

# QINGZHOU YONGLI MINING AND DREDGING MACHINERY CO., LTD

## 650 MM (26 INCH) CUTTER SUCTION DREDGER TECHNICAL SPECIFICATION

The following parameters should be provided in the technical specification

### General description:

The dredger is to be used in the tropical climate of Bangladesh, with an average rainfall of 2000 mm, air temperature of 5°C to 50°C and a relative humidity of 60% to 100%. All the equipment to be designed to comply the above climate conditions.

All materials and equipment supplied for dredger construction should be new and of latest design and intended for marine use.

All machineries such as Engines, gear boxes, hydraulic pumps, motors, control valves, dredge pump, PLC, electrical components etc. should be made of reputed company of USA or European countries

All steel plates should be of shipbuilding quality Lloyd's Grade A or equivalent mild steel of uniform surface. Best quality steel angles & other sections required will be used for secondary members such as longitudinal stiffeners etc.

### 1. General Specification

|                                                                             |                      |
|-----------------------------------------------------------------------------|----------------------|
| Production Capacity (solid) for medium sand at a distance of 1000 m, cbm/hr | 900-1200             |
| Pump flow capacity, cum/hr                                                  | 6000                 |
| Pumping distance (maximum), m                                               | 2000                 |
| Dredging depth at 45 degree, m 桥架与水平面45度夹角挖深                                | 18米                  |
| Min. dredging depth, m                                                      | 1.6                  |
| Dredging width with 35° swinging angle each side                            |                      |
| a. At minimum dredging depth, m                                             | 49.5                 |
| b. At maximum dredging depth, m                                             | 41                   |
| Inner Diameter of suction pipe, mm                                          | 650                  |
| Inner Diameter of discharge pipe, mm                                        | 650                  |
| Average Draught, m                                                          | 1.5                  |
| Maximum draught, m                                                          | 1.7                  |
| Total weight, ton                                                           | 300                  |
| Total installed power, KW 总装机功率                                             | 2730 千瓦              |
| Fuel tank capacity, Litre                                                   | 60,000               |
| <b>2. Dredger pontoon dimensions</b>                                        |                      |
| Length overall (including ladder and cutter head), mm                       | 44                   |
| Breadth/Width, m                                                            | 9.03                 |
| Depth, m                                                                    | 2.75                 |
| Engine room pontoon length x width x depth, m                               | 18.0 x 3.75 x 2.75 m |
| Side pontoon Length x width x depth, m                                      | 33 x 2.64 x 2.75 m   |

|                         |      |
|-------------------------|------|
| Cutter ladder length, m | 25.2 |
|-------------------------|------|

|                                                                                                                                                                           |                                         |
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| <b>3. Main pontoon (engine pontoon)</b>                                                                                                                                   |                                         |
| Deck plate thickness, mm                                                                                                                                                  | 10                                      |
| Bottom plate thickness, mm                                                                                                                                                | 12                                      |
| Side plate thickness, mm                                                                                                                                                  | 10                                      |
| Front plate thickness, mm                                                                                                                                                 | 24                                      |
| Back plate thickness, mm                                                                                                                                                  | 24                                      |
| <b>4. Side pontoons</b>                                                                                                                                                   |                                         |
| Deck plate thickness                                                                                                                                                      | 10                                      |
| Bottom plate thickness                                                                                                                                                    | 10                                      |
| Side plate thickness                                                                                                                                                      | 10                                      |
| Front plate thickness                                                                                                                                                     | 16                                      |
| Back plate thickness                                                                                                                                                      | 14                                      |
| <b>5. Main engine: 主发动机</b>                                                                                                                                               |                                         |
| Engine should be of Marine type, Turbocharged, continuous duty                                                                                                            | ✓                                       |
| Make 制造商                                                                                                                                                                  | CUMMINS, UK ( Marine engine )           |
| Model 型号                                                                                                                                                                  | QSK60-M                                 |
| Power, KW 功率                                                                                                                                                              | 1864                                    |
| RPM 转速                                                                                                                                                                    | 1900                                    |
| No. of cylinders 缸数                                                                                                                                                       | 16                                      |
| Engine shape 类型                                                                                                                                                           | V16-cylinder, 4-stroke, Heater exchange |
| <b>6. Auxiliary engine: 副发动机</b>                                                                                                                                          |                                         |
| Engine should be of Marine type, Turbocharged, continuous duty                                                                                                            |                                         |
| Make 制造商                                                                                                                                                                  | CUMMINS, China (Marine engine)          |
| Power, KW 功率                                                                                                                                                              | 895                                     |
| RPM 转速                                                                                                                                                                    | 1800                                    |
| No. of cylinders 缸数                                                                                                                                                       | 12                                      |
| <b>7. Auxiliary engine generator/alternator</b>                                                                                                                           |                                         |
| Alternator Make, model                                                                                                                                                    | Furi China, SUHZ274C                    |
| Power, KW                                                                                                                                                                 | 50                                      |
| <b>8. Dredging pump</b>                                                                                                                                                   |                                         |
| A Single walled dredge pump of high efficiency with wear resistant material construction. Material hardness for pump casing and impeller should be BHN 500 or equivalent. |                                         |
| Make                                                                                                                                                                      | ZHIJIAZHUANG KENDA PUMP                 |

