

- 1. APPROVED
- 2. APPROVED AS NOTED (WITH COMMENTS)
- 3. NOT APPROVED
- 4. FOR INFORMATION

This approval does not relieve the vendor of his responsibility to meet purchase order conditions relating to duty, specifications, materials, design, construction and delivery requirements.

Date _____ CHKD _____ REVD _____ APPD _____

Rev. No.	Date	Description	DRWN	CHKD	REVD	APPD
4	2013.05.13	FOR FINAL	X.B.ZHANG	I.H.DO	K.Y.LEE	B.J.KWUN
3	2013.04.09	FOR FINAL	X.B.ZHANG	I.H.DO	K.Y.LEE	B.J.KWUN
2	2013.01.02	FOR APPROVAL	X.B.ZHANG	I.H.DO	K.Y.LEE	B.J.KWUN
1	2012.10.26	FOR APPROVAL	X.B.ZHANG	I.H.DO	K.Y.LEE	B.J.KWUN
0	2012-09-04	ISSUED FOR APPROVAL	X.B.ZHANG	I.H.DO	K.Y.LEE	B.J.KWUN

Client :

SKSOL LUBE BASE OILS S.A.

Project :

CARTAGENA LUBE BASE OIL COMPLEX

Contractor :



Vendor :

HYOSUNG GOOD SPRINGS

Title :

PUMP DATA SHEET

Drawn By	X.B.ZHANG	Vendor DOC. No.			
Checked By	I.H.DO	SKR01-YP0311ABC-002			
Reviewed By	K.Y.LEE	Purchaser DOC. No.			
Approved By	B.J.KWUN	SKR01-VD-Y-P0311ABC-002			
Job. No.	SKR-01	Scale	A4	Date	2013.05.13
PO No.	11244D-ME-MR-MF110				

PROJECT NO. 11244D
 PROJECT NAME CARTAGENA LUBE BASE OILCOMPLEX
 ITEM NO. Y-P0311 A/B/C QTY. 3 (Three)
 SERVICE MARINE LOADING PUMP
 DOC.NO. SKR01-YP0311AB-002 REV. 4

1 APPLICABLE TO : PROPOSALS PURCHASE AS BUILT
 2 FOR SK LUBRICANTS AND REPSOL PETR6LEO UNIT UTILITIES / OFFSITE
 3 SITE CARTAGENA, SPAIN SERVICE MARINE LOADING PUMP
 4 NOTES: INFORMATION BELOW TO BE COMPLETED BY PURCHASER BY MANUFACTURER BY MANUFACTURER OR PURCHASER

DATA SHEETS

	ITEM NO.	ATTACHED	DATA SHEET NO.
7 PUMP	Y-P0311 A/B/C	<input checked="" type="radio"/>	SKR01-YP0311AB-002
8 MOTOR	Y-MP0311 A/B/C	<input checked="" type="radio"/>	
9 GEAR		<input type="radio"/>	
10 TURBINE		<input type="radio"/>	

MANUFACTURER: **HYOSUNG GOOD SPRINGS**
 SERIAL NO.: 1201244-028
 NO. REQ'D (WORKING 2 STAND-BY 1 TOTAL 3)
 NO. STAGES: 1
 PUMP SIZE & TYPE: USP200-650 / OH2

11 APPLICABLE OVERLAY STANDARD(S):

OPERATING CONDITIONS (5.1.3)

13 FLOW, NORMAL 623 (m³/h) RATED 685 (m³/h)
 14 OTHER _____
 15
 16 SUCTION PRESSURE MAX./RATE: 1.6 / -0.7 (kg/cm2G)
 17 DISCHARGE PRESSURE 7.3 (kg/cm2G)
 18 DIFFERENTIAL PRESSURE 8 (kg/cm2G)
 19 DIFF. HEAD 96 (m) NPSHA@Imp.Eye 6.5 (m)
 20 PROCESS VARIATIONS (5.1.4) _____
 21 STARTING CONDITIONS (5.1.4) _____
 22 SERVICE : CONT. INTERMITTENT (STARTS/DAY) _____
 23 PARALLEL OPERATION REQ'D (5.1.13)

LIQUID (5.1.3)

LIQUID TYPE OR NAME Lube Products
 HAZARDOUS FLAMMABLE Toxic (5.1.5)

	MIN.	NORMAL	MAX.
PUMPING TEMP. (°C)	0	AMB	35
VAPOR PRESS. (kg/cm2A)		Nil	
RELATIVE DENSITY (SG)		0.833	
VISCOSITY (Cp)		45	

