## INDEX

<table>
<thead>
<tr>
<th>PAGE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GENERAL DESCRIPTION</td>
</tr>
<tr>
<td>2</td>
<td>2.0 DUTY</td>
</tr>
<tr>
<td></td>
<td>2.1 PRINCIPAL DIMENSIONS</td>
</tr>
<tr>
<td></td>
<td>2.2 INSTALLED POWER</td>
</tr>
<tr>
<td>3</td>
<td>3.0 DREDGE PUMP</td>
</tr>
<tr>
<td>4</td>
<td>3.1 DREDGE PUMP ENGINE</td>
</tr>
<tr>
<td>5</td>
<td>3.3 DREDGE PUMP TRANSMISSION</td>
</tr>
<tr>
<td></td>
<td>3.4 SUCTION AND DISCHARGE PIPEWORK</td>
</tr>
<tr>
<td>6</td>
<td>4.00 AUXILIARY SERVICES ENGINE</td>
</tr>
<tr>
<td></td>
<td>4.1 HYDRAULICS SYSTEM</td>
</tr>
<tr>
<td></td>
<td>A: Cutter Head Circuit</td>
</tr>
<tr>
<td></td>
<td>B: Port &amp; Starboard Winch Circuits</td>
</tr>
<tr>
<td></td>
<td>C: Spud Circuits</td>
</tr>
<tr>
<td></td>
<td>D: Cutter Arm Circuit</td>
</tr>
<tr>
<td>7</td>
<td>4.3 ELECTRIC SERVICES</td>
</tr>
<tr>
<td>9</td>
<td>5.00 CUTTER HEAD</td>
</tr>
<tr>
<td>10</td>
<td>5.1 CUTTER ARM</td>
</tr>
<tr>
<td>11</td>
<td>5.3 SPUDS</td>
</tr>
<tr>
<td>12</td>
<td>5.4 DECK MACHINERY</td>
</tr>
<tr>
<td></td>
<td>A: Warping Winches</td>
</tr>
<tr>
<td></td>
<td>B: Spud Hoist Cylinders</td>
</tr>
<tr>
<td></td>
<td>C: Cutter Arm Operating Winch</td>
</tr>
<tr>
<td>13</td>
<td>6.00 WIRE ROPE &amp; ANCILLARY EQUIPMENT</td>
</tr>
<tr>
<td>15</td>
<td>6.1 CONTROL ROOM AND CONTROLS</td>
</tr>
<tr>
<td>16</td>
<td>6.2 HULL CONSTRUCTION</td>
</tr>
<tr>
<td>17</td>
<td>6.3 WELDING</td>
</tr>
<tr>
<td></td>
<td>6.4 OUTFIT AND EQUIPMENT</td>
</tr>
<tr>
<td></td>
<td>6.5 PAINTING</td>
</tr>
<tr>
<td>19</td>
<td>7.00 WORK TESTING</td>
</tr>
<tr>
<td></td>
<td>7.1 SITE TESTING AND SURVEY</td>
</tr>
<tr>
<td></td>
<td>7.3 OPERATING MANUALS/AS FITTED DRAWINGS</td>
</tr>
</tbody>
</table>
1.0 GENERAL DESCRIPTION

The vessel is a non propelled cutter suction dredger of five dismountable pontoons, steel hull construction capable of dredging from depths down to 14 metres and pumping the discharge through a 1000 metre long pipeline. Designed for multi-purpose dredging as land reclamation, channel clearing and maintenance work. To operate in saline waters under tropical conditions of air temperatures up to 55°C, water temperatures up to 35°C, and humidity up to 100%.

The dredger is diesel engine powered. The dredge pump engine direct-driving the dredge pump via reduction gearbox. Power for the hydraulic systems of the dredger is provided by the auxiliary service engine. Electric power is provided by engine driven alternators and batteries.

