TECHNICAL SPECIFICATION FOR AUXILIARY OIL PUMP SET (CENTRIFUGAL PUMP)

1.0 INTENT OF SPECIFICATION:–

THIS SPECIFICATION IS INTENDED TO COVER DESIGN, MANUFACTURE, ASSEMBLY, TESTING AND DELIVERY OF PUMP SET COMPLETE WITH BASE PLATE, LIFTING LUGS, COUPLING, MOTOR AND OTHER ACCESSORIES IF FELT NECESSARY BY SUPPLIER.

THE PUMPING SETS ARE INTENDED FOR OPERATION IN CONJUCTION WITH STEAM TURBINES AND SHOULD BE SUITABLE FOR CONTINUOUS OPERATION AT AN AMBIENT TEMPERATURE OF 50°c + AVERAGE HUMIDITY 90% AND MAXIMUM HUMIDITY 100%.

2.0 FUNCTION:–

A.O.P. COMES IN OPERATION WHEN THE TURBINE IS INITIALLY STARTED AND WHENEVER PRESSURE IN THE LINE IS BELOW SET POINT, GOVERNING SYSTEM IS TO BE CHARGED AND LUBE OIL SUPPLY IS NEEDED FOR THE BEARING. THESE ARE TWO IN QUANTITY / SET. ONE PUMP IS KEPT AS STANDBY PUMP.

3.0 APPLICABLE CODE/STANDARD:– IS:4722, IS:325, IS:2253, IS:2254, IS:3202, IS:4029.

4.0 OIL SPECIFICATION:–

THE OIL TO BE HANDLED BY THE PUMP IS SERVOPRIME–46 OR IOC 46 OF IOC BRAND AND TURBINOL–47 OF M/S HINDUSTAN PETROLEUM CORPORATION LTD. (ISO VG 46).

KINEMATIC VISCOSITY AT 65°c/20°c	: 16 cs/100 cs
SPECIFIC GRAVITY AT 65°c	: 0.8488
FLASH POINT	: 200°c (min.)
OPERATIONAL TEMPERATURE	: 65°c
POUR POINT	: –6.6°c (max.)

				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
			अनुवादक TRANSLATED BY	-	
TSX	AKCHATURVEDI		निर्माणकर्ता WORKED BY	DHARAMPAL	27/03/06
QAX	S.S.Chauhan		जांचकर्ता CHECKED BY	ANUJ JAIN	27/3/06
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	S.C.AGRAWAL	27/3/6
			स्वीकृति APPROVED : (A.K.JAIN) AGM		Sr. No. 2 of 3
REV.NO. 09 Dt. 08-11-11			निर्माण PREPARED : STE	जारी ISSUED : TSX	दिनांक DATE : 03-08-84

हस्ताक्षर एवं दिनांक SIGN & DATE

सम्पत्ति सूची संख्या INVENTORY NO. P-5541

5.0 PUMP SPECIFICATION:–

5.1 IDENTIFICATION NO. TO BE MENTIONED ON NAME PLATE MAV22AP001 AND MAV23AP001.

5.2 DESIGN TEMPERATURE = 100°C
OPERATING TEMPERATURE = 65°C
NORMAL SUCTION PRESSURE = 0.05 Bar
MINIMUM SUCTION PRESSURE = 0.025 Bar

VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Liter/Min)	NORMAL DISCHARGE PRESSURE (Bar)	MAXIMUM DISCHARGE CAPACITY (Liter/Min)	MAXIMUM DISCHARGE PRESSURE (Bar)
VAR. 1	2544	7.0	4700	6.6
VAR. 2	3248	6.1	4560	5.8
VAR. 3	2820	6.6	5355	6.2
VAR. 4	3240	7.4	5460	6.6
VAR. 5	3060	7.3	6600	7.1
VAR. 6	2544	8.0	4700	6.6
VAR. 7	2356	7.4	3204	6.9
VAR. 8	2905	8.2	5177	6.6
VAR. 9	1930	7.5	–	–
VAR. 10	2880	6.7	6016	6.3
VAR. 11	3060	7.3	6600	7.1
VAR. 12	3180	8.2	5400	6.6
VAR. 13	1852	8.0	4649	7.0
VAR. 14	2392	8.3	2767	8.0
VAR. 15	2774	8.4	5144	8.0
VAR. 16	1656	8.5	1919	8.0
VAR. 17	2210	8.0	3765	6.6
VAR. 18	3040	6.7	6900	6.3
VAR. 19	2400	8.2	–	–
VAR. 20	2355	8.3	4065	8.0

5.3 DURING INITIAL STARTUP IN WINTER OIL TEMPERATURE MAY GO AS BELOW AS 20°C. THE CAPACITY OF MOTOR SHALL BE AS INDICATED IN CLAUSE NO. 7.3 OF THIS SPECIFICATION.

5.4 PUMP WITH DROOPING CHARACTERSTIC SHALL NOT BE ACCEPTABLE.

5.5 PUMP SHALL BE SUITABLE FOR MOUNTING VERTICALLY ON THE OIL TANK & PUMP BED PLATE SHALL MATCH THE COUNTER FLANGE PROVIDED ON THE TANK AS PER SKETCH ON SHEET NO. 6.

