SPECIFICATION

DT-03R-Advanced Solution-2038

DT RESEARCH PLANT

ADVANCED SOLUTION
FOR PREPERATION OF BITUMEN EMULSION
Capacity 300 LPH.

Manufacturer:

DENIMOTECH A/S
Haandvaerkervangen 12
DK-5792 Aarslev
Denmark



This model is shown with options (PMB – Add-on)

PROCESS DESCRIPTION

DENIMOTECH Research Plant is tailored for test productions of high-grade Bitumen Emulsions.

<u>The unit is one integrated unit consisting of the following parts:</u>

- Colloid mill with specially designed high-speed AC motor.
- The DT-03R Emulsion Research Plant is capable of producing any cationic, anionic and non-ionic emulsions at a capacity of 300 l/h.
- An oversized bitumen pump enables handling of highly polymer modified bitumen for emulsification of PMB.
- Two tanks with automatically controlled heating elements provide the means for achieving a correct production temperature of the bitumen and water phase.
- The water phase and the bitumen flows are continuously variable through use of variable speed motor drives. This means the plant can be run at full production capacity regardless of bitumen residual.
- The bitumen system is enclosed in an insulated and heated compartment greatly simplifying service.

The chosen process layout as well as scope of components and instrumentation ensures best possible scalability from research plant to full scale production plant.

