



**CAN-K TWIN SCREW PUMP (ESTSP)
ELECTRIC SUBMERSIBLE TWIN SCREW
PUMP
FOR SUNCOR FIRE BAG
TESTING SUMMARY
PUMP MODEL: 675UEFG-HT
SERIAL # _____**

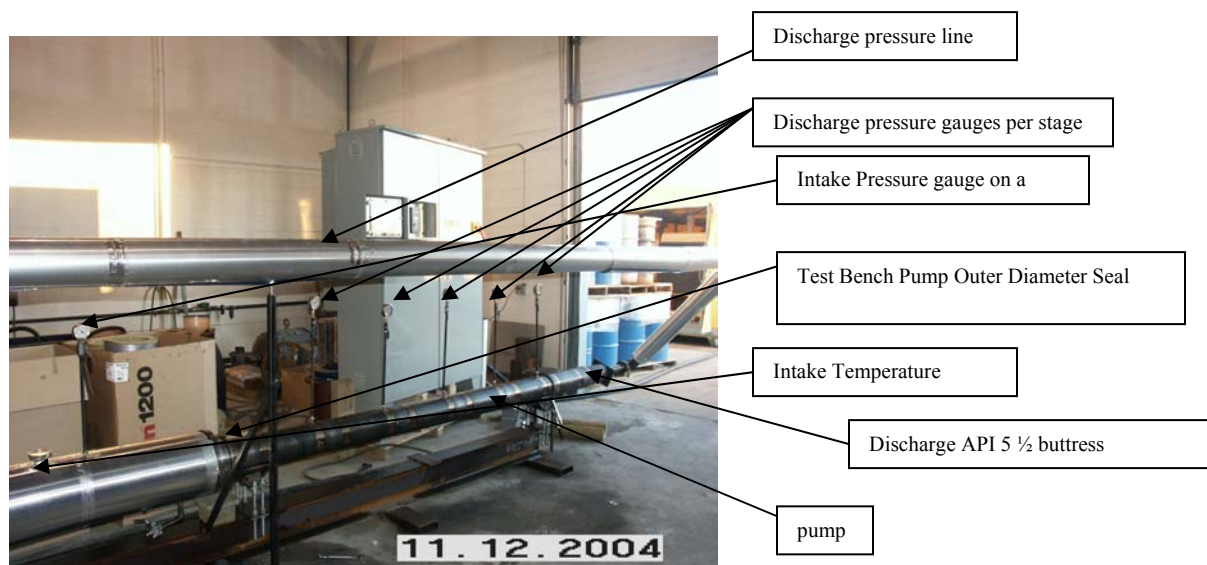
CONFIDENTIAL DOCUMENT

Objective:

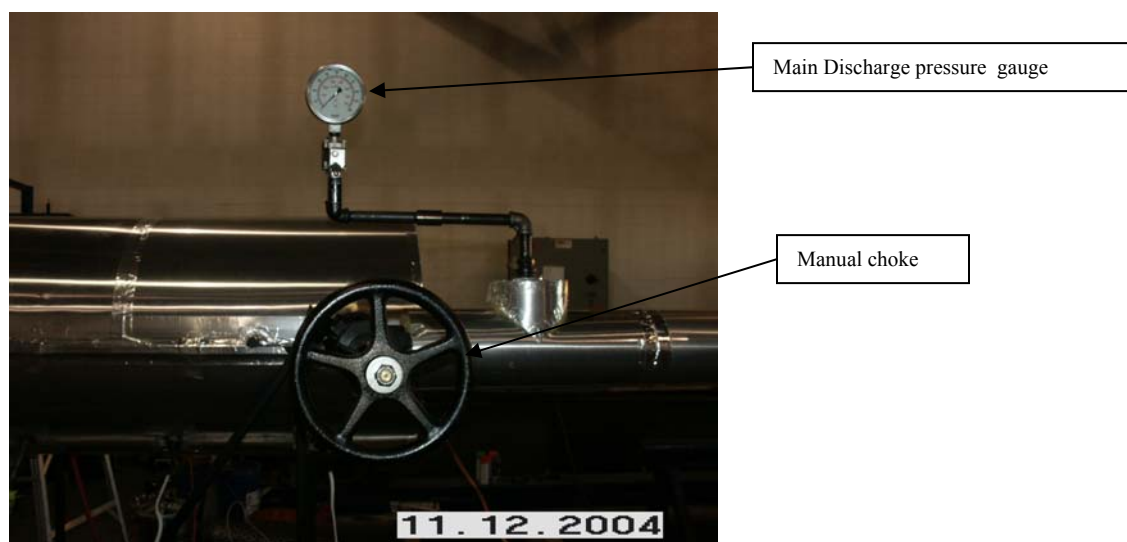
- To test the CAN-K pump under simulated conditions using a CAN-K temporary test bench.
- Test with varying stages from 4, 5 and 6.
- Pump to be installed is 6 stages.