5.6 PUMP SUPPLIER SHALL FURNISH THE PERMISSIBLE TIME FOR THE OPERATION OF PUMP AT SHUT OFF LOAD.

6.0 MOTOR:–

A SUITABLE MOTOR CONFORMING TO THE PUMP REQUIREMENT SHALL BE SUPPLIED. THE MOTOR SHALL ALSO MEET THE FOLLOWING REQUIREMENTS BROADLY. THE MOTOR SHALL CONFIRM TO IS:4722, IS:325, IS:2253, IS:2254, IS:4029 & IS:3202 OR EQUIVALENT BS: SPECIFICATIONS. THE MOTOR SHALL MEET ALL INDIAN STATUTORY REQUIREMENTS.

6.1 APPLICATION:–

TO DRIVE OIL PUMP FOR SUPPLYING OIL TO BEARING & GOVERNING ELEMENTS.

6.2 TYPE OF MOTOR:–

SQUIRREL CAGE, INDUCTION MOTOR.

6.3 KW RATING OF THE MOTOR SHOULD BE THE MAXIMUM OF THE FOLLOWING THREE CONDITIONS:

6.3.1 IT SHALL HAVE ATLEAST 15% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP WHEN IT IS DISCHARGING MAXIMUM QUANTITY AT A VISCOSITY CORRESPONDING TO 50°C TEMPERATURE.

6.3.2 IT SHALL HAVE ATLEAST 5% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP WHEN IT IS DISCHARGING MAXIMUM QUANTITY AT A VISCOSITY CORRESPONDING TO 35°C TEMPERATURE.

6.3.3 IT SHALL HAVE AT LEAST 5% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP WHEN IT IS DISCHARGING 70% OF MAXIMUM QUANTITY AT A VISCOSITY CORRESPONDING TO 20° TEMPERATURE. FINALLY SUPPLIER SHALL FURNISH THE KW RATING AT AN AMBIENT TEMPERATURE OF 50°C.

6.4	KW ACTUALLY REQUIRED BY DRIVEN EQUIPMENT UNDER SPECIFIED OPERATION/STARTUP CONDITIONS.	: PUMP CAPACITY
6.5	RATED VOTAGE	: 415V
	FREQUENCY	: 50 Hz
6.6	PERMISSIBLE VOLTAGE AND FREQUENCY VARIATION UNDER NORMAL RUNNING CONDITIONS.	: ±10% VOLT. ± 5% FREQUENCY
6.7	COMBINED VARIATION	: 10% (SUM OF ABSOLUTE VALUES)
6.8	MINIMUM VOLTAGE REQUIRED UNDER STARTING CONDITION TO BRING DRIVEN EQUIPEMENT UPTO RATED SPEED.	: 80% RATED
6.9	NO. OF PHASES	: 3 ø
6.10	TYPE OF DUTY	: CONTINUOUS
6.11	FULL LOAD SPEED	: IT SHALL BE COMMENSURATE WITH PUMP SPEED AS PER DESIGN.
6.12	FULL LOAD CURRENT	: AS PER DESIGN.
6.13	STARTING CURRENT	: NOT TO EXCEED 600% OF RATED CURRENT (EXCLUSIVE OF IS TOLERANCES)
6.14	STARTING TORQUE	: 1.3 (MIN.) OF RATED TORQUE.
6.15	BREAK DOWN TORQUE	: 2.05 TIMES (MIN.) OF RATED VALUE.
6.16	EFFICIENCY AT FULL LOAD	: 90% (MIN.)
6.17	POWER FACTOR AT FULL LOAD	: 0.85% MINIMUM

6.18 MOTOR SHALL BE DESIGNED TO WITH STAND THE VOLTAGE AND TORQUE STRESSES DEVELOPED DUE TO THE DIFFERENCE BETWEEN THE MOTOR RESIDUAL VOLTAGE AND INCOMING SUPPLY VOLTAGE EQUAL TO 150% OF THE RATED MOTOR VOLTAGE DURING FAST CHANGEOVER OF BUSES.

7.0 STARTING DATA OF MOTOR:

7.1	STARTING	: SUITABLE FOR DOL STARTING.
7.2	ACCELERATION TIME WITH FULL LOAD CONNECTED.	: 3.5 ± 0.5 SECS.

7.3 LOCKED ROTOR WITHSTAND TIME UNDER HOT CONDITION AT RATED VOLTAGE SHALL BE AT LEAST 2.5 SEC. MORE THAN STARTING TIME.

7.4	PERMISSIBLE STARTING DUTY CYCLE NO. OF STARTS.	: 3 STARTS EQUALLY SPREAD OVER HOUR AND 2 CONSECUTIVE STARTS FROM HOT CONDITION WITHOUT ANY INJURIOUS HEATING TO THE WINDING.
7.5	OVER LOAD (% OF FULL LOAD) THAT CAN BE CARRIED BY THE MOTOR WITHOUT IMPAIRING, OVERALL PERFORMANCE AND PERIOD FOR WHICH THIS OVERLOAD IS APPLICABLE.	: MOTOR SHALL BE CAPABLE OF RUNNING AT FULL LOAD AT 80% OF RATED VOLTAGE FOR FIVE MINUTES AND 70% OF RATED VOLTAGE FOR 1 SEC.
7.6	LOCATION	: INDOOR
7.7	CLASS OF INSULATION	: CLASS–F, FUNGUS RESISTANT, TROPICALISED AS PER IS:3202 WITH TEMP. RISE LIMITED TO THAT OF CLASS B.

