seepex.com
all things flow

Your Pump Solution for the Sugar Industry.

Gentle handling of raw materials.

Sugar mills are classified into the areas of: the receiving yard, which includes beet or cane washing and effluent treatment – the juice house, which includes juice extraction, juice classification, juice thickening and pulp drying; and the sugar house, which incorporates crystallization with sugar refining.

Contrary to artificial sweeteners, sugar is a natural product of plant origin. It is extracted from sugar beet or sugar cane. In the sugar extraction process the plant cells of the sugar are removed using water without a chemical change, thickened and ultimately crystallized.

The sugar content of the sugar beet amounts up to 14 % – 17 %, while the sugar cane content is between 11 % – 16 %. These low sugar levels require the movement of large amounts of raw materials and auxiliaries. Due to their special advantages, seepex pumps are used worldwide in almost all areas. The areas of application focus on the sewage purification, crystallization, juice extraction, juice cleaning and juice thikkening.

As an international leading provider of products and services for pumping and treating viscous products, seepex makes a valuable contribution to these new technologies with a focus on high quality, cost effective solutions which are fully compliant with environmental guidelines. We have responded to the challenge of our customers´ changing needs by delivering new products using state-of-the-art technology. Our range of services includes initial consultation, development of suitable equipment, process optimization, control and support packages.

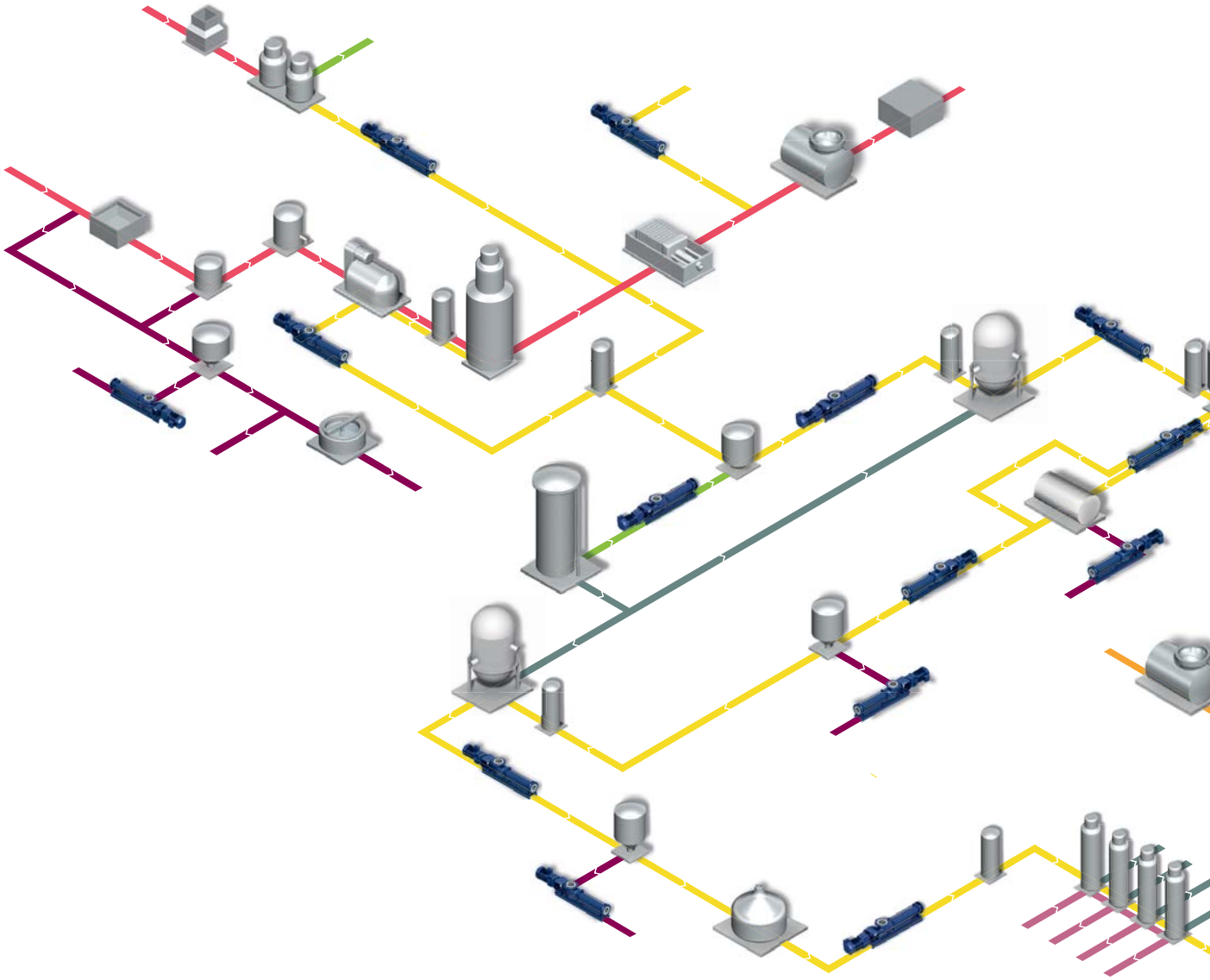
The modular seepex system allows us to offer the optimal technical and economic solution for virtually every application. Each pump is individually selected to the specific requirements of your sector, your company, your installation location and of course your individual application.

