DenimoTech
the road ahead

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Technical Specification

Mobile

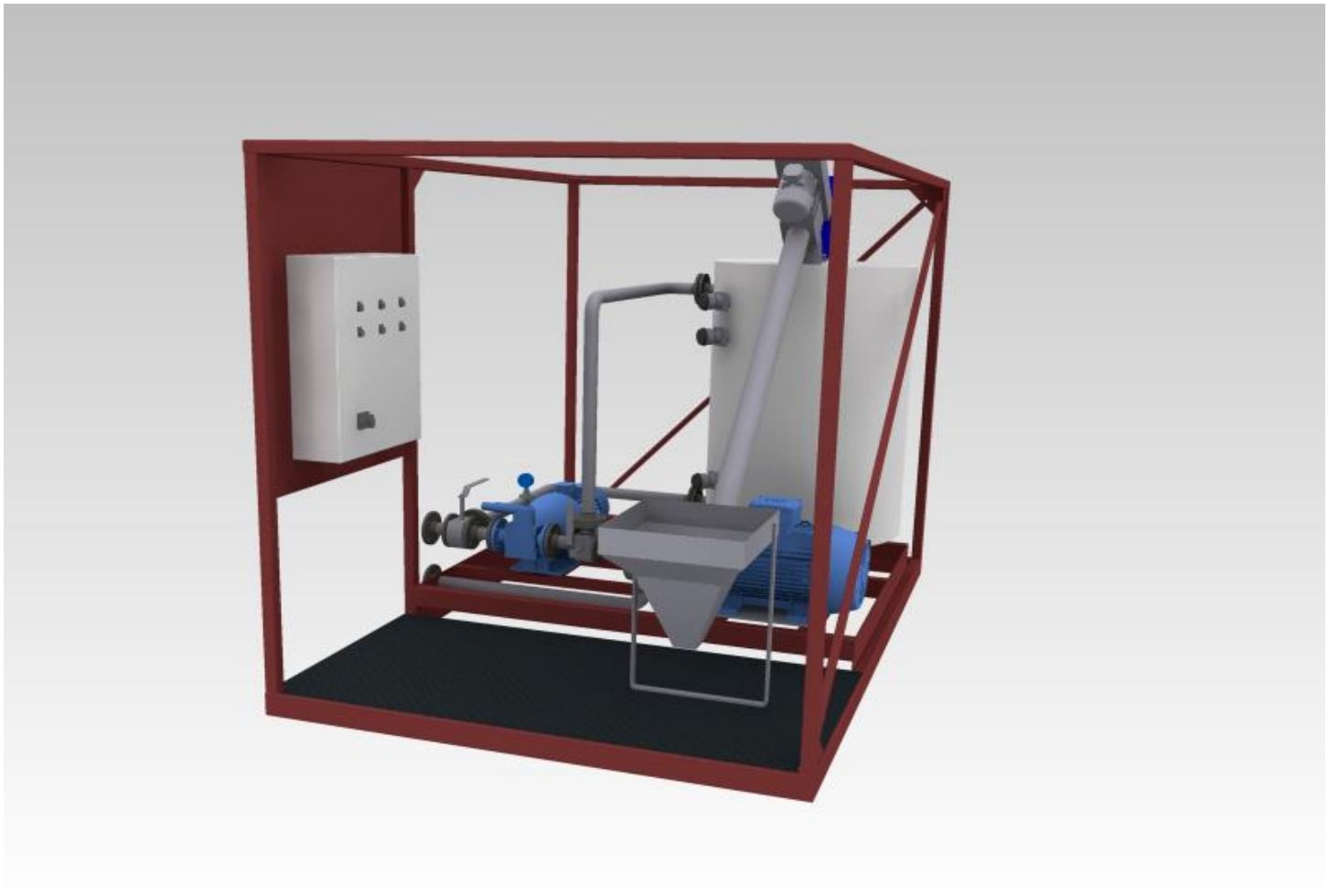
DenimoTECH Batch Plant

For

Modification of Bitumen with

Polymers & Crumb Rubber

3-7 TONNE/HOUR CAPACITY



Introduction

About DenimoTECH A/S

DenimoTECH is a worldwide supplier of PMB and Emulsion Technology

DenimoTECH is a global manufacturer of high quality equipment for modification and emulsification of bitumen, with a network of distributors worldwide focusing on helping our customers to be successful.

DenimoTECH is owned by DT Bitumina Group which is a private company focused on generating value for the petroleum, refining and power industries by leveraging their emulsion and industry expertise.

