HOJA DE DATOS PARA BOMBA DE TORNILLO DOBLE (PDD)

REV.	FECHA	PÁG	DESCRIPCIÓN	ELAB	REV. / APROB.	APROB. ICHQ	APROB. PSSA
0	28/12/2012	7	EMISIÓN FINAL	GXD	ZYB/XGK		
B	10/09/2012	7	INCORPORACIÓN DE COMENTARIOS	GXD	ZYB/XGK		
A	24/05/2012	7	EMISIÓN PARA COMENTARIOS	GXD	ZYB/XGK		

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Archivo Electrónico:	PDD-D-178-20-2212-S204-0

PDVSA PETROLERA SINOVENSA	DESARROLLO DE LA INGENIERÍA CONCEPTUAL Y BÁSICA DEL PROYECTO DE EXPANSIÓN DE PRODUCCIÓN DE 105 MBD A 160 MBD	PDVSA INGENIERÍA Y CONSTRUCCIÓN HQCEC

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SCREW PUMP DATA SHEET

APPLICABLE TO: • PROPOSAL O PURCHASE O AS BUILT — ITEM TAG: 0003-P-1002A/B/C/D/E/F

CLIENT: PSSA — PLANT: DDP

SITE: MORICHAL — NO. OF PUMPS REQUIRED: FOUR (4) OPERATING AND TWO (2) SPARE

SERVICE: WDEHO FEED PUMPS — SIZE AND TYPE: HORIZONTAL TWIN-SCREW PUMP

MANUFACTURER: — SERIAL NO.:

LEYEND: O INDICATES INFORMATION TO BE COMPLETED BY PURCHASER — □ BY MANUFACTURER

GENERAL

NO. MOTORS DRIVEN:		OTHER DRIVER TYPE			
PUMP ITEM NO'S:	0003-P-1002A/B/C/D/E/F	PUMP ITEM NO'S			
MOTOR ITEM NO'S:		DRIVER ITEM NO'S		GEAR ITEM NO'S	
MOTOR PROVIDED BY:	pump manufacture	DRIVER PROVIDED BY		GEAR PROVIDED BY	
MOTOR MOUNTED BY:	pump manufacture	DRIVER MOUNTED BY		GEAR MOUNTED BY	
MOTOR DATA SHEET NO.:		DRIVER DATA SHEET NO.		GEAR DATA SHEET NO.	

OPERATING CONDITIONS

- CAPACITY @ PT (GPM US): RANGE NORMAL 1081.2 RATED 1189.3
- DISCHARGE PRESSURE (psig): MAXIMUM: 565 MINIMUM: 485
- SUCTION PRESSURE (psig): MAXIMUM: 16 MINIMUM: 3.5
- DIFFERENTIAL PRESSURE (psi): MAXIMUM: 561.5 MINIMUM: 469
- NPSH AVAILABLE (ft.) 8.5 (NOTE2)
- SERVICE • CONTINUOUS O INTERMITTENT
- HYDRAULIC HP. 390

LIQUID

- TYPE OR NAME OF LIQUID: WET DILUTED EXTRA HEAVY OIL (NOTE3)
- PUMPING TEMPERATURE (°F): NORMAL: 100 MAX: 120 MIN: 90
- SPECIFIC GRAVITY: NORMAL 0.953 MAXIMUM 1 MINIMUM 0.94
- SPECIFIC HEAT Btu/lb °F
- VISCOSITY (cP): 442@ 100 °F MINIMUM 640.39@ 90 °F MAXIMUM
- VAPOR PRESSURE@ P.T. (psia) 14.7@ 100 °F
- O CORROSIVE/EROSIVE AGENTS: sand particules / Dissolved salt
- CHLORIDE CONCENTRATION (PTB) NaCl: 689 ~ 848 PTB
- O H_2S CONCENTRATION (PPM)