370 of the over 630 employees worldwide work at our headquarters in Bottrop to make sure this is the case. They develop, manufacture and market your pump solution – whether progressive cavity pumps, macerators or control systems.

No wonder sugar industry without our pumps is inconceivable.

Sugar – sweet energy source from nature.

Sugar mill installation – overview.



1 Juice extraction

Pumping of:

- Beet soil
- Carbolime
- Molasses
- Thickened juice sludge
- Thickened sludge
- Raw juice

2 Juice purification

Pumping of:

- Carbolime
- Lime milk
- Raw juice, lime added or carbonated
- Thickened juice sludge

3 Juice evaporation

Pumping of:

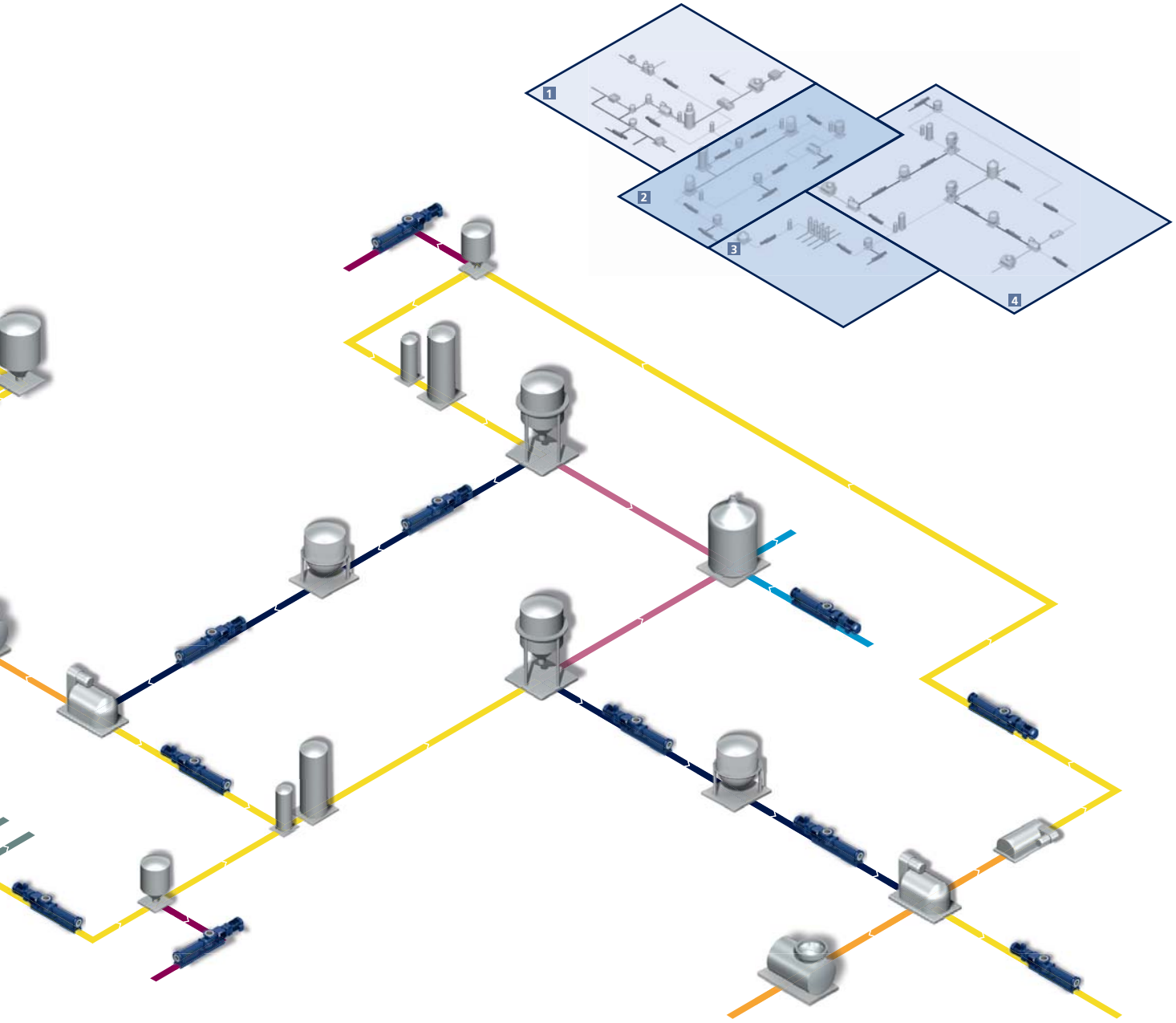
- Syrup from evaporation
- Thin juice

4 Crystallization

Pumping of:

- Clear Syrup
- Crystalls in suspension
- Molasses
- Seed
- Syrup from evaporation
- Water/Condensate

Several sectors of sugar manufacturing



Pumping solutions for juice extraction and purification.

The washed sugar beets are chopped into pulp in cutting machines. These beet chips go into a mash, where they are heated to about 70 °C and subsequently transported to the extraction tower. The cell walls of the pulp become permeable at this temperature, and by means of the counter-current process, the hot water dissolves the sugar out of the beet cells. The raw juice thus obtained contains about 15 % sugar as well as other natural ingredients of the sugar beet. The desugared beet pulp is mechanically pressed, thermally dried to about 90 % dry substance and pelletised. The nutrient-rich pellets are often used as animal feed.

In the processing of sugar cane, the cut cane is chopped in mills, and the juice is then pressed out. This produces a fibrous residue called the bagasse, which is mainly used as fuel or in the pulp industry.

For purification, lime water and carbonic acid are added one at a time to the raw juice. These bind the non-sugar substances and are precipitated together with the lime. This produces carbolime, which is pressed out and used as agricultural lime. What remains is the clear, light yellow thin juice with about 16 % sugar content.

Applications (see flow chart on next page)

1 Pumps of the range BN convey beet soil out of the sedimentation tank
2 Pumps of the range BN convey raw juice out of the pulp mash to the liming
3 Pumps of the range BN convey molasses to the dry drum
4 Pumps of the range BN convey limed raw juice to carbonation
5 Pumps of the range BN convey lime water out of the lime kiln to the liming
6 Pumps of the range BN convey carbonated raw juice from the carbonation to the thickening filter
7 Pumps of the range BN convey concentrated carbonation juice from the thickening filter to the rotating filter
8 Pumps of the range BN convey carbolime from the rotating and pressure filter
9 Pumps of the range BN convey thin juice to the pressure filter

