Pump performance data

Doc No. :
Issued date :
Item No. :
Model :

▶ Application Code

- Pump design :
- Connection Flange, Suc./Dis. :
- Test :

▶ Design Condition

- Capacity :
- Pump head :
- Suction pressure, rated/max :
- Frequency :
- Ambient Temperature :
- Barometer :
- Casing design Temp., min/max :

▶ Considered Liquid data

- Liquid type :
- Temperature :
- Density :
- Viscosity :
- Vapor pressure :

▶ Pump Performance

- Speed :
- Impeller dia, min/rated/max :
- Rated Impeller dia ratio to max :
- Shut off head of rated impeller :
- Shut off head ratio to rated :
- Possible Impeller head rise @ Rt.flow :
  (with exchanging Max. dia. Impeller)
- Impeller head rise available % :
- Min. flow rate, %@Rt. :
- Max flow rate, %@Rt. :
- Allowable operating region (AOR) :
- Preferred operating region (POR) :
- Efficiency, rated flow rate :
- Efficiency, max flow rate :
- Best efficiency, %, flowrate :
- Rated/BEP flowrate % :
- NPSH required, min/rated/max flow :
- NPSH margin, min/rated/max flow :
- Suction Specific speed :
- Expected sound pressure level :

▶ Drive & Power

- Driver type :
- BHP, Shutoff/Rated/Max flow :
- Driver Rating :
- Power margin, Shutoff/Rated/Max :

▶ Pressure data

- Max. discharge pressure :
- Max. allowable working P @38 ℃ :
- Hydrostatic test pressure :
- Normal suction pressure :
- Differential pressure @ rated :
- Discharge pressure, @ rated :
- Stuffing box pressure @ rated :

(Vertical pump)

- Total Head (Vertical pump) :
- Lift head (water surface – D.Flange) :
- Head @ Discharge .Flange :

▶ Pump Construction

- Casing mount by :
- Casing split :
- Casing volute Type :
- Casing material :
- Impeller material :
- Shaft material :
- Pump designation :
- Suction flange, DN,PR,LO :
- Discharge flange, DN,PR,LO :
- No. of stage :
- Impeller type :
- Pump assembly design :
- Bearing lubrication, Thrust/Radial :
- Bearing type, Thrust/Radial :
- Bearing expecting Life @ Rated. :
- Rotation viewed from driver :

(Vertical pump)

- Installation type, if vertical pump :

Recommend dimension for Intake vertical pump accordance with HI Standard without Anti-Vortex Device

▶ Sealing & Cooling information

- Sealing type :
- Seal Flushing Piping Plan :
- Customer cooling utility :
- Cooling Piping Plan :

HYOSUNG GOODSPRINGS

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CENTRIFUGAL PUMP DATA SHEET
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JOB NO. _____ ITEM NO.(S) _____
REQ/SPEC NO _____ / _____
PURCH ORDER NO. _____ DATE _____
INQUIRY NO _____ BY _____

APPLICABLE TO: ○ PROPOSALS ○ PURCHASE ○ AS BUILT _____
FOR _____ NO. REQ'D: TOTAL _____ (WORKING _____ STAND-BY _____)
SITE _____ SERVICE _____
MFR.NAME _____ MODEL _____ SERIAL NO. _____

NOTES: INFORMATION BELOW TO BE COMPLETED ○ BY PURCHASER ❑ BY MANUFACTURE ○ BY MANUFACTURE OR PURCHASER

○ DATA SHEETS

	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED
PUMP		○		○		○
MOTOR		○		○		○
GEAR		○		○		○
TURBINE		○		○		○

APPLICABLE OVERLAY STANDARD(S):

REVISIONS

NO	DATE	BY

○ OPERATING CONDITIONS (5.1.3)