Full plant instrumentation and alarm systems are installed in the control room from where all dredging operations can be remotely controlled.
2.1 **DUTY**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Diameter</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge</td>
<td>457mm</td>
<td>18.00 in O.D</td>
</tr>
<tr>
<td>Suction</td>
<td>508mm</td>
<td>20.00 in O.D</td>
</tr>
<tr>
<td>Discharge Distance</td>
<td>1000 metres</td>
<td>(3280 ft)</td>
</tr>
<tr>
<td>Static lift</td>
<td>3 metres</td>
<td>(10.0 ft)</td>
</tr>
<tr>
<td>Dredge/Suction Depth</td>
<td>14 metres</td>
<td>(32.8 ft)</td>
</tr>
</tbody>
</table>

2.2 **PRINCIPAL DIMENSIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Measurement</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Length (Cutter Arm Raised)</td>
<td>38.0 metres</td>
<td>(125 ft)</td>
</tr>
<tr>
<td>Main Hull length</td>
<td>25 metres</td>
<td>(82 ft)</td>
</tr>
<tr>
<td>Width</td>
<td>8 metres</td>
<td>(26.2 ft)</td>
</tr>
<tr>
<td>Depth</td>
<td>2.4 metres</td>
<td>(7.9 ft)</td>
</tr>
<tr>
<td>Draught (light ship)</td>
<td>0.97 metres</td>
<td>(3.18 ft)</td>
</tr>
<tr>
<td>(fully bunkered)</td>
<td>1.09 metres</td>
<td>(3.58 ft)</td>
</tr>
<tr>
<td>(mean)</td>
<td>1.03 metres</td>
<td>(3.38 ft)</td>
</tr>
</tbody>
</table>

2.3 **INSTALLED POWER**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Power Rating</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dredge Pump at 1800rpm</td>
<td>895 kW</td>
<td>(1200 hp)</td>
</tr>
<tr>
<td>Auxiliary Services at 1800rpm</td>
<td>280 kW</td>
<td>(375 hp)</td>
</tr>
</tbody>
</table>
3.1 **DREDGE PUMP**

The dredge pump will be a heavy duty high head, high efficiency centrifugal dredge and gravel pump with a three vane closed design impeller. The pump will be a Weir Warman 18/16 HGH type or similar.

The main wearing parts of the pump are supplied as follows:

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impeller &amp; Pump Shell</td>
<td>High chrome alloy iron A25  BN 300</td>
<td></td>
</tr>
<tr>
<td>Pump Door and Back Liners</td>
<td>High chrome alloy iron A05  BN 650</td>
<td></td>
</tr>
</tbody>
</table>

The pump drive shaft is of large diameter and extremely rigid being supported between heavy duty grease lubricated taper roller bearings installed in an axially adjustable bearing housing. A full flow flushed gland sealing arrangement seals the shaft in the pump casing. The whole shaft assembly and pump bowl is cradled in a cast or fabricated steel pedestal which is integrated as low as possible with the dredge hull steel work to ensure that the pump suction is primed.

The suction and discharge of the pump are flange connected into the pipework of the dredger via flexible hoses or joints and arranged for easy release of the pump door and bowl for maintenance.

Suction vacuum and discharge pressure sensors will be installed in the pipework giving remote readings of dredge pump performance in the operator’s control room.
3.2 **DREDGE PUMP ENGINE**

The dredge pump will be driven by a Cummins turbo charged after-cooled KTA38 diesel engine developing 895 kW (1200 hp) at 1800 R.P.M. The water cooled marine engine would be installed with the following equipment:

- Jacket water to raw water heat exchanger
- Jacket and raw water circulating pumps
- Dry exhaust silencer
- Duplex fuel filters
- Lubricating oil filters and cooler
- 24 Volt electric starter
- Battery charging alternator
- Gland pump for dredge pump

The engine will be arranged for local start/stop control in Engine Room and remote start/stop control from the Control Room. Local instrumentation and gauges on the engine will monitor the following:

- Lubricating oil pressure
- Jacket water temperature
- Voltmeter
- Engine Speed
- Engine service hour meter

Remote gauges in the Control room will monitor the following:

- Lubricating oil pressure
- Jacket water temperature
- Voltmeter
- Engine Speed
- Engine service hour meter

In addition automatic audible and visual alarms will be located in the Control Room for both low lubrication oil pressure and high jacket water temperature. The engine speed will be governed from the Control Room by means of morse controls.
3.3 **DREDGE PUMP TRANSMISSION**

The dredge pump will be driven by a suitably rated marine reduction gearbox with built in hydraulic operated multiplate clutch. The gearbox will be installed with a direct driven lube oil circulating pump and oil cooler. Drive will be effected from the engine flywheel via a torsionally resilient coupling.

The output shaft of the gearbox will be coupled to the dredge pump drive shaft via a suitable coupling with capability to prevent overload.

3.4 **SUCTION AND DISCHARGE PIPEWORK**

The dredge suction pipework will consist of a specially flared suction mouth piece at the cutter connected to 508mm nominal bore suction pipework up the cutter arm. A Fulflex rubber dredge suction hose connects the cutter arm suction pipe to the dredge via a replaceable liner bulkhead adapter and inboard dredge suction shut off valve.

The internal suction pipework to the dredge pump will consist of a short suction flexible hose and a full bore suction inspection chamber close coupled to the dredge pump suction with a quick release inspection cover.

The discharge pipework from the dredge pump will be formed using 457mm nominal bore pipework. Extra long radius bends will be employed on the discharge from the dredge pump ensuring minimum additional flow and head loss. The discharge pipework will terminate at the stern of the dredge with a flange for connection to the discharge pipeline. (There is a discharge shut off valve to prevent discharge head returning to pump bowl should repairs or maintenance be required to the dredge pump).
4.1 **AUXILIARY SERVICES ENGINE**
A Cummins QSL9 diesel engine developing 280 kW (375 hp) at 1800 RPM will be installed to power the hydraulic transmissions, and the hydraulic oil cooling. An air conditioning compressor can also be installed on the engine.

The auxiliary services engine will be installed with a similar equipment specification to the Dredge Pump Engine (Section 3.2) and include the same levels of local and remote instrumentation, alarm and controls.

Primary drive of the hydraulic pumps will be via a triple output splitter gearbox direct mounted on to the engine fly wheel housing and driven via a flexible coupling. Other auxiliary drives will be via belt transmissions.

All raw water, bilge and general service pump operations will be via pumps driven directly from auxiliary service engine.

4.2 **HYDRAULIC SYSTEM**
Mounted on a splitter gearbox driven by the auxiliary services engine will be three heavy duty variable displacement axial piston pumps and two through driven fixed displacement gear pumps. The main circuits will be powered as follows:

A. **Cutter Head Circuit**
One Rexroth or similar transmission pump developing from 0 to 450 L/min (99 I.G.P.M.) at a continuous pressure of 250 bar (3625 P.S.I.).

B. **Port and Starboard Winch Circuits**
Two Rexroth (or equivalent) transmission pumps each developing from 0 to 160 L/min (35 I.G.P.M.) at a continuous pressure of 210 bar (3000 P.S.I.).
C. **SPUD CIRCUITS**

One High pressure gear pump developing 100 L/min (22 I.G.P.M.) at 140 bar (2000 P.S.I.)

D. **CUTTER ARM LIFT CIRCUIT**

One Rexroth (or equivalent) transmission pumps each developing from 0 to 160 L/min (35 I.G.P.M.) at a continuous pressure of 210 bar (3000 P.S.I.).

will provide the power to the cutter arm lift circuit.

E. **GENERAL HYDRAULIC SYSTEM**

A hydraulic oil reservoir will be installed with a suitable capacity for the requirements of the system. The reservoir will be of all welded steel construction, with a removable inspection cover, internally shot blasted, sealed and oiled. The reservoir will be equipped with filler breather cap, level and temperature gauges and independent valved suction strainer connections to each pump suction.

High pressure filters are installed in each circuit and transmission circuits are additionally protected by micro suction filters. Spent oil from the circuits is fed back to the reservoir via an oil cooler and tank top return filter. All circuits are adequately protected against overload by high pressure relief valves. All the control valves are installed in the Plant Room and remotely controlled from the Control Room by means of proportional hydraulic pilot controls.

4.3 **ELECTRIC SERVICES**

The primary system of the dredge will function from a 24 volt D.C. system. Isolated
pairs of batteries will be charged by heavy duty alternators mounted on both engines.

The electric installation will be installed with suitably approved materials with each circuit adequately protected against overload.

In addition to operational lighting in the Plant Room and Control Room, the following additional lighting and equipment will be installed:

a) One 150 watt Search Light
b) Flood lights 2 x 150 watt.
c) Windscreen wiper
d) Supply to Echo Sounder
e) Port Generator 230/400 V AC 50 Hz 24 kVa
5.0

5.1 **CUTTER HEAD**

At the forward extremity of the cutter arm, will be installed a hydraulic driven cutter head.

The cutter will be a high alloy steel crown type with replaceable teeth adaptors or blades specially designed to suit the material to be dredged. The working parts of the head comprise the low speed high torque hydraulic motor sealed for underwater operation. The motor is close coupled to the cutter shaft which is supported between pairs of heavy duty bearing assemblies capable of absorbing the radial and thrust loads generated by the cutter.

A fabricated heavily gusseted tubular steel cutter shaft housing will carry the motor and shaft assembly. This will be installed into a fully welded fabricated steel mounting frame to integrate the head with the cutter arm at the appropriate angle for efficient dredging.

Heavy duty underwater shaft seals are fitted and the whole cutter shaft housing is oil filled and primed from an oil header tank on the dredge.

The cutter duty will be as follows:

- Shaft power 170 kW (228 H.P.)
- Cutter speed 0 to 32 R.P.M.
- Effective torque 50734 Nm (37421 lb.ft)
5.2. **CUTTER ARM**

The cutter arm assembly is designed to enable the cutter head to be lowered to a maximum dredging depth of 14 metres.

The cutter arm assembly will consist of twin tubular side members closed at each end to form buoyancy chambers and interconnected at intervals by transverse saddle tanks of steel plate construction which support the dredge suction pipe. The suction pipe is retained in the saddle tanks with removable pipe clamps.

The cutter arm will be fabricated using high grade structural steel tubular sections suitably strengthened in way of highly stressed areas. The inboard end of the arm will terminate at the pivots with heavy duty underwater bearings running on stainless steel shafts.

The outboard end of the arm will be terminated in flange connections for location of the cutter head and also carry sheave housings to port and starboard for the winch warps.

5.3 **SPUDS**

Two tubular welded steel spuds will be installed in spud pintles at the port and starboard aft end of the dredge. The normal length of the spud will be such that the spud can still sufficiently penetrate the ground and provide anchorage with the dredge operating at the maximum dredge depth of 14 metres.

Each spud will be constructed from high grade structural tubular steel of heavy wall thickness, designed to suit the operating conditions and fabricated such that the exterior is entirely smooth.

The lower end of each spud is terminated in a heavy plated steel point and the upper end is closed and fitted with a lifting eye. At regular intervals up the spud tube, heavy wall tubular sleeves are welded in, which allow stowage pins to be inserted whilst handling the spuds. Raising and lowering of the spuds is by means of steel wire slings operated by hydraulic rams with a rapid dump facility.
5.4 **DECK MACHINERY**

A **Warping Winches**

Two hydraulic driven warping winches will be mounted forward of the control room to Port and Starboard.

Each winch will have a single drum direct driven by a low speed high torque hydraulic motor complete with brake and supported at its outer extremity on a bearing pedestal. The winch motor and bearing pedestal will be mounted on a fabricated steel base frame.

Both winches will have independently hydraulic piloted levers to provide variable speed drum drive, load holding stop (hydraulic release, spring brake on) and drum free wheel against a counter load.

The duty of each winch will be as follows:-

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft Power</td>
<td>46 kW (61 HP)</td>
</tr>
<tr>
<td>Rope speed</td>
<td>0 to 30 m/min</td>
</tr>
<tr>
<td>Winch pull (max)</td>
<td>11 tonnes</td>
</tr>
<tr>
<td>Drum capacity</td>
<td>150m of 28mm dia wire rope</td>
</tr>
</tbody>
</table>

Cont'd
5.4 Deck Machinery - cont

B  **Spud Hoist Cylinders**
Two single acting spud hoisting hydraulic cylinders will be installed to Port and Starboard aft as shown on the General Arrangement drawing. Each cylinder will be fitted with a steel wire rope sheave at its upper end and a pivot joint at its lower end. The cylinders and associated valve gear will enable controlled hoist of the spud and a rapid dump. The cylinders will stroke about 1.8 metres and operate to achieve a maximum spud hoist speed of 8.2 m/min.

C  **Cutter Ladder Operating Winch**
A suitable ladder winch will be fitted, positioned forward of the operating cabin, driven by a hydraulic braked motor. The hauling speed will be regulated by remote controls in the control cabin to give a smooth running of the winch under all dredging conditions.

5.5. **WIRE ROPEs AND ANCILLARY EQUIPMENT**

The following galvanized flexible steel wire ropes will be supplied:

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>LENGTH (metres)</th>
<th>DIA (mm)</th>
<th>SECTION</th>
<th>SWL (tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor wires</td>
<td>2 x 150m</td>
<td>28</td>
<td>6 x 36</td>
<td>11.0</td>
</tr>
<tr>
<td>Spud lifting wires</td>
<td>2 x 6m*</td>
<td>26</td>
<td>6 x 36</td>
<td>8.0</td>
</tr>
<tr>
<td>Spud slings</td>
<td>2 x 5m*</td>
<td>26</td>
<td>6 x 36</td>
<td>8.0</td>
</tr>
<tr>
<td>Handrails</td>
<td>4 x 16m*</td>
<td>8</td>
<td>6 x 19</td>
<td>1.0</td>
</tr>
<tr>
<td>Arm Lift Wire</td>
<td>To suit</td>
<td>28</td>
<td>6 x 36</td>
<td>11.0</td>
</tr>
</tbody>
</table>

- These lengths are approximate

In addition to the wire rope, all sheaves, shackles and rope terminations will be supplied as necessary suitable for the initial operation of the dredge.
6.00

6.1 **CONTROL ROOM AND CONTROLS**

A control room of steel construction will be installed with windows on all sides, offering extended forward visibility over the cutter arm, winches and entrance doors to both sides. The Control Room will have control and instrument Consoles installed in the forward section; External fittings will include floodlights, a search light (controlled from inside the cabin) and a screen-wiper to the forward centre window.

The Control Room will be acoustically and thermally insulated on the floor, up to the window level and under the roof. Lining panels will be installed below the window level and under the roof.

The Control Consoles will be set out to the best ergonomic layout and provide the following controls:

- Morse speed controls for dredge pump engine and auxiliary services engine.
- Proportional hydraulic speed controls for cutter head and port and starboard winches.
- Proportional hydraulic controls for cutter arm, spuds, and arm lift cylinders
- Controls for winch drives and dredge pump transmission clutch.

Engine Control panels will be equipped with the following:

- Lubrication oil pressure gauge
- Jacket water temperature gauge
- Engine speed tachometer
- Voltmeter
- Warning lights and audible alarms for low lubrication oil and high jacket water temperature
- Key operated start switch
- Diesel Tank Level Gauges

...
6.1. Control Room and Controls

The Dredge Control panel will include the following instrumentation:

- Dredge pump speed tachometer
- Dredge pump suction vacuum gauge
- Dredge pump discharge pressure gauge
- Gland pump pressure gauge
- Cutter head pressure gauge
- Port and Starboard winch pressure gauges

All auxiliary electrical circuits will be controlled by a switch panel with each circuit individually switched and fused. All services will be switched from the Control Room.

The function of each control or instrument will be clearly indicated on the Consoles by means of engraved legends.

The following equipment will also be installed in the control room:

- Electric dredging lights as required
- A set of signal balls as required
- Top light as required
- Fire extinguishers (4.5 kgs cap 2 no. plus buckets etc)
- A First Aid medical box
- Compass
- SB-HF radio
- Echo sounder
- Production meter (optional)
- Cutter Dredger Monitoring System (optional)
6.2. **HULL CONSTRUCTION**

The vessel will be of all welded mild steel plate and structural section construction. The hull plating will be 6mm side plates, 10mm bottom plate and 8mm deck plate. The structure will be adequately stiffened in way of cutter arm pivots, spud pintle connections, deck machinery, lifting points and other points of high loading.

The dredge pump, engines and other machinery will be mounted on substantial and properly constructed seatings. The supporting structure in way of the seatings will be strengthened as appropriate to the loadings and effectively integrated into the main hull structure.

Care will be taken to ensure good access to all holding down bolts and permit inspection and maintenance. Adequate limber holes will be provided in the hull floor structure and in way of deck machinery seatings to allowing bilging and drainage.

Twin fuel tanks to Port and Starboard, cross connected by a balancing pipe, will be fabricated as an integral part of the side pontoons. The fuel tanks of nominal 23,000 litres total capacity will be positioned about the centre of buoyancy.

All tanks spaces and void spaces in the hull construction will be provided with a combined filler-breather-sounding pipe, a drain plug and a manhole or water tight hatch as appropriate. A flange ring will be welded round the manhole opening and the manhole covers secured to it, by means of nuts and bolts or studs. Lifting handles will be fitted to manhole covers on a vertical tank face. Special packing rings will be used to ensure water or oil tightness as appropriate. Hand and foot rungs will be provided to facilitate access into tanks and void spaces.

Bilging of Engine Room will be through the electric drive or double action manual bilge pumps. Further bilging is possible using dredge pump and associated valves and suction strainers.
6.3 **WELDING**

Electric welding will be used throughout the dredge construction and carefully executed in accordance with good ship building practice. All finished welds will be sound, uniform and substantially free from slag, inclusion, porosity, undercutting and other defects. In general, continuous fillet or bevel welds will be used. Intermittent chain or zig-zag welds may be used on light bars or section machinery seats, hull or tank corners (including brackets) will be continuously welded to the plating. Every care will be taken to avoid distortion and locked-in-stresses.

6.4. **OUTFIT AND EQUIPMENT**

The dredge will be installed with the following items:

- Double post bollards of fabricated steel construction
- Steel wire rope guard rails supported in flat bar stanchions along the outer edges of side decks and at the stern
- Access steps between decks and control room to both Port and Starboard; also access steps from Port side deck to Engine Room. A vertical ladder will be installed as an emergency exit from the pump room.
- Floor plates around the main machinery
- A three tonne travelling chain block and davit,
- A mast mounted over the control room
- Fire extinguishers in the plant room

Loose equipment will include:

- Two Life buoys
- A set of special tools for maintenance purposes
- Two 36mm dia nylon mooring rope 30 metres long
6.5 **PAINTING**

Plate and sections used in the construction will be sand blasted to SA 2½ and given a 15 micron thick coat of inorganic zinc primer. The primer will be compatible with subsequent coatings.

Prior to final painting, all steel surfaces will be free of all rust and loose shop primer, made free from oil, dirt and dust, using appropriate solvent washing and wiping where necessary.

All paint will be of Jotun paints (or similar). Finishing colours will be in accordance with manufacturer’s standard unless arranged otherwise.

Standard exterior colour schemes will be black hull, grey deck, white control room and engine room housing, and blue trim (other colours optional). All miscellaneous items including winches, cutter heads etc. will be painted in the hull colour scheme.

The interior colour scheme will be white walls with hull exterior colour on floor and kickers. Engines will be finished in manufacturer’s colours as will the dredge pump. Other machinery and pipe work will be painted to match in with the above.

Paint film thickness will be in accordance with the following recommendations, and painting will be carried out in accordance with the following schedule, (or suitable alternative)
7.0

7.1 WORK TESTING

The dredge will be tested at the manufacturer’s works in the presence of an authorized representative of the purchaser.

7.2 SITE TESTING AND SURVEY

After assembly and launching on site, the dredge will be finally tested to establish its performance as specified. The Purchaser will be responsible for providing any output measuring equipment etc., if required.

7.3 OPERATING MANUALS / AS FITTED DRAWINGS

A Procedure for equipment commissioning
B Description of special tools required for installation and maintenance
C Start-up procedure including special running-in requirements
D Operating instructions
E Trouble shooting list
F Inspection and maintenance procedure, including dismantling of equipment
G General Arrangement drawings containing principal dimensions, interface dimensions and recommended clearances for removal of equipment and/or assemblies
H Assembly drawings illustrating and identifying each part used in the assembly of the equipment and for ordering spare or replacement parts
I Characteristic performance curves for varying pipe lengths
J Test Certificates
K Lubrication Schedule
L Lubrication schedule