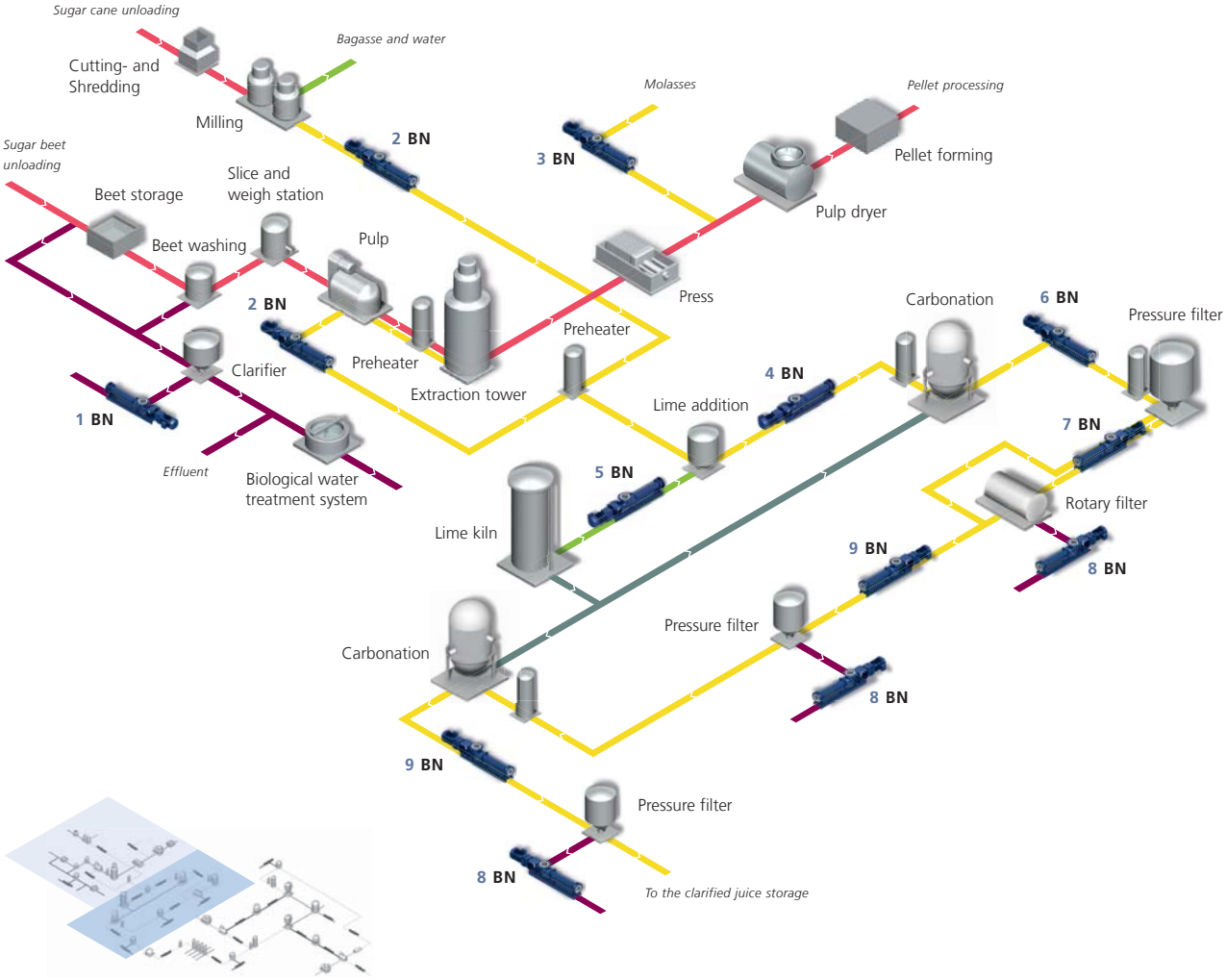
Features

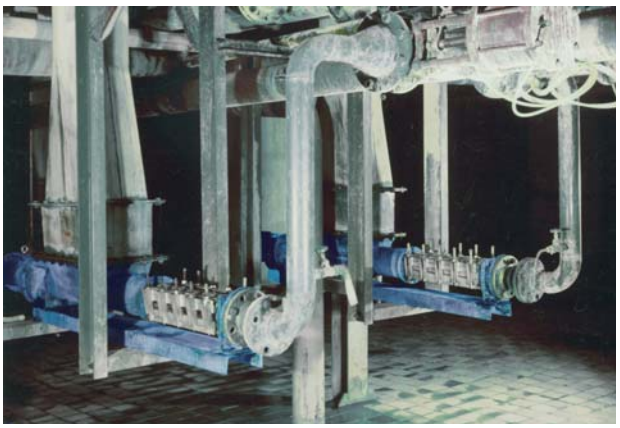
- Conveyance of high-temperature media
- Conveyance of solid-containing products
- Conveyance of high-viscosity products
- Reliable, almost trouble-free continuous operation

Pump of range N 350-6L
Conveying product: Thickened sludge with a ds content up to 35 %
Conveying capacity: 65 – 265 m³/h (286 – 1170 GPM) • Pressure: 2 bar (28 PSI)
Temperature: 20 °C (68 °F)

Pump of range BN 2-6L
Conveying product: Thickened juice sludge
Conveying capacity: 0,6 – 2 m³/h (2.65 – 8.8 GPM) • Pressure: 2 bar (32 PSI)
Temperature: 20 °C (68 °F)

Flow chart based on juice extraction and purification





Pumps of range BN 17-6L and BN 5-24
Conveying product: Molasses
Conveying capacity: 5 – 15 and 5 m³/h (22 – 66 GPM) • Pressure: 5 and 14 bar (65 and 202 PSI) • Temperature: 70 and 55 °C (158 and 131 °F)

Pumps of range BN 10-12 and BT 17-6L
Conveying product: carbolime
Conveying capacity: 1,7 and 6 m³/h (7.5 and 26.5 GPM)
Pressure: 3 and 6 bar (43 and 85 PSI) • Temperature: 20 °C (68 °F)

Pumping solutions for juice evaporation and crystallization.