FLOW, NORMAL _____ (m³ /h) RATED _____ (m³ /h)
OTHER _____
SUCTION PRESSURE MAX./RATED/MIN. _____ / _____ / _____ (kg/cm² .g)
DISCHARGE PRESSURE _____ (kg/cm² .g)
DIFFERENTIAL PRESSURE _____ (kg/cm² .g)
DIFF.HEAD _____ (m) NPSHA _____ (m)
PROCESS VARIATIONS (5.1.4) _____
STARTING CONDITIONS (5.1.4) _____
SERVICE : ○ CONT. ○ INTERMITTENT(STARTS/DAY). _____
○ PARALLEL OPERATING 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)
CL _____ GR _____ DIV _____
○ WINTERIZATION REQ'D ○ TROPICALIZATION REQ'D
SITE DATA(5.1.30)
○ ALITITUDE _____ (m) BAROMETER _____ (kg/cm² .a)
○ RANGE OF AMBIENT TEMPS: MIN/MAX _____ / _____ (℃)
○ RELATIVE HUMIDITY: MIN/MAX _____ / _____ (%)
UNUSUAL CONDITIONS : (5.1.30) ○ DUST ○ FUMES
○ OTHER _____

○ DRIVER TYPE

○ INDUCTION MOTOR ○ STEAM TURBINE ○ GEAR
○ OTHER _____

○ MOTOR DRIVER(6.1.1/6.1.4)

○ MANUFACTURER _____
❑ _____ (kW) ❑ _____ (r/min)
❑ FRAME _____ ❑ ENCLOSURE _____
○ HORIZONTAL ○ VERTICAL ○ SERVICE FACTOR _____
○ VOLTS/PHASE/HERTZ _____ / _____ / _____
○ TYPE _____ INDUCTION
○ MINIMUM STARTING VOLTAGE (6.1.5) _____
○ INSULATION _____ ○ TEMP.RISE _____
○ FULL LOAD AMPS _____
○ LOCKED ROTOR AMPS _____
○ STARTING METHOD _____
○ LUBE _____
BEARINGS (TYPE/NUMBER) :
❑ RADIAL _____ / _____
❑ TRUST _____ / _____
❑ VERTICAL THRUST CAPACITY
UP _____ (N) DOWN _____ (N)

○ LIQUID (5.1.3)

LIQUID TYPE OR NAME _____
○ HARZARDOUS ○ FLAMMABLE ○ _____ (5.1.5)

	MIN	NORMAL	MAX	DESIGN
PUMPING TEMP(℃)				
VAPOR PRESS(kg/cm² .a)				
RELATIVE DEINSITY(S.G)				
VISCOSITY(cP)				

SPECIFIC HEAT, Cp _____ (KJ/kg.K)
○ CHILORIDE CONCENTRATION (6.5.2.4) _____ (mg/kg)
○ H2S CONCENTRATION _____ (molfraction)wet (5.12.1.12C)
CORROSIVE/EROSIVE AGENT _____ (5.12.1.9)

MATERIALS (5.12.1.1)

○ ANNEX H CLASS (5.12.1.1) _____
○ MIN DESIGN METAL TEMPS (5.12.4.1) _____ (℃)
○ REDUCED HARDNESS MATERIALS REQ'D. (5.12.1.12)
❑ BARREL/CASE _____ IMPELLER _____
❑ CASE/IMPELLER WEAR RINGS _____
❑ SHAFT _____
❑ DIFFUSERS _____

○ PERFORMANCE :

