



HAARSLEV™

Processing Technology

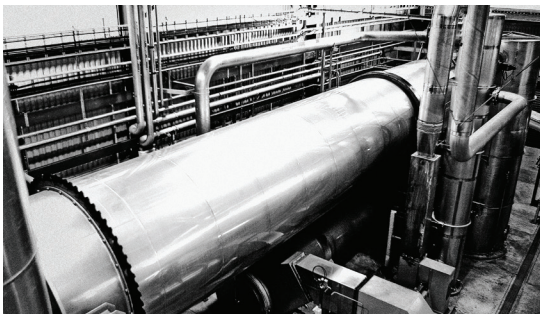
ROTARY DIRECT DRYER

Product brochure



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ROTARY DIRECT DRYER



Safe, economical drying and granulation of municipal sludge to produce Class A biosolids

The Haarslev Rotary Direct Dryer for Sludge is a directly fired, single pass, rotary drum drying system with advanced sizing screening and granulation techniques producing a dust free granule suitable for reuse in agriculture and as fuel.

The system features process gas recirculation with a unique indirect condensing heat exchanger to minimise effluent retreatment in the WWTP and also minimise the off-gas volume sent to odor control.

The drying System is offered as a complete system including the latest in safety enhancements in full compliance with NFPS/ ATEX regulations and includes a sophisticated process control for system for both safety compliance and the possibility of unattended operations at night.



MUNICIPAL SLUDGE TO CLASS A BIOSOLIDS GRANULES

DRYING AND GRANULATION IN ONE STEP

The Haarslev Rotary Direct Dryer for Sludge is a directly fired, single pass, rotary drum drying system with advanced sizing screening and granulation techniques producing a dust free granule suitable for reuse in agriculture and as fuel.

The system features process gas recirculation with a unique indirect condensing heat exchanger to minimise effluent retreatment in the WWTP and also minimise the off-gas volume sent to odor control.

Mechanical discharge of drum for optimum thermodynamics and assurance of Class A compliance at all times.

[MUNICIPAL SLUDGE TO CLASS A BIOSOLIDS GRANULES]

USE OF SECONDARY ENERGY

Safe, economical drying and granulation of sludge to produce Class A biosolids.

Durable granules, relatively dust free, used in agriculture with slow release of organic Nitrogen. granulation of sludge to produce Class A biosolids.

The dryer incorporates a waste heat recovery system providing hot water for other process uses. Gases discharged from the dryer are passed through a cyclone to remove dust and then cooled down through a shell and tube condenser. Up to 50% of the air flow is then recycled back to the dryer and the remainder is discharged to a suitable odour control system. Recycling air back to the dryer significantly reduces the exhaust gas volume for treatment.

Haarslev/Flo-Dry Rotary Direct Drying plants have operating histories of up to 12 years, on a range of sludge types and with a range of fuels including digester gas and direct use of engine exhaust heat, delivered as turnkey or equipment package only.



*New Plymouth
New Zealand
2000*



*Hutt City
New Zealand
2001*



*United Water
Ballarat
Australia*



*EarthPower
Sydney
Australia*

1ST STAGE

HAARSLEV FLO-DRY ROTARY DIRECT DRYER

The rotary dryer is a direct-fired hot air cascading type of dryer, which dries sludge to between 40 to 45 % dry solids. The material is gently dried as it cascades through the hot air flow.

The hot air stream is provided by a direct-fired gas burner that heats recirculated gases. This produces high inlet temperatures for rapid surface frying and maintains a safe low oxygen atmosphere inside the dryer.

The Flo-Dry Rotary Dryer has a minimum of moving parts, which means reduced wear, less maintenance and increased operating life.

A range of fuels including natural gas, methane, LPG, oil, coal or bio-gas. It can also be supplied with indirect heating systems.

ADVANTAGES

- High yield and low capital cost.
- Meets international sterility standers.
- Gently drying process ensures a high quality end product.
- No beaters or discs used inside the dryer prevents sticking and clogging.



2ST STAGE

HAARSLEV FLO-DRY ENERSAVER SYSTEM

The second stage dryer is a belt-type dryer with multiple belts and drying chambers.

Partially dried product from the first stage is passed to the top belt.

Heated air blows down through the product and out the bottom of the belt where it is recirculated through the heat exchanger to the top again. The heat exchanger uses hot water from the stage 1 dryer for its heat source.

Product slowly passes successively through the chambers and belts to dry fully. Fresh air is drawn into the last compartment to cool the product and reduce humidity.

ADVANTAGES

- The two-stage system reuses heat from the first stage, helping reduce energy costs.
- Energy costs for a two-stage system can be reduced by over 20% compared to conventional systems.
- The two-stage process eliminates the need to recycle.