REV. NO. 09	SUPERSEDES	निर्माणकर्ता WORKED BY	H.GUPTA	02/12/11
		जांचकर्ता CHECKED BY	A.JAIN	2/12/11

सामग्री सूची संख्या INVENTORY NO P-5541
हस्ताक्षर एवं दिनांक SIGN & DATE 25/12/11
सामग्री सूची संख्या को अधिक्रमित करता है SUPERSEDES INVENTORY
दिनांक एवं हस्ताक्षर SIGN & DATE

7.8	SHAFT DISPOSITION MOUNTING	: VERTICAL / FLANGE MOUNTED
7.9	METHOD OF CONNECTION DRIVEN EQUIPEMENT.	: FLANGE FLEXIBLE COUPLING.
7.10	DIRECTION OF ROTATION AND CORRESPONDING TERMINAL DESIGNATION.	: TO SUIT PUMP
7.11	ENCLOSURE AND VENTILATION	: TOTALLY ENCLOSED FAN COOLED IP-55
7.12	BEARING	: THRUST BEARING MIN. STANDARD LIFE OF NOT LESS THAN 30,000 WORKING HOURS.
7.13	GROUNDING DEVICE	: SUITABLE ARRANGEMENT SHALL BE PROVIDED FOR EARTHING THE MOTOR AT TWO SEPARATE AND DISTINCT CONNECTION POINTS. DESIGN OF EARTHING CONDUCTOR SHALL BE AS PER IS:4722-1992.
7.14	TERMINAL CONNECTORS FOR STATOR HEADS TYPE AND NUMBER.	: 6 NEUTRAL SHALL BE CONNECTED EXTERNALLY IN THE TERMINAL BOX.
7.15	TERMINAL BOX	: TERMINAL BOX SHALL BE PROVIDED WITH DOUBLE COMPRESSION TYPE BRASS CABLE GLANDS AND COPPER CABLE LUGS TO MATCH OWNER'S ALUMINIUM CABLES, THE SIZE OF WHICH WILL BE INTIMATED AT THE TIME OF ORDERING. TERMINAL BOX SHALL BE CAPABLE OF BEING ROTATED THROUGH 180° IN STEPS OF 90° AND IT SHALL HAVE A DEGREE OF PROTECTION OF IP:55. IT SHALL ALSO BE SUITABLE TO WITHSTAND THE FAULT LEVEL OF 50 KA FOR 0.25 SEC.
7.16	WHETHER PHASES SEGREGATED	: NO
7.17	SPACE HEATER	: TO BE PROVIDED
7.18	RATED VOLTAGE FOR SPACE HEATERS	: 240 VOLTS

8.0 SPECIAL REQUIREMENTS OF MOTOR

8.01 THE MOTOR SHALL BE RE-WOUNDABLE.

8.02 THE MOTOR SHALL HAVE ON LINE GREASING FACILITY.

8.03 THE MOTOR CONSTRUCTION SHALL BE SUITABLE FOR EASY DIASSEMBLY AND REASSEMBLY.

8.04 THE MOTOR SHALL BE SUITABLE FOR WORKING IN AN ENVIRONMENT OF OIL FUMES WITHOUT ANY HAZARD.

8.05 SEPARATE TERMINAL BOX FOR SPACE HEATERS SHALL BE PROVIDED.

8.06 MOTOR SHALL BE PAINTED WITH PAINT SUITABLE FOR WORKING CONDITION AND ITS COLOUR SHALL BE INTIMATED AT THE TIME OF ORDERING.

8.07 MOTOR BEARINGS (DE & NDE)SHALL BE SEALED TYPE TO AVOID FREQUENT RE-GREASING.

8.08 LIMITS OF MECHANICAL VIBRATIONS SEVERITY SHALL BE LIMITED TO VIBRATION GRADE "R" (REDUCED) AS PER IS:12075.

9.0 TESTS AT MANUFACTURE'S WORKS OF MOTOR:

(i) MOTOR AFTER COMPLETE ASSEMBLY SHALL BE SUBJECTED TO BOTH TYPE AND ROUTINE TESTS AS PER IS: 4722.

(ii) IN ADDITION THE FOLLOWING TESTS SHALL ALSO BE CARRIED OUT:

REV. NO.					
09	SUPERSEDES	निर्माणकर्ता WORKED BY	H.GUPTA	Hgpt	02/12/11
		जांचकर्ता CHECKED BY	A.JAIN	Ajain	2/12/11

ADDITIONAL TYPE TEST:

(a) DEGREE OF PROTECTION TEST TO CONFORM TO THE SPECIFIED DEGREE OF PROTECTION.