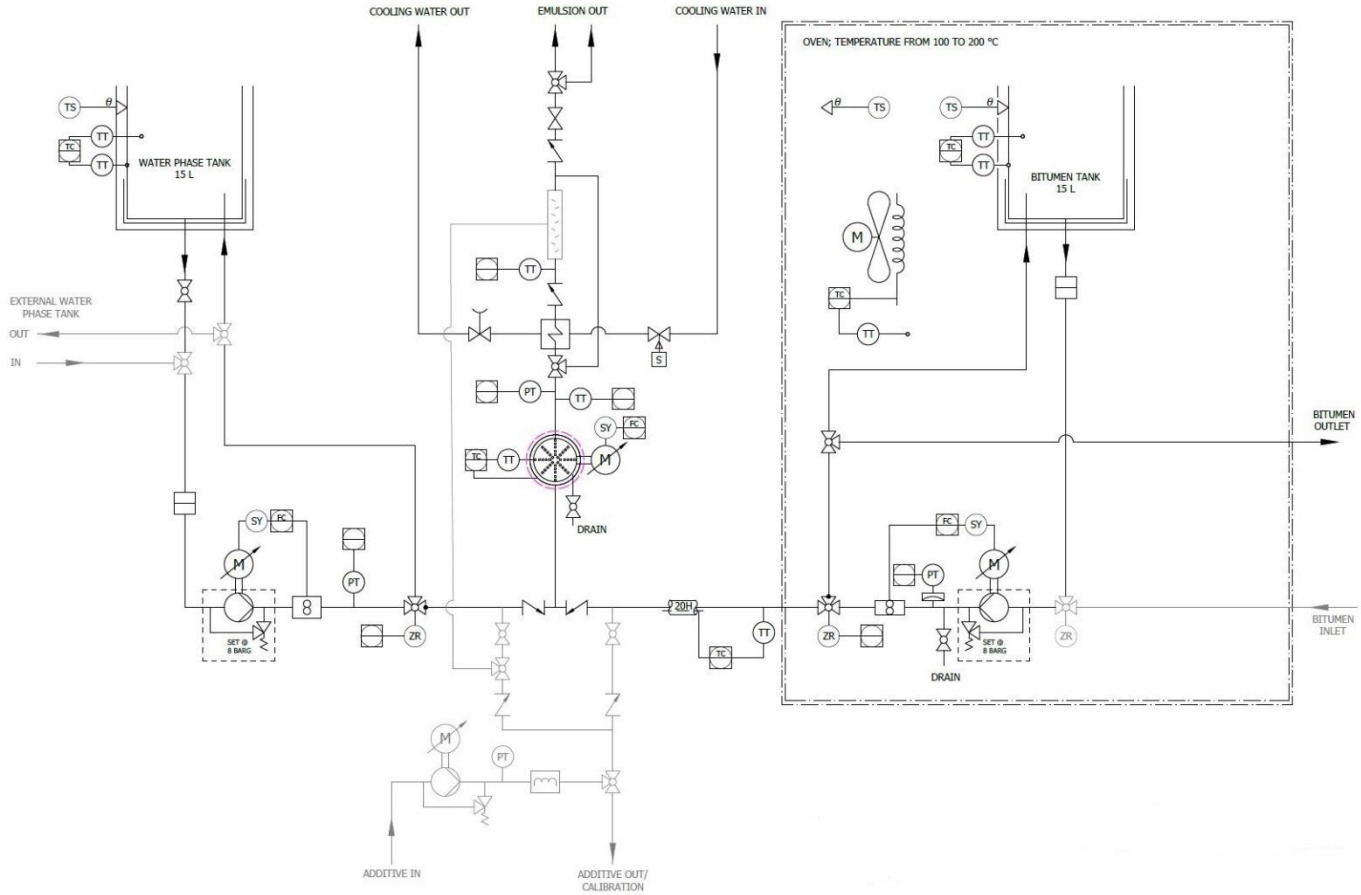


Figure 1: Ex. on a research plant flow-diagram / flow-process with options.

GENERAL FEATURES

Easy operation

The complete plant is mounted in a cabinet with easy access to control devices and process supervision. The electrical components are all mounted together in one area inside the cabinet. The plant is controlled by using the PLC touch screen. The media temperatures and line pressure are also shown on the touch screen.
The cabinet is built on wheels which makes it easy to move around in the laboratory.
One person is enough to operate this unit.

Operational reliability



The plant is designed and build in full compliance with the latest European Standards of process machinery including mechanical and electrical design as well as documentation.

Only high-quality components and materials are used to ensure best possible operational reliability in tropical and tempered climates as well as industrial environment.

The plant is laid out for easy access to all components and electrical wiring and parts are completely numbered and identifiable in manuals and part lists.

All parts are completely numbered and identifiable in manuals and part lists. Extensive manuals go with the plants and include process and electrical diagrams, maintenance and service instructions and technical data for the various components and systems. Repair readiness is achieved with a relatively small stock of spare parts.

Fast and easy installation

The DENIMOTECH research plant is fully assembled with all the equipment. Calibration and testing are done at the factory prior to shipment.

The electric hook-up is simply done with terminal connections. The front as well as the back of the plant consists of two hinged doors. This provides full access to the internal of the plant making cleaning and service very easy while at the same time providing a wear resistant, safe and attractive outer casing.

EQUIPMENT SPECIFICATION

MILL & EMULSION SYSTEM

The emulsion temperature, pressure and flow rates are at all times displayed on the monitor. Relevant production data is logged. Mill speed is controlled by a frequency inverter. All relevant parameters can be defined by the operator directly on the touch screen. An emulsion cooler allows for the production of pressurized high-temperature emulsion, such as PME (Polymer Modified Emulsions).

All wetted parts of the colloid mill are made from AISI 316L and the pipe system and other components in AISI 316 stainless steel for corrosion resistance against low pH emulsions.



BITUMEN LINE

The bitumen tank temperature is fully adjustable. The bitumen piping and are all placed in a heated insulated oven to ensure the best possible heat distribution prior to start-up.
The temperature in the oven is adjustable.
The pump flow rate is controlled by a frequency inverter and feedback is provided by an accurate flowmeter.
All relevant parameters can be defined by the operator directly on the touch screen.



WATER PHASE DOSAGE SYSTEM

The temperature in the water phase tank is adjustable. The flow rate is controlled by a frequency inverter and feedback is provided by an accurate flowmeter.
All relevant parameters can be defined by the operator directly on the touch screen.



EXTERNAL CONNECTIONS, Option

Larger volume external tanks can be connected on both the water phase- and bitumen lines. This enables the production of larger quantities emulsion. This feature includes two 3-way valves for easy shifting between the external- and internal tanks.