For over a decade DenimoTECH's mission has been to provide both the global road construction industry and oil companies with bitumen emulsion- and bitumen modification technology, innovation and expertise to produce highly stable products for building high performance roads that last, while minimizing the impact on the environment.

Scope

The scope of this specification is to give a detailed technical description of DenimoTECH CRMB plants. When partnering up with DenimoTECH innumerable possibilities are offered. We are always tailoring the plants according to our customers' needs. This specification covers the most common details and options. For further details or inquiries, please contact DenimoTECH directly.

DenimoTECH is a strong partner. We make sure that our customers get exactly what they need.

Reliability and Personal Safety – Product Compliance with Industrial Standards

The plants are designed and built 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 colloid mill is made of stainless steel to improve corrosion resistance.

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.

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 because of the uniform system design.

Fast and easy Installation – Minimizing Commissioning Costs and Time

A DenimoTECH Polymer Plant - B03-07 is fully assembled on one skid for fast and easy installation.

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

Equipment Specification

Mill & rotor/stator system

The Compact Colloid PMB Mill housing and all other wetted parts are manufactured in AISI304, stainless steel to avoid corrosion and the material is ideal for easier cleaning.

Rotor and stator are manufactured in IMPAX SUPREME steel which is a premium pre-hardened mold steel of high quality and further the surface has gone through a hardening process, called Gas nitriding, which is a thermochemical case hardening process used to increase wear resistance, surface hardness and fatigue life by dissolution of nitrogen and hard nitride precipitations. In essence the material has exceptional wear and tear properties.

The rotor and stator system consist of two discs with a pattern of teeth and grooves. The bitumen and polymer 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 gap between the rotor and stator can be adjusted from 2 to 4 mm. (standard setting is 3 mm.)

The adjustment can be done by adding or removing the shims.

The rotor and stator are designed to create the adequate turbulent forces with a minimum of energy input.

-The shaft seal system consists of packing cords made of

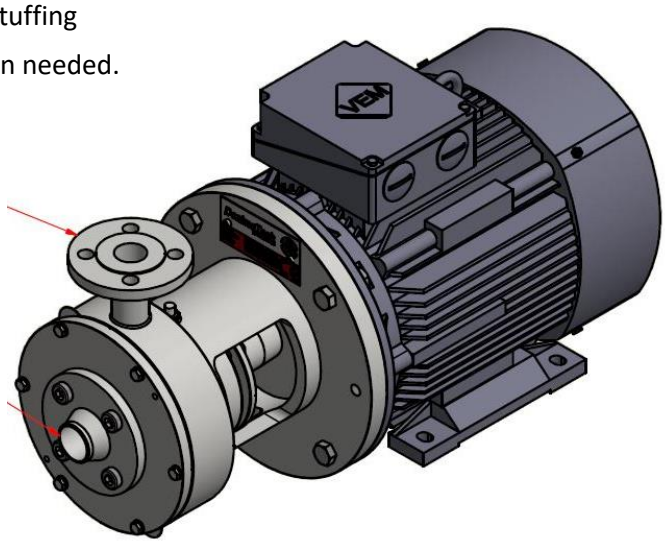
PTFE / Graphite compound with high heat, medium and wear

resistance. Cords are mounted in a special designed stuffing

box, with easy access for tightening the packings when needed.

- Mill is heated with a pre-installed electrical heating band with an effect of 800 watts, to ensure fast and timely preheating of the mill house, before production.

- Temperature sensor or thermostat is installed in the mill housing to ensure continuously monitoring of the mill house temperature.



Bitumen Line

Positive displacement pump for steady bitumen flow, including AC-motor.

3-way valve in pump loop for filling of pre-mixing tank.

3-way valve in pump loop for pumping bitumen/polymer-mixture through mill.

Piping and fittings in mild steel.

Polymer dosage

Screw conveyor with AC motor for feeding of polymer into pre-mixing tank.

Funnel with coarse strainer for easy emptying of bags.

Pre-mixing tank

Steel tank with bitumen pipe and polymer feed connection.
Agitator for adequate distribution of the polymer throughout the bitumen.
Level switches connection to bitumen/polymer blend pump for ensuring correct volume in tank and back-up safety against overflow.
Electrical heat tracing, insulation and cladding.