PROPOSAL CURVE NO. _____ ❑ _____ (r/min)
❑ IMPELLER DIA.RATED _____ MAX _____ MIN _____ (mm)
❑ IMPELLER TYPE _____
❑ RATED POWER _____ (kW) EFFICIENCY _____ (%)
❑ MINIMUM CONTINOUS FLOW:
❑ THERMAL _____ (m³ /h) STABLE _____ (m³ /h)
❑ PREFERRED OPER.REGION _____ TO _____ (m³ /h)
❑ ALLOWABLE OPER.REGION _____ TO _____ (m³ /h)
❑ MAX HEAD@RATED IMPELLER _____ (m)
❑ MAX POWER@RATED IMPELLER _____ (kW)
❑ NPSHR AT RATED FLOW _____ (m) (5.1.11)
○ MAX.SUCTION SPECIFIC SPEED: _____ (5.1.16)
○ MAX.SOUND PRESS.LEVEL REQ'D _____ (dBA) (5.1.16)
○ EST MAX. SOUND PRESS.LEVEL _____ (dBA) (5.1.16)
○ EST MAX. SOUND POWER.LEVEL _____ (dBA) (5.1.16)

○ UTILITY CONDITIONS(5.1.3) :

ELECTRICITY	VOLTAGE	PHASE	HERTZ
DRIVERS			
HEATING			

SYSTEM VOLTAGE DIP ○ 80% ○ OTHER (6.1.5)

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

COOLING WATER : (5.1.19) SOURCE _____
SUPPLY TEMP. _____ (℃) MAX.RETURN TEMP. _____ (℃)
NORM.PRESS. _____ (kg/cm² .g) DESIGN PRESS. _____ (kg/cm² .g)
MIN.RET.PRESS. _____ (kg/cm² .g) MAX.ALLOW.DP. _____ (kg/cm² .g)
CHLORIDE CONCENTRATION: _____ (mg/kg)

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REQ/SPEC NO _____ / _____
PURCH ORDER NO. _____ DATE _____
INQUIRY NO. _____ BY _____

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JOB NO. _____ ITEM NO.(S) _____
REQ/SPEC NO _____ / _____
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INQUIRY NO. _____ BY _____

CONSTRUCTION

ROTATION : (VIEWD FROM COUPLING END) ❑ CW ❑ CCW

PUMP TYPE: (4.1)

☐ OH2 ☐ OH3 ☐ OH6 ☐ OTHER _____
☐ BB1 ☐ BB2 ☐ BB3 ☐ BB5
☐ VS1 ☐ VS2 ☐ VS3 ☐ VS4 ☐ VS5 ☐ VS6 ☐ VS7

CASING MOUNTING :

❑ CENTERLINE ❑ NEAR CENTERLINE ❑ FOOT
❑ IN-LINE ❑ SUMP COVER PLATE ❑ OTHER _____
☐ SEPARATE MOUNTING PLATE(8.3.8.3.1)
☐ SEPARATE SOLE PLATE(8.3.8.3.3)

CASING TYPE :

❑ SINGLE VOLUTE ❑ MULTIPLE VOLUTE ❑ DIFFUSER
❑ BETWEEN BEARINGS ❑ BARREL

CASE PRESSURE RATING :

○ OH6 PUMP SUCTION REGION DESIGNED FOR MAWP (5.3.6)
○ MAX. ALLOWABLE WORKING PRESSURE _____ (kg/cm² .g)
@ _____ (℃)
○ HYDROTEST PRESSURE _____ (kg/cm² .g)
○ SUCTION PRESS. REGIONS MUST BE DESIGNED FOR MAWP(5.3.6)
○ NOZZLE CONNECTIONS : (5.4.2)

	SIZE(mm)	FLANGE RATING	FACING	POSITION
SUCTION				
DISCHARGE				
BALANCE DRUM				

PRESSURE CASING AUX.CONNECTIONS : (5.4.3)

	NO.	SIZE	TYPE
☐ DRAIN			
☐ VENT			
☐ WARM-UP			
☐ BALANCE/LEAK-OFF			
☐ PRESS.GAUGE			
☐ TEMP.GAUGE			

☐ MACHINED AND STUDDED CONNECTIONS (5.4.3.8)
○ CYLINDRICAL THREADS REQUIRED(5.4.3.3)