|                                                                                                                                                                                             |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Model                                                                                                                                                                                       | 500WN                             |
| Dredge pump water flow (cubic metre per hour)                                                                                                                                               | 6000                              |
| Diameter of suction, mm                                                                                                                                                                     | 650                               |
| Diameter of Discharge, mm                                                                                                                                                                   | 500                               |
| Head, mm                                                                                                                                                                                    | 67                                |
| RPM                                                                                                                                                                                         | 400                               |
| Pump shaft power, KW                                                                                                                                                                        | 1700                              |
| Diameter of impeller, mm                                                                                                                                                                    | 1400                              |
| Blade quantity                                                                                                                                                                              | 5                                 |
| Blade Material                                                                                                                                                                              | Cr26                              |
| Hardness of pump casing                                                                                                                                                                     | ≥58 Rockwell                      |
| Hardness of Impeller                                                                                                                                                                        | ≥58 Rockwell                      |
| Max. dia. Granule, mm                                                                                                                                                                       | 180                               |
| <b>9. Gear Box (Dredge pump)</b>                                                                                                                                                            |                                   |
| #####                                                                                                                                                                                       |                                   |
| Make                                                                                                                                                                                        | JICHAI ,CHINA                     |
| Model                                                                                                                                                                                       | YOTFJBX750-36FSH                  |
| Ratio                                                                                                                                                                                       | 4.5:1                             |
| Power, KW                                                                                                                                                                                   | 1864                              |
| <b>10. Hydraulic system</b>                                                                                                                                                                 |                                   |
| Hydraulic system of proven design & reputed make to be used for operation of winches, cutter, spuds, anchor boom etc. All components are to be of proven design for trouble free operation. |                                   |
| <b>Hydraulic valve:</b>                                                                                                                                                                     |                                   |
| Make, Model                                                                                                                                                                                 | Huade beijing Rexroth, China      |
| Controlling system                                                                                                                                                                          | SIEMENS PLC SYSTEM PLC, China     |
| <b>Hydraulic pump:</b>                                                                                                                                                                      |                                   |
| Make                                                                                                                                                                                        | VICKERS, CHINA (Nanjing jincheng) |
| Quantity, Model                                                                                                                                                                             | 4535VQ*3 sets                     |
| Hydraulic pressure                                                                                                                                                                          | 16 MPA                            |
| <b>Hydraulic motor:</b>                                                                                                                                                                     |                                   |
| Make, Model                                                                                                                                                                                 | Xinhong china                     |
| Quantity                                                                                                                                                                                    | 9 sets                            |
| Hydraulic pressure                                                                                                                                                                          | 16 MPA                            |
| <b>Hydraulic pump driving gear box</b>                                                                                                                                                      |                                   |

|      |                        |
|------|------------------------|
| Make | Hangzhou weihao ,China |
|------|------------------------|