(b) MEASUREMENT OF NOISE LEVEL AS PER IS: 12065. MOTOR NOISE LEVEL SHALL BE LIMITED SO AS TO ACHIEVE COMBINED PUMP MOTOR NOISE LEVEL AS PER CLAUSE 1.4 OF ST38013.

ADDITIONAL ROUTINE TESTS:

(a) 20% OVERSPEED TEST FOR 2 MINUTES.

(b) MEASUREMENT OF VIBRATION AS PER IS: 12075.

10.0 DOCUMENTS TO BE SUPPLIED WITH OFFER OF MOTOR:–

THE OFFER SHOULD BE ACCOMPANIED WITH FOLLOWING DOCUMENTS IN TWO COPIES. THE OFFER WILL NOT BE CONSIDERED IF ALL THESE DOCUMENTS ARE NOT SUPPLIED.

10.1 CHARACTERISTICS AT 80%, 100% AND 110% VOLTAGES.

10.1.1 STARTING CURRENT V/S TIME.

10.1.2 TORQUE V/S SLIP.

10.1.3 THERMAL WITHSTAND CHARATERISTIC FOR HOT AND COLD CONDITION.

10.2 TYPE AND FRAME SIZE.

10.3 STARTING TIME

10.3.1 WITH 100% VOLTAGE AT TERMINAL.

10.3.2 WITH 80 % VOLTAGE AT TERMINAL.

10.4 SAFE STALL TIME AT 110% VOLTAGE UNDER HOT CONDITION.

10.5 POWER (Kw) RATING CALCULATION W.R.T. PUMP REQUIREMENT.

10.6 EXPECTED LIFE OF BEARING.

11.0 DOCUMENTS TO BE FURNISHED WITHIN FOUR WEEKS OF PLACEMENT OF ORDER OF MOTOR (FOR BHEL OR THEIR CUSTOMER'S APPROVAL):–

11.1 SIX HARD COPIES AND ONE SOFT COPY (IN PDF FORMAT) OF MOTOR DATA SHEET AND G.A. DRAWING.

11.2 DRAWING SHOWING TERMINAL DETAIL OF ALL TERMINALS AND LOCATION AND DIMENSION OF TERMINAL BOXES.

11.3 ROTOR WEIGHT AND TOTAL MOTOR WEIGHT.

11.4 CHARACTERISTIC CURVES OF THE MOTOR.

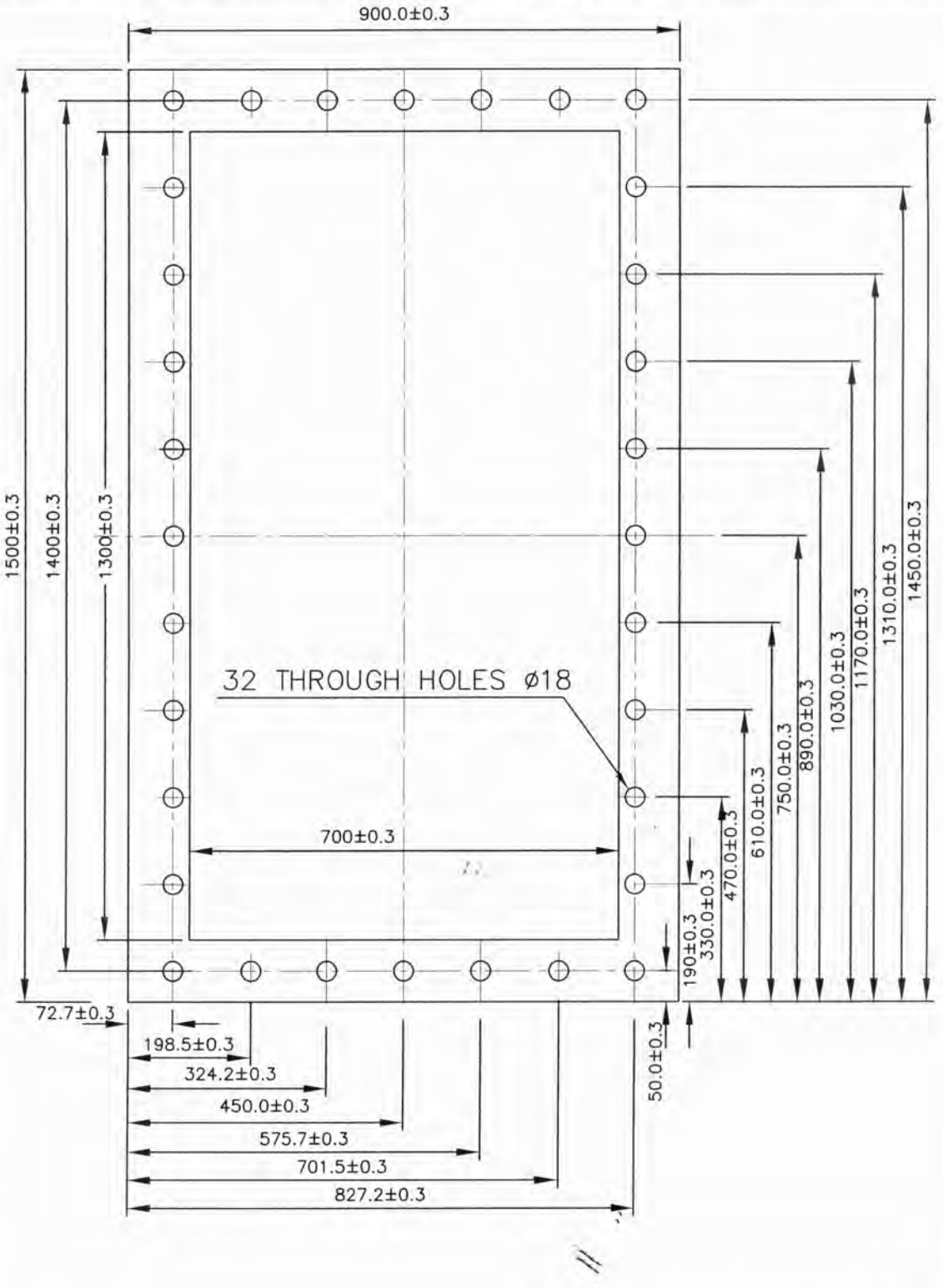
12.0 SIX COPIES OF TESTS CARRIED OUT AS PER CLAUSE NO. 9.0 ON EACH MOTOR SHALL BE FURNISHED TO BHEL FOR SCRUTINY AND APPROVAL. ONLY ON ACCEPTANCE FROM BHEL SIDE, MOTOR CAN BE CONSIDERED SUITABLE FOR DISPATCH.

