

IBU-tec – Pre- & Post-Processing

Conveying and Dosing Equipment

- ▶ Screw conveyors
- ▶ Conveyor belts
- ▶ Disc conveyors
- ▶ Pneumatic conveyors
- ▶ Gravimetric dosing unit with screw feed
- ▶ Volumetric dosing screws
- ▶ Vibration chutes (Vibration conveyors, Gravimetric feeders)
- ▶ Dosing belt scale
- ▶ Membrane pumps
- ▶ Spraying lances
- ▶ Rotary feeders
- ▶ Displacement and peristaltic pumps

Exhaus Gas Treatment

- ▶ Thermal afterburners and exhaust gas cleaning
- ▶ DeNO_x systems to denitrogenize the exhaust gas
- ▶ Filter systems to remove dust from the exhaust gas
- ▶ Gas scrubbers, venture-scrubbers (wet gas scrubbers) for the removal of particulates and absorbable gases (acidic and alkaline washes)
- ▶ Dust analysis in the treated gas, final police filter
- ▶ Use of adsorbents to remove acidic components

Mixing and Granulation Units

| Type | Number on site | Typical size | Attainable throughput | Material type | Specifications / special characteristics |
|-----------------------------------|----------------|---|-----------------------|-----------------|--|
| EIRICH Intensive mixer R2 | 1 | Useable vol.: 3.5 l | N/A | Stainless steel | Laboratory mixer |
| EIRICH Intensive mixer R09 | 1 | Useable vol.: 150 l | up to 300 kg/h | Stainless steel | Batch mixer, suitable for tests or production |
| EIRICH Intensive mixer R11 | 1 | Useable vol.: 250 l | up to 1,000 kg/h | Carbon steel | Batch mixer, suitable for tests or production, automated |
| Cone mixer | 2 | 1 x à 1,500 l 1 x à 2,500 l | up to 400 kg/h | Stainless steel | Batch mixer, suitable for tests or production |
| Lödige ploughshare mixer | 5 | 3 x à 600 l 1 x à 300 l 1 x à 1,600 l | up to 600 kg/h | Stainless steel | Batch mixer, suitable for tests or production |

Screening and Sorting

| Type | Number on site | Attainable throughput | Mesh dimensions | Spezifications / special characteristics |
|-------------------------------------|----------------|-----------------------|------------------|---|
| Multi-deck screening machine | 1 | up to 1,000 kg/h | 0.1 mm to 7 mm | 7 decks |
| Vibration-screening machine | 1 | up to 500 kg/h | 40 µm - 1,000 µm | 2 decks / ultrasound cleaning |
| Vibration-screening machine | 1 | up to 350 kg/h | 40 µm - 1,000 µm | 2 decks / ball cleaning |
| Round-vibration sieve | 1 | up to 350 kg/h | 40 µm - 1,000 µm | 2 decks / ultrasound cleaning |
| Single deck screen | 2 | up to 100 kg/h | 0.2 mm to 5 mm | 1 deck / only for removal of oversized and undersized particles |

IBU-tec – Laboratory Facilities

Experimental Kilns

- ▶ A gradient kiln of our own design is used to simulate processing conditions in industrial direct kilns (dynamic laboratory kiln, max. 1,500 °C)
- ▶ Pivot kiln (Carbolite) with a modifiable atmosphere, simulating sample movement (max. 1,100 °C)
- ▶ High-temperature microscope with automatic image analysis (HTM) for the determination of melting and expansion behavior (max. 1,600 °C)
- ▶ A large number of muffle furnaces (max. 1,600 °C)

Mineralogical Analysis

- ▶ Phase analysis using X-ray diffraction / XRD (Bruker D2 Phaser), including Rietveld analysis

Chemical Analysis

- ▶ Digestion (among others: fusion, microwave, acidic)
- ▶ Optical emissions spectroscopy (ICP-OES)
- ▶ Atomic absorption spectrometer (F-AAS)
- ▶ Complexometric titration
- ▶ Colorimetry
- ▶ Photometry
- ▶ Potentiometry
- ▶ Gravimetric analysis
- ▶ Elemental analysis

Processing Technology

- ▶ **2 agitator bead mills** (Netzsch Zeta RS & LabStar)
- ▶ **Spray drying** (GEA Niro Minor)
- ▶ Cryomilling
- ▶ Homogenization
- ▶ Dispersing
- ▶ Stirring
- ▶ Drying
- ▶ Centrifugation

Fuel Analysis

- ▶ Elemental analysis (C, H, N, S)
- ▶ Ash analysis
- ▶ Calorific value measurement
- ▶ Ash melting characteristics (HTM)

Physical Analysis

- ▶ Specific surface area (Brunauer-Emmett-Teller, BET) by N₂-Physisorption
- ▶ Pore size distribution and pore radius distribution
- ▶ Dynamic and static laser granulometry (particle size analysis / PSD)
- ▶ Sieving analysis
- ▶ Determination of particle size, particle shape, particle distribution and strength
- ▶ Color value measurement
- ▶ Density analysis
- ▶ Light microscopy with digital image analysis