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CONIDUR®

FINE HOLE SHEETS AS GAS DISTRIBUTION DECKS IN FLUIDISED BED UNITS

DRYING | COOLING | COATING | AGGLOMIZING

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An increasing number of bulk materials are thermally treated in fluidised bed units. One important reason for this is the high economic efficiency resulting from the intensive heat and material exchange between solid material and fluid medium.

An essential component of the fluid bed installation is the **CONIDUR®** Gas Distribution Plate.

The even distribution of the fluid medium is obtained by a minimum pressure under the distribution plate dependent on product data and dumping height in the Installation.

All **CONIDUR®** Fine Hole Sheets for Fluidised Bed units are:

- levelled
- rolled
- electrolytically de-burred and polished

Moreover, the **CONIDUR®** Distribution Plate fulfil further requirements enabling smooth work of the installation. The most important are:

- Adaptability of pressure head
- to process parameters
- Strong **CONIDUR®** plates finest perforations
- Good adaptability to the respective dryer construction
- High mechanical loading capacity with suitable support
- Applicable to working conditions ≥ 500 °C
- A stable fluid bed due to an even air distribution
- Jet-shaped conical holes produce a sharp air flow which keeps the openings free
- Change conveying direction by guided air-flow
- Discharge of the dryer without additional dynamic drive power
- Passive surface due to electrolytical treatment of the plates, therefore hardly any adhesion
- Excellent cleaning facilities by mechanical, chemical, pneumatic or hydrodynamic means.

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By meeting these requirements, the application of CONIDUR® Fine Hole Sheets enables in many cases an increase of capacity of the fluidised beds and a trouble-free operation.

The following products have been handled in fluidised bed units so far:

Chemical industry

- organic acids
- paints
- salts
- Fertilizers
- insecticides
- synthetics
- Detergent additives

Food industry

- coffee
- Cocoa
- Tea
- Sugar
- Milk powder
- Cereals
- Vegetables
- Baby food
- Gelatine
- instant products for food stuf

General processing technology

- Coal
- Quartz sand
- Mould sand

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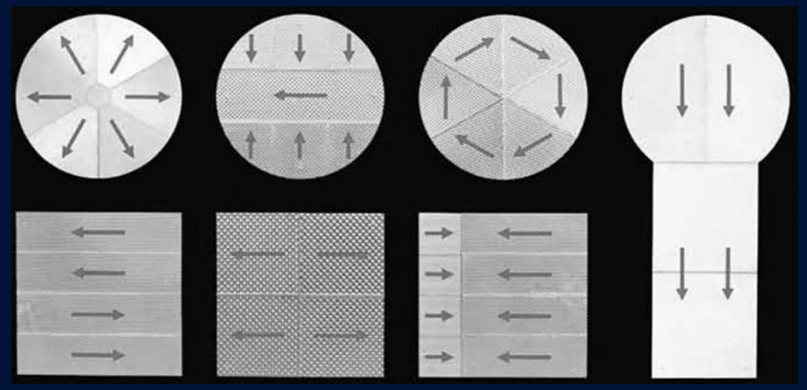
All **CONIDUR®** Fine Hole Sheets to be applied for fluidisation have to pass before delivery a special test to check up the pressure drop in dependence on the afflux velocity.
The direction of air flow is indicated by the arrow marked on the product side of the **CONIDUR®** Fine Hole Sheet.

Horizontal air flow enables conveying of the product and supports the discharge at the same time.

The direction of the airflow over the distribution plate can be determined by arranging the **CONIDUR®** Pierced Sheet in different ways.



This picture shows various arrangements.

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Selection of CONIDUR® Fine Hole Sheets

CONIDUR® Fine Hole Sheets can be fabricated in a great variety of hole sizes. This results in different pressure drops with according afflux velocity. You can see pressure drop curves of some sheets in a separate file. The values are based on an air temperature of 20 °C and 1010 hPa as well as 60 % relative humidity of air.

Selection of the right CONIDUR® Fine Hole Sheet is decisively determined by process parameters:

- Gas volume at operating temperature
- Corresponding specified pressure drop of CONIDUR® fine hole sheet.

The specified pressure drop (difference in pressure between the approach side and working side) of CONIDUR® Fine Hole Sheet depends on the process and the product. The flowability of the product must also be taken into account.

Due to the special manufacturing method and additional surface treatment of CONIDUR® fine hole sheets, a pressure drop of ±25% should be taken into consideration.

