REV	Description:	Tag No.	P-05
4	18-Jan-12	Frank	
5	20-Feb-12	Frank	
A00	7-Apr-17	Frank	

NUMBER REQUIRED: 2 — SPEC NO.:

MANUFACTURER: Dalian Deep Blue Pump Co.,Ltd — PURCHASE ORDER NO.:

SIZE & TYPE: DCSG 400-120X4 BB5 — SERIAL NO.:

APPLICABLE TO: ○ PROPOSALS ○ PURCHASE ■ AS BUILT

NOTES: INFORMATION BELOW TO BE COMPLETED: ○ BY PURCHASER ☐ BY MANUFACTURER ◎ BY MANUFACTURER OR PURCHASER

● OPERATING CONDITIONS (5.1.3)

CAPACITY, NORMAL 309 (m^3/h) RATED 402 (m3/h)

OTHER

SUCTION PRESSURE RATED/MAX. 4.89 / 18 (barg)

DISCHARGE PRESSURE 31.6 (barg)

DIFFERENTIAL PRESSURE 26.7 (bar)

DIFF. HEAD 307.0 (m) NPSHA 57.4 (m)

PROCESS VARIATIONS (5.1.4)

STARTING CONDITIONS (5.1.4)

SERVICE: ● CONT. ○ INTERMITTENT (STARTS/DAY)

○ PARALLEL OPERATION REQ'D (5.1.13)

● SITE DATA (5.1.3)

LOCATION: (5.1.30)

○ INDOOR ○ HEATED ● OUTDOOR ● UNHEATED

● ELECTRICAL AREA CLASSIFICATION (5.1.24 / 6.1.4)

TEMP. CL T3 GR IIB Zone 2

○ WINTERIZATION REQ'D ● TROPICALIZATION REQ'D.

SITE DATA (5.1.30) **Refer spec:YAP1-CTEP00-SAEM-SPJB-1001**

● ALTITUDE 10 (m) BAROMETER (bar)

● RANGE OF AMBIENT TEMPS: MIN/MAX. -4 / 52 (°C)

● RELATIVE HUMIDITY: MIN / MAX / 100 (%)

UNUSUAL CONDITIONS: (5.1.30) ● DUST ○ FUMES

● OTHER Temporary Sand Storm

● DRIVER TYPE

● INDUCTION MOTOR ○ STEAM TURBINE ○ GEAR

○ OTHER

● MOTOR DRIVER (6.1.1 / 6.1.4)

◎ MANUFACTURER ABB

■ 630 (kW) ■ 2980 (RPM)

■ FRAME AMD500L2T ◎ ENCLOSURE IP55W

◎ HORIZONTAL ◎ VERTICAL ◎ SERVICE FACTOR

◎ VOLTS/PHASE/HERTZ 6000V / 3 / 50

● TYPE Induction Type

○ MINIMUM STARTING VOLTAGE (6.1.5)

◎ INSULATION F ● TEMP. RISE B

■ FULL LOAD AMPS 70A

■ LOCKED ROTOR AMPS 371A

◎ STARTING METHOD DOL

◎ LUBE OIL

BEARINGS (TYPE/NUMBER):

■ RADIAL 6317M/C3 / 1

■ THRUST 6317M/C3 / 1

☐ VERTICAL THRUST CAPACITY

UP (N) DOWN (N)

● LIQUID (5.1.3)

LIQUID TYPE OR NAME STABILISED HEAVY CRUDE OIL

● HAZARDOUS ● FLAMMABLE ○ (5.1.5)

	MIN.	NORMAL	MAX.
PUMPING TEMP (°C)	6		60
VAPOR PRESS. (bar)	0.22		0.93
RELATIVE DENSITY (SG):	0.928		0.887
VISCOSITY (cP)	51.7		11.4

SPECIFIC HEAT, Cp 1.67～1.9 (kJ/kg °C)

● CHLORIDE CONCENTRATION 10 PTB BS &W (PPM)

● H_2S CONCENTRATION (6.5.2.4) 15PPM by Wt (PPM) WET (5.2.1.12c)

CORROSIVE / EROSIVE AGENT H_2S, CO_2, Cl^- (5.12.1.9)

MATERIALS

● ANNEX H CLASS (5.12.1.1) S-6

○ MIN DESIGN METAL TEMP (5.12.4.1) (°C)