LIQUID: O TOXIC • FLAMMABLE O OTHER

PERFORMANCE

- □ RATED CAPACITY (GPM US)
- □ NPSH REQUIRED (ft.)
- □ RATED SPEED (RPM)
- □ DISPLACEMENT (GPM)
- □ VOLUMETRIC EFFICIENCY (%)
- □ MECHANICAL EFFICIENCY (%)
- □ BHP @ MAXIMUM VISCOSITY
- □ BHP @ RELIEF VALVE SETTING
- □ MAXIMUM ALLOWABLE SPEED (RPM)
- □ MINIMUM ALLOWABLE SPEED (RPM)

SITE AND UTILITY DATA (NOTE 1)

LOCATION: O INDOOR • OUTDOOR O SUN

O HEATED • UNHEATED O UNDER ROOF

• ELECTRICAL AREA CLASS 1 GROUP D DIV: 2

O WINTERIZATION REQD • TROPICALIZATION REQD

SITE DATA :

O RANGE OF AMBIENT TEMPS:MIN/MAX : 72 / 90 °F

UNUSUAL CONDITIONS

• DUST • FUMES • SALTY ATMOSPHERE

O OTHER

O UTILITY CONDITIONS

CONSTRUCTION

CONNECTIONS	SIZE	RATING	FACING	POSITION
SUCTION				
DISCHARGE				
GLAND FLUSH				
DRAINS				
VENTS				
JACKET				

PUMP TYPE:

□ INTRN'L GEAR ■ TWIN-SCREW □ VANE

□ EXTRN'L GEAR □ 3-SCREW □ PROGRESSING CAVITY

GEAR TYPE

□ SPUR ■ HELICAL

□ OTHER

ELECTRICITY	DRIVERS	HEATING	CONTROL	SHUTDOWN
VOLTAGE	4160			
HERTZ	60			
PHASE	3			

COOLING WATER	INLET	RETURN	DESIGN	MAX Δ
TEMP °F	MAX			
PRESS. (psig)	MIN			
SOURCE	N/A			
INSTRUMENT AIR		MAX	MIN	
PRESSURE (psig)				

APPLICABLE SPECIFICATIONS:

- API 676 POSITIVE DISPLACEMENT PUMPS - ROTARY
- PDVSA GA-202
- OTHERS SPECIFIED IN THE MATERIAL REQUISITION

PDVSA PETROLERA SINOVENSA	DESARROLLO DE LA INGENIERÍA CONCEPTUAL Y B ÁSICA DEL PROYECTO DE EXPANSIÓN DE PRODUCCIÓN DE 105 MBD A 160 MBD	PDVSA INGENIERÍA Y CONSTRUCCIÓN HQCEC

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PROGRESSIVE CAVITY PUMP DATA SHEET

CONSTRUCTION (CONTINUED)

CASING (NOTE7)

- ☐ MAXIMUM ALLOWABLE PRESSURE: _____ kPa @ ____ °F
- ☐ HYDROSTATIC TEST PRESSURE: _____ kPa @
- ☐ STEAM JACKET PRESSURE: _____ kPa @ ____ °C

ROTOR MOUNT: ☐ BTWN. BEARINGS ☐ OVERHUNG

TIMING GEARS ☐ YES ☐ NO

BEARING TYPE: ☐ RADIAL _____ ☐ THRUST ____

LUBRICATION TYPE: ■ CONSTANT LEVEL OILERS

☐ PUMPED FLUID ☐ RING OIL ☐ OIL MIST

■ EXTERNAL ■ OIL FLOOD ☐ GREASE

- ☐ LUBRICANT TYPE: _____
- ● MECHANICAL SEALS: pump manufacture
  - ☐ MANUFACTURER AND MODEL _____
  - ☐ MANUFACTURER CODE _____
- ■ API 610 SEAL FLUSH PLAN 32+61 (NOTE5)
- ☐ API 610 SEAL CODE _____
- ○ PACKING: ☐ LANTERN RING
  - ○ MFR. AND TYPE _____ ○ NO. OF RINGS ____

DRIVE MECHANISM

■ DIRECT-COUPLED ☐ V-BELT ☐ GEAR

☐ COUPLING MANUFACTURER _____

DRIVERS

MOTOR :