|                                                                                                                                                                                               |                            |
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| Model                                                                                                                                                                                         | 4P800                      |
| Power, KW                                                                                                                                                                                     | 809                        |
| Input speed                                                                                                                                                                                   | 1800                       |
| Ratio                                                                                                                                                                                         | 1.1:1                      |
| <b>11. Winches</b>                                                                                                                                                                            |                            |
| a. Ladder lifting winch                                                                                                                                                                       |                            |
| Diameter of drum, mm                                                                                                                                                                          | 630                        |
| Line pull, 2nd layer                                                                                                                                                                          | 180 KN                     |
| Wire rope speed                                                                                                                                                                               | 0-20 m/min                 |
| Hydraulic motor make, model                                                                                                                                                                   | Zhejiang Xinhong China S7  |
| Dia. of wire rope, mm                                                                                                                                                                         | 36                         |
| Wire rope quantity to be supplied, m                                                                                                                                                          | 180                        |
| <b>b. Swing winch</b>                                                                                                                                                                         |                            |
| Diameter of drum, mm                                                                                                                                                                          | 630                        |
| Line pull, 2nd layer                                                                                                                                                                          | 180 KN                     |
| Wire rope speed                                                                                                                                                                               | 0-20 m/min                 |
| Hydraulic motor make, model                                                                                                                                                                   | Zhejing xinhong China , S7 |
| Dia. of wire rope, mm                                                                                                                                                                         | 30                         |
| Wire rope quantity to be supplied, m                                                                                                                                                          | 150                        |
| <b>Anchor boom</b>                                                                                                                                                                            |                            |
| Boom length, m                                                                                                                                                                                | 18                         |
| Boom diameter, mm                                                                                                                                                                             | 300                        |
| Wall thickness, mm                                                                                                                                                                            | 12                         |
| Winch motor make, model                                                                                                                                                                       | S5, 80KN Winch : 2 SETS    |
| Drum dia                                                                                                                                                                                      | 425                        |
| Line pull, 2nd layer                                                                                                                                                                          | 80 KN                      |
| Wire rope speed, m/min                                                                                                                                                                        | 0-18                       |
| Wire rope dia, mm                                                                                                                                                                             | 22                         |
| Wire rope quantity to be supplied, m                                                                                                                                                          | 120                        |
| <b>12. Cutter head with replaceable teeth 铰刀头带有可更换铰刀齿</b>                                                                                                                                     |                            |
| Cutter should be crown or equivalent type with replaceable teeth driven by hydraulic motor. Speed should variable 0 to 30 rpm, continuous or staged and should be suitable for dredging sand. |                            |
| Make 制造商                                                                                                                                                                                      | Yongli ,China 中国永利         |
| Type 类型                                                                                                                                                                                       | Crown type                 |
| Diameter, mm 直径（毫米）                                                                                                                                                                           | 2100                       |