○ REDUCED HARDNESS MATERIALS REQ'D. (5.12.1.11)

■ BARREL/CASE C.S IMPELLER 12%CHr

■ CASE/IMPELLER WEAR RINGS 12%CHr

■ SHAFT AISI4140

■ DIFFUSERS 12%CHr

◎ PERFORMANCE:

PROPOSAL CURVE NO. ◎ RPM 2980

■ IMPELLER DIA. RATED 285 MAX. 330 MIN. 275 (mm)

■ IMPELLER TYPE Closed Type

■ RATED POWER 452 (kW) EFFICIENCY 68 (%)

■ MINIMUM CONTINUOUS FLOW:

THERMAL (m^3/h) STABLE 61.8 (m^3/h)

■ PREFERRED OPER. REGION 280 TO 440 (m^3/h)

■ ALLOWABLE OPER. REGION 61.8 TO 480 (m^3/h)

■ MAX HEAD @ RATED IMPELLER 506 (m)

■ MAX POWER @ RATED IMPELLER 540 (kW)

■ NPSHR AT RATED CAPACITY 10 (m) (5.1.10)

■ SUCTION SPECIFIC SPEED 9121 (US)

MAX/ACTUAL / (5.1.11)

■ MAX. SOUND PRESS. LEVEL REQ'D 85 @ 1m(Note 1) (dBA) (5.1.16)

◎ EST MAX SOUND PRESS. LEVEL (dBA) (5.1.16)

○ UTILITY CONDITIONS

ELECTRICITY	VOLTAGE	PHASE	HERTZ
DRIVERS	6000	3	50
HEATING	230	1	50

SYSTEM VOLTAGE DIP ○ 80% ● OTH YAP1-AAAA81-MEEL-SPEQ-1005

STEAM	MAX. PRESS.	MAX. TEMP.	MIN. PRESS.	MIN. TEMP.
DRIVERS	N.A			
HEATING	N.A			

COOLING WATER: (5.1.19) SOURCE

SUPPLY TEMP. N.A (°C) MAX. RETURN TEMP. (°C)

NORM. PRESS. N.A (bar) DESIGN PRESS. (bar)

MIN. RET. PRESS. N.A (bar) MAX. ALLOW. D.P. (bar)

CHLORIDE CONCENTRATION: (PPM)

Description	REV.	Tag No.	P-0	4	18-Jan-12	Frank		
				5	20-Feb-12	Frank		
				A00	7-Apr-17	Frank		

NOTES:

1 Motor datasheet will be submiited separately.

2 This pump can be self-vent.So there is no vent.

3 There is no extra pressured lub oil system,since the ring oil is appliable.

4 The procured mechanical seal plan 11+53B is suitable for this case.

REV	Description:	Tag No.	P-05

4	18-Jan-12	Frank		
5	20-Feb-12	Frank		
A00	7-Apr-17	Frank		

CONSTRUCTION

ROTATION: (VIEWED FROM COUPLING END) ● CW ○ CCW

PUMP TYPE: (1.3)

○ BB1 ○ BB2 ○ BB3 ● BB5

CASING MOUNTING:

● CENTERLINE ○ NEAR CENTERLINE

○ FOOT

CASING SPLIT:

○ AXIAL ● RADIAL

CASING TYPE:

○ SINGLE VOLUTE ○ MULTIPLE VOLUTE ● DIFFUSER

● BETWEEN BEARINGS ● BARREL

CASE PRESSURE RATING:

● MAX ALLOWABLE WORKING PRESSURE **69** (bar)

@ **6/175** (°C)

● HYDROTEST PRESSURE **104** (bar)

○ SUCTION PRESS. REGIONS MUST BE DESIGNED FOR MAWP (5.3.6)

● **NOZZLE CONNECTIONS: (5.4.2)**

	SIZE	FLANGE RATING	FACING	POSITION
SUCTION	**250**	**600lb**	**RF**	**TOP**
DISCHARGE	**200**	**600lb**	**RF**	**TOP**
BALANCE DRUM				

PRESSURE CASING AUX. CONNECTIONS: (5.4.3)

	NO.	SIZE (NPS)	TYPE
● DRAIN	**1**	**20**	**FLANGE**
○ COOLING			
○ PRESS. GAUGE			
○ TEMP GAUGE			
○ WARM-UP			
○ BALANCE / LEAK-OFF			

