

SPECIFICATION

DT-BE-2149 - 20' container version

DENIMOTECH
THE ROAD AHEAD

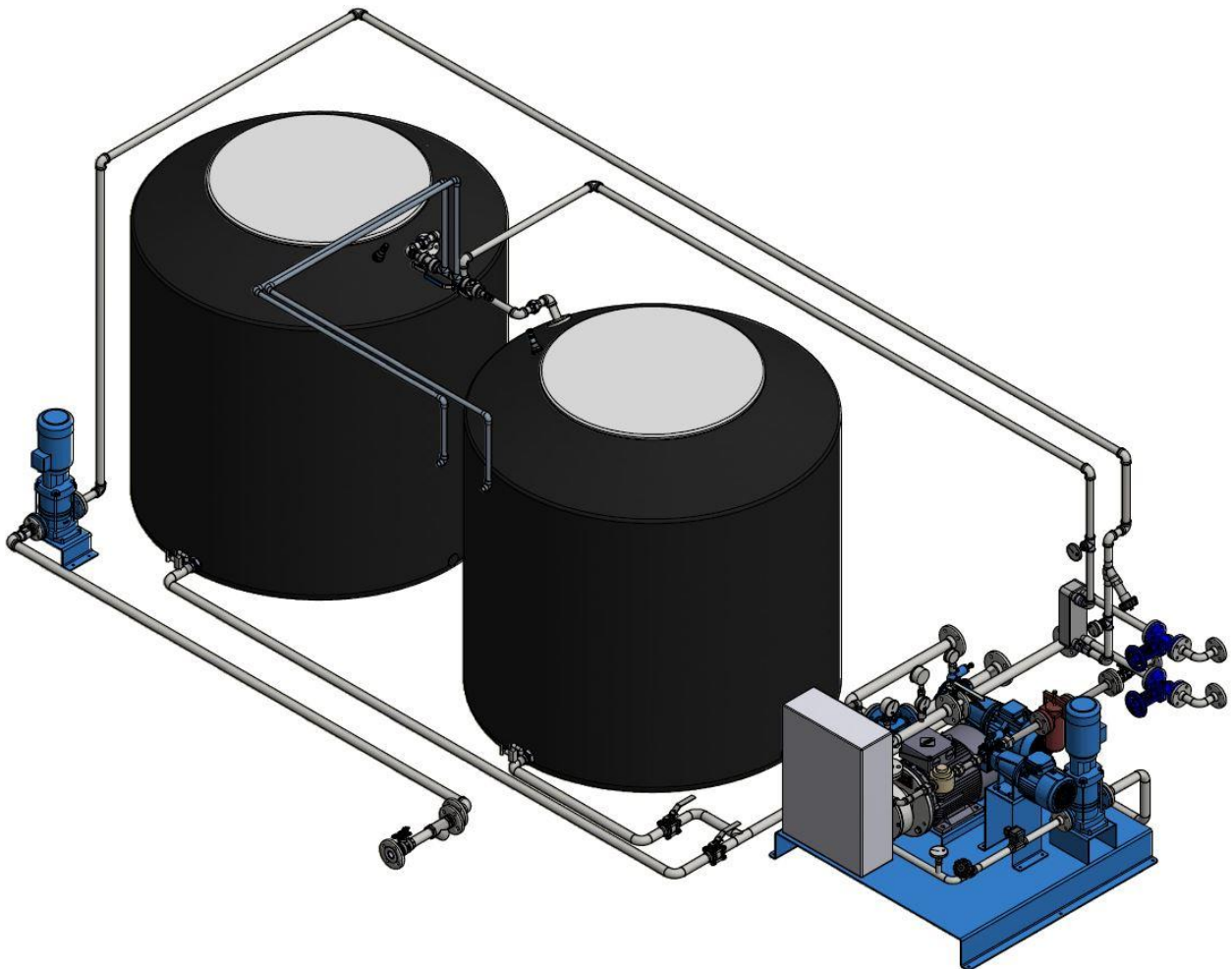


DEP BATCH ECONOMY

BITUMEN EMULSION PLANT
FOR BATCH PRODUCTION
Capacity 3 - 7 - 15 TPH,

Manufacturer:

DENIMOTECH A/S
Haandvaerkervangen 12
DK-5792 Aarslev
Denmark



Batch economy plant model with options, fits in a 20' container

PROCESS DESCRIPTION

In this DEP-BATCH plants the emulsion is produced from bitumen, possibly solvent, and a mixed water-phase consisting of water, emulsifier and other additives.