|                                                                                                                                                                                                                                                 |                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Cutter shaft power, KW 铰刀头轴功率                                                                                                                                                                                                                   | 450                           |
| RPM 转速                                                                                                                                                                                                                                          | 0-30                          |
| Crown diameter, mm 铰刀头直径                                                                                                                                                                                                                        | 2450                          |
| <b>Motor: 马达</b>                                                                                                                                                                                                                                |                               |
| Make 制造商                                                                                                                                                                                                                                        | Zhejiang xinhong China 中国浙江新宏 |
| Model 型号                                                                                                                                                                                                                                        | S6                            |
| Power, KW 功率                                                                                                                                                                                                                                    | 450                           |
| Motor quantity 马达数量                                                                                                                                                                                                                             | 4 pcs                         |
| Cutter teeth replaceable quantity 铰刀齿数量                                                                                                                                                                                                         | 55 pcs                        |
| Cutter teeth material 铰刀齿材质                                                                                                                                                                                                                     | K10.40Cr                      |
| Cutter blade quantity 铰刀片数量                                                                                                                                                                                                                     | 5 pcs                         |
| Cutter blade material 铰刀片材质                                                                                                                                                                                                                     | ZG35SiMn                      |
| <b>13. Harbour/Emergency generator</b>                                                                                                                                                                                                          |                               |
| Diesel generating set with proper power to arrange battery charging, fuel transfer pump operation, emergency lighting, operation of one welding set, cabin air cooler, emergency bilge pump etc.                                                |                               |
| <b>Generator/Alternator:</b>                                                                                                                                                                                                                    |                               |
| Make                                                                                                                                                                                                                                            | Stamford, China               |
| Model                                                                                                                                                                                                                                           | UCM224                        |
| Power, KW                                                                                                                                                                                                                                       | 50                            |
| <b>Generator engine:</b>                                                                                                                                                                                                                        |                               |
| Make                                                                                                                                                                                                                                            | Weichai, China                |
| Model                                                                                                                                                                                                                                           | WP4.1D66E200                  |
| Power, KW                                                                                                                                                                                                                                       | 55                            |
| <b>14. Deck crane</b>                                                                                                                                                                                                                           |                               |
| One deck crane is to be provided for maintenance of dredge pump and other components with manual chain tackle/other suitable mechanism.                                                                                                         |                               |
| Capacity, KN/ton                                                                                                                                                                                                                                | 50                            |
| Lift diameter /outreach, m                                                                                                                                                                                                                      | 4.5                           |
| <b>15. Spud</b>                                                                                                                                                                                                                                 |                               |
| Construction of spud should be strong enough to withstand dredger during high velocity of river water. Minimum length of spud should be of 21 metre. Spud should be operated by hydraulic ram. Manual spud tilting facility should be provided. |                               |
| Spud length, m                                                                                                                                                                                                                                  | 24                            |
| Spud diameter, mm                                                                                                                                                                                                                               | 630                           |
| Spud wall thickness                                                                                                                                                                                                                             | 30                            |
| Spud tilting facility                                                                                                                                                                                                                           | Manual                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |
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| <b>Spud cylinder</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |
| Cylinder stroke, m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2.5        |
| Cylinder dia, mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 200        |
| Working pressure, Mpa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 15         |
| Travel speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.2 M/S    |
| Spud tilting system                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Manual     |
| <b>16. Anchor, 2 nos</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |
| Atleast one set of high holding power (HPP) anchors and wire ropes are to be provided for instant operation of the dredger.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |
| Type:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Lips type  |
| Anchor weight per pc:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1500 KG    |
| Anchor material:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Mild Steel |
| <b>17. Electrical installation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |
| Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 24 V       |
| Battery capacity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 195 A      |
| Battery quantity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 8 pcs      |
| <b>18. Coating Protection (Painting)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |
| Surface preparation before painting:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |
| #####                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |
| <p><b>Painting Schedule</b></p> <p><b>1. BOTTOM &amp; BOOT TOP AREA (COALTAR EPOXY SYSTEM):</b></p> <p>a) Anti Corrosive System i) Epoxy Primer- 1x100 Microns ii) Coaltar Epoxy-2x75 Microns iii) Modified Coaltar Epoxy (Sealer Coat)- 2x75 Micron</p> <p>b) Antifouling System i) Self Polishing Antifouling Paint (for 24 months protection)- 2x50 Microns</p> <p><b>2. TOP SIDES (RECOATABLE EPOXY SYSTEM)</b></p> <p>a) Epoxy Primer- 1x100 Microns b) Recoatable Epoxy Undercoat- 1x100 Microns c) Recoatable Epoxy Finish- 1x100 Microns</p> <p><b>3. DECK (RECOATABLE EPOXY SYSTEM)</b> a) Epoxy Primer-1x50 Microns b) Recoatable Epoxy Undercoat- 1x100 Microns c) Recoatable Polyurethane/ Epoxy Finish- 1x100 Microns</p> <p><b>4. BILGES/BALLAST/TANKS (COALTAR EPOXY SYSTEM)</b> a) Epoxy Primer- 1x50 Microns b) Coaltar Epoxy (two different shades)- 2x100 Microns</p> <p><b>5. SUPERSTRUCTURE-EXTERIOR, INTERIOR &amp; DECK FITTINGS (RECOATABLE EPOXY SYSTEM)</b> a) Epoxy Primer - 1x50 Microns b) Recoatable Epoxy Undercoat- 1x100 Microns c) Recoatable Epoxy Finish- 1x50 Microns</p> |            |



