IRD INFRARED ROTARY DRUM

HEATING. DRYING. CRYSTALLIZING. COATING.

KREYENBORG
MINIMAL PROCESSING TIMES
HIGH FLEXIBILITY
LOW ENERGY CONSUMPTION
KREYENBORG is a leading provider of solutions in the field of bulk material handling for over 60 years. We specialize in innovative ideas for drying, crystallizing, coating, mixing, storage, conveying and dosing of demanding bulk materials in the plastics, food and chemical industries with the aim of ensuring a safe and efficient material supply in your production chain, through the intelligent combination of these process steps. In addition, we provide turn-key solutions for bulk material handling.
**Continuous processing.**

**Minutes instead of hours.** The product remains for only a few minutes in the drying process and is then available for further production steps.

**Low energy consumption.** Significantly lower energy consumption compared to conventional processes, through the direct introduction of infrared energy to the product.

**Higher flexibility** due to less material in process.

**Instantly.** An immediate start of the production run is possible immediately upon startup. A warm-up phase of the machine is not required. No preheating of the material as in conventional systems.

**Directly.** Processing can be started, stopped and restarted easily.

**Excellent mixing behavior** of blends and no sticking of the material by virtue of the constant movement of the drum.

**Constant output moisture.**

**Capable for high and varying input moisture.**

**Evenly.** Ensuring a constant discharge.
★ **Retrofit solution.** Can be placed in almost every existing plant.
★ **High throughputs.** 20 – 5.000 kg/h.
★ **Reproducible quality.** Recipe management in the automation system.

★ **High efficiency.** The energy is immediately brought into the core of the product.
★ **Gently.** The material is gently heated from the inside to the outside and not loaded from the outside for hours with heat / damaged.
★ **Easy.** Ready access to all components allows for easy and fast cleaning, and for rapid product change-over.
★ **In one step.** Crystallization and drying.
★ **Increased throughput.** Increase of plant throughput by providing relief to the extruder.
**DESIGN AND FUNCTION**

1. **Material feeding** with continuous volumetric feeder.
2. **Air supply.** Air-Shield protection for the lamps.
3. **Drum with built in helix.** Ensures continuous feeding, movement and mixing of the material.
4. **Temperature measurement.** Direct and fast responsive temperature measurement. PID regulation of the infrared heaters.
5. **Infrared module.** Patented module specially designed for dusty conditions.
6. **Exhaust air-fan.** Evacuation of humid air and volatiles.
7. **Material outlet.** After minutes instead of hours, the material automatically exits the rotary tube and is sent to downstream processes.
8. **Sealing system.** Special, optional sealing system for dusty materials.
Crystallizing and drying in one step.

It takes 12 minutes for the material to be crystallized and dried up to 300 ppm without the use of an additional desiccant dryer. The continuous process can handle up to 5,000 kg/h, depending on the size of the IRD.

No sticking of the bulk material.

Due to the rotation of the rotary drum, the material is continuously conveyed and mixed. Even difficult materials with a tendency to stick can be crystallized and dried.

Eco-friendly energy balance.

Thanks to infrared technology, the energy is introduced directly into the material. This results not only in shorting the processing time but also in significant energy saving.
INFRARED.

Heat to the core. By means of short-wave infrared light the material is heated directly from the inside.

From the inside to the outside. The energy in the core heats the material from the inside out, so the moisture is driven from the inside to the outside of the product.

Evaporation of moisture. The additional air circulation inside the dryer removes the evaporated moisture from the material.

ALWAYS IN MOTION.

Rotation. The permanent rotation of the drum keeps the material moving.

Uniform. The special adapted helix and the mixing elements of the drum provide an optimal mixing of the material. Clumping can be avoided and the material is heated homogenously.

Gentle. Low rotational speed of the drum avoids damage to the material.
### SELECTED APPLICATIONS