- ☐ MANUFACTURER _____
- ☐ TYPE _____
- ☐ FRAME NO. _____
- ☐ NEMA DESIGN _____
- ☐ APPROVAL, LISTED OR CERTIFIED BY: _____
- ○ CONSTANT SPEED _____
- ○ VARIABLE SPEED _____
- ☐ HP _____ RPM _____
- ● VOLTS 4000 PHASE 3
- ● HERTZ 60 SERVICE FACTOR _____
- ● ENCLOSURE TEFC
- ○ MINIMUM STARTING VOLTAGE _____
- ● STARTING METHOD Automatic
- ○ INSULATION _____ ○ TEMPERATURE CLASS _____
- ☐ CONSECUTIVE STARTS _____
- ☐ MOTOR WINDING MATERIAL _____

MAIN JUNCTION BOX:

- ○ CONDUIT INPUT _____ ☐ QUANTITY _____
- ☐ SIZE _____

SPACE HEATERS JUNCTION BOX:

- ○ CONDUIT INPUT _____ ☐ QUANTITY _____
- ☐ SIZE _____
- ○ STEAM TURBINE

REMARKS _____

OTHER PURCHASER REQUIREMENTS

NAMEPLATE UNITS ● ENGLISH ○ SI

● RELIEF VALVES BY PUMP MFRG ○ INTERNAL ● EXTRNL (NOTE4)

PIPING FOR SEAL FLUSH FURNISHED BY:

● PUMP VENDOR ○ OTHERS

PIPING FOR COOLING/HEATING FURNISHED BY:

○ PUMP VENDOR ○ OTHERS

○ PROVIDE TECHNICAL DATA MANUAL

MATERIALS (NOTE6)

- ☐ CASING CS
- ☐ STATOR _____
- ☐ COMMON BASE PLATES _____
- ☐ ROTOR (S) CS
- ☐ VANES _____
- ☐ SHAFT _____
- ☐ SLEEVE (S) _____
- ☐ GLAND (S) _____
- ☐ BEARING HOUSING _____
- ☐ TIMING GEARS _____
- ○ SPECIAL MATERIAL TESTS (2.9.1.3) _____
- ○ LOW AMBIENT TEMP. MATERIALS TESTS (2.9.5)

QA INSPECTION AND TEST

- ● COMPLIANCE WITH INSPECTORS & TEST PLAN
- ○ CERTIFICATION OF MATERIALS
- ○ FINAL ASSEMBLY CLEARANCES
- ○ SURFACE AND SUBSURFACE EXAMINATIONS
  - ○ RADIOGRAPHY _____
  - ○ ULTRASONIC _____
  - ○ MAGNETIC PARTICLE _____
  - ○ LIQUID PENETRANT _____
- ○ CLEANLINESS PRIOR TO FINAL ASSEMBLY
- ○ HARDNESS OF PARTS, WELDS & HEAT AFFECTED ZONES
- ○ FURNISH PROCEDURES FOR OPTIONAL TESTS

TESTS	REQ'D	WIT	OBS
HYDROSTATIC	●	○	○
MECHANICAL RUN	●	●	○
PERFORMANCE	●	■	○
NPSH	■	○	○

PREPARATION FOR SHIPMENT

○ DOMESTIC ● EXPORT

● OUTDOOR STORAGE MORE THAN 6 MONTHS

WEIGHTS (kg)

☐ PUMP _____ ☐ BASE _____ ☐ DRIVER _____

☐ COUPLING ☐ ACCESSORIES

BASEPLATE

● BY PUMP MANUFACTURER ○ SUITABLE FOR EPOXY GROUT

○ EXTENDED FOR _____

● COMMON PLATES BY PUMP MANUFACTURER

○ DRAIN ☐ DRAIN-RIM

■ DRAIN-PAN

PDVSA PETROLERA SINOVENSA	DESARROLLO DE LA INGENIERÍA CONCEPTUAL Y BÁSICA DEL PROYECTO DE EXPANSIÓN DE PRODUCCIÓN DE 105 MBD A 160 MBD				PDVSA INGENIERÍA Y CONSTRUCCIÓN HQCEC	
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PROGRESSIVE CAVITY PUMP DATA SHEET