ROTOR

○ COMPONENT BLANCE TO ISO 1940 G1.0 (5.9.4.4)
○ SHRINK RT-LIMITED MOVEMENT IMPELLERS(8.2.2.3)

COUPLINGS:(6.2.2)

○ MANUFACTURER _____ ☐ MODEL _____
❑ RATING(kW per 100 r/min) _____
☐ SPACER LENGTH _____ (mm) ☐ SERVICE FACT _____
☐ RIGID

THROUGH COUPLINGS:

○ MANUFACTURER _____ ☐ MODEL _____
❑ RATING(kW per 100 r/min) _____ ☐ LUBE _____
☐ SPACER LENGTH _____ (mm) ☐ SERVICE FACT _____
☐ RIGID

DRIVER HALF-COUPLING MOUNTED BY:

○ PUMP MFR. ○ DRIVER MFR. ○ PURCHASER

○ COUPLING WITH HYDRAULIC FIT(6.2.10)
○ COUPLING BALANCED TO ISO 1940-1G6.3 (6.2.3)
○ COUPLING WITH PROPRIETARY CLAMPING DEVICE (6.2.11)
○ COUPLING PER ISO 14691 (6.2.4)
○ COUPLING PER ISO 10441 (6.2.4)
○ COUPLING PER API671 (6.2.4) ○ ASME B15.1
○ NON SPARK COUPLING GUARD (6.2.14C)
○ COUPLING GUARD STANDARD PER _____ (6.2.14a)

BASE PLATES :

❑ API BASEPLATE NUMBER _____ (ANNEX D)
○ NON-GROUT CONSTRUCTION (6.3.13)
○ OTHER _____

MECHANICAL SEAL : (5.8.1)

○ SEE ATTACHED ISO 21049/API682 DATA SHEET :

SURFACE PREPARATION AND PAINT

○ MANUFACTURERS STANDARD ○ OTHER (SEE BELOW)
○ SPECIFICATION NO. _____

PUMP :

○ PUMP SURFACE PREARATION _____
○ PRIMER _____
○ FINISH COAT _____

BASEPLATE : (6.3.17)

○ PUMP SURFACE PREARATION _____
○ PRIMER _____
○ FINISH COAT _____
○ DETAIL OF LIFTING DEVICES (6.3.20) _____

SHIPMENT : (7.4.1)

○ DOMESTIC ○ EXPORT ○ EXPORT BOXING REQUIRED
○ OUTDOORS STORAGE MORE THAN 6MONTHS

SPARE ROTOR ASSEMBLY PACKAGED FOR :

○ HORIZONTAL STORAGE ○ VERTICAL STORAGE
○ 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(6.5.3.1) _____

C.W. PIPING

☐ PIPE ☐ TUBING ☐ FITIINGS _____

C.W. PIPING MATERIALS :

☐ S.STEEL ☐ C.STEEL ☐ GALVANIZED

COOLING WATER REQUIREMENTS :

❑ BEARING HOUSING _____ (m³ /h) @ _____ (kg/cm² .g)
❑ HEAT EXCHANGER _____ (m³ /h) @ _____ (kg/cm² .g)
TOTAL COOLING WATER _____ (m³ /h)

HEAT MEDIUM : ○ STEAM ○ OTHER
HEATING PIPING : ○ TUBING ○ PIPE
STEAM PIPING : ○ TUBING ○ PIPE

BEARING AND LUBRICATION

BEARING (TYPE/NUMBER) (5.10.1)

❑ RADIAL _____ / _____
❑ THRUST _____ / _____

LUBRICATION (5.11.3, 5.11.4)

☐ GREASE ☐ FLOOD ☐ OIL(FLINGER) ☐ RING OIL
☐ HYDRODYNAMIC ☐ PURE OIL MIST ☐ PURGE OIL MIST
○ CONSTANT LEVEL OILER PREFERENCE (5.10.2.2) _____
☐ OIL VISC.SIO GRADE _____
○ OIL PRESS. TO BE GREATER THAN COOLANT PRESSURE
○ REVIEW AND APPROVE THRUST BEARING SIZE(8.2.5.2 d)
☐ OIL HEATER REQUIRED ○ STEAM ○ ELECTRIC

