

**1.0 GENERAL**

This Engineering Selection Sheet provides required Design and Performance Parameters for the LP Startup Condensate Pumps for Kothagudem Thermal power station (1x800 MW) project. This has to be read along with pump Technical Specification No: PC: TSP: LPSS: CON-PUMP-R00

**2.0 EQUIPMENT**

2.1 The pumps covered by this specification are identified in the following table(per boiler)

| QTY. | DESCRIPTION         | TAG NOS.     |
|------|---------------------|--------------|
|      |                     | Unit-1       |
| 1    | CONDENSATE PUMP "A" | 10LCL30AP001 |
| 1    | CONDENSATE PUMP "B" | 10LCL30AP002 |
| 1    | CONDENSATE PUMP "C" | 10LCL30AP003 |

**3.0 DESIGN AND PERFORMANCE PARAMETERS**

|                                                                                                                                             |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Name                                                                                                                                        | LP Startup Condensate Pump                                                           |
| Type                                                                                                                                        | Either Double Suction, axially split casing<br>Or End suction, Radially split casing |
| Location                                                                                                                                    | Out door                                                                             |
| Tag Number(s)                                                                                                                               | See section 2.1.                                                                     |
| Number of Pumps Required per boiler                                                                                                         | Three (3)                                                                            |
| Number of pumps per project                                                                                                                 | Three (3)                                                                            |
| Liquid to be Pumped                                                                                                                         | Condensate Water                                                                     |
| Specific Gravity                                                                                                                            | 0.959                                                                                |
| pH                                                                                                                                          | 6.8 – 7.2                                                                            |
| Fluid Temperature Range                                                                                                                     | 15 – 100 °C                                                                          |
| Maximum Operating (Design Point) Temperature                                                                                                | 100 °C                                                                               |
| Design Fluid Temperature                                                                                                                    | 135 °C                                                                               |
| Design Maximum Supply Cooling Water Fluid Temperature (for Seal Cooling Heat Exchanger)                                                     | 38°C                                                                                 |
| Design Maximum Supply Cooling Water Fluid Pressure (for Seal Cooling Heat Exchanger)                                                        | 12 kg/cm <sup>2</sup> (g)                                                            |
| <b>Rated Conditions – For each pump (Guarantee Case)</b>                                                                                    |                                                                                      |
| Design Flow rate, m <sup>3</sup> /hr                                                                                                        | 637                                                                                  |
| Design Total Developed Head, m<br>(Measured at pump discharge flange, two pumps operating, not including pump internal suction & discharge) | Bidder to Specify                                                                    |

|                                                                                                                                                             |                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| losses)                                                                                                                                                     |                                                                                                                            |
| NPSH avail, m @ design flow rate                                                                                                                            | 4.95                                                                                                                       |
| <b>Run-out Conditions – for each pump</b>                                                                                                                   |                                                                                                                            |
| Flow rate, m <sup>3</sup> /hr                                                                                                                               | 999                                                                                                                        |
| Design Total Developed Head, m.<br>(Measured at pump discharge flange,<br>one pump operating, not including<br>pump internal suction & discharge<br>losses) | 25.4                                                                                                                       |
| NPSH avail, m@ Run-out flow rate                                                                                                                            | 4.87                                                                                                                       |
| Suction pipe size ODxTHK in mm                                                                                                                              | 508.0x9.53                                                                                                                 |
| Discharge pipe size ODxTHK in mm                                                                                                                            | 323.9x9.53                                                                                                                 |
| End connection at both suction and<br>discharge                                                                                                             | Weld neck Flanged                                                                                                          |
| Flanged Eccentric reducer/expander at<br>both suction and discharge sides as<br>applicable.                                                                 | Vendor to match the pump terminals with the<br>connecting pipe sizes as indicated above.                                   |
| Counter flanges along with fixing nut,<br>bolts & gaskets as applicable.                                                                                    | Pump vendor scope                                                                                                          |
| <b>Construction</b>                                                                                                                                         |                                                                                                                            |
| Materials                                                                                                                                                   | Pump materials shall meet or exceed the strength<br>and corrosion-erosion resistance of the<br>following listed materials: |
| Casing                                                                                                                                                      | Carbon Steel                                                                                                               |
| Impeller                                                                                                                                                    | 316 Stainless Steel                                                                                                        |
| Shaft                                                                                                                                                       | 316 Stainless Steel                                                                                                        |
| Seals                                                                                                                                                       | 316 Stainless Steel                                                                                                        |
| Casing wear rings                                                                                                                                           | Nitronic 60                                                                                                                |
| Impeller wear rings                                                                                                                                         | 316 Stainless Steel                                                                                                        |
| Common Base frame along with<br>foundation bolts                                                                                                            | Fabricated Steel                                                                                                           |