○ MACHINED AND STUDDED CONNECTIONS (5.4.3.8)

○ CYLINDRICAL THREADS REQUIRED (5.4.3.3)

ROTOR:

● COMPONENT BALANCE TO ISO 1940 G1.0 (5.9.4.4)

● SHRINK FIT -LIMITED MOVEMENT IMPELLERS (8.2.2.3)

COUPLINGS:(6.2.2) (Remark 1)

● MANUFACTURER **Metastream** ● MODEL **Flexible with spacer**

□ RATING (kW/100 RPM)

● SPACER LENGTH **250** (mm) ● SERVICE FACTOR **1.5**

DRIVER HALF COUPLING MOUNTED BY:

● PUMP MFR. ○ DRIVER MFR. ○ PURCHASER

COUPLING WITH HYDRAULIC FIT (6.2.9)

○ COUPLING BALANCED TO ISO 1940-1 G6.3 (6.2.3)

○ COUPLING PER ISO 14691(6.2.3)

○ COUPLING PER ISO 10441(6.2.3)

● COUPLING PER API 671(6.2.3) and IPS-M-PM-310

● NON SPARK COUPLING GUARD (6.2.13)

○ COUPLING GUARD STANDARD

ASME B15.1 _____ OTHER _____

BASEPLATES:

□ API BASEPLATE NUMBER _____ (ANNEX C)

● NON-GROUT CONSTRUCTION (6.3.13)

● OTHER **Anchor bolts & levelling screws RQD**

MECHANICAL SEAL:(5.8.1)

○ SEE ATTACHED ISO 21049/API 682 DATA SHEET

● Seal Plan: 11+53B

● Manufacturer: JohnCrane

SURFACE PREPARATION AND PAINT

○ MANUFACTURER'S STANDARD ● OTHER (SEE BELOW)

● SPECIFICATION NO. **YAP1-CTEP00-SAMW-SPPA-1001**

PUMP:

○ PUMP SURFACE PREPARATION _____

○ PRIMER _____

○ FINISH COAT _____

BASEPLATE: (6.3.17)

○ BASEPLATE SURFACE PREPARATION _____

○ PRIMER _____

○ FINISH COAT _____

● DETAILS OF LIFTING DEVICES(6.3.20) _____

SHIPMENT: (7.4.1)

○ DOMESTIC ● EXPORT ● EXPORT BOXING REQUIRED

● OUTDOOR STORAGE MORE THAN 12 MONTHS

SPARE ROTOR ASSEMBLY PACKAGED FOR:

○ SHIPPING CONTAINER (8.2.8.3) ○ VERTICAL STORAGE (8.2.8.2)

○ TYPE OF SHIPPING PREPARATION ○ N2 PURGE (8.2.8.4)

HEATING AND COOLING

○ HEATING JACKET REQ'D. (5.8.9) ○ COOLING REQ'D.

○ COOLING WATER PIPING PLAN (6.5.4.1) _____

C.W. PIPING:

○ PIPE ○ TUBING; FITTINGS _____

C.W. PIPING MATERIALS:

○ S. STEEL ○ C. STEEL ○ GALVANIZED

COOLING WATER REQUIREMENTS:

□ BEARING HOUSING _____ (m^3/h) @ _____ (bar)

□ HEAT EXCHANGER _____ (m^3/h) @ _____ (bar)

STEAM PIPING: ○ TUBING ○ PIPE

BEARINGS AND LUBRICATION

BEARING (TYPE/NUMBER) (5.10.1):

● RADIAL **Sliding Bearing** / **Z90(Sleeve type)**

● THRUST **Antifriction bearing** / **7315BECBM**

LUBRICATION (5.11.3, 5.11.4):

● RING OIL ○ HYDRODYNAMIC ○ PURGE OIL MIST ○ PURE OIL MIST

○ CONSTANT LEVEL OILER PREFERENCE (5.10.2.2): _____

● PRESSURE LUBE SYS.ISO13709-3 ○ ISO 13709-2 (8.2.6.1/8.2.6.5)

● OIL VISC. ISO GRADE **VG46**

○ OIL PRESS. TO BE GREATER THAN COOLANT PRESSURE

○ REVIEW AND APPROVE THRUST BEARING SIZE(8.2.5.2.4)

○ OIL HEATER REQUIRED: ○ STEAM ○ ELECTRIC

INSTRUMENTATION (6.4.2)

○ SEE ATTACHED API-670 DATA SHEET

○ ACCELEROMETER(S) (6.4.2.1) _____

● VIBRATION PROBES

● **2** PER NDE BRG HOUSING. ● **2** PER DE BRG HOUSING.