13.0 FOR TECHNICAL DELIVERY CONDITON AND GENERAL FEATURES OF PUMP, PLEASE REFER ST38013.

14.0 CROSS REFERRED STANDARDS:

IS:325, IS:4722, IS:2253, IS:2254, IS:3202, IS:4029, IS:12065, IS:12075, ST38013.

REV. NO. 09	SUPERSEDES	निर्माणकर्ता WORKED BY	H.GUPTA		02/12/11
P-554-1		जांचकर्ता CHECKED BY	A.JAIN		2/12/11



हस्ताक्षर एवं दिनांक SIGN & DATE	25/2/12			
सामग्री सूची संख्या INVENTORY NO	P-5541	REV. NO. 09	SUPERSEDES	निर्माणकर्ता WORKED BY: H.GUPTA — 8/11/11
				जांचकर्ता CHECKED BY: A.JAIN — 8/11/11

TECHNICAL SPECIFICATION FOR EMERGENCY OIL PUMP SET (CENTRIFUGAL PUMP)

1.0 INTENT OF SPECIFICATION:–

THIS SPECIFICATION IS INTENDED TO COVER DESIGN, MANUFACTURE, ASSEMBLY, TESTING AND SUPPLY OF PUMP SETS COMPLETE WITH BASE PLATE, LIFTING LUGS, COUPLING, MOTOR WITH STARTING RESISTANCE AND OTHER ACCESSORIES IF FELT NECESSARY BY THE SUPPLIER.

THE PUMPING SETS ARE INTENDED FOR OPERATION IN CONJUCTION WITH STEAM TURBINES AND SHOULD BE SUITABLE FOR CONTINUOUS OPERATION AT AN AMBIENT TEMPERATURE 50°c & AVERAGE HUMIDITY 90% AND MAXIMUM HUMIDITY 100%.

2.0 FUNCTION:–

WHEN THERE IS AC POWER FAILURE, THIS PUMP COMES IN OPERATION WITH DC POWER SUPPLY. MAINLY THE FUNCTION OF THIS PUMP IS TO SUPPLY OIL TO BEARINGS SO AS TO SAVE THESE FROM STARVATION DURING EMERGENCY. THIS IS ONE IN QUANTITY/SET.

3.0 APPLICABLE CODE/STANDARD:–

IS:2253, IS:2254, IS:3202, IS:4691, IS:4722 AND IS:4729.

4.0 OIL SPECIFICATION:–

THE OIL TO BE HANDELED BY THE PUMP IS SERVOPRIME–46 OR IOC–46 OF IOC BRAND AND TURBINOL–47 OF M/S HINDUSTAN PETROLEUM CORPORATION LTD. (ISO VG–46).

KINEMATIC VISCOSITY AT 65°c/20°c	: 16 cs/100 cs
SPECIFIC GRAVITY AT 65°c	: 0.8488
FLASH POINT	: 200°c (min.)
OPERATIONAL TEMPERATURE	: 65°c
POUR POINT	: –6.6°c (max.)

				NAME	SIGNATURE & DATE
CIE	VINOD KUMAR		अनुवादक TRANSLATED BY	-	
TSX	AKCHATURVEDI		निर्माणकर्ता WORKED BY	DHARAMPAL	14/8/06
QAX	S S Chauhan		जांचकर्ता CHECKED BY	ANUJ JAIN	14/8/06
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	S.C.AGRAWAL	28/6/06
			स्वीकृति APPROVED :	(A.K.JAIN) AGM	21.08.06
REV.NO. 04 (SUPERSEDES)			निर्माण PREPARED :	STE (TL/TH)	जारी ISSUED : TSX
Dt. 31.08.06					दिनांक DATE : 03-08-84

हस्ताक्षर एवं दिनांक SIGN & DATE: 21/9/06

सामग्री सूची संख्या INVENTORY NO.: P-5540

सामग्री सूची संख्या को अधिक्रमित करता है SUPERSEDES INVENTORY NO.