 SPECIFIC HEAT, Cp _____ (kCal/kg-K)
 CHLORIDE CONCENTRATION (6.5.2.4) _____ (mg/kg)
 H₂S CONCENTRATION _____ (5.12.1.12.c) _____
 CORROSIVE / EROSION AGENT _____ (5.12.1.9)

SITE DATA (5.1.3)

26 LOCATION : (5.1.30)
 INDOOR HEATED OUTDOOR UNHEATED
 UNDER ROOF PARTIAL SIDES GRADE
 ELECTRICAL AREA CLASS IF LOCATION (5.1.24 / 6.1.4)
 Zone 2 GR IIA & IIB Temp. rise T3
 WINTERIZATION REQ'D TROPICALIZATION REQ'D.

MATERIALS (5.12.1.1)

ANNEX H CLASS (5.12.1.1) S-6
 MIN DESIGN METAL TEMPS (5.12.4.1) 0 (°C)
 REDUCED-HARDNESS MATERIALS REQ'D. (5.12.1.12)
 BARREL/CASE A216 Gr.WCB IMPELLER A743 Gr.CA15
 CASE / IMPELLER WEAR RINGS A276 Ty.420 / A276 Ty.420
 SHAFT A322 Gr.4140Q
 DIFFUSERS N/A

SITE DATA (5.1.30)

33 ALTITUDE _____ (m) BAROMETER (AVERAGE) 1.03 (kg/cm2G)
 34 RANGE OF AMBIENT TEMPS : MIN./MAX. 1 / 34.2 (°C)
 35 RELATIVE HUMIDITY : MIN./MAX. 31 / 95 (%)
 36 UNUSUAL CONDITIONS : (5.1.30) DUST FUMES
 37 OTHER _____

PERFORMANCE :

PROPOSAL CURVE NC SKR01-YP0312AB-004 1487 r/min
 IMPELLER DIA. RATED 565 MAX. 645 MIN. 501 (mm)
 IMPELLER TYPE Closed
 RATED POWER 214.4 (kW) EFFICIENCY 69.6 (%)
 MINIMUM CONTINUOUS FLOW :
 THERMAL _____ (m³/h) STABLE 263.2 (m³/h)
 PREFERRED OPER. REGION 644 TO 1048.7 (m³/h)
 ALLOWABLE OPER. REGION 263.2 TO 1048.7 (m³/h)
 MAX HEAD @ RATED IMPELLER 107.8 (m)
 MAX POWER @ RATED IMPELLER 287.3 (kW)
 NPSHR AT RATED FLOW 4.2 (m) (5.1.10)
 MAX. SUCTION SPECIFIC SPEED : 11517.8 (m3/hr.m.rpm) (5.1.11)
 MAX. SOUND PRESS. LEVEL REQ'D Below 85 (dBA) (5.1.16)
 EST MAX. SOUND PRESS. LEVEL 85 (dBA) (5.1.16)
 EST MAX. SOUND POWER. LEVEL 85 (dBA) (5.1.16)

DRIVER TYPE

40 INDUCTION MOTOR STEAM TURBINE GEAR
 41 OTHER _____

UTILITY CONDITIONS (5.1.3)

ELECTRICITY	VOLTAGE	PHASE	HERTZ
DRIVERS	6000	3	50
HEATING			

SYSTEM VOLTAGE DIP 80% OTHER _____ (6.1.5)

MOTOR DRIVER (6.1.1 / 6.1.4)

44 MANUFACTURER HHI
 300 (kW) 1487 (r/min)
 FRAME 315 ENCLOSURE TEFC
 HORIZONTAL VERTICAL SERVICE FACTOR 1.0
 VOLTS/PHASE/HERTZ 6000 / 3 / 50
 TYPE Exe nA T3
 MINIMUM STARTING VOLTAGE (6.1.5) 80% of rated voltage
 INSULATION F TEMP. RISE B
 FULL LOAD AMPS 35.4
 LOCKED ROTOR AMPS 230
 STARTING METHOD Direct on line
 LUBE Grease

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

57 BEARINGS (TYPE / NUMBER) :
 RADIAL SLEEVE / SLEEVE
 TRUST _____ / _____
 VERTICAL THRUST CAPACITY
 UP _____ (N) DOWN _____ (N)

COOLING WATER : (5.1.19) SOURCE _____
 SUPPLY TEMP. 30 (°C) MAX. RETURN TEMP. 45 (°C)
 NORM. PRESS. 4.5 (kg/cm2G) DESIGN PRESS. 6.5 (kg/cm2G)
 MIN. RET. PRESS 3 (kg/cm2G) MAX. ALLOW. D.f 1 (kg/cm2)
 CHLORIDE CONCENTRATION : 800 (wt ppm)

