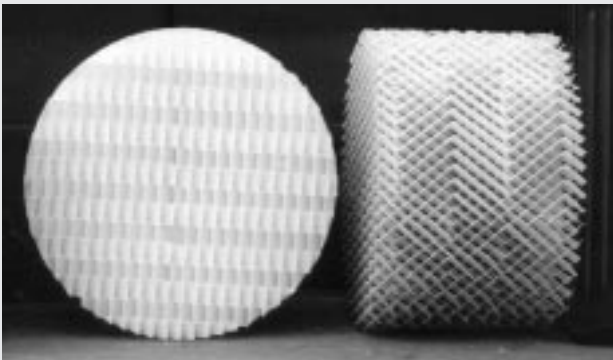
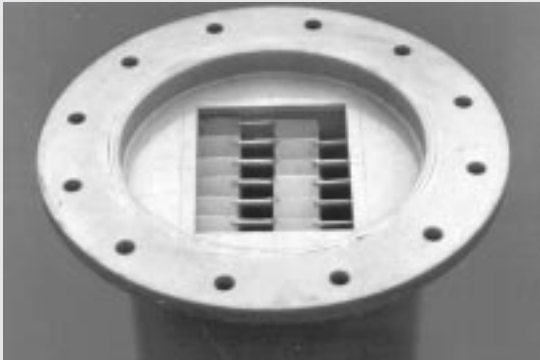
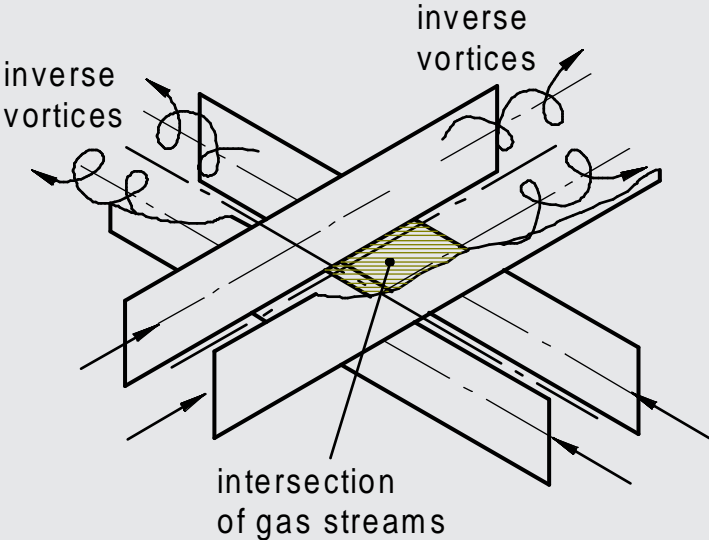
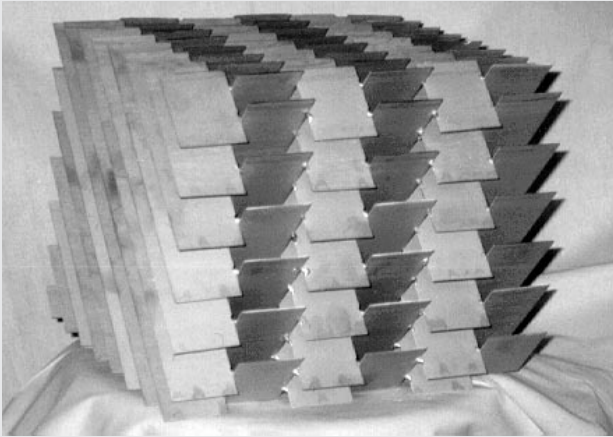


**TECHNICAL INFORMATION MW 9901**

CALDYN Demister and Deduster MULTIWIR



MULTIWIR combines the properties of multicyclones and staggered packings. Minute droplets and particles are removed effectively due to a large number of vortices within the packing.

## Design

MULTIWIR packing consists of parallel plates, which are fixed at a particular angle to the gas flow. The distance between the plates is relatively large (e.g. 25 mm), therefore there is practically no danger of plugging (Fig. 1).