Process Control Principle & Equipment

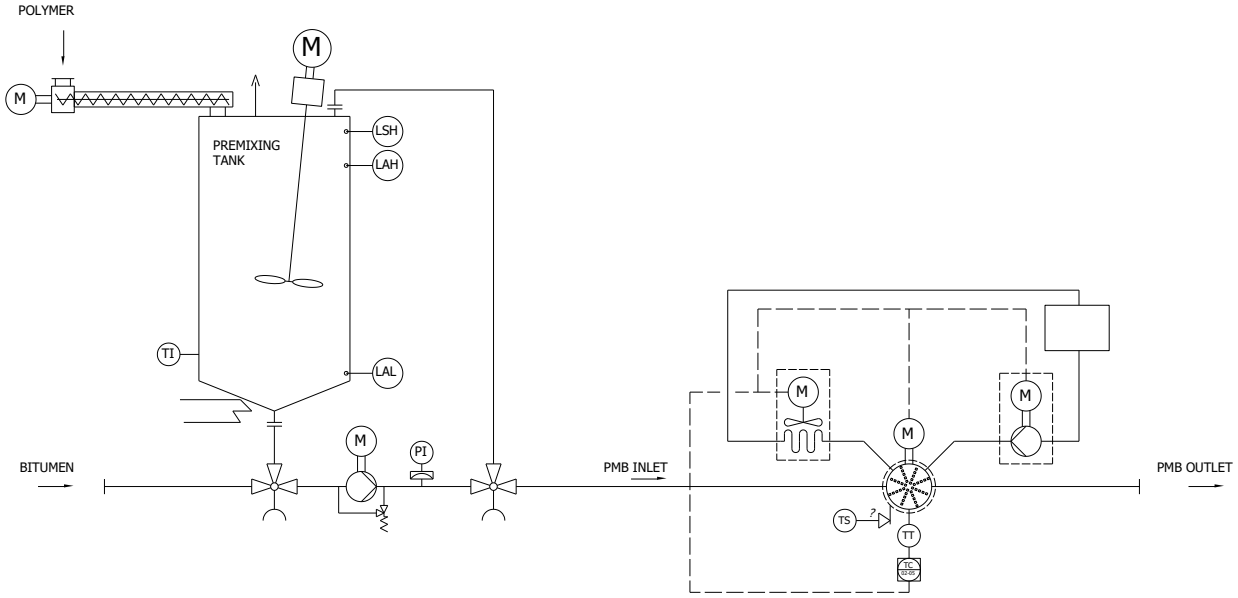
The process controls are manual operated start / stop of equipment and setting of valves.

The principle of operation is the “batch principle”, meaning that the hourly capacity of 3 tons is obtained by running 6 batches of each 500 kg, within an hour.

The manufacturing of PMB on a DenimoTECH Polymer Plant B03 is performed in 2 steps.

1) The polymer contents of the batch in question is calculated and weighed, and then conveyed into the pre-mixing tank by the means of the screw conveyor, which ensures a steady dosage of polymer while the bitumen pump adds the bitumen to the pre-mixing tank. An agitator serves to properly distribute the polymer in the bitumen.

2) The bitumen-polymer blend is then pumped through the colloid mill where the size of the polymer aggregates is reduced before dispatch to the storage tank.



Electrical Power Components

All components wired to one common control box includes:

Main switch.

Soft starter for the Mill

Emergency stop.

On/off buttons for all equipment; pump, colloid mill, agitator and heating elements.

Level control including safety back-up system for bitumen/polymer blend pump.

Control of electrical heat tracing.

Amp. meters for mill and bitumen pump motors.

Technical Data

Production capacity		**Up to 3 mtph with 10 % polymer content**	**Up to 7 mtph with 10 % polymer content**
Polymer dosage	**Polymer type**	**Granules or powder**	**Granules or powder**
	Screw conveyor	**750 kg/h 1.1 kW**	**1800 kg/h 1.1 kW**
	Funnel	**55 l.**	**55 l.**
Bitumen dosage	**Pump capacity**	**7.500 l/h 3.0 Kw**	**15.000 l/h 5.5 Kw**
Bitumen/polymer premixing tank	**Tank capacity**	**600 l**	**1300 l**
	Agitator	**1.1 kW**	**1.1 kW**
Colloid mill	**Motor power**	**15 kW (Soft start)**	**30 kW (Soft start)**
	Rotor/stator gap (*standard)	**2mm, 3mm* or 4mm.**	**2mm, 3mm* or 4mm.**
	Rotor speed @ 50Hz	**2940 rpm**	**2940 rpm**
Heating	**Temperature**	**Up to 200°C**	**Up to 200°C**
Electrical data	**Installed power**	**25 kW**	**40 kW**
Dimensions	**length aprx width aprx height aprx**	**3.90 m. 2.02 m. 2.22 m.**	**3.90 m. 2.02 m. 2.22 m.**

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