The gas velocity over the distributor plate is important. It has to be smaller than the sinking speed of the smallest particles in the fluidised product bed, as otherwise too much of the product will be carried along by the gas flow and has to be recovered undried or uncooled in a filter or cyclone.

The hole size can, of course, be larger than the smallest product particle, as trickling through is largely prevented by rapid gap bridging over the openings, even if there is no gas pressure under the plate. This rule does not apply to vibratory dryers.

If the temperature of the afflux velocity does not correspond to 20 °C, the pressure drop "Δp" has to be converted with the correction factor "f" to achieve the corresponding pressure drop of the CONIDUR® Fine Hole Sheet "Δp" at 20 °C.

The conversion factor "f" results from the ratio between gas density value ρ at 20 °C and density value ρ at operating temperature t °C of the approaching fluid medium at constant pressure. At constant approach velocity the pressure drop (Δp1) decreases with increasing temperature and increases with falling temperature.

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EXAMPLE FOR SELECTION OF A CONIDUR® FINE HOLE SHEET:

GIVEN:

working surface **A = 16 m²**

Volume of approaching air $\dot{V}$ **= 14000 m³/h**

Temperature of approaching air **t_1 = 110 °C**

max. permissible hole size **L_w = 0.5 mm**

Specified pressure drop **Δp_1= 600-800 Pa**

The approach velocity A (m^2) under the **CONIDUR®** Fine Hole Sheet results from the volume $\dot{V}$ (m^3/h) of approaching air in relation to the working surface.

$$v = \frac{\dot{V}}{A * 3600} \text{ (m/s)}$$

$$v = \frac{14000}{16 * 3600} = 0.243 \text{ m/s}$$

Based on the approach velocity v and the required pressure drop Δp_1 (and permissible hole size) a suitable **CONIDUR®** Fine Hole Sheet can be selected by means of the pressure drop curves.

As the pressure drop curves are based on an air temperature of **20 °C**, the value **Δp_1** (700 Pa) has to be converted by multiplying **Δp_1** with the conversion factor "f" **("f" for 110 °C = 0.763)**.

$\Delta p_1 = \Delta p * f$

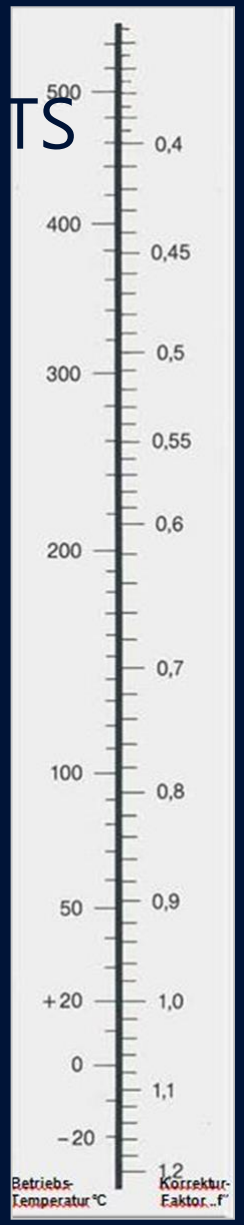
$$\Delta p = \frac{700}{0.763}$$

Δp = **917 Pa**

The **CONIDUR®** Fine Hole Sheet has a pressure drop of **Δp 917 Pa** at a temperature of **20 °C** and an afflux velocity of **0.243 m/s**. At an operating temperature of **110 °C** the required pressure drop of **Δp_1 = 700 Pa**. is obtained.

SELECTED:

CONIDUR® Fine Hole sheet No. 38, see "Pressure drop curves"