INSTRUMENTATION

○ SEE ATTACHED API670 DATA SHEET
○ ACCELEROMETER(6.4.2.1) _____
○ PROVISION FOR VIBRATION PROBES(6.4.2.2)
○ RADIAL _____ PER BRG. ○ AXIAL _____ PER BRG.
○ PROVISION FOR MOUNTING ONLY (5.10.2.11)
○ FLAT SURFACE REQ'D (5.10.2.12)
○ RADIAL BEARING METAL TEMP. ○ THRUST BEARING METAL TEMP.
○ TEMP. GAUGES (WITH THERMOWELLS)(8.1.3.6) _____
○ PRESSURE GAUGE TYPE _____
○ MONITORS AND CABLES SUPPLIED BY (6.4.2.4) _____

REMARKS: _____

MASSES (kg)

PUMP _____ BASEPLATE _____
DRIVER _____ TOTAL _____
GEAR _____

HYOSUNG GOODSPRINGS

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JOB NO. _____ ITEM NO.(S) _____
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INQUIRY NO _____ BY _____

SPARE PARTS (TABLE 1.8)

- ○ START-UP ○ NORMAL MAINTENANCE
- ○ SPECIFY _____

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
- ○ OH3 BEARING HS6 LIFTER (8.1.2.6)
- ○ CONNECTION DESIGN APPROVAL (5.12.3.4)
- ☒ TORSIONAL ANALYSIS REQUIRED (5.9.2.1)
- ○ TORSIONAL ANALYSIS REPORT (5.9.2.6)
- ○ PROGRESS REPORTS (9.3.3)
- ○ OUTLINE OF PROCEDURES FOR OPTIONAL TEST(9.2.5)
- ○ ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (7.2.1.1f)

☐ PIPING AND APPURTENANCES

MAINFOLD PIPING TO SINGLE CONNECTION (6.5.1.6)
☒ VENT ☒ DRAIN ☒ COOLING WATER

- ☒ MOUNT SEAL RESSERVOIR OFF BASEPLATE (6.5.1.4)
- ☒ FLANGES REQ'D IN PLACE OF SOCKET WELD UNIONS(6.5.2.8)
- ☒ INSTALLATION LIST IN PROPOSAL (9.2.3L)

CONNECTION BOLTING
☒ PTFE COATING ○ ASTM A153 GALVANIZED
○ PAINTED ○ SS

○ VERTICAL PUMPS

- ☐ PUMP THRUST : (+)UP (−)DOWN
  - AT MIN.FLOW _____ (N) _____ (N)
  - AT RATED FLOW _____ (N) _____ (N)
  - MAX.THRUST _____ (N) _____ (N)
- ☒ SOLEPLATE REQ'D(8.3.8.3.3) _____ (m) X _____ (m)
- ☐ SEPARATE MOUNTING PLATE REQUIRED(8.3.8.3.1)
- ☐ SOLEPLATE THICKNESS _____ (mm)

COLUMN PIPE : ☐ FLANGED ☐ THREADED

- ☐ DIAMETER _____ (mm) ☐ FLANGED _____ (mm)

GUIDE BUSHINGS

- ☐ NUMBER _____
- ☐ LINE SHAFT BEARING SPACING _____ (mm)

GUIDE BUSHINGS LUBE :
☐ WATER ☐ OIL ☐ GREASE ☐ PUMPAGE

LINESHAFT: ☐ OPEN ☐ ENCLOSED

- ☐ LINE SHAFT DIAMETER : _____ (mm)
- ☐ TUBE DIAMETER : _____ (mm)

LINESHAFT COUPLING :