CAN-K Temporary Test Bench Details

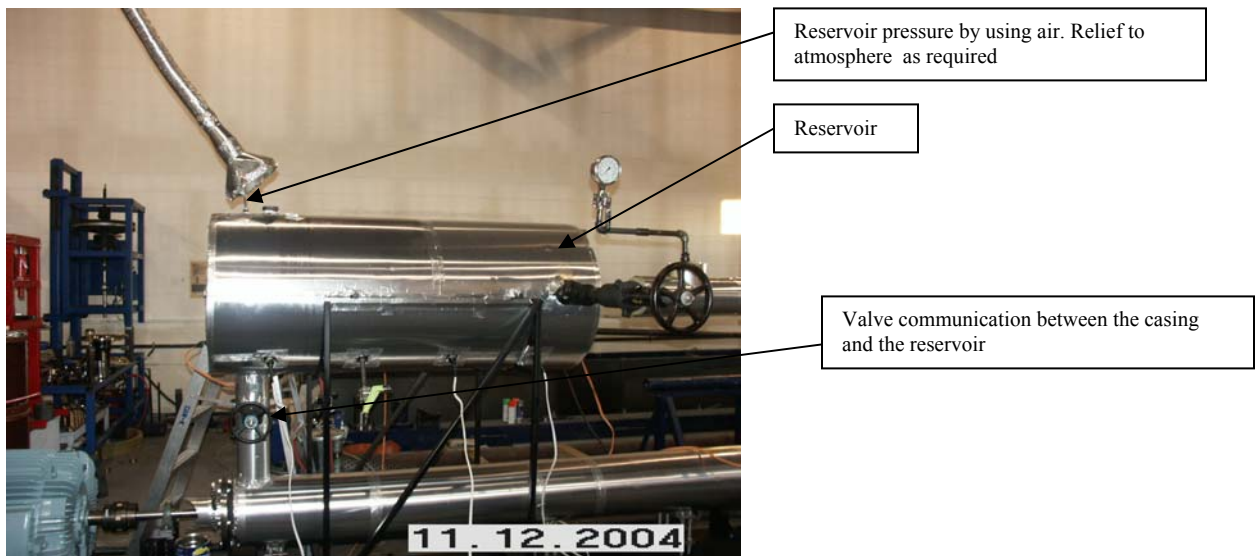
Temporary Manual Test Bench



Test Bench Pump installed 1



Test bench pressure gauge & choke 1

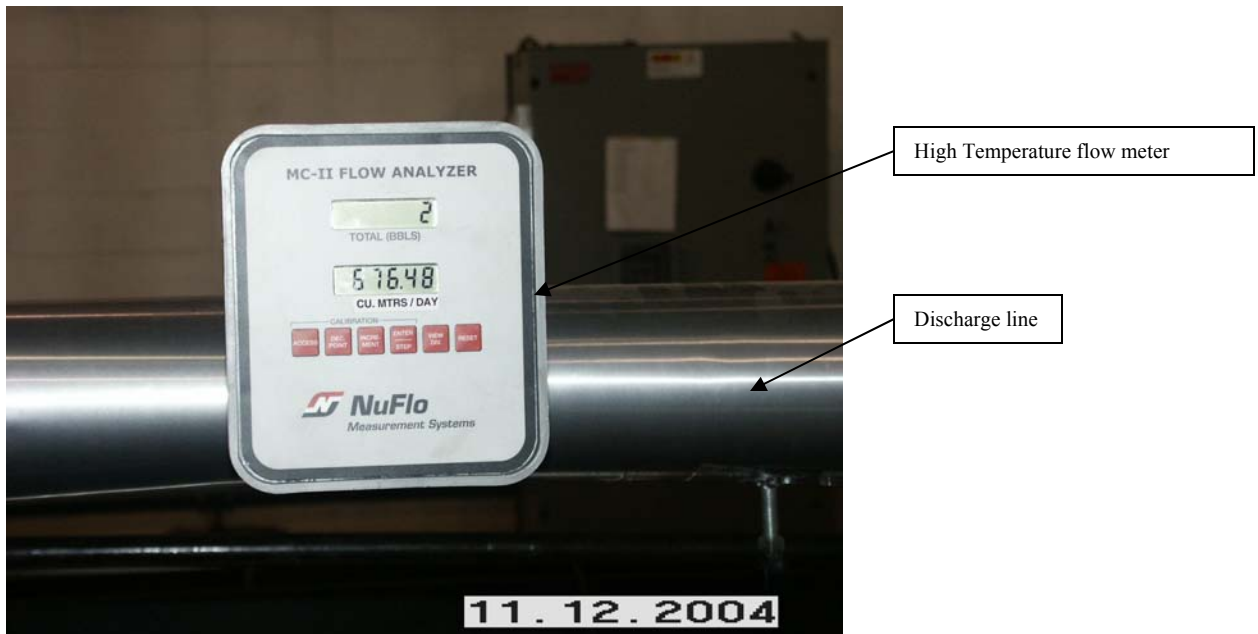


Test Bench Reservoir

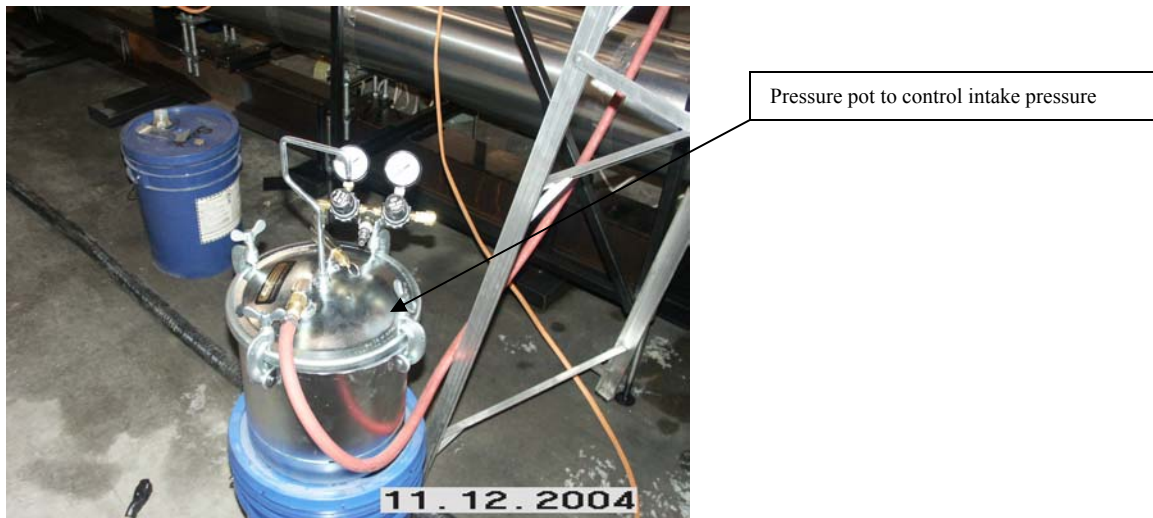


Flange bolted to the pump.
Housing for sealing system

Pump to Test bench connection



Flow Meter



Pressure Pot- Connected to reservoir



Relief Valve

Relief Valve



VFD

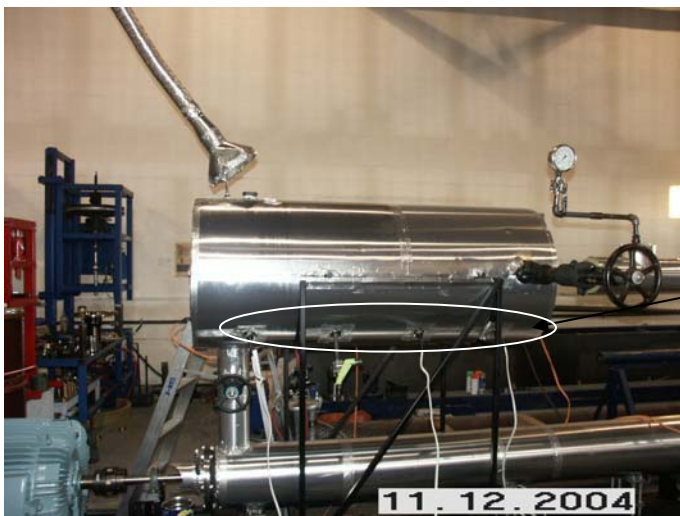
API 5 ½ inch buttress thread

Bench Frame

VFD & Discharge Pump stages



View of Test Bench Showing the Motor, Flow Meter, Choke, Reservoir and Discharge pressure gauge



Heaters

Heaters

Test Data

The data is collected as follows:

Stages 4, 5 and 6

- 1800 rpm no choke
- 1800 rpm choked to 300 psi, no choke, 400 psi, no choke, 500 psi, no choke, 600 psi, no choke.
- 2320 rpm no choke
- 2320 rpm 300 psi, no choke, 400 psi, no choke 500 psi, no choke, 600 psi, no choke
- 3600 rpm no choke
- 3600 rpm 300 psi, no choke, 400 psi, no choke, 500 psi no choke, 600 psi, no choke.
- Take any other readings as required to verify records of the procedure
- The above testing was repeated for 4, 5 and 6 stages. The pump is supplied with 6 stages.