○ PROVISION FOR MOUNTING ONLY (5.10.2.10)

○ FLAT SURFACE REQ'D (5.10.2.11)

○ RADIAL BEARING METAL TEMP. ○ THRUST BRG METAL TEMP.

○ TEMP. GAUGES (WITH THERMOWELLS) _____

○ PRESSURE GAUGE TYPE _____

● MONITORS AND CABLES SUPPLIED BY (6.4.3.3) **PUMP SUPPLIER**

REMARKS **More information refer to the PID accordingly.**

● WEIGHTS (kg)

PUMP	**5880**	BASEPLATE	**2200**
DRIVER	**3800**	TOTAL	**12180**
Pipe	**300**		

REV	Description:	Tag No.	P-05	5
4	18-Jan-12	Frank		
	20-Feb-12	Frank		
A00	7-Apr-17	Frank		

SPARE PARTS (TABLE 18)

- ● START-UP ● NORMAL MAINTENANCE
- ● SPECIFY **2 YEARS OPERATING SPARE PARTS**

OTHER PURCHASER REQUIREMENTS

- ● COORDINATION MEETING REQUIRED (9.1.3)
- ● MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)
  - ● MAX RELATIVE DENSITY
  - ● MAX DIA. IMPELLERS AND/OR NO OF STAGES
  - ○ OPERATION TO TRIP SPEED
- ○ CONNECTION DESIGN APPROVAL (5.12.3.4/8.2.1.4)
- ○ INERT GAS INHIBITED STORAGE OF SPARE CARTRIDGE (8.2.8.3)
- ○ TORSIONAL ANALYSIS REQUIRED (5.9.2.1)
- ○ TORSIONAL ANALYSIS REPORT (5.9.2.6)
- ● PROGRESS REPORTS (9.3.3)
- ● OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.3.5)
- ○ ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.2.1f)
- ● LATERAL ANALYSIS REQUIRED (8.2.4.1 / 8.2.4.1.3)
- ● DYNAMIC BALANCE ROTOR (8.2.4.2)
- MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)
  - ● VENT ● DRAIN ○ COOLING WATER
- ○ MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)
- ● FLANGES REQUIRED IN PLACE OF SOCKET WELD UNIONS (6.5.2.8)
- CONNECTION BOLTING
  - ○ PTFE COATING ○ ASTM A153 GALVANIZED
  - ○ PAINTED ● SS
- ● INSTALLATION LIST IN PROPOSAL (9.2.3L)

QA INSPECTION AND TESTING

- ● SHOP INSPECTION (7.1.4)
- ● PERFORMANCE CURVE APPR.
- ○ TEST WITH SUBSTITUTE SEAL (7.3.3.2)
- ● MATERIAL CERTIFICATION REQUIRED (5.12.1.8)
  - ● CASING ● IMPELLER ● SHAFT
  - ● OTHER **PER APPROVED QUALITY PLAN**
- ○ CASTING REPAIR PROCEDURE APPROVAL REQ'D (5.12.2.5)
- ● INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.1.5)
  - ○ MAG PARTICLE ● LIQUID PENETRANT
  - ● RADIOGRAPHIC ○ ULTRASONIC
- ● INSPECTION REQUIRED FOR CASTINGS (7.2.1.3)(5.12.1.5)
  - ○ MAG PARTICLE ● LIQUID PENETRANT
  - ● RADIOGRAPHIC ○ ULTRASONIC
- ○ HARDNESS TEST REQUIRED: _____ (7.2.2.3)
- ○ ADDITIONAL SUBSURFACE EXAMINATION (7.2.1.1)
  - FOR **Shaft**
  - METHOD **Ultrasonic**

QA INSPECTION AND TESTING (CONT.)

