m.	Flow m3/h	H1 m	H2 m	Head m	Hyd.pow Kw	Pum.pow Kw	NPSH m	Eff %	Flow m3/h	Head m	Power Kw	NPSH m
1	+20	+996,6	+696,1	+10,12	+58,72	+50,15	+95,13	+118,6	1,53	+80,19	+1019,	+107,6	+365,9	328
2	+20	+996,6	+897,7	+14,88	+54,13	+41,83	+102,3	+133,9	2,19	+76,39	+1315,	+89,78	+413,2	470
3	+20	+998,1	+503,2	+15,79	+70,84	+55,85	+76,59	+101,5	1,92	+75,42	+736,1	+119,5	+311,8	412
4	+20	+998,1	+326,7	+16,14	+74,74	+58,94	+52,48	+82,46		+63,65	+477,9	+126,1	+253,2	
5	+20	+999,6	+141,1	+16,35	+75,74	+59,44	+22,86	+62,54		+36,55	+206,1	+126,8	+191,2	
6	+20	+1001,	+4,747	+17,11	+77,02	+59,90	+0,775	+52,01		+1,489	+6,924	+127,4	+158,3	



Notes : Date : 08.12.95 Operator : CONILLEAU Chief of test : SCHMIDT Customer : TEBODIN

PUMP TEST SHEET

DRESSER POMPES

Arnage, : 08.12.95

Pump type : 10 HNN 27
Customer : TEBODIN
Item : PD2 1502

Stages : 1

Report numb. : 951208/07
Manufact. No : 306 902/2

First stage Diam.	max : +675 mm	Real : +602 mm
Other stages Diam.	max : +0 mm	Real : +0 mm
Imp. Clear.	asp : +0 mm	ref : +0 mm
Diametre	suct. : +300 mm	del. : +200 mm
Gauge Level	suct. : +1 m	deliv. : +1 mm

Motor type : NA 355M	
Water Temperature : +20 degre	Atm. Pressure : +758 mmHg
Test chief : SCHMUTZ C.	Operator : CONILLEAU
Customer :	

Remarqs :

OPERATING CONDITIONS

Capacity : +1020 m3/H	Total Head : +109,5 m
Pump speed : +1460 rpm	Req. NPSH : +4,599 m
Density : +0,981	
Viscosity : +240	
Temperature : +92 degre	
Efficiency : +63	Water Eff. : +80
Power : +441 Kw	Water power : +380,3 Kw
Test Norma :	

Flowmeter : 3

Gauges Suct. : 1 Deliv. : 5

PT	FLOW m3/h	H1 m	H2 m	Nmot. rpm	Npump rpm	Pbor. Kw	Pmot. Kw	U Volt	I Amp.
1	+696,1	+10,12	+58,72	+1000	+996,6	+125,8	+118,6	+401,2	+292,3
2	+897,7	+14,88	+54,13	+1000	+996,6	+141,7	+133,9	+400,7	+309,4
3	+503,2	+15,79	+70,84	+1000	+998,1	+108,2	+101,5	+401,8	+275,2
4	+326,7	+16,14	+74,74	+1000	+998,1	+88,57	+82,46	+400,7	+258,1
5	+141,1	+16,35	+75,74	+1000	+999,6	+68,05	+62,54	+402,2	+245,2
6	+4,747	+17,11	+77,02	+1000	+1001,	+56,59	+52,01	+400,0	+235,9