The process includes the following steps:

1. The water supply volume is controlled by a centrifugal pump and has a fixed speed.
2. The water supply can be pre-heated through a hot-oil heat exchanger. When the water has the correct temperature, it enters the batch tanks where needed additives are added (ex. via our Easy Weigh Unit, chemical dosage system¹) From now, the water can be used directly from tank or main water supply line.
3. When the first batch tank is ready, the filling of tank number two, can be initiated. Along with the plant producing, using batch water from tank one. The switching from one tank to another makes the production continuous.
4. The water phase flow rate is manually controlled with a control valve.
5. Bitumen is dosed with a positive displacement pump at fixed flow rate.
6. The emulsification is done in a colloid mill, in which the bitumen is broken up in micron size droplets and dispersed in the water phase.

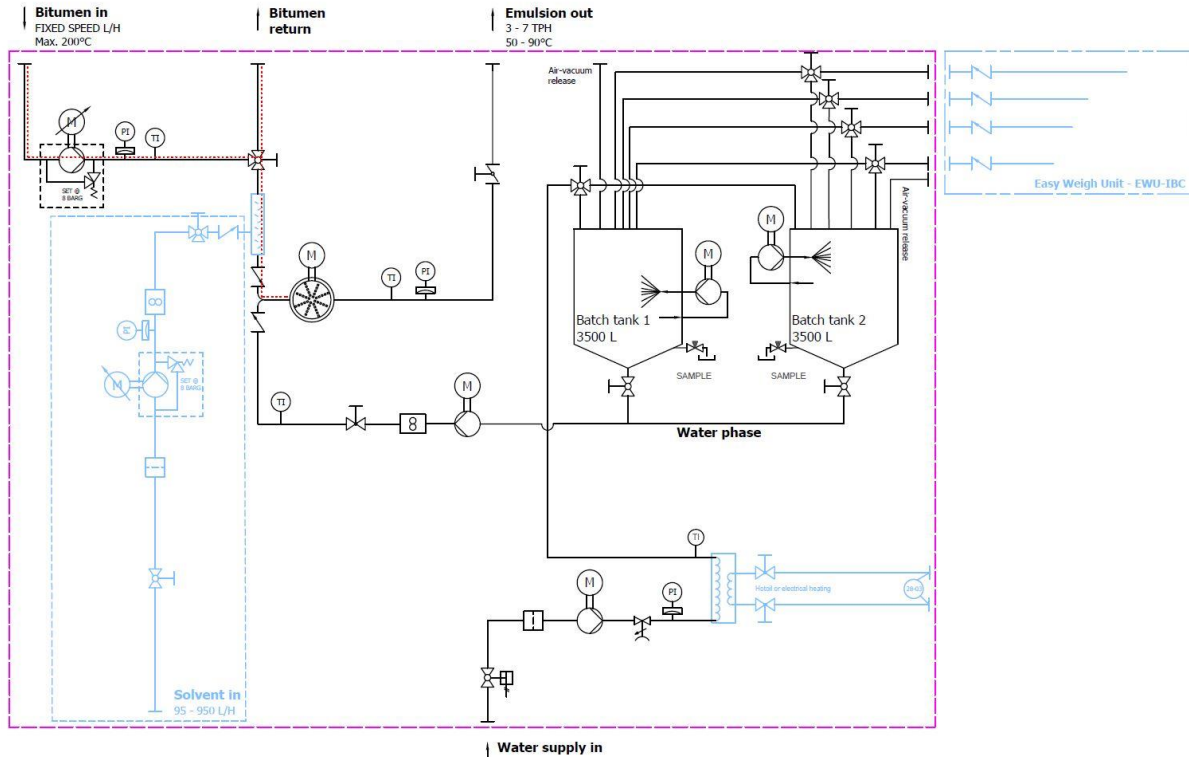


Figure 1: Ex. on a batch economy flow-diagram / flow-process.
The lines marked with blue are optional lines.