**4.0 CONDENSATE PUMPS TECHNICAL DATASHEET(To be filled by vendor)****\* Items with Asterisk are to be guaranteed by the Supplier.**

|                         |                                   |
|-------------------------|-----------------------------------|
| <b>Name of Pump</b>     | <b>LP Startup Condensate Pump</b> |
| Number of pumps offered |                                   |
| Pump Type               |                                   |
| Pump Model              |                                   |

|                                        |  |
|----------------------------------------|--|
| Make                                   |  |
| Liquid to be pumped                    |  |
| Specific gravity                       |  |
| PH                                     |  |
| Service                                |  |
| Fluid Temperature, °C                  |  |
| Capacity (m <sup>3</sup> /hr)          |  |
| <b>At Design Point *</b>               |  |
| <b>Maximum Flow</b>                    |  |
| <b>Minimum Flow</b>                    |  |
| <b>At Runout Flow *</b>                |  |
| Total developed head (mlc)             |  |
| <b>At Design Point *</b>               |  |
| <b>Maximum Flow</b>                    |  |
| <b>Minimum Flow</b>                    |  |
| <b>At Runout Flow *</b>                |  |
| NPSH required (mlc)                    |  |
| <b>At Design Point *</b>               |  |
| <b>Maximum Flow</b>                    |  |
| <b>Minimum Flow</b>                    |  |
| <b>At Runout Flow *</b>                |  |
| Number of Pump Stages                  |  |
| Pump speed (rpm) at Design Point       |  |
| <b>Pump speed (rpm) at Runout Flow</b> |  |
| Pump Critical Speed (rpm)              |  |
| Efficiency at Design Point (%) *       |  |
| Motor Size (kW) *                      |  |
| Brake Horsepower Required (KW)         |  |

|                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------|--|
| At Design Point                                                                                                                  |  |
| At Maximum Flow                                                                                                                  |  |
| Suction weld neck flange<br>SIZE/RATING/MATL                                                                                     |  |
| Discharge weld neck flange<br>SIZE/RATING/MATL                                                                                   |  |
| Impeller diameter for design conditions, mm.                                                                                     |  |
| Maximum impeller diameter, mm.                                                                                                   |  |
| Minimum impeller diameter, mm.                                                                                                   |  |
| Minimum recirculation flow required for safe<br>operation (m <sup>3</sup> /hr / temp. rise °C)                                   |  |
| Type of Pump Bearing Lubrication                                                                                                 |  |
| Is Water Cooling Required for Motor<br>Bearings? (m <sup>3</sup> /hr)/temp./max. particle size                                   |  |
| Type Radial Bearings                                                                                                             |  |
| Type Thrust Bearing - Make                                                                                                       |  |
| Type Couplings - Make                                                                                                            |  |
| Suction and Discharge Nozzles                                                                                                    |  |
| Suction Pump Nozzle Size/Rating                                                                                                  |  |
| Discharge Pump Nozzle Size/Rating                                                                                                |  |
| Length x Width of Base Plate, (mm.) (Common<br>base plate)                                                                       |  |
| Weight of Pump Unit. (kg.)                                                                                                       |  |
| Total Weight of Pump and Motor, incl.<br>Baseplate (kg)                                                                          |  |
| Overall sound pressure level for pump/motor<br>unit without attenuation measured at one<br>meter from pump unit, dB(A)           |  |
| Maximum Permissible Change of Design<br>Point TDH and Capacity from the Specified<br>Values Without Additional Cost to the Owner |  |
| Casing design/hydro pressure (bar)                                                                                               |  |
| Shaft diameter, in.                                                                                                              |  |
| Rotation (looking down from motor end)                                                                                           |  |