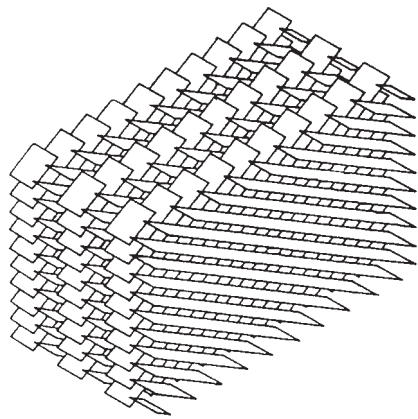


Fig. 1: Design of MULTIWIR

## Principle

The incoming gas stream with droplets/particles passes the packing in the form of a large number of smaller streams, which cross each other spatially and thus induce rotational motion in each other (see top sheet). Vortices with a frequency up to 400 per second are generated depending upon the dimensions of the packing and the gas flow velocity. Due to centrifugal forces the droplets/particles settle on the surfaces of the strips. The removal efficiency is much higher than in conventional droplet eliminators.

Droplet eliminator MULTIWIR can be mounted in a horizontal, inclined or vertical line.

## Removal Efficiency

Knowledge of cut-off droplet diameter is important for the user. The cut-off diameter represents the diameter of the droplet with a removal efficiency of 99,9 %. The smaller droplets are partially removed whereas bigger droplets

than the cut-off diameter are completely removed out of the gas. Cut-off diameter depends upon the pressure drop for all types of eliminators employing inertia forces for particle removal.

The removal efficiency of MULTIWIR depends upon:

- droplet/particle diameter
- gas flow velocity
- design of the packing
- difference between particle and gas density
- dynamic viscosity of the gas

CALDYN employs own computer programs for the design of MULTIWIR packings. Optimum dimensions can be computed for a particular case (Fig. 3). That means highest flexibility without additional experiments.

Fig. 2 shows the cut-off diameter  $d_{99,9}$  and pressure drop for various MULTIWIR packings as a function

of the gas flow velocity. The curves are valid for the elimination of water droplets out of air at 20°C.

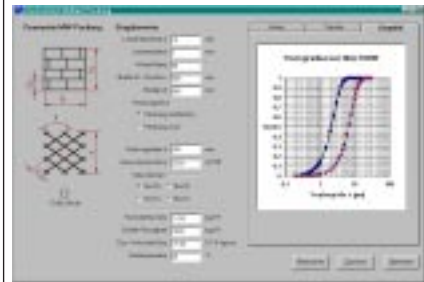
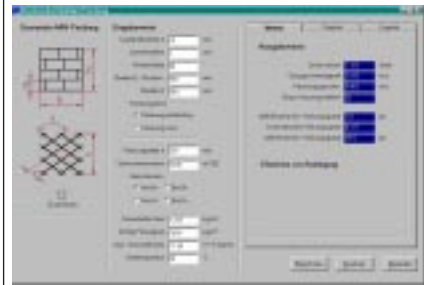
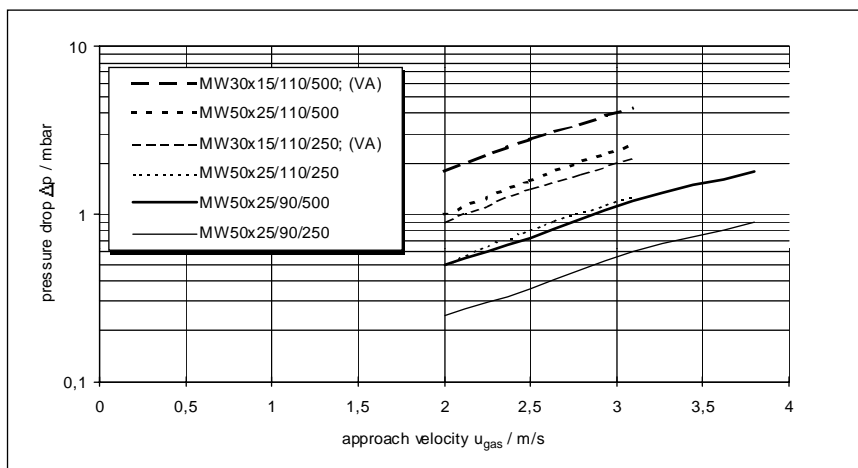
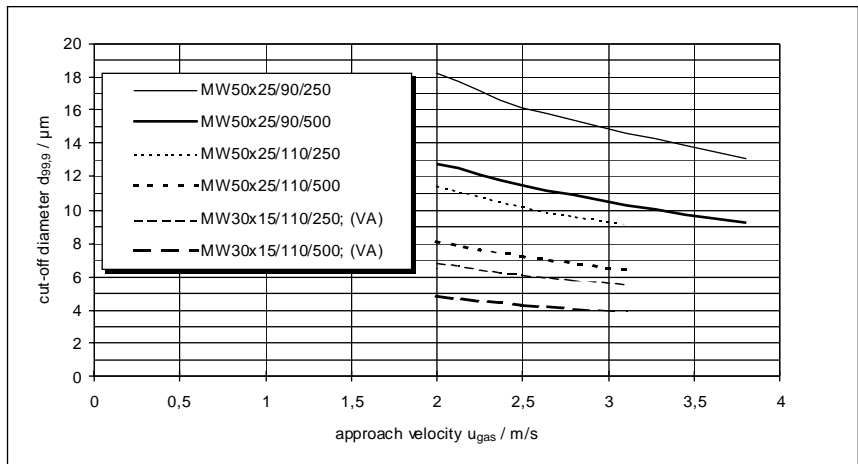