¹ Find more information about our Easy Weigh Unit in our technical specification – DT EWU-IBC-1510

GENERAL FEATURES

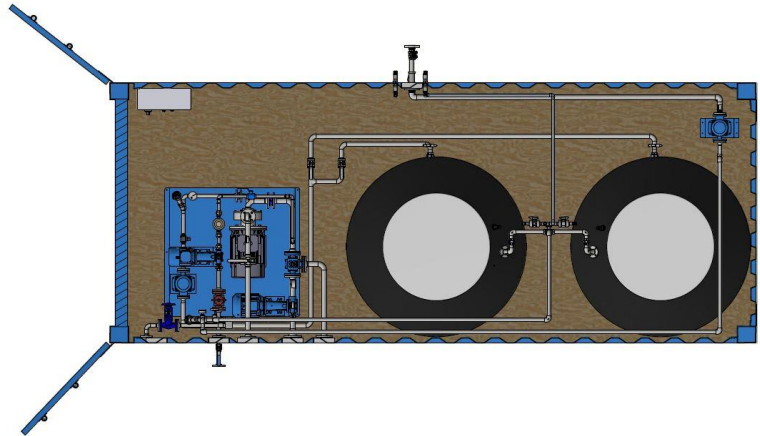
High and constant product quality

The DENIMOTECH Batch Economy Plant, DEP BE, for batch production is designed and build to ensure a high and consistent quality of the bitumen emulsion.

The heart of the plant, the colloid mill, is especially designed and optimised for bitumen emulsion and produces a fine and narrow particle size distribution, which builds viscosity and improves storage stability.

Easy operation

The complete plant is either mounted on a frame or build in a container, for easy access to control devices and process supervision. The electrical controls are collected in one panel, which is mounted on the frame or in the container wall. From this panel the plant is controlled. The media temperatures and line pressure are shown on the pipe lines by visual indicators.



One man can usually operate the complete plant including sampling and production quality testing, reception of incoming raw material and loading out emulsion.

Operational reliability

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

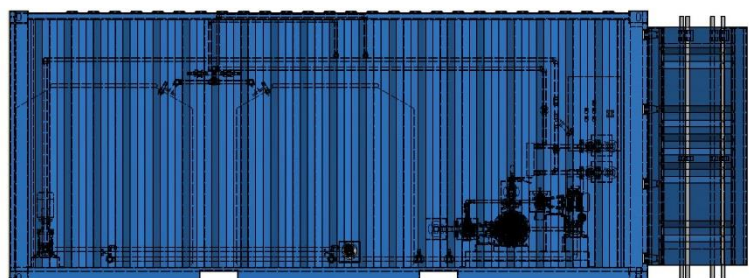
Only high-quality components and materials are used to ensure best possible operational reliability in tropical and tempered climates as well as industrial environment. The emulsion and water-phase pipe systems are made in AISI 316L stainless steel, or better, to guarantee corrosion resistance running low pH emulsions.

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 DEP-Batch plants are fully assembled with all the equipment. Calibration and testing are done at the factory prior to shipment. This brings down the installation and commissioning time to 2-3 days provided other equipment, tanks, etc are already installed.

The skid is sized to allow transport in standard shipping containers, which simplifies handling and gives low freight costs and excellent protection during transport.

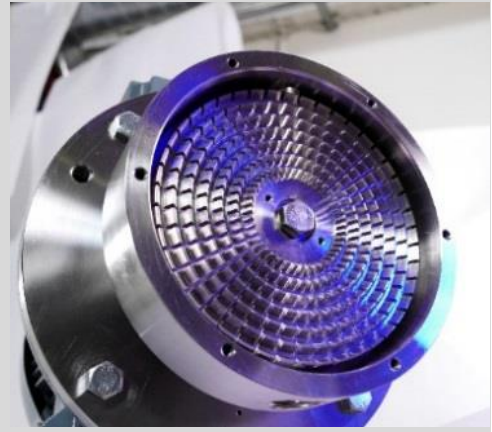


EQUIPMENT SPECIFICATION

Colloid mill & emulsion system

Colloid mill with all wetted parts in AISI304, stainless steel. The rotor and stator system consist of two discs with a pattern of teeth and grooves. The bitumen and water phase enter the mill house through the centre of the stator and the milling takes place as the streams are pushed radially out between the rotor and the stator.