Summary of test data with **4 stages**. Temperatures varying from 80 to 180 deg C @ the pump Intake.

RPM	Torque ft. lbs	Amps (480 Volts 3600 rpm)	Inlet Pressures (-4 psig to +3 psig)	HP (calculated) hp= NT/5252	Differential Pressures PSI	M3/day
1800	69		(-4 psig to +3 psig)	24	45 (Open	535
1800	106		(-4 psig to +3 psig)	36	300	399
1800	122		(-4 psig to +3 psig)	42	400	347
1800	146		(-4 psig to +3 psig)	50	500	300
1800	161		(-4 psig to +3 psig)	55	600	260
2320	36		(-4 psig to +3 psig)	16	Open choke	640
2320	89		(-4 psig to +3 psig)	39	300	438
2320			(-4 psig to +3 psig)		400	
2320			(-4 psig to +3 psig)		500	
2320			(-4 psig to +3 psig)		600	
3600	72		(-4 psig to +3 psig)	49	120(Open	940
3600	104		(-4 psig to +3 psig)	71	300	835
3600			(-4 psig to +3 psig)	0	400	
3600	146		(-4 psig to +3 psig)	100	500	723
3600	168		(-4 psig to +3 psig)	115	600	650

Summary of test data with **5 stages**. Temperatures varying from 80 to 180 deg C @ the pump Intake.

RPM	Torque ft. lbs	Amps (480 Volts 3600 rpm)	Inlet Pressures (-4 psig to +3 psig)	HP (calculated) hp= NT/5252	Differential Pressures PSI	M3/day
1800	47		(-4 psig to +3 psig)	16.1	40	522
1800	100		(-4 psig to +3 psig)	34.3	300	362
1800	117		(-4 psig to +3 psig)	40	400	302
1800	136		(-4 psig to +3 psig)	46.6	500	248
1800	153		(-4 psig to +3 psig)	52.4	600	195
2320	80		(-4 psig to +3 psig)	35.3	59	670
2320	107		(-4 psig to +3 psig)	47.27	300	528
2320	122		(-4 psig to +3 psig)	54	400	477
2320	141		(-4 psig to +3 psig)	62.3	500	423
2320	159		(-4 psig to +3 psig)	70.3	600	374
3600	87		(-4 psig to +3 psig)	59.6	130	972
3600	120		(-4 psig to +3 psig)	82.3	300	906
3600	136		(-4 psig to +3 psig)	93.2	400	848
3600	153		(-4 psig to +3 psig)	104.9	500	797
3600	173		(-4 psig to +3 psig)	118.6	600	770

Summary of test data with **6 stages**. Temperatures varying from 80 to 180 deg C @ the pump Intake.

1800	114		(-4 psig to +3 psig)	39	300	456
1800	127		(-4 psig to +3 psig)	44	400	413
1800	150		(-4 psig to +3 psig)	51	500	377
1800	164		(-4 psig to +3 psig)	56	600	335
2320	61		(-4 psig to +3 psig)	27	Open choke	667
2320	104		(-4 psig to +3 psig)	46	300	525
2320	121		(-4 psig to +3 psig)	53	400	468
2320	143		(-4 psig to +3 psig)	63	500	426
2320	170		(-4 psig to +3 psig)	75	600	384
3600	83		(-4 psig to +3 psig)	57	(120) open	958
3600	117		(-4 psig to +3 psig)	80	300	903
3600	136		(-4 psig to +3 psig)	93	400	864
3600	153		(-4 psig to +3 psig)	105	500	815
3600	174		(-4 psig to +3 psig)	119	600	773

Conclusion:

After extensive testing with 4, 5 and 6 stages and reviewing the well information, it was decided to ship the pump with 6 stages. The pump must be run at 2000 rpm or higher up to a maximum of 3600 rpm. The starting time to reach 2000 rpm or higher should be achieved in less than a few seconds, in any case not more than 10 seconds. This will also keep the Schlumberger motor.