HydraPower Dynamics Pre-Treatment Plant

Stock No	BMF500
Manufacturer	HydraPower Dynamics
Model	Rack Type Immersion Treatments Line
Year of Manufacture	Ref. 2018
Condition	Seen working by RSW, Excellent Condition
Work Envelope (WxDxH mm)	3000 x 750 x 1750
Process Stages	11 Station + Load & unload
Other Info	All wetted stages - Stainless Steel
Location	Ipswich, Suffolk, UK
Weight (kgs)	All wetted stages - Stainless Steel
External Dimensions (WxDxH mm)	6200 x 14120 x 5150

Description

Fully Automatic Pre-treatment Line part of Complete Aluminum Powder Coating Facility

General Description

A fully automatic pre-treatment line which is in excellent condition. Originally manufactured by Hydra Power Dynamics in 2006 it has been the subject of major investment and upgrade in 2018 to configure it for preparation of aluminium prior to painting using the Chemetall Gardabond process. This has involved addition of tankage and new heated stages, a

complete rewiring and replumbing of the equipment along with reconfiguration of the automatic control system.

The equipment is arranged in a straight line with the Load and Unload stations at opposite ends for efficiency of workflow onwards to powder coating or other finishing application.

The work is carried through the line automatically by a transporter complete with motorised raise lower and traverse which is PLC controlled with the option of operator control via pendant push buttons.

This represents a unique and rare opportunity to acquire a complete facility in excellent condition offering considerable savings over the buy new price.

This plant is accompanied by a Spectrum Spectrum De-mineralised Water Treatment Plant on site, available by separate negotiation.

Professional decommission and commissioning support is available from the current plant engineers to ensure a smooth transition to a new facility in the UK, Europe or Worldwide.

Technical Specification

Plant Design: Straight Line Fully Automatic Plant
Current Process: Aluminum Pre-treatment
Components: Various
Stages: 13 including Load/Unload and Inline oven
Operation: Automatic
Estimated Plant Output: Variable
Tank Section: 3000mm wide x 1750mm deep
Work Cages: 2750mm wide x 550mm long x 1500mm deep
Transporter: One 200kg SWL Transporter
Hoist Motor: Single Speed
Traverse Motor: Two Speed Inverter Control
Flight Bars: 6 off included each with trolley and work cage
Heating: Process Tanks Electric /Drying Oven Gas
Electrical Supply: 415v 50hz 3ph with neutral
Approx. Plant Dimensions: Length: 14120mm, **Width**: 6200mm, **Height**: 5500mm

Principle of Operation

There are six work trollies each one carrying a flight bar supporting a stainless steel work holding cage.

Components are manually loaded into the work cage by the operator. The trolley supporting the flight bar and work cage is then manually moved to the load station which has interlocked safety gates and trolley location guides and sensors. Once the trolly is in position and the safety gate shut the transporter will service the load station and lift up the flight bar and work cage and place it into the first process stage. The transporter under automatic control will continue to process the flight bars sequentially through the line until it places each one into a waiting empty trolley at the unload station, which is at the opposite end of the line. This station is also provided with interlocked safety gates. From here the operator

manually moves the trolley to enable the work to be transferred to the adjacent powder application booth.

Specification Of Equipment

Station No.1: Load Station

Stage is fitted with: -

- 1 Set Trolley location guides and trolley in position sensor
- 1 Set Safety Guarding and interlocked access gate

Station No. 2 Process: Alkaline Cleaner (Gardoclean T5281)

Temperature: 60°C

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

Tank lagged externally and clad with painted steel.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- 1 Set Electric heating equipment complete with protection and level control.
- 1 Set Process Temperature Control.
- 1 Set Steel flight bar location brackets.
- 1 Set Mains Water supply with manual on/off isolation valve.
- 1 Off Manual Bottom Drain Valve.

Station No. 3 Process: Etch (Gardoclean S5123)

Temperature: 40° C

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- 1 Set Electric heating equipment complete with protection and level control.
- 1 Set Process Temperature Control.
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1 Set Steel flight bar location brackets.
- 1 Set Mains Water supply with manual on/off isolation valve.
- 1 Off Manual Bottom Drain Valve.

Station No. 4 Process: Cold Mains Water Rinse

Temperature: AMB

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- Overflow to drain manifold.
- 1 Set Steel flight bar location brackets.
- 1 Set Mains Water supply with manual on/off isolation valve
- 1 Set Air agitation.
- 1 Off Manual Bottom Drain Valve.

Station No. 5 Process: Cold Mains Water Rinse

Temperature: AMB

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- Overflow to drain manifold.
- 1 Set Steel flight bar location brackets.
- 1 Set Mains Water supply with manual on/off isolation valve
- 1 Set Air agitation.
- 1 Off Manual Bottom Drain Valve.

Station No. 6 Process Desmut (Gardacid P4413)

Temperature: 30°C

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

Tank lagged externally and clad with painted steel.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- 1 Set Electric heating equipment complete with protection and level control.
- 1 Set Process Temperature Control.
- 1 Set Steel flight bar location brackets.
- 1 Set Mains Water supply with manual on/off isolation valve.
- 1 Off Manual Bottom Drain Valve.

Station No. 7 Process: Cold Mains Water Rinse

Temperature: AMB

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- Overflow to drain manifold.
- 1 Set Steel flight bar location brackets.
- 1 Set Mains Water supply with manual on/off isolation valve
- 1 Set Air agitation.
- 1 Off Manual Bottom Drain Valve.

Station No. 8 Process: Cold DI Water Rinse

Temperature: AMB

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- Overflow to drain manifold.
- 1 Set Steel flight bar location brackets.
- 1 Set DI Water supply with manual on/off isolation valve
- 1 Set Air agitation.
- 1 Off Manual Bottom Drain Valve.

Station No. 9 Process Seal (Gardobond X4707)

Temperature: 30°C

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

Tank lagged externally and clad with painted steel.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- 1 Set Electric heating equipment complete with protection and level control.
- 1 Set Process Temperature Control.
- 1 Set Steel flight bar location brackets.
- 1 Set DI Water supply with manual on/off isolation valve.
- 1 Off Manual Bottom Drain Valve.

Station No. 10 Process: Cold DI Water Rinse

Temperature: AMB

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- Overflow to drain manifold.
- 1 Set Steel flight bar location brackets.
- 1 Set DI Water supply with manual on/off isolation valve
- 1 Set Air agitation.
- 1 Off Manual Bottom Drain Valve.

Station No. 11 Process: Cold DI Water Rinse

Temperature: AMB

1 Off Single compartment tank of internal size 3000mm x 750mm x 1750mm deep, complete with top flange.

The body of the tank is manufactured from stainless steel material supported with external strengthening.

The tank is raised off the floor by steel support bearers.

Tank is supplied with:

- Overflow to drain manifold.
- 1 Set Steel flight bar location brackets.
- 1 Set DI Water supply with manual on/off isolation valve
- 1 Set Air agitation.
- 1 Off Manual Bottom Drain Valve.

Station No. 12 Process: Drying Oven

Temperature: 100°C

1 Off Single chamber well oven of internal size 3000mm x 900mm x 1900mm deep, complete with top flange.

The body of the oven is manufactured from galvanised steel sheet material supported with external strengthening.

The oven is lagged externally and clad with galvanised steel sheet.

Oven is supplied with:

- Lanemark model FD5CN-30 60kW gas fired package burner.
- 1 Set burner controls and safety interlocks.
- 1 Set Process Temperature Control.
- 1 Set Over Temperature Control.
- 1 Set Hot Air recirculation fan and ductwork.
- 1 Set Partial Air extraction fan and ductwork.
- 1 Set Pneumatically Actuated Lids interlocked with transporter.
- 1 Set Steel flight bar location brackets.

Station No.13: Unload Station:

Stage is fitted with: -

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- 1 Set Trolley location guides and trolley in position sensor
- 1 Set Safety Guarding and interlocked access gate

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Transfer Through Process Stations

Transporter Equipment

1 Off Fully motorized 200kg SWL heavy duty twin track transporter system, to operate in automatic and semi-automatic mode. The transporter is manufactured in mild steel RHS, and other steel sections all painted in hazard warning yellow. Two parallel down shop tracks on which run the two driven and two idler urethane tyred wheels. The hoist is by means of twin lifting belts at each side with a cross shaft at high level to the geared motor. Power feed to the transporter via festoon cable catenary system.

The transporter movements in normal production are initiated automatically by the PLC control system. For set up and maintenance purposes transporter control can be by the operator using a manual pendant unit. The transporter is controlled and monitored to ensure that all safety interlocks remain active.

Track Support Structure

The heavy duty twin track gantry system is manufactured from 100mm x 100mm mild steel RHS beams supported by 100mm x 100mm mild steel RHS stanchions from the floor. Cross bracing is provided as required. All steel work is painted finish.

The self-supporting structure is in bolted sections lined and levelled onto the factory floor without the need for special foundations.

Walkway

The full length of the front of the pre-treatment line is served by a raised operator walkway. The walkway has two sets of access stairways one at each end, grid flooring and painted steel hand railing.

Guarding

Safety guarding is provided around the line manufactured from painted steel mesh and angle sections. At the rear and ends of the line, this comprises fixed fencing with panel sections bolted together. There is an access door at the rear for maintenance purposes. The front of the line has lift off mesh guarding panels and two interlocked gates serving the load and unload stations. Emergency stops are fitted on the control panel, transporter and a pull wire emergency stop cable runs the full length of the front of the line. Secondary containment is provided by a 200mm high x 100mm rolled steel angle section bolted to the factory floor around the perimeter of the plant footprint.

Control Console

The central control console is located adjacent to the load area and contains a door interlocking isolator, contactors, circuit breakers, rail mounted terminal blocks, transporter control gear and man machine interface touch screen.

To control the following:

- Oven recirculation fan
- Oven extraction fan
- Oven burner fan
- Low pressure air blower
- Traverse motor
- Hoist motor
- 3 Off 12kW heaters Station 2
- 2 Off 9kW heaters Station 3
- 1 Off 9kW heater Station 6
- 1 Off 9kW heater Station 9
- Oven burner controls
- Emergency stop circuits Pilz relay

Automatic Control System

Recently upgraded to a Siemens S7 PLC and TP15 touch screen with 4 programmable sequences the PLC and HMI run a software solution called Proplate designed by Optimatum (the maintenance and service company available to support decommissioning & commissioning).

This line has the following features enabled:

1. Intelligent planning system. This allows the PLC to determine the optimal route for work to be carried through the line to maximise continuous throughput.
2. Temperature control. PID control of the temperature in independent tanks
3. Variable hoist and traverse control. Set up to 16 different speed setpoints for the hoist and traverse independently at different stages of its movement.
4. Modular job entry. Submit work as unique jobs with unique sequences or use recipe names to submit batches of work with repeating recipes.
5. Maintenance mode. Allow greater levels of control for engineers when in maintenance mode, overriding safeties and operating the plant in minimal speed.
6. On screen calibration. Set calibration data for measured equipment to ensure that the values shown on the screen are correct.
7. Simplified touch screen user interface.

Additional features can be enabled from within Proplate during commissioning

- Modular analyses. Any tank can be equipped with temperature, PH, conductivity, ORP, or rectifier control to be displayed by the HMI.
- Level control. Control the level of tanks through the use of ultrasonic or level floats.
- Dosing control. Control periodic dosing of chemicals through dosing pumps and a variety of consumption measurements based on either real data, throughput or used ampere hours.
- Multiple transporter control. Connect up to 5 transporters on a line to transfer work between themselves through customisable handover stations.

Electrical Wiring

All electrical wiring between the central control console and field electrical items is installed on corrosion resistant galvanised-steel cable tray suitably supported. A full set of panel wiring diagrams are available with the machine.

Mechanical Services

One set mechanical services serving the previously described plant complete with all necessary supports and brackets. Comprising:

- Low pressure oil free air blower for rinse tank agitation, complete with inlet filter, pressure relief valve and distribution pipework manifold to the six rinse tanks.
- Pipe manifold connections from rinse tank overflows and drain valves in both rigid and flexible pipework to a double diaphragm air pump mounted at the rear of the line to enable rinse tank emptying and transfer to an IBC located on a stand at one end of the line for onward offsite disposal.
- Flexible pipework connections to the same double diaphragm air pump to enable process tank emptying via the fitted drain valves and transfer to a second IBC located on a stand at the other end of the line for onward offsite disposal.
- Mains water distribution manifold pipework to enable manual top up of six tanks as indicated on the process schedule. With tank overflow shutoff valve.
- DI water distribution manifold pipework to enable manual top up of four tanks as indicated on the process schedule. With tank overflow shutoff valve.

Drip Shields

Tanks generally have stainless drip shields fitted over adjacent top flanges to stop solution spillage. These are also fitted with mild steel painted basket location guides.

Work Trollies

6 Off work trollies manufactured in mild steel RHS with a painted finish fitted with heavy duty castors. Nominal dimensions 3100mm long x 900mm wide x 1700 mm high.

Flight Bars

6 Off flight bars manufactured in painted mild steel sections of welded construction with pick up horns to enable lifting by the transporter. Fitted with stainless steel work cages of angle frame construction infilled with rectangular mesh panels to enable work to be hung inside. Nominal dimensions 2750mm long x 550mm wide x 1500 mm high.

Commissioning & Support

Professional decommission and commissioning support is available from the current plant engineers to ensure a smooth transition to a new facility in the UK, Europe or Worldwide.

Photographs taken prior refurbishment. Our refurbishment service is not available on all machines.