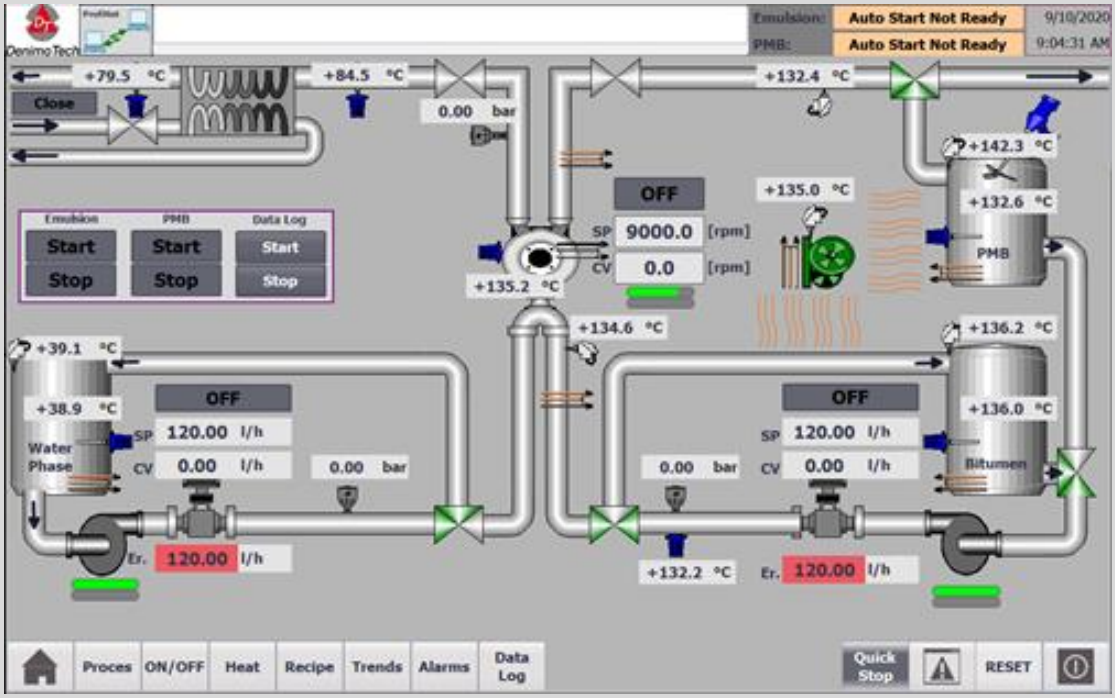
ADDITIVE DOSING LINES

Optional the laboratory plant can be built with one or more additive dosage line, to mix into the water phase line, bitumen line and/or the emulsion line. Additives like Latex, Solvent or Emulsifier. All lines are including a pump, flowmeter, valves and pressure guard.