- ☐ LINE SHAFT DIAMETER : ☐ SLEEVE & KEY ☐ THREADED
- ☐ SUCTION CAN THICKNESS _____ (mm)
  - ☐ LENGTH _____ (mm) ☐ DIAMETER _____ (mm)
- ☐ SUCTION STRAINER TYPE _____
- ○ FLOAT & ROD ○ FLOAT SWITCH
- ○ IMPELLER COLLETS ACCEPTABLE (5.6.3)
- ○ HARDENED SLEEVES UNDER BEARING(8.3.10.5)

QA INSPECTION AND TESTING

- ○ SHOP INSPECTION(7.14) ○ PERF.CURVE APPROVAL
- ☒ TEST WITH SUBSTITUTE SEAL(7.3.3.2b)

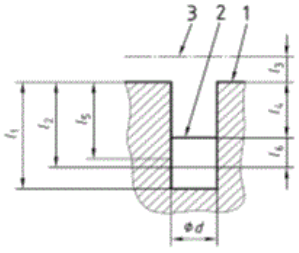
TEST	NON-WIT	WIT	OBSERVE
○ HYDROSTATIC TEST OF BOWL AND COLUMN(8.3.13.2)	○	○	○
○ HYDRO STATIC(7.3.2)	○	○	○
○ PERFORMANCE (7.3.3)	○	○	○
○ RETEST OF SEAL L'KGE(7.3.3.2d)	○	○	○
○ RETEST REQUIRED AFTER FINAL HEAD ADJUSTMENT(7.3.3.5b)	○	○	○
○ TRUE PEAK VELOCITY DATA (7.3.3.4d)	○	○	○
○ NPSH (7.3.4.2)	○	○	○
○ 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(7.3.4.7.1)	○	○	○
○ 4HR.MECHANICAL RUN AFTER OIL TEP. STABLE (7.3.4.7.3)	○	○	○
○ 4HR.MECH. RUN TEST(7.3.4.7.2)	○	○	○
○ RESONANCE TEST(8.3.9.2)	○	○	○
○ BRG HSG RESONANCE TEST(7.3.4.5)	○	○	○
○ REMOVE/INSPECT HYDRODYNAMIC BEARINGS AFTER TEST(8.2.7.5)	○	○	○
○ AUXILIARY EQUIPMENT TEST(7.3.4.5)	○	○	○
☒ IMPACT TESTING(5.12.4.3)	○	○	○
○ PER EN 13445			
○ PER ASME VIII			

- ○ 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 24HOURS (7.3.3.3e)
- ○ INCLUDE PLOTTED VIBRATION SPECTRA (5.9.33)
- ○ RECORD FINAL ASSEMBLY RUNNING CLEARANCES
- ○ SUBMIT COMPLETION OF INSPECTION CHECK LIST (7.1.6)
- ○ MATERIAL CERTIFICATION REQUIRED (5.12.1.8)
  - ○ CASING ○ IMPELLER ○ SHAFT
  - ○ OTHER _____
- ○ CASTING REPAIR PROCEDURE APPROVAL REQ'D(5.12.2.5)
- ☒ INSPECTION REQUIRED FOR CONNECTION WELDS (5.12.3.4e)
  - ☒ 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 FOR 7.2.2.3
  - FOR _____
  - METHOD _____

SUMP ARRANGEMENT

KEY

1	grade
2	low liquid level
3	centerline of discharge
l1	sump depth
l2	pump length
l3	centerline discharge height
l4	height of grade above low liquid level
l5	datum elevation, first-stage impeller
l6	submergence required
Φd	sump diameter



Refer to hydraulic institute standards for definitions

- ○ l1 _____ (m)
- ○ Φd _____ (m)
- ○ l4 _____ (m)
- ☐ l2 _____ (m)
- ☐ l6 _____ (m)
- ☐ l3 _____ (m)
- ☐ l5 _____ (m)