हस्ताक्षर एवं दिनांक SIGN & DATE

5.0 PUMP SPECIFICATION:-

5.1 IDENTIFICATION NO. TO BE MENTIONED ON NAME PLATE MAV24AP001

5.2 TYPE CENTRIFUGAL TYPE

DESIGN TEMPERATURE = 100°C

OPERATING TEMPERATURE = 65°C

NORMAL SUCTION PRESSURE = 0.05 Bar

MINIMUM SUCTION PRESSURE = 0.025 Bar

VARIANT NUMBER	NORMAL DISCHARGE CAPACITY (Litre/Min.)	NORMAL DISCHARGE PRESSURE (Bar)
VAR. 1	1800.00	2.3
VAR. 2	1920.00	1.7
VAR. 3	1200.00	2.0
VAR. 4		
VAR. 5		

5.3 DURING INITIAL STARTUP IN WINTER OIL TEMPERATURE MAY GO AS BELOW AS 20°C. MOTOR SHALL BE CAPABLE OF STARTING AND CONTINUOUS RUNNING OF THE PUMPING SET AT THIS SPECIFIED VALUE OF TEMPERATURE .

5.4 PUMP WITH DROOPING CHARACTERSTIC SHALL NOT BE ACCEPTABLE.

5.5 PUMP SHALL BE SUITABLE FOR MOUNTING VERTICALLY ON THE OIL TANK AND PUMP BED PLATE SHALL MATCH THE COUNTER FLANGE PROVIDED ON THE TANK AS PER SKETCH ON SHEET NO. 6.

5.6 PUMP SUPPLIER SHALL FURNISH THE PERMISSIBLE TIME FOR THE OPERATION OF PUMP AT SHUT OFF LOAD.

6.0 MOTOR:-

A SUITABLE MOTOR CONFORMING TO THE PUMP REQUIREMENT SHALL BE SUPPLIED. THE MOTOR SHALL ALSO MEET THE FOLLOWING SPECIFICATIONS BROADLY. THE MOTOR SHALL CONFIRM TO IS:2253, IS:2254, IS:3202 AND IS:4722 OR EQUIVALENT BS: SPECIFICATIONS. THE MOTOR SHALL MEET ALL INDIAN STATUTORY REQUIREMENTS.

6.1 APPLICATION:-

TO DRIVE OIL PUMP FOR SUPPLYING OIL TO BEARINGS IN THE EVENT OF A.C.

6.2 TYPE OF MOTOR:-

SEPARATELY EXCITED OR COMPOUND MOTOR WITH 10% COMPOUNDING .

6.3 KW RATING:-

IT SHALL HAVE AT LEAST 25% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP WHEN IT IS DISCHARGING MAX. QUANTITY, AT VISCOSITY CORRESPONDING TO 65°C. FINALLY SUPPLIER SHALL MENTION KW RATING AT AN AMBIENT TEMP. OF 50°C.

6.4 KW ACTUALLY REQUIRED BY DRIVE EQUIPMENT UNDER SPECIFIED OPERATING AND START UP CONDITION. : PUMP CAPACITY

6.5 RATED VOLTAGE : 220 V D.C.
220 V D.C.FIELD.

6.6	PERMISSIBLE VOLTAGE VARIATIONS UNDER NORMAL RUNING CONDITIONS.	: −15% +10%
6.7	MINIMUM VOLTAGE REQUIRED UNDER STARTING CONDITION TO BRING DRIVEN EQUIPEMENT UPTO RATED SPEED.	: 80% RATED CURRENT
6.8	TYPE OF DUTY	: CONTINUOUS
6.9	FULL LOAD SPEED	: IT SHALL BE COMENSURATE WITH PUMP SPEED AS PER DESIGN.
6.10	FULL LOAD CURRENT	: AS PER DESIGN.
6.11	STARTING CURRENT	: 3 TO 3.5 TIMES. I RATED
6.12	STARTING TORQUE	: 3 TO 3.5 TIMES. TORQUE
6.13	EFFICIENCY AT FULL LOAD	: 85% MINIMUM

7.0 STARTING DATA

7.1 STARTING

SUITABLE FOR DIRECT ON LINE STARTING WITH A PERMANENT RESISTANCE CONNECTED IN THE ARMATURE CIRCUIT. UNDER THIS CONDITION MOTOR SHALL BE CAPABLE OF DRIVING THE PUMP AT 100% LOAD. THE MOTOR SHALL ACCELARATE TO FULL SPEED WITH FULL LOAD CONNECTED WITHIN 3±0.5 SECONDS. SUCH RESISTANCE SHALL ALSO BE INCLUDED IN THE OFFER. THE RESISTANCE SHALL BE FOR CONTINUOUS DUTY. THE RESISTANCE BOX ENCLOSURE TEMP. RISE OVER AMBIENT SHOULD NOT EXCEED 70°C AND IT IS OF FeCr−Al OR CUPRO−NICKLE TYPE SHOULD HAVE IP21 (MIN.) DEGREE OF PROTECTION.