Fig. 3: Calculation of MULTIWIR packings



## Further Applications

MULTIWIR packings are being used in the following processes:

- Aerosol enlargement
- Gas cleaning
- Flow equalizer
- Mass transfer
- Deduster

## Scrubbing system with aerosol enlargement CALWIR

CALWIR is suitable to remove minute particles. The minute particles (aerosols) are enlarged by condensation of water vapour and furthermore agglomerated to sizes bigger than 8  $\mu\text{m}$  in order to remove completely with MULTIWIR /1,2/.

## Gas Scrubber

MULTIWIR is employed as mass transfer packing and droplet eliminator in a gas cleaning process developed by CALDYN /3/.

## Flow Equalizer

Due to the large distances between the strips in the MULTIWIR packing a uniform velocity flow over the cross-section can be achieved without plugging even for gases with substantial dust load. /4/.

## Mass Transfer Packing

High mass transfer coefficients are achieved due to the vortices generated within the packing. This leads to lower heights of the packing and less pressure drop. Large distance between the plates of the packing allows to work with fluids with substantial solid contents like lime slurry without plugging (Fig. 4).

Apart from scrubbers, the MULTIWIR system can also be employed in air humidifiers and gas coolers (dehumidification).

## Particle Eliminator

The removal efficiency for solid particles is higher compared to liquid droplets, due to the higher density. MULTIWIR can be operated with high gas velocity and also at high gas temperatures.

## Material of Construction

Standard packings are available in PP, mild steel and stainless steel. Other materials can be offered on request.

## Additional Information

- /1/ Technical Information „The Role of Minute Droplets in the Separation of Aerosols from Gases“
- /2/ Technical Information CALWIR
- /3/ Technical Information ABR-M and ABR (Gas cleaning)
- /4/ Technical Information QN (Quenching systems)

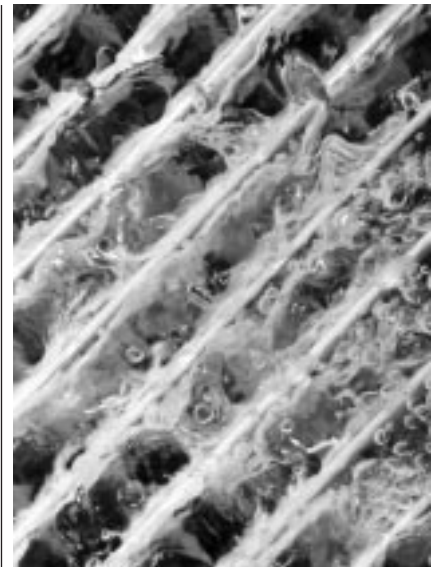


Fig.4: Mass transfer packing



Fig. 5: Droplet eliminator manufactured out of SS 316Ti for 1.000 Nm<sup>3</sup>/h gas.

## Main Advantages of the MULTIWIR-System

- practically no plugging
- low pressure drop for a particular droplet removal efficiency as compared to conventional demisters
- high droplet loads can be handled with success
- economical design
- available in different dimensions and materials
- high flexibility due to variation of the packing design

## Scope of CALDYN

CALDYN supplies standard MULTIWIR packings with or without housing, consultancy and supply of special customer designed MULTIWIR. Supply of quenching towers, spray dryers, scrubbers etc. as well as related engineering belongs to the activities of CALDYN.

## References

CALDYN has delivered MULTIWIR-Systems to the following companies:

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AGA Gas, Bad Driburg	Germany
Bact Engineering, Chicago	USA
BASF, Ludwigshafen	Germany