62 REMARKS: _____
 63 _____
 64 _____



CENTRIFUGAL PUMP MECHANICAL DATA SHEET

API STANDARD 610, 11TH EDITION

PROJECT NO.	11244D		
PROJECT NAME	CARTAGENA LUBE BASE OILCOMPLEX		
ITEM NO.	Y-P0311 A/B/C	Q'TY.	3 (Three)
SERVICE	MARINE LOADING PUMP		
DOC.NO.	SKR01-YP0311AB-002	REV.	4

REMARKS

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2	1. PUMP SHALL BE TRACED WITH LP STEAM AND INSULATED	
3	2. MINIMUM MECHANICAL DESIGN = 10.5kg/cm2G, 80°C	
4	3. SITE & UTILITY DATA SHALL BE REFERED AS PER BEDD.	
5	4. SEAL PLAN SHALL BE AS BELOW;	
6	1) PLAN 11 AND PLAN 52	
7	2) LSL, LSH, PSH, PG, LG, AND TG SHALL BE REQUIRED FOR RESERVOIR OF PLAN 52.	
8	5. NOISE COVER SHALL BE PROVIDED BY VENDOR.	1
9	6. COOLING WATER SHALL NOT BE AVAILABLE. AIR COOLING TYPE SHALL BE APPLIED TO SEAL PLAN 52.	
10	7. NPSH TEST SHALL BE REQUIRED.	2
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PROJECT NO. 11244D
PROJECT NAME CARTAGENA LUBE BASE OILCOMPLEX
ITEM NO. Y-P0311 A/B/C Q'TY. 3 (Three)
SERVICE MARINE LOADING PUMP
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CONSTRUCTION

1 **ROTATION :** (VIEWED FROM COUPLING END) CW CCW

2 **PUMP TYPE : (4.1)**

3 OH2 OH3 OH6 OTHER _____

4 **CASING MOUNTING :**

5 CENTERLINE IN-LINE OTHER _____

6

7 **CASING TYPE :**

8 SINGLE VOLUTE MULTIPLE VOLUTE DIFFUSER

9 **CASE PRESSURE RATING :**

10 OH6 PUMP SUCTION REGION DESIGNED FOR MAWP (5.3.6)

11 MAX. ALLOWABLE WORKING PRESSURE 49.8 (kg/cm2G)

12 @ 35 (°C)

13 HYDROTEST PRESSURE 75 (kg/cm2G)

14 **NOZZLE CONNECTIONS : (5.4.2)**

	SIZE	FLANGE RATING	FACING	POSITION
17 SUCTION	12"	300#	RF	End
18 DISCHARGE	8"	300#	RF	Top

19

20 **PRESSURE CASING AUX.CONNECTIONS : (5.4.3)**

	NO.	SIZE(DN)	TYPE
22 <input checked="" type="checkbox"/> DRAIN	1	3/4	w/Valve & Flanged
23 <input type="checkbox"/> VENT			
24 <input type="checkbox"/> WARM-UP			

25

26 MACHINED AND STUDDED CONNECTIONS (5.4.3.8)

27 CYLINDRICAL THREADS REQUIRED(5.4.3.3)

28 **ROTOR**

29 COMPONENT BALANCE TO ISO 1940-1 G1.0 (5.9.4.4)

30 **COUPLINGS : (6.2.2)**

31 MANUFACTUREF THOMAS MODEL 71-462-ASSY

32 RATING (kW per 100 r/min) 47.8

33 SPACER LENGTH 300 (mm) SERVICE FACTOR 1.5

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

35 COUPLING WITH PROPRIETARY CLAMPING DEVICE (6.2.11)

36 COUPLING PER ISO 14691 (6.2.4)

37 COUPLING PER ISO 10441 (6.2.4)

38 COUPLING PER API 671 (6.2.4) ASME B15.1

39 NON-SPARK COUPLING GUARD (6.2.14.c)

40 COUPLING GUARD STANDARD PER _____ (6.2.14.a)

41 **BASE PLATES :**

42 API BASEPLATE NUMBER _____ (ANNEX D)

43 NON-GROUT CONSTRUCTION (6.3.13)

44 OTHER "J" type anchor bolts with double nuts

45 **MECHANICAL SEAL : (5.8.1)**

46 SEE ATTACHED ISO 21049 / API 682 DATA SHEET

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SURFACE PREPARATION AND PAINT

MANUFACTURER'S STANDARD OTHER (SEE BELOW)

SPECIFICATION NO. ED-B-06.00-I-02A 1

PUMP :