In the evaporating station, the thin juice is concentrated by heating in a multistage process to a dry matter content of up to 70 %. A viscous golden syrup is formed with a sugar content of 65 – 80 %. The waste steam produced during this process is reused to warm the raw juice and heat the cooking equipment in the sugar house.

In this cooking equipment, more water is removed from the syrup under a strong vacuum and at low temperature. This concentration causes the sugar crystals to reach the desired size. The massecuite now contains about 50 % sugar crystals, which are coated with viscous syrup. This massecuite is discharged for cooling and further crystallisation in mashes. The massecuite then goes from the crystallisation mashes to centrifuges, where the syrup is separated from the sugar crystals. The last syrup residues are then washed away with hot water, so that the sugar crystals remain. The recovered sugar is dried and stored in air-conditioned silos.

Further crystallisation steps by filtration recover very high-purity refined sugars. Molasses is precipitated as the residue, which is used primarily in alcohol, yeast production or as animal feed.

Applications (see flow chart on next page)

1 Pumps of the range BN convey thin juice to the economiser
2 Pumps of the range BN convey syrup out of the evaporator to the pressure filter
3 Pumps of the range BN convey carbolime out of the pressure filter
4 Pumps of the range BN convey effluents such as molasses out of the centrifuges to the syrup intake vessels
5 Pumps of the range BN convey clear liquid from the dissolution vessel to the pressure filter
6 Pumps of the range BN convey crystal suspension from the cooking equipment to the mash or from the mash to the centrifuge
7 Pumps of the range BN convey water to the condenser