TEST (7.3.1.2)	NON-WIT	WIT	OBSERVE
● HYDROSTATIC (7.3.2)	○	●	○
● PERFORMANCE (7.3.3)	○	●	○
● NPSH (7.3.4.2)	○	●	○
● RETEST ON SEAL LEAKAGE (7.3.3.2d)	○	●	○
● RETEST REQUIRED AFTER FINAL HEAD ADJUSTMENT (7.3.3.5b)	○	●	○
● COMPLETE UNIT TEST (7.3.4.3)	○	●	○
● SOUND LEVEL TEST (7.3.4.4)	○	●	○
● CLEANLINESS PRIOR TO FINAL ASSEMBLY (7.2.2.2)	○	●	○
○ NOZZLE LOAD TEST (6.3.6)	○	○	○
○ CHECK FOR CO-PLANAR MOUNTING PAD SURFACES (6.3.3)	○	○	○
○ MECHANICAL RUN UNTIL OIL TEMP. STABLE	○	○	○
● 4 HR. MECHANICAL RUN AFTER OIL TEMP. STABLE	○	●	○
○ 4 HR. MECH. RUN TEST(7.3.4.7.2)	○	○	○
○ TRUE PEAK VELOCITY DATA (7.3.3.4e)	○	○	○
○ BRG HSG RESONANCE TEST (7.3.4.6)	○	○	○
● REMOVE / INSPECT HYDRODYNAMIC BEARINGS AFTER TEST (8.2.7.5)	○	●	○
○ AUXILIARY EQUIPMENT TEST (7.3.4.5) (Note 1)	○	○	○
○ CHARPY TEST (EN 13445/ASME VIII)	○	○	○
○ OIL SYSTEM CLEANLINESS (Note 1)	○	○	○
○	○	○	○
○	○	○	○

- ● VENDOR KEEP REPAIR AND HT RECORDS (7.2.1.1c)
- ● VENDOR SUBMIT TEST PROCEDURES (7.3.1.2 / 9.2.5)
- ● VENDOR SUBMIT TEST DATA WITHIN 24 HOURS (7.3.3.3c)
- ● INCLUDE PLOTTED VIBRATION SPECTRA (5.9.3.3)
- ● RECORD FINAL ASSEMBLY RUNNING CLEARANCES
- ● COMPLETION OF INSPECTION CHECK LIST (7.1.6)

REMARKS

Note 1: There is no oil system and control system for these pumps.

MR / PO No.	10GZ718	Service:	HEAVY CRUDE EXPORT PUMPS	3	31-Dec-11	Frank		
Description:		Tag No.	P-05	4	18-Jan-12	Frank		
				5	20-Feb-12	Frank		
				A00	7-Apr-17	Frank		

PRESSURE VESSEL DESIGN CODE REFERENCES.

☐ THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER

PRESSURE VESSEL DESIGN STANDARD USED TO DESIGN PRESSURE CASING(5.3.4)	☐
CASTING FACTORS USED IN DESIGN(5.3.2)(TABLE 2)	☐
SOURCE OF MATERIAL PROPERTIES	☐

WELDING AND REPAIRS (5.12.3.1)

THESE REFERENCES MUST BE LISTED BY THE PURCHASER. (DEFAULT TO TABLE 9 IF NO PURCHASER PREFERENCE IS STATED)

○ ALTERNATE WELDING CODES AND STANDARDS (5.12.3.1)

Welding Requirement (Applicable Code or Standard)	**Purchaser defined**	**Default per Table 10**
Welder/operator qualification	○	●
Welding procedure qualification	○	●
Non-pressure retaining structural welding such as baseplates or supports	○	●
Magnetic particle or liquid penetrant examination of the plate edges	○	●
Postweld heat treatment	○	●
Postweld heat treatment of casing fabrication welds	○	●

MATERIAL INSPECTION (7.2.2.1)(7.2.1.3)

THESE REFERENCES MUST BE LISTED BY THE PURCHASER (DEFAULT TO TABLE 13 IF NO PURCHASER PREFERENCE IS STATED)

○ ALTERNATIVE MATERIAL INSPECTIONS AND ACCEPTANCE CRITERIA (SEE TABLE 13)

Type of inspection	Methods	For fabrications	Castings
Radiography	○	○	○
Ultrasonic inspection	○	○	○
Magnetic particle inspection	○	○	○
Liquid penetrant inspection	○	○	○

REMARKS