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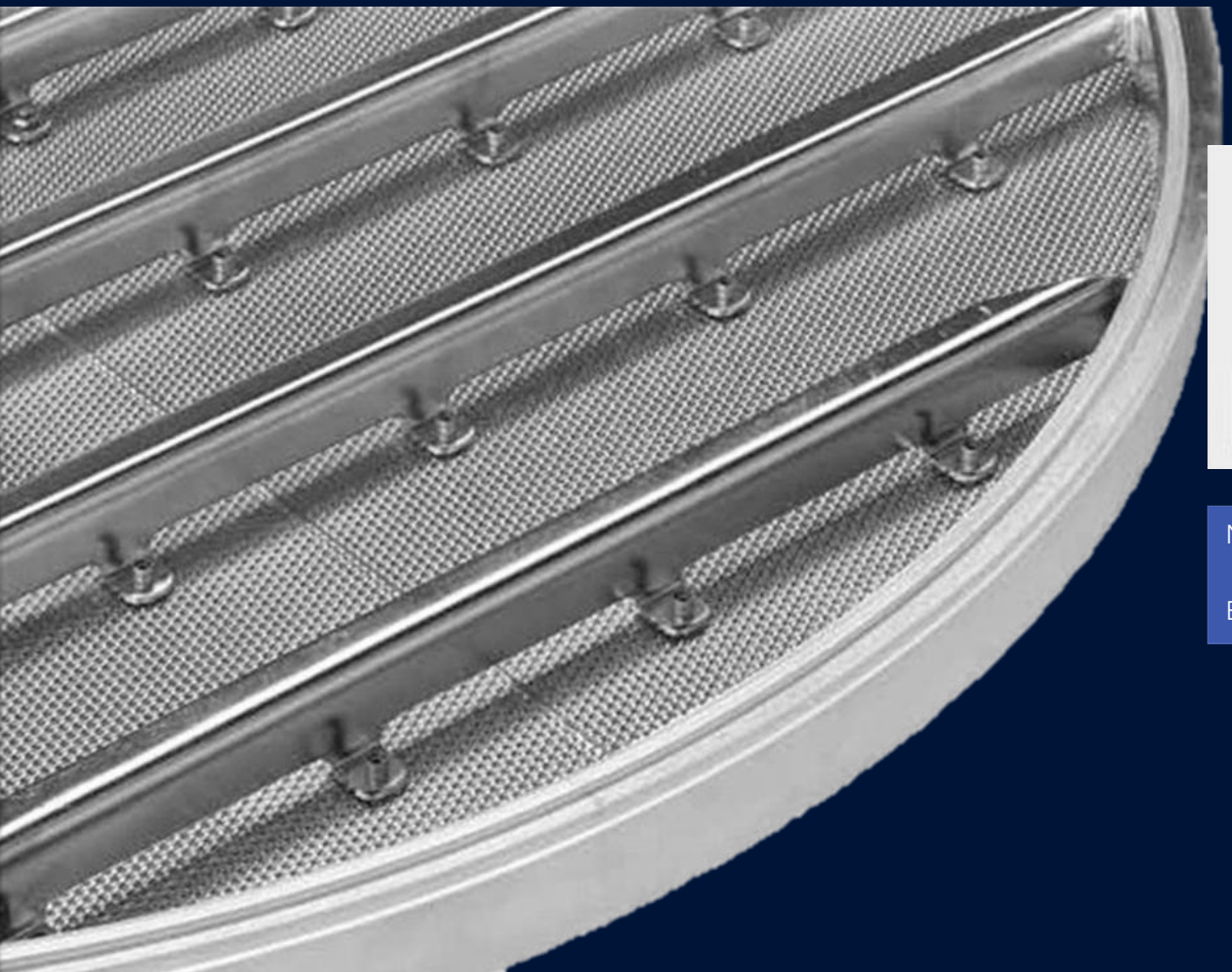
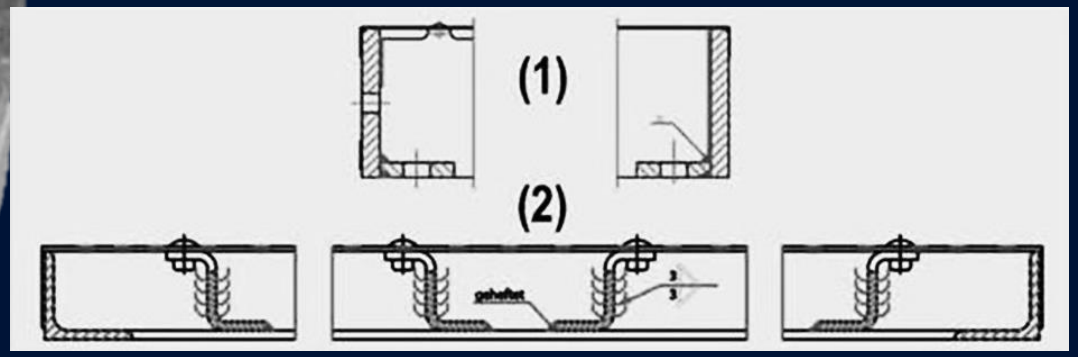
CONIDUR®-THIN HOLE SHEET WITH FRAME AND SUPPORT CONSTRUCTION





Notched reinforcements give optimal support and enable an open gas flow

Edge-reinforcement can be made out of flat steel (1) or angle steel (2).