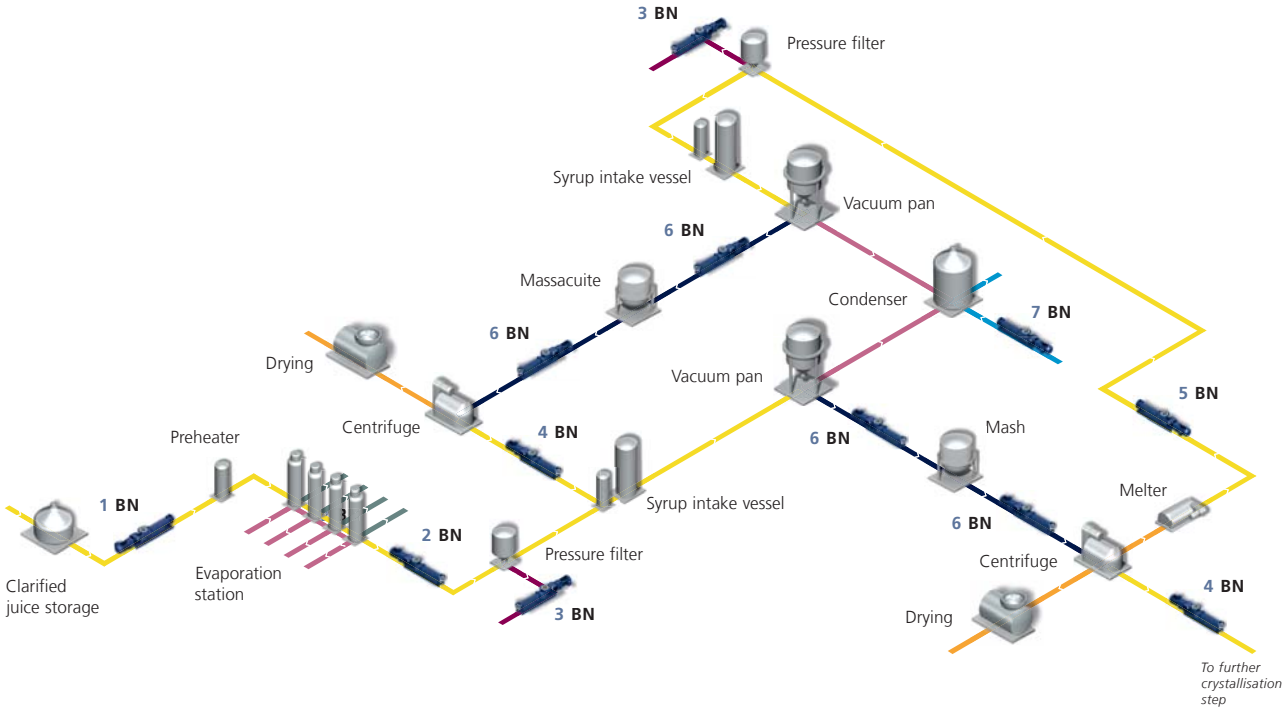
Features

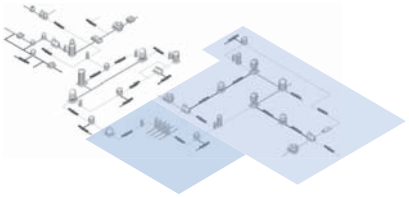
- Conveyance of high-temperature media
- Conveying media with abrasive/crystalline components

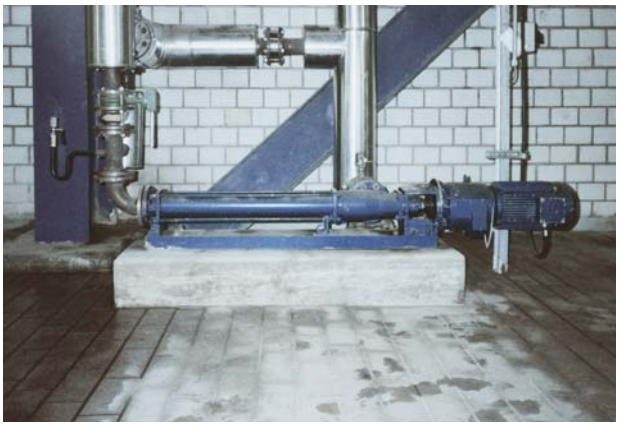
Pump of range BN 70-12
Conveying product: Syrup fom thickening to crystallization
Conveying capacity: 70 m³/h (308 GPM) • Pressure: 11 bar (156 PSI)
Temperature: 15´°C (59 °F)

Pump of range BN 35-12
Conveying product: Thick juice
Conveying capacity: 25 m³/h (110 GPM) • Pressure: 10 bar (146 PSI)
Temperature: 15 °C (59 °F)

Flow chart based on juice evaporation and crystallization







Pump of range BN 17-6L
Conveying product: A-sugar run off
Conveying capacity: 13 m³/h (57 GPM) • Pressure: 3 bar (38 PSI)
Temperature: 50 °C (122 °F)

Pump of range BN 5-12
Conveying product: Molasses
Conveying capacity: 1,7 – 5 m³/h (7.5 – 22 GPM) • Pressure: 7 bar (96 PSI)
Temperature: 55 °C (131 °F)

Your pump solutions at a glance.

seepex pumps gently transport thin to high-viscosity products with and without solids over a wide temperature range with low pulsations and low shear. They also feature excellent metering accuracy and can easily pump media such as carbo-lime or molasse.

Range BN

Product group N pumps with two ranges are used in virtually all industry sectors to convey thin to high viscosity materials with or without solids up to 15 %. They are also used in metering applications.

> Conveying capacity: 30 l/h – 500 m³/h
(0.13 GPM – 2,200 GPM), Pressure: up to 48 bar (720 PSI)

Range NS

In favour of a universal configuration of drives through flexible couplings or V-belts, seepex pumps of the NS range are built without direct flange-mounting of a drive. They feature a drive casing and a free shaft end, in which case the service-friendly plug-in connection between the rotating unit and the drive shaft of the pump is maintained. This facilita-tes convenient replacement of the rotating wearing parts and the shaft sealing without dismantling the bearing unit.

> Conveying capacity: 30 l/h - 500 m³/h
(0.13 GPM – 2,200 GPM), Pressure: up to 48 bar (720 PSI)

Product group D metering pumps are available in six different ranges for pumping and dosing small quantities in virtually all industries. They are especially suited for low pulsation metering of low to high viscosity media containing solids and chemically aggressive media with a high accuracy.

> Conveying capacity: 0.2 l/h – 1,000 l/h (up to 380 GPH), Pressure: up to 24 bar (360 PSI)

See our "Product groups and ranges" brochure for further solutions for a wide range of applications.

Range MD

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And what can we get flowing for you? Your nearest contact:

Or visit www.seepex.com

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