NOTES

1 See Document "PDD-D-178-00-2111-S001" for detail.
Because no cooling water is applicable, vendor shall consider air cooling for pump bear housing and flushing plan etc., where cooling is necessary. Tropicalization is required.
2 For the value of NPSHa, the pumps shall be able to operate with 0.5%(mol) disolved gas.
3 WDEHO is a mixture of extra heavy oil, diluent(naphtha) and water 12%(V), it is flammable. The fluid containing sands.
4 External safety valves shall be supplied by vendor, the design pressure of downstream pipe is 642 Psig.
5 The mechanical seal flushing plan shall be confirmed by vendor.
6 The material shall be confirmed by vendor.
7 Pump casing drain shall be connected to the edge of baseplate with block valve.

PDVSA PETROLERA SINOVENSA	DESARROLLO DE LA INGENIERÍA CONCEPTUAL Y BÁSICA DEL PROYECTO DE EXPANSIÓN DE PRODUCCIÓN DE 105 MBD A 160 MBD	PDVSA INGENIERÍA Y CONSTRUCCIÓN HQCEC

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SCREW PUMP DATA SHEET

APPLICABLE TO: ● PROPOSAL O PURCHASE O AS BUILT
CLIENT: PSSA
SITE: MORICHAL
SERVICE: DDEHO TRANSFER PUMPS
MANUFACTURER:
ITEM TAG: 0003-P-1102A/B/C/D/E/F
PLANT: DDP
NO. OF PUMPS REQUIRED: FOUR (4) OPERATING AND TWO (2) SPARE
SIZE AND TYPE: HORIZONTAL TWIN-SCREW PUMP
SERIAL NO.:

LEYEND: O INDICATES INFORMATION TO BE COMPLETED BY PURCHASER □ BY MANUFACTURER

GENERAL

NO. MOTORS DRIVEN:
PUMP ITEM NO'S: 0003-P-1102A/B/C/D/E/F
MOTOR ITEM NO'S:
MOTOR PROVIDED BY: pump manufacture
MOTOR MOUNTED BY: pump manufacture
MOTOR DATA SHEET NO.:
OTHER DRIVER TYPE
PUMP ITEM NO'S
DRIVER ITEM NO'S
DRIVER PROVIDED BY
DRIVER MOUNTED BY
DRIVER DATA SHEET NO.
GEAR ITEM NO'S
GEAR PROVIDED BY
GEAR MOUNTED BY
GEAR DATA SHEET NO.

OPERATING CONDITIONS

● CAPACITY @ PT (GPM US):
RANGE NORMAL 1043.6 RATED 1148
● DISCHARGE PRESSURE (psig):
MAXIMUM: 258 MINIMUM: 210
● SUCTION PRESSURE (psig):
MAXIMUM: 135 MINIMUM: 90
● DIFFERENTIAL PRESSURE (psi):
MAXIMUM: 168 MINIMUM: 75
● NPSH AVAILABLE (ft.) 136
● SERVICE ● CONTINUOUS O INTERMITTENT
● HYDRAULIC HP. 108

LIQUID

● TYPE OR NAME OF LIQUID: DRY DILUTED EXTRA HEAVY OIL
● PUMPING TEMPERATURE (°F):
NORMAL: 288 MAX: 300 MIN: 250
● SPECIFIC GRAVITY: NORMAL 0.88 MAXIMUM 0.941 MINIMUM 0.88
● SPECIFIC HEAT Btu/lb °F
● VISCOSITY (cP): 7.497@ 288 °F MINIMUM 13.16@ 250 °F MAXIMUM
● VAPOR PRESSURE@ P.T. (psia) 98@ 288 °F
O CORROSIVE/EROSIVE AGENTS: sand particules / Dissolved salt
● CHLORIDE CONCENTRATION (PTB) NaCl: 20 PTB
O H_2S CONCENTRATION (PPM)
LIQUID: O TOXIC ● FLAMMABLE O OTHER

PERFORMANCE

□ RATED CAPACITY (GPM US)
□ NPSH REQUIRED (ft.)
□ RATED SPEED (RPM)
□ DISPLACEMENT (GPM)
□ VOLUMETRIC EFFICIENCY (%)
□ MECHANICAL EFFICIENCY (%)
□ BHP @ MAXIMUM VISCOSITY
□ BHP @ RELIEF VALVE SETTING
□ MAXIMUM ALLOWABLE SPEED (RPM)
□ MINIMUM ALLOWABLE SPEED (RPM)