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| <b>8. MACHINERY SPACE (EPOXY SYSTEM)</b>                                                                                                              |        |
| a) Below Floor Plates i) Epoxy Primer- 1x50 Microns ii) Recoatable Epoxy Coating- 1x100 Microns                                                       |        |
| b) Above Floor Plates i) Epoxy Primer- 1x50 Microns ii) Recoatable Epoxy Undercoat- 1x100 Microns iii) Recoatable Epoxy Finish- 1x50 Microns          |        |
| <b>19. Cathodic Protection</b>                                                                                                                        |        |
| Sufficient amount of anodes to be placed on under water hull and ladder for a period of 2 years in salt water.                                        |        |
| No. of Zinc anode in the hull                                                                                                                         | 30 pcs |
| No. of Zinc Anode in the ladder                                                                                                                       | 10 pcs |
| <b>20. Firefighting appliances and deck inventory</b>                                                                                                 |        |
| 1. Portable powder type fire extinguishers, 6-7 kg- 4 nos                                                                                             |        |
| 2. Co2 fire extinguishers, 6-7 kg - 4 nos                                                                                                             |        |
| 3. Canvas hoses, 1.5 inch dia, 15m in length, complete with nozzles, encased in red painted boxes – 2 sets                                            |        |
| 4. Nylon rope, dia. 40 mm - 200 metre                                                                                                                 |        |
| 5. Nylon rope, dia. 50 mm - 200 metre                                                                                                                 |        |
| <b>21. Life saving appliances</b>                                                                                                                     |        |
| 1. Life jacket - 6 nos                                                                                                                                |        |
| 2. Life buoy, solid - 6 nos                                                                                                                           |        |
| <b>22. Misc. accessories to be supplied for instant dredger operation</b>                                                                             |        |
| a) Spud slings- 2 sets                                                                                                                                |        |
| b) Spud shaft/pin- 2 nos                                                                                                                              |        |
| c) Mooring ropes- 2 sets                                                                                                                              |        |
| d) Gantry wires- 2 sets                                                                                                                               |        |
| e) Anchor (for floating pipe line), 350 kg- 4 nos , 500 kg - 4 nos                                                                                    |        |
| f) Anchor buoys - 10 nos                                                                                                                              |        |
| <b>23. Lightings</b>                                                                                                                                  |        |
| In addition to normal lights for operation of the dredger, for night time operation sufficient flood lights are to be provided in suitable locations. |        |
| a) Deck lights                                                                                                                                        |        |
| b) Engine room lights                                                                                                                                 |        |
| c) Operating cabin lights                                                                                                                             |        |
| <b>24. Operating cabin</b>                                                                                                                            |        |

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| <b>25. Control system</b>                                                                                                                                                                                                                              |                              |
| Make                                                                                                                                                                                                                                                   | SIEMENS PLC SYSTEM 西门子PLC 系统 |
| <b>26. Other Installations and accessories should be provided</b>                                                                                                                                                                                      |                              |
| 1 Dredge pump intake Inspection window: At the entry of the dredge pump suction pipe a dissassembled type window should be provided for the inspection of suction part of dredge pump.                                                                 |                              |
| 2. Depth Indicator: Depth indicator to be installed in the proper position of the dredger.                                                                                                                                                             |                              |
| 3. Lights: In addition to normal lights for operation of the dredger, for night time operation sufficient flood lights are to be provided in suitable locations.                                                                                       |                              |
| 4. Ventilation for the Engine room: Air Blowers and Exhaust fans are to be provided of adequate capacity and number for proper ventilation of engine room considering high temperature and humidity in Bangladesh.                                     |                              |
| 5. Tanks: Fuel oil tanks, dirty oil tank, water ballast tanks, fresh water tank and dry tanks are to be provided. Necessary pipelines, i.e. filling, suction, sounding and air escape pipes and also access manholes will be provided for these tanks. |                              |
| 6. Store: Two store with rack & wooden floor shall be at Portside and staboard side under main deck.                                                                                                                                                   |                              |
| 7. Signal Mast: A steel mast will be erected on the operating cabin top with requisite signal lamps, search lights etc. complete for navigation. The mast will be collapsible.                                                                         |                              |
| 8. Bollard: 6 Nos. double bollard shall be provided on the side pontoon of dredger for towing the dredger.                                                                                                                                             |                              |
| 9. Whistle/Horns: On the operating cabin top a horn will be fitted feed from A/C power system.                                                                                                                                                         |                              |
| 10. Sanitary oulfit: A steel frame toilet with a aluminium panel door to be fitted at the aft side of the dredger deck                                                                                                                                 |                              |
| <b>27. Tools</b>                                                                                                                                                                                                                                       |                              |
| With the dredger complete with engine, equipment, tools, accessories and tools will be provided. List is provided hereunder:                                                                                                                           |                              |
| 1. Spud shaft/pin - 4 pcs                                                                                                                                                                                                                              |                              |
| 2. Circuit breaker of required capacity - 4 pcs                                                                                                                                                                                                        |                              |
| 3. Tools with tool box for main engine maintenance- 1 set                                                                                                                                                                                              |                              |
| 4. Tools with tool box for auxiliary engine maintenance- 1 set                                                                                                                                                                                         |                              |
| 5. Pliers, Insulated and ordinary - 2 nos.                                                                                                                                                                                                             |                              |
| 6. Open end spanner, from 8mm to 40mm - 1 set (min 16 pcs)                                                                                                                                                                                             |                              |
| 7. Box spanner from, 8mm to 40mm - 1 set (min 16 pcs)                                                                                                                                                                                                  |                              |
| 8. Adjustable wrench, 250mm, 300mm, 350mm, 400mm- 4 nos                                                                                                                                                                                                |                              |
| 9. Pipe wrench, 300mm & 450 mm- 2 nos                                                                                                                                                                                                                  |                              |
| 10. Hammer, 20 lb - 1 no                                                                                                                                                                                                                               |                              |
| 11. Hammer, 10 lb - 2 nos                                                                                                                                                                                                                              |                              |
| 12. Hammer, 5 lb- 2 nos                                                                                                                                                                                                                                |                              |
| 13. Nose/Combination pliers - 1 no                                                                                                                                                                                                                     |                              |
| 14. Flat screw driver, 200mm, 250 mm, 300 mm - 3 nos                                                                                                                                                                                                   |                              |
| 15. Star screw driver, 200mm, 250 mm, 300 mm - 3 nos                                                                                                                                                                                                   |                              |