The rotor and stator are designed to create the adequate turbulent forces with a minimum of energy input. The gap between the rotor and stator can be adjusted with shims.



AISI 304L stainless steel manifold, for joining the bitumen and water phase streams just outside the mill.

Mill flange-mounted directly on the AC motor.

There is thermometer and pressure gauge for monitoring of the emulsion flow. After the colloid mill there is valves for setting of mill pressure and sampling. All piping and fittings in AISI 316L stainless steel on emulsion line.

Bitumen system



- Positive displacement gear pump, fixed flow, coupling and AC-motor.
- Measuring equipment including pressure gauge and thermometer.
- Piping and fittings in mild steel.
- Valves in steel including check valve preventing back flow of emulsion and water-phase, 3-way valve for circulation/production selection.
- Thermostatically controlled electrical heating, mineral wool insulation and steel cladding guaranteeing a fast and trouble-free start-up.

Water-phase system

- Inlet coarse filter.
- Stainless steel centrifugal type pump, paddlewheel type flowmeter and manual operated flow control valve.
- Measuring equipment including pressure gauge and thermometer.
- Hot oil heat exchanger or electrical heating, for inline heating of water to the water phase tank.
- Water phase preparation tank with agitation/circulation.
- Connection points (ex. in the container wall) for dosage of water phase chemicals to the water phase tank.
- Piping, fittings and valves in AISI 316L stainless steel including 3-way valve for production/circulation and check-valve preventing back flow of bitumen or emulsion.

Production control panel

All electrical controls are collected in one control panel.

Start and stop switches for pumps, mill and heating elements. All start switches with green light and all stop switches with red colour.

Electrical power components including;

- Main switch with high breaking/tripping capacity.
- Automatic circuit breakers for all groups.
- Frequency inverter with EMC filter.
- Control voltage transformer.



Mounting

All the process equipment and the control panel are mounted on one space saving frame or build in a standard container, leaving good access for maintenance.

The skid is made of L-profile steel bars galvanised for corrosion resistance.

TECHNICAL DATA

Process Line	Parameter	Unit	Plant Size		
			3 ton/hr	7 ton/hr	15 ton/hr
Mill	Capacity	ton/hr	2.4 - 3	5.5 - 7	9.6 - 15
	Rotor Speed 50/60Hz	RPM	3000/3600		
	Rated Pressure	barg	4		
	Motor Power	kW	11	15	30
Bitumen	Capacity	l/hr	1500	3500	7500
	Temperature, Maximum	°C	200		
	Viscosity	cSt	100 – 500		
	Pressure	barg	3		
	Motor power, Pump	kW	1,1	2,2	4,0
Water Phase preparation²	Tank capacity	m ³	2 x 2500	2 x 3500	2 x 3500
	Temperature, Maximum	°C	60		
	Hot oil heat exchanger 5 to 50C°	l/hr	2000	4000	8600
	Agitation / recirculation pump	kW	0.37		
Water Phase	Capacity	l/hr	1500	3500	9000
	Flow meter repeatability	±%	0.4		
	Temperature, Maximum	°C	60		
	Viscosity	cSt	6 – 25		
	Pressure	barg	4		
	Motor Power	kW	0,55	1,1	1,5
Water Supply	Capacity	l/hr	2200	5000	11000
	Temperature, Maximum	°C	60		
	Viscosity	cSt	6 – 25		
	Pressure	barg	4		
	Motor Power	kW	0,75	1,1	2,2
Electrical data	Voltage	-	380-440 V, 50/60 Hz		
	Power Consumption	KVA	15	25	40
	Motor Protection Class	-	IP 54		
	Electrical Standard	-	IEC 204-1		

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² Optional, with water preparation tanks, agitation and electrical pre-heating of water supply.