7.2 STARTING RESISTANCE BOX/PANEL SHALL BE IN VENDOR SCOPE OF SUPPLY.

7.3 PERMISSIBLE STARTING DUTY CYCLE/NO. OF STARTS:−

THREE STARTS SPREAD OVER AN HOUR AND TWO CONSECUTIVE STARTS FROM HOT CONDITION WITHOUT ANY INJURIOUS HEATING TO THE WINDING.

7.4	OVER LOAD (% OF FULL LOAD) THAT CAN BE CARRIED BY THE MOTOR WITHOUT IMPAIRING, OVERALL PERFORMANCE AND PERIOD FOR WHICH THIS OVERLOAD IS APPLICABLE.	: 25% FOR 5 MINUTES.
7.5	LOCATION	: INDOOR
7.6	CLASS OF INSULATION	: CLASS−F, FUNGUS RESISITANT, TROPICALISED AS PER IS:3202 WITH TEMP. RISE LIMITED TO THAT OF CLASS B.
7.7	SHAFT DISPOSITION/MOUNTING	: VERTICAL / FLANGE MOUNTED
7.8	METHOD OF CONNECTION TO DRIVEN EQUIPEMENT.	: FLANGE FLEXIBLE COUPLING.
7.9	DIRECTION OF ROTATION AND CORRESPONDING TERMINAL DESIGNATION.	: TO SUIT PUMP
7.10	ENCLOSURE AND VENTILATION	: TOTALLY ENCLOSED FAN COOLED IP−55

7.11	BEARING	: THRUST BEARING WITH A MINIMUM STANDARD LIFE OF NOT LESS THAN 30,000 WORKING HOURS.
7.12	GROUNDING DEVICE	: SUITABLE ARRANGEMENT SHALL BE PROVIDED FOR EARTHING THE MOTOR AT TWO SEPARATE & DISTINCT CONNECTION POINTS. DESIGNATION OF EARTHING CONDUCTOR SHALL BE AS PER IS:4722–1992.
7.13	TERMINAL CONNECTORS	: 2 FOR ARMATURE SUITABLE FOR ALUMINIUM CABLE. 2 FOR FIELD. SUITABLE FOR 2C–10 mm ALUMINIUM CABLE.
7.14	CABLE FOR GROUNDING POINTS	: TO BE PROVIDED
7.15	TERMINAL BOX	: TERMINAL BOX SHALL BE PROVIDED WITH DOUBLE COMPRESSION TYPE BRASS CABLE GLANDS (Nickel Chromium PLAED HEAVY DUTY, CONFIRMING TO BS:6121) AND COPPER CABLE LUGS TO MATCH OWNER'S ALUMINIUM CABLES, THE SIZE OF WHICH SHALL BE INTIMATED LATER. TERMINAL BOX SHALL BE CAPABLE OF BEING ROTATED THROUGH 180° IN STEPS OF 90°. IT SHALL HAVE A DEGREE OF PROTECTION OF IP–55.

8.0 SPECIAL REQUIREMENTS

8.1 THE MOTOR SHALL BE RE–WOUNDABLE.

8.2 THE MOTOR SHALL HAVE ON LINE GREASING FACILITY.

8.3 THE MOTOR CONSTRUCTION SHALL BE SUITABLE FOR EASY DIASSEMBLY AND REASSEMBLY.

8.4 THE MOTOR SHALL BE SUITABLE FOR WORKING IN AN ENVIRONMENT OF OIL FUMES WITHOUT ANY HAZARD.

8.5 THE MOTOR SHALL BE PAINTED WITH PAINT SUITABLE FOR WORKING CONDITION AND ITS COLOUR SHALL BE INTIMATED LATER ON.

9.0 TESTS AT MANUFACTURER'S WORKS:

(i) MOTOR AFTER COMPLETE ASSEMBLY SHALL BE SUBJECTED TO BOTH TYPE AND ROUTINE TESTS AS PER IS:4722. TYPE TEST SHOULD NOT BE MORE THAN 5 YEARS OLD w.r.t. DATE OF ORDERING.

(ii) IN ADDITION THE FOLLOWING TESTS SHALL ALSO BE CARRIED OUT.

ADDITIONAL TYPE TESTS:

(a) DEGREE OF PROTECTION TEST TO CONFORM TO THE SPECIFIED DEGREE OF PROTECTION.

(b) MEASUREMENT OF NOISE LEVEL AS PER IS: 12065. MOTOR NOISE LEVEL SHALL BE LIMITED SO AS TO ACHIEVE COMBINED PUMP MOTOR NOISE LEVEL AS PER CLAUSE 1.4 OF ST38013.

REV. NO. 04		निर्माणकर्ता WORKED BY	DHARAMPAL		14/06/06
P-5540		जांचकर्ता CHECKED BY	ANUJ JAIN		14/6/06

ADDITIONAL ROUTINE TESTS:

(a) 20% OVERSPEED TEST FOR 2 MINUTES.
(b) MEASUREMENT OF VIBRATION AS PER IS: 12075.