**HEATING. CRYSTALLISING. DRYING. COATING.**

<table>
<thead>
<tr>
<th><strong>PET.</strong></th>
<th><strong>PVC.</strong></th>
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<tbody>
<tr>
<td>★ Crystallization and drying.</td>
<td>★ Heating of PVC.</td>
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<tr>
<td>★ Virgin and recycling material.</td>
<td>★ Flooring industry.</td>
</tr>
<tr>
<td>★ Film, strapping tapes, etc.</td>
<td>★ Recyclable material.</td>
</tr>
<tr>
<td>★ Crystallization of masterbatches.</td>
<td>★ Film, strapping tapes, etc.</td>
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<tr>
<th><strong>PET with PE.</strong></th>
<th><strong>Hotmelt.</strong></th>
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<tbody>
<tr>
<td>★ Crystallization and drying.</td>
<td>★ Coating of hotmelt.</td>
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<tr>
<td>★ Recyclable material.</td>
<td>★ Coating of pellets with additives.</td>
</tr>
<tr>
<td>★ Film, strapping tapes, etc.</td>
<td>★ Coating with additives.</td>
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<th><strong>PLA.</strong></th>
<th><strong>Wood compound.</strong></th>
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<tbody>
<tr>
<td>★ Crystallization and drying.</td>
<td>★ Drying of wood compounds.</td>
</tr>
<tr>
<td>★ Packaging industry.</td>
<td>★ Drying of various plastics.</td>
</tr>
<tr>
<td>★ Thermoforming sheet.</td>
<td>★ Chips, pellets and fibers.</td>
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<td>★ Drying of very wet material.</td>
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<th><strong>ABS/PC.</strong></th>
<th><strong>And many more!</strong></th>
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<tr>
<td>★ Crystallization and drying.</td>
<td>★ For free-flowing bulk material.</td>
</tr>
<tr>
<td>★ Recycling material.</td>
<td>★ Heating.</td>
</tr>
<tr>
<td>★ Film, strapping tapes, etc.</td>
<td>★ PP/PE.</td>
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**PP/PE.**

★ Heating.
PET APPLICATIONS

★ PET Booster: crystallization + fast drying < 500 ppm.

> 1% 8 to 12 min IRD 0,05%

★ IRD + insulated buffer hopper: crystallization + drying < 200 ppm.

> 1% 15 min IRD 0,05% 45 min 0,02%

★ IRD + desiccant dryer: crystallization + drying < 50 ppm.

> 1% 15 min IRD 0,05% 45 min 0,005%

Twin-Screw Extruder.
Multi-Screw Extruder.
Planetary Extruder with degassing.

Single-Screw Extruder.
Multi-Screw Extruder.
with degassing.

Single-Screw Extruder
without degassing.
HOMOGENIZATION.

Frequently changing incoming moisture. Typically, the moisture content of recycling material oscillates significantly.

Homogenous and repeatable after the IRD. Directly after the IRD and only minutes of drying time the moisture content is already homogenous <300 ppm.

PET BOOSTER.

Fast heating. Direct heat transfer into the materials ensures fastest drying times and highly efficient drying processes.

Drastic reduction of drying time. Extensive pre-heating with hot air is not necessary. Drying time can be reduced from 5 hours to less than 1 hour.
FROM AN INDIVIDUAL COMPONENT TO A COMPLETE SYSTEM.

Based on its many years of experience in plant engineering, KREYENBORG also offers individualized total solutions that incorporate infrared technology. KREYENBORG offers project planning, construction and after-sale support.

1. **Material supply. Big-Bag stations.**

2. **Vacuum conveying.** Vacuum pumps and receivers for cold and hot material, special designs for poorly-flowing flake materials. **Conveying screws** as an alternative to vacuum conveyors are available.

3. **Material discharge containers** for adapting vacuum conveying systems or conveying screws.

4. **Buffer Silos / insulated drying hoppers** for buffering material and reducing moisture content.
5. **Automatic throughput control** by means of constant measurement of the fill levels in the buffer hopper.

6. **Desiccant dryers** for low moisture content <50 ppm.

7. **Filters / Cyclones** for the exhaust air flow.

8. **Central controls**. All components centrally controlled by the IRD PLC.
FULLY AUTOMATIC CONTROL CONCEPT.

- Innovative and easily operated automation.
- Different modes available to cover typical applications.
- Recipes for different materials.
- Online service via modem.
- Individual radiator control.
- Up to 5 temperature zones available.
- More flexible temperature control.

LOW MAINTENANCE.

- Low maintenance costs.
- No compressed air or cooling water necessary.
- All components easy accessible.
- Separately extractable infrared module for quickest service times.
- Easy access to all machine components ensures quick cleaning and changeover times.
TRY US!

At our trial center in Senden, together with you, we can perform continuous or discontinuous trials for the plastics, food and chemical industries and we can provide all services - storage, mixing, conveying, dosing, drying and crystallizing. Experienced personnel supervise demanding tests and applications. Our equipment is furnished with comprehensive automation and measurement technologies.

Your employees are cordially invited to participate in our joint experiments.

Thus you have both the possibility to contribute actively and the opportunity to actually see our products in operation.

Our equipment in the trial center:
- IRD.
- IR-Batch.
- Dosing equipment.
- Mixer.
- Pneumatic conveying equipment.
- Conveyor screws.
- Moisture analyser.