HAARSLEV THERMAL DRYING SYSTEMS



TST DISC DRYER

- Simple system, low maintenance
- Compact design resulting in minimal building requirements
- Supreme energy efficiency due to a minimum of heat loss
- High recovery of heat from dryer exhaust vapor
- Low cost and long life



SBD BELT DRYER

- Low drying temperature (70 - 140°C)
- High degree of flexibility use of various energy sources incl. waste heat by direct and indirect heating
- Final dry solids content easily adjustable with a final dry solids of 40 to 90%
- Odour control by a negative pressure in the dryer, high recycling and treatment of the drying gas



FLO-DRY DRUM DRYER

- Variable speed. Single pass rotary drum for ease of maintenance and long life
- Gravity discharge of drum allows for optimisation of process gas conditions
- Process gas recycle for low O_2 and with unique compact shell and tube condenser
- Product recycle with plowshare mixer for hard granule formation
- Class A granules per USA EPA 503 regulation



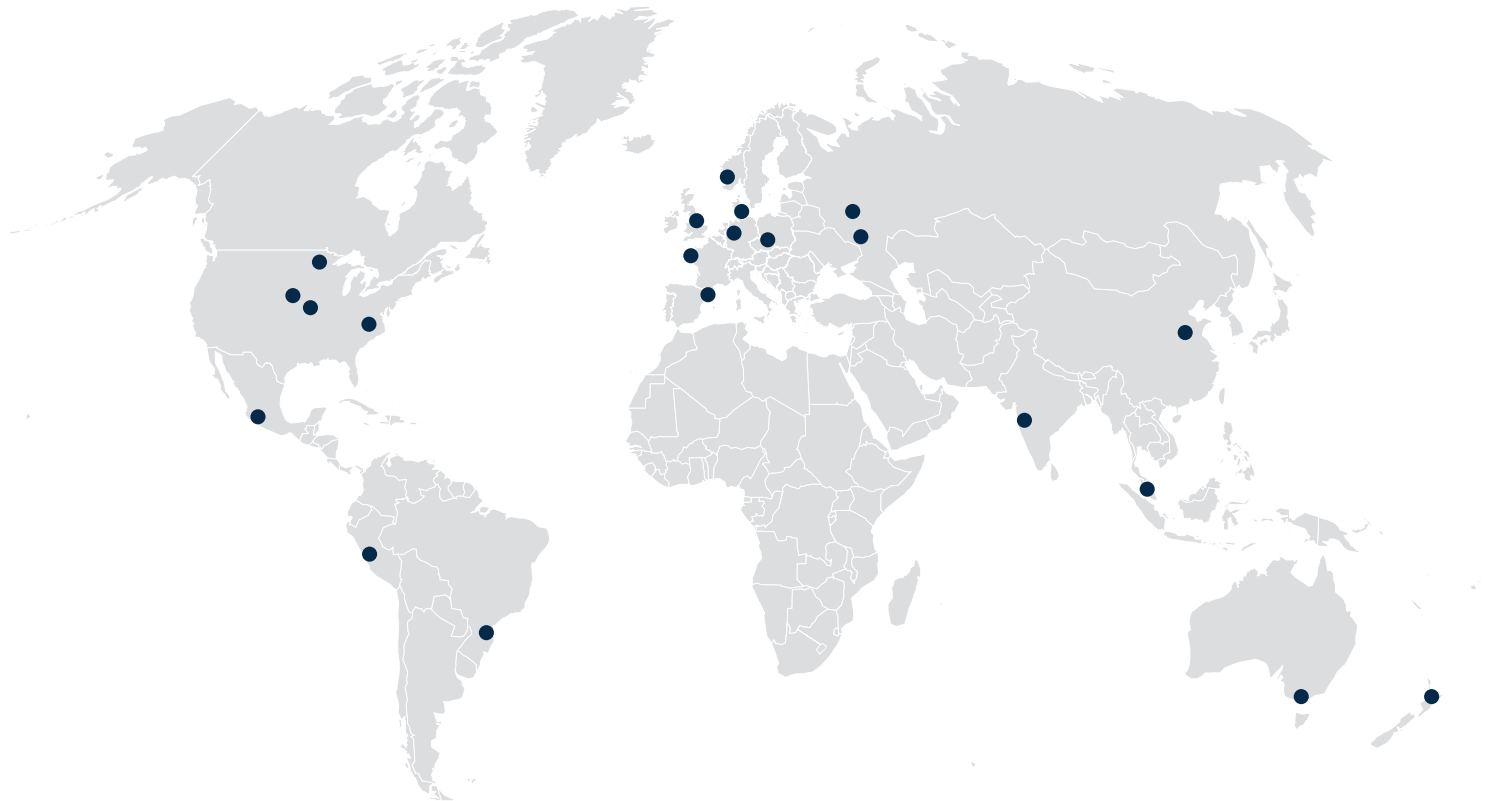
ES ENERSAVER

- Logical application of theory of drying
- Large LMTD for rapid first stage drying
- "Inherently safe" belt dryer for second stage
- Gentler conditions, lower LMTD
- Able to handle "sticky" phase
- Minimal dust due to gentle movement
- Less conveying, no screening, no mixing



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MASTER YOUR PROCESS

US OFFICE

Haarslev Inc.
9700 NW Conant Avenue
Kansas City, MO 64153 - USA
Telephone: +1 816 799 0808
Email: info-usa@haarslev.com
www.haarslev.com

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