10.0 DOCUMENTS TO BE SUPPLIED WITH OFFER:–

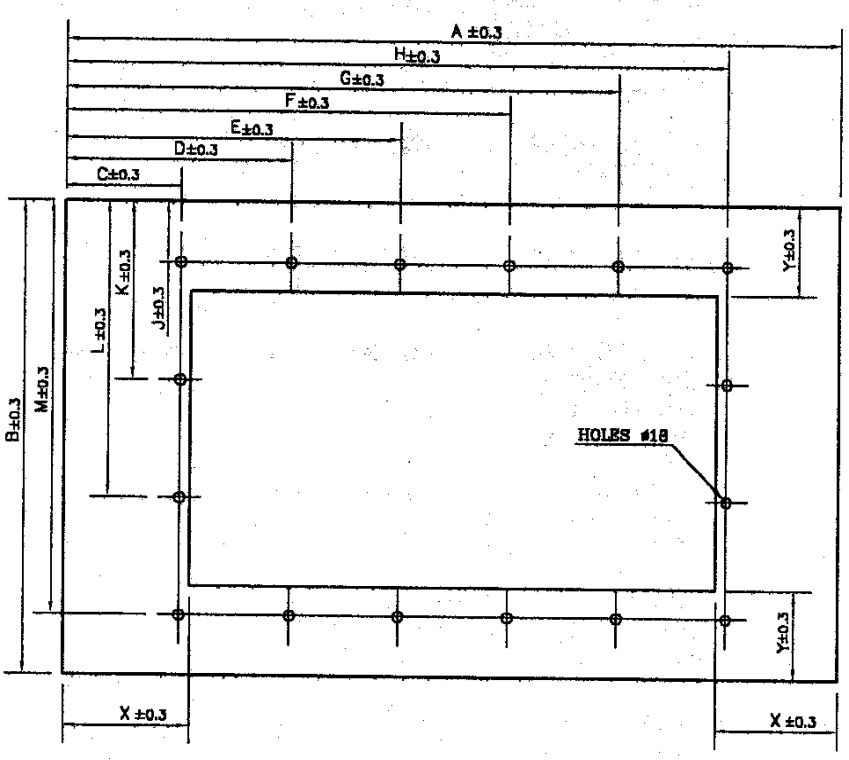
THE OFFER SHOULD BE ACCOMPANIED WITH FOLLOWING DOCUMENTS IN TWO COPIES. THE OFFER WILL NOT BE CONSIDERED IF ALL THESE DOCUMENTS ARE NOT SUPPLIED.

10.1 CHARACTERISTICS
10.1.1 STARTING CURRENT V/S TIME.
10.2 TYPE AND FRAME SIZE.
10.3 STARTING TIME IN SECOND.
10.3.1 WITH 100% VOLTAGE AT TERMINALS.
10.3.1 WITH 85 % VOLTAGE AT TERMINALS.
10.3.2 WITH 80 % VOLTAGE AT TERMINALS.
10.4 SAFE STALL TIME AT 100% VOLTAGE UNDER HOT CONDITIONS.
10.5 POWER (Kw) RATING CALCULATIONS W.R.T. PUMP REQUIREMENT.
10.6 EXPECTED LIFE OF BEARING.

11.0 DOCUMENTS TO BE FURNISHED WITHIN FOUR WEEKS OF PLACEMENT OF ORDER:–

11.1 SIX HARD COPIES AND ONE SOFT COPY (IN PDF FORMAT) OF MOTOR DATA SHEET AND G.A. DRAWING.
11.2 DRAWING SHOWING TERMINAL DETAIL OF ALL TERMINALS AND LOCATION AND DIMENSION OF TERMINAL BOXES.
11.3 ROTOR WEIGHT AND TOTAL MOTOR WEIGHT.
11.4 CHARACTERISTIC CURVES OF THE MOTOR.
12.0 SIX COPIES OF TESTS CARRIED OUT AS PER CLAUSE NO. 9.0 ON EACH MOTOR SHALL BE FURNISHED TO BHEL FOR SCRUTINY AND APPROVAL. ONLY ON ACCEPTANCE FROM BHEL SIDE, MOTOR CAN BE CONSIDERED SUITABLE FOR DISPATCH.
13.0 FOR TECHNICAL DELIVERY CONDITION AND GENERAL FEATURES OF PUMP. LPEASE REFER ST38013.
14.0 CROSS REFERRED STANDARDS: IS:2253, IS:2254, IS:3202, IS:4691 IS:4722 AND IS:4729.

BED PLATE EXISTING ON OIL TANK



BED PLATE TYPE	A±0.3	B±0.3	C ±0.3	D ±0.3	E±0.3	F ±0.3	G±0.3	H ±0.3	J ±0.3	K±0.3	L ±0.3	M±0.3	X ±0.3	Y ±0.3	NO. OFF HOLES
AA	1500	900	220	432	644	856	1068	1280	115	338.3	561.6	784.9	240	170	16