PRIMER ED-B-06.00-I-02A 1

FINISH COAT ED-B-06.00-I-02A 1

BASEPLATE : (6.3.17)

PRIMER ED-B-06.00-I-02A 1

FINISH COAT ED-B-06.00-I-02A 1

DETAILS OF LIFTING DEVICES (6.3.20) _____

SHIPMENT : (7.4.1)

DOMESTIC EXPORT EXPORT BOXING REQUIRED

OUTDOOR STORAGE MORE THAN 6 MONTHS

SPARE ROTOR ASSEMBLY PACKAGED FOR :

HORIZONTAL STORAGE VERTICAL STORAGE

TYPE OF SHIPPING PREPARATION _____

HEATING AND COOLING *

HEATING JACKET REQ'D (5.8.9)

COOLING REQ'D

COOLING WATER(C.W.) PIPING PLAN (6.5.3.1) _____

C.W. PIPING

PIPE TUBING FITTINGS _____

C.W. PIPING MATERIALS :

S.STEEL C.STEEL GALVANIZED

COOLING WATER REQUIREMENTS :

BEARING HOUSING 1* (m³/h) 2

HEAT EXCHANGER _____ (m³/h)

TOTAL COOLING WATER _____ (m³/h)

HEAT MEDIUM : STEAM OTHER 1

HEATING PIPING : TUBING PIPE

BEARING AND LUBRICATION

BEARING (TYPE / NUMBER) (5.10.1) 1

RADIAL Ball / 6322 1

THRUST Ball / 7324 BDB

LUBRICATION (5.11.3, 5.11.4)

GREASE OIL

PURGE OIL MIST PURE OIL MIST FORCED OIL SYSTEM

CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) : _____

OIL VISC. ISO GRADE _____ Vendor to advise

INSTRUMENTATION

ACCELEROMETER (6.4.2.1) _____

PROVISION FOR MOUNTING ONLY (5.10.2.11)

FLAT SURFACE REQ'D (5.10.2.12)

TEMP. GAUGES (WITH THERMOWELLS) (8.1.3.6) _____

PRESSURE GAUGE TYPE _____

REMARKS : _____

MASSES(kg)

PUMP	2200
BASEPLATE	1988
SEAL SYSTEM	100
DRIVER	2320
MASS	6608

REMARKS

56 1*. FAN COOLING FOR BEARING HOUSING SHALL BE REQUIRED 2

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CENTRIFUGAL PUMP MECHANICAL DATA SHEET

API STANDARD 610, 11TH EDITION

PROJECT NO. 11244D
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 DOC.NO. SKR01-YP0311AB-002 REV. 4

SPARE PARTS (TABLE 18)

QA INSPECTION AND TESTING (CONT.)

- 1 ● START-UP ● NORMAL MAINTENANCE
- 2 ○ Per PE-4600 (Spare Parts Spec.)
- 3 **OTHER PURCHASER REQUIREMENTS**
- 4 ● COORDINATION MEETING REQUIRED (9.1.3)
- 5 ○ MAXIMUM DISCHARGE PRESSURE TO INCLUDE (5.3.2)
- 6 ○ MAX. RELATIVE DENSITY
- 7 ○ MAX. DIA. IMPELLERS AND/OR NO. OF STAGES
- 8 ○ OPERATION TO TRIP SPEED
- 9 ○ OH3 BEARING HS6 LIFTER (8.1.2.6)
- 10 ○ CONNECTION DESIGN APPROVAL (5.12.3.4)
- 11 ☐ TORSIONAL ANALYSIS REQUIRED (5.9.2.1)
- 12 ○ TORSIONAL ANALYSIS REPORT (5.9.2.6)
- 13 ● PROGRESS REPORTS (9.3.3)
- 14 ○ OUTLINE OF PROCEDURES FOR OPTIONAL TESTS (9.2.5)
- 15 ○ ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.1.1.f)

TEST	NON-WIT	WIT	OBSERVE
● HYDRO STATIC(7.3.2)	○	●	○
● PERFORMANCE(7.3.3)	○	●	○
○ RETEST ON SEAL LEAKAGE (7.3.3.2.d)	○	○	○
● NPSH (7.3.4.2)	○	●	○
○ TRUE PEAK VELOCITY DATA (7.3.3.4.d)	○	○	○
● 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)	○	○	○

PIPING AND APPURTENANCES

- 16 MANIFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)
- 17 ☐ VENT ☐ DRAIN ● COOLING WATER
- 18 ☐ MOUNT SEAL RESERVOIR OFF BASEPLATE (6.5.1.4)
- 19 ● FLANGES REQ'D IN PLACE OF SOCKET WELD UNIONS (6.5.2.8)
- 20 ☐ INSTALLATION LIST IN PROPOSAL (9.2.3L)
- 21 CONNECTION BOLTING
- 22 ○ PTFE COATING ○ ASTM A153 GALVANIZED
- 23 ○ PAINTED ○ SS

● MECHANICAL RUN UNTIL OIL TEMP. STABLE(7.3.4.7.1)	○	●	○
○ 4h MECHANICAL RUN AFTER OIL TEMP. STABLE (7.3.4.7.3)	○	○	○
○ 4h MECH. RUN TEST(7.3.4.7.2)	○	○	○
○ BRG HSG RESONANCE TEST (7.3.4.6)	○	○	○
○ AUXILIARY EQUIPMENT TEST (7.3.4.5)	○	○	○

QA INSPECTION AND TESTING

- 24 ● SHOP INSPECTION (7.1.4)
- 25 ● PERFORMANCE CURVE APPROVAL
- 26 ☐ TEST WITH SUBSTITUTE SEAL (7.3.3.2.b)
- 27 ● MATERIAL CERTIFICATION REQUIRED (5.12.1.8)
- 28 ● CASING ● IMPELLER ● SHAFT
- 29 ○ OTHER _____
- 30 ○ CASTING REPAIR PROCEDURE APPROVAL REQ'D (5.12.2.5)
- 31 ● INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.3.4.e)
- 32 ☐ MAG. PARTICLE ● LIQUID PENETRANT
- 33 ☐ RADIOGRAPHIC ☐ ULTRASONIC
- 34 ● INSPECTION REQUIRED FOR CASTINGS (7.2.1.3 / 5.12.1.5)
- 35 ☐ MAG. PARTICLE ● LIQUID PENETRANT
- 36 ☐ RADIOGRAPHIC ☐ ULTRASONIC
- 37 ○ HARDNESS TEST REQUIRED : _____ (7.2.2.3)
- 38 ○ ADDITIONAL SUBSURFACE EXAMINATION FOR 7.2.1.3
- 39 FOR _____
- 40 METHOD _____

☐ IMPACT TESTING (5.12.4.3)	○	○	○
○ PER EN 13445			
○ PER ASME VIII			
○ VENDOR KEEP REPAIR AND HT RECORDS (7.2.1.1.c)	○	○	○
● VENDOR SUBMIT TEST PROCEDURES (7.3.1.2 / 9.2.5)			
● VENDOR SUBMIT TEST DATA WITHIN 24h (7.3.3.3.e)			
○ INCLUDE PLOTTED VIBRATION SPECTRA (5.9.3.3)			
○ SUBMIT INSPECTION CHECK LIST (7.1.6)			

REMARKS

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CENTRIFUGAL PUMP MECHANICAL DATA SHEET

API STANDARD 610, 11TH EDITION

PROJECT NO. 11244D
 PROJECT NAME CARTAGENA LUBE BASE OILCOMPLEX
 ITEM NO. Y-P0311 A/B/C QTY. 3 (Three)
 SERVICE MARINE LOADING PUMP
 DOC.NO. SKR01-YP0311AB-002 REV. 4

Centrifugal pump - References

- PRESSURE DESIGN CODES
- WELDING REQUIREMENTS
- PURCHASE-DEFINED MATERIAL INSPECTIONS

APPLICABLE TO : PROPOSALS PURCHASE AS BUILT

FOR _____ UNIT _____

SITE _____ SERVICE _____

NOTE : INFORMATION BELOW TO BE COMPLETED BY PURCHASER BY MANUFACTURER BY MANUFACTURER OR PURCHASER

PRESSURE VESSEL DESIGN CODE REFERENCES.

THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER

CASTING FACTORS USED IN DESIGN (5.3.4) (TABLE 3) 0.8

SOURCE OF MATERIAL PROPERTIES ASTM or JIS

WELDING AND REPAIRS (5.12.3)

THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER (DEFAULT TO TABLE 10 IF NO PURCHASER PREFERENCE IS STATED)

ALTERNATIVE 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 base plates 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	<input type="radio"/> _____	<input type="radio"/> _____	<input type="radio"/> _____
Ultrasonic inspection	<input type="radio"/> _____	<input type="radio"/> _____	<input type="radio"/> _____
Magnetic particle inspection	<input type="radio"/> _____	<input type="radio"/> _____	<input type="radio"/> _____
Liquid penetrant inspection	<input type="radio"/> _____	<input type="radio"/> _____	<input type="radio"/> _____

REMARKS

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