16. Digital voltage detection screw driver- 1no

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|-----------------------------------------------------------------------------------------|
| 17. Electric hand drill machine, 220V, 400W- 1 set                                      |
| 18. Electric hand angle grinder, 220V, 670W- 1 set                                      |
| 19. Grinding wheel/disc, 100 mm - 25 nos                                                |
| 20. Cup brush, 100 mm - 25 nos                                                          |
| 21. Water bucket, 15 litres capacity - 2 nos                                            |
| 22. Mop- 2 nos                                                                          |
| 23. Electronic multimeter - 1 no                                                        |
| 24. Torch light - 2 nos                                                                 |
| 25. Hack Saw frame - 2 nos                                                              |
| 26. Hack Saw blade- 50 nos                                                              |
| 27. Search light bulb, 500W - 12 nos                                                    |
| 28. Slide/Vernier caliper, 150mm & 300 mm - 2 nos                                       |
| 29. Measuring steel tape, 3 m and 5m- 2 nos                                             |
| 30. Thermometers, 100 degree C with casing - 2 nos                                      |
| 31. Electric welding machine - 1 set                                                    |
| 32. Gas cutting set including regulators and pipes - 1 set                              |
| 33. Hydraulic Jack, 5 ton and 10 ton - 2 nos                                            |
| 34. Crowbar- 2 nos                                                                      |
| 35. Grease gun - 2 nos                                                                  |
| 36. Grease nipple/cup - 12 nos                                                          |
| 37. Tinman's scissors, 250 mm, flat & round-1 no each                                   |
| 38. Hand oil pump (for fuel transfer) - 1 no                                            |
| 39. Steel wire ropes clips/clamp of required size- 50 nos                               |
| 40. Anchor D shackle of required size- 20 nos                                           |
| 41. Fuel oil transfer pump (electric motor driven) - 1 set                              |
| 42. Cold chisels, 200 & 150 mm- 4 nos                                                   |
| 43. Engine room and control room light bulb- 15 nos.                                    |
| 44. Wooden hammer- 2 nos                                                                |
| 45. Chain pulley block, 3 ton and 5 ton- 2 sets                                         |
| 46. Allen keys - 1 set (min 16 pcs)                                                     |
| 47. Feeler gauge - 1 no                                                                 |
| 48. Files (hand tool), 250 mm, coarse and medium, flat, round and half round- 1 no each |
| 49. Double end ring spanner, from 8mm to 40mm - 1 set (min 16 pcs)                      |
| 50. Portable motor driven bilge pump- 1 set                                             |
| 51. Electric bench grinding machine- 1 set                                              |
| 52. Electric bench drill machine- 1 set                                                 |
| 53. Clock - 1 no                                                                        |