SITE AND UTILITY DATA (NOTE 1)

LOCATION: O INDOOR ● OUTDOOR O SUN
O HEATED ● UNHEATED O UNDER ROOF
● ELECTRICAL AREA CLASS I GROUP D DIV: 2
O WINTERIZATION REQD ● TROPICALIZATION REQD
SITE DATA :
O RANGE OF AMBIENT TEMPS:MIN/MAX : 72 / 90 °F
UNUSUAL CONDITIONS
● DUST ● FUMES ● SALTY ATMOSPHERE
O OTHER
O UTILITY CONDITIONS

ELECTRICITY	DRIVERS	HEATING	CONTROL	SHUTDOWN
VOLTAGE	4160			
HERTZ	60			
PHASE	3			

COOLING WATER	INLET	RETURN	DESIGN	MAX Δ
TEMP °F	MAX			
PRESS. (psig)	MIN			
SOURCE	N/A			
INSTRUMENT AIR		MAX	MIN	
PRESSURE (psig)				

CONSTRUCTION

CONNECTIONS	SIZE	RATING	FACING	POSITION
SUCTION				
DISCHARGE				
GLAND FLUSH				
DRAINS				
VENTS				
JACKET				

PUMP TYPE:
□ INTRN'L GEAR ■ TWIN-SCREW □ VANE
□ EXTRN'L GEAR □ 3-SCREW □ PROGRESSING CAVITY
GEAR TYPE
□ SPUR ■ HELICAL
□ OTHER

APPLICABLE SPECIFICATIONS:

● API 676 POSITIVE DISPLACEMENT PUMPS - ROTARY
● PDVSA GA-202
● OTHERS SPECIFIED IN THE MATERIAL REQUISITION

PDVSA PETROLERA SINOVENSA	DESARROLLO DE LA INGENIERÍA CONCEPTUAL Y BÁSICA DEL PROYECTO DE EXPANSIÓN DE PRODUCCIÓN DE 105 MBD A 160 MBD	PDVSA INGENIERÍA Y CONSTRUCCIÓN HQCEC

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PROGRESSIVE CAVITY PUMP DATA SHEET

CONSTRUCTION (CONTINUED)

CASING (NOTE5)

- ☐ MAXIMUM ALLOWABLE PRESSURE: _____ kPa @ ___ °F
- ☐ HYDROSTATIC TEST PRESSURE: _____ kPa @
- ☐ STEAM JACKET PRESSURE: _____ kPa @ ___ °C

ROTOR MOUNT: ☐ BTWN. BEARINGS ☐ OVERHUNG

TIMING GEARS ☐ YES ☐ NO

BEARING TYPE: ☐ RADIAL _____ ☐ THRUST ____

LUBRICATION TYPE: ■ CONSTANT LEVEL OILERS

- ☐ PUMPED FLUID ☐ RING OIL ☐ OIL MIST
- ■ EXTERNAL ■ OIL FLOOD ☐ GREASE

- ☐ LUBRICANT TYPE: _____
- ● MECHANICAL SEALS: pump manufacture
  - ☐ MANUFACTURER AND MODEL _____
  - ☐ MANUFACTURER CODE _____
- ■ API 610 SEAL FLUSH PLAN 11+61 (NOTE3)
- ☐ API 610 SEAL CODE _____
- ○ PACKING: ☐ LANTERN RING
  - ○ MFR. AND TYPE _____ ○ NO. OF RINGS ____

DRIVE MECHANISM

■ DIRECT-COUPLED ☐ V-BELT ☐ GEAR

☐ COUPLING MANUFACTURER _____

DRIVERS

MOTOR :

- ☐ MANUFACTURER _____
- ☐ TYPE _____
- ☐ FRAME NO. _____
- ☐ NEMA DESIGN _____
- ☐ APPROVAL, LISTED OR CERTIFIED BY: _____
- ○ CONSTANT SPEED _____
- ○ VARIABLE SPEED _____
- ☐ HP _____ RPM _____
- ● VOLTS 4000 PHASE 3
- ● HERTZ 60 SERVICE FACTOR _____
- ● ENCLOSURE TEFC
- ○ MINIMUM STARTING VOLTAGE _____
- ● STARTING METHOD Automatic
- ○ INSULATION _____ ○ TEMPERATURE CLASS _____
- ☐ CONSECUTIVE STARTS _____
- ☐ MOTOR WINDING MATERIAL _____

MAIN JUNCTION BOX:

- ○ CONDUIT INPUT _____ ☐ QUANTITY _____
- ☐ SIZE _____

SPACE HEATERS JUNCTION BOX:

- ○ CONDUIT INPUT _____ ☐ QUANTITY _____
- ☐ SIZE _____
- ○ STEAM TURBINE

REMARKS _____

OTHER PURCHASER REQUIREMENTS

NAMEPLATE UNITS ● ENGLISH ○ SI

● RELIEF VALVES BY PUMP MFRG ○ INTERNAL ● EXTRNL (NOTE2)

PIPING FOR SEAL FLUSH FURNISHED BY:

● PUMP VENDOR ○ OTHERS

PIPING FOR COOLING/HEATING FURNISHED BY:

○ PUMP VENDOR ○ OTHERS

○ PROVIDE TECHNICAL DATA MANUAL

MATERIALS (NOTE4)

- ☐ CASING CS
- ☐ STATOR _____
- ☐ COMMON BASE PLATES _____
- ☐ ROTOR (S) CS
- ☐ VANES _____
- ☐ SHAFT _____
- ☐ SLEEVE (S) _____
- ☐ GLAND (S) _____
- ☐ BEARING HOUSING _____
- ☐ TIMING GEARS _____
- ○ SPECIAL MATERIAL TESTS (2.9.1.3) _____
- ○ LOW AMBIENT TEMP. MATERIALS TESTS (2.9.5)

QA INSPECTION AND TEST

- ● COMPLIANCE WITH INSPECTORS & TEST PLAN
- ○ CERTIFICATION OF MATERIALS
- ○ FINAL ASSEMBLY CLEARANCES
- ○ SURFACE AND SUBSURFACE EXAMINATIONS
  - ○ RADIOGRAPHY _____
  - ○ ULTRASONIC _____
  - ○ MAGNETIC PARTICLE _____
  - ○ LIQUID PENETRANT _____
- ○ CLEANLINESS PRIOR TO FINAL ASSEMBLY
- ○ HARDNESS OF PARTS, WELDS & HEAT AFFECTED ZONES
- ○ FURNISH PROCEDURES FOR OPTIONAL TESTS

TESTS	REQ'D	WIT	OBS
HYDROSTATIC	●	○	○
MECHANICAL RUN	●	●	○
PERFORMANCE	●	●	○
NPSH	●	○	○

PREPARATION FOR SHIPMENT

○ DOMESTIC ● EXPORT

● OUTDOOR STORAGE MORE THAN 6 MONTHS

WEIGHTS (kg)

☐ PUMP _____ ☐ BASE _____ ☐ DRIVER _____

☐ COUPLING ☐ ACCESSORIES

BASEPLATE

● BY PUMP MANUFACTURER ○ SUITABLE FOR EPOXY GROUT

○ EXTENDED FOR _____

● COMMON PLATES BY PUMP MANUFACTURER

○ DRAIN ☐ DRAIN-RIM ■ DRAIN-PAN

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PROGRESSIVE CAVITY PUMP DATA SHEET

NOTES

1 See Document "PDD-D-178-00-2111-S001" for detail
Because no cooling water is applicable, vendor shall consider air cooling for pump bear housing and flushing plan etc., where cooling is necessary. Tropicalization is required.
2 External safety valves shall be supplied by vendor, the design pressure of downstream pipe is 429 Psig.
3 The mechanical seal flushing plan shall be confirmed by vendor.
4 The material shall be confirmed by vendor.
5 Pump casing drain shall be connected to the edge of baseplate with block valve.