PROCESS CONTROL PRINCIPLE & EQUIPMENT

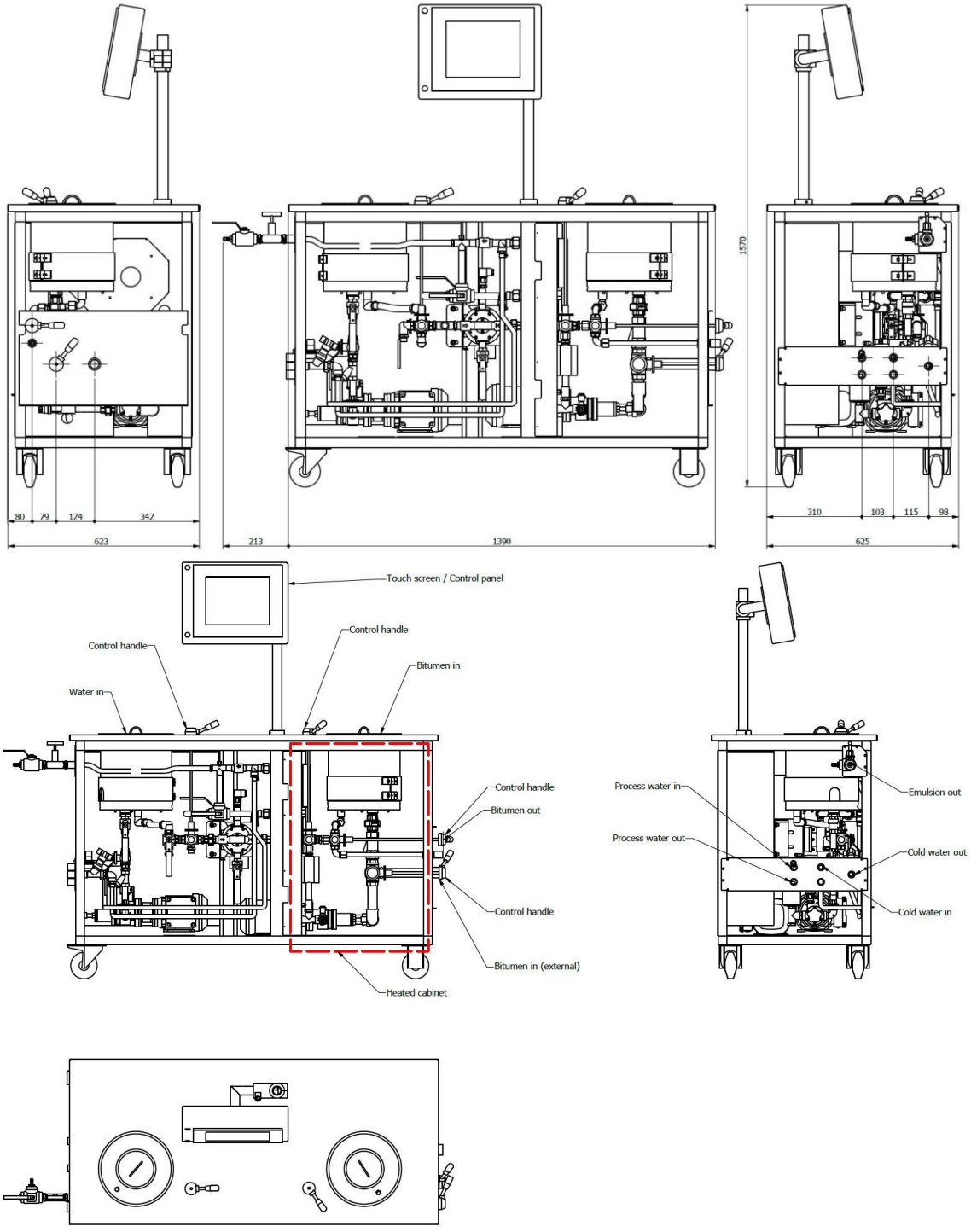
The DT-03R research plant is equipped with the latest in PLC technology setting new standards for research plant configurations by offering excellent versatility and reliability.
A touch screen forms the man-machine interface to the research plant.
All relevant parameters can be defined here. Production data is shown on the screen during production.
The system comes with data acquisition as standard – all relevant production data is logged in the memory and can be exported for further analysis. Recipes can be saved and reloaded for future use. Peripheral equipment like printer, keyboard and mouse can be connected through the USB ports on the monitor.
Remote control and support are possible via the internet through the VPN connection on the PLC.
This reduces down time and allows for easy software updates.

Note: PMB line is option.



TECHNICAL DATA

Plant model	DT-03R (bitumen emulsion)	
Mill	Capacity	200 - 350 LPH
	Rotor / stator gap	0.6 / 1.4 / 2.2 mm
	Rotor speed, adjustable	6.000 – 11.800 rpm
	Pressure, maximum	10.0 bar
	Motor	2.0 kW
Bitumen dosage	Capacity	90 – 250 LPH
	Tank volume	15 L
	Viscosity, maximum	1500 cSt.
	Pressure, maximum	5 bar
	Motor	0.25 kW
	Flowmeter repeatability	0.05 %
	Bitumen heating, Capacity	50 – 200 °C
Water phase dosage	Capacity	80 – 200 LPH
	Tank volume	15 L
	Viscosity, maximum	25 cSt .
	Pressure, maximum	5 bar
	Motor	0.25 kW
	Flowmeter repeatability	0.1 %
	Water phase heating, Capacity	Ambient – 70°C
Emulsion cooler	Capacity	10 kW
Electrical data	Voltage	3x400V + N + PE, 50 Hz
	Installed power	5 kW
	Back-up fuse	16A
	PLC	Simatic ET 200 S
Man-machine interface	Monitor	Siemens 12” – touch screen
	Software	winCC Flexible
	Auxiliary connections	2 x USB
Remote connection	Connection	VPN via the Internet
	Connector	RJ45
Dimensions	L x W x H - approx.	1580 x 620 x 1570 mm
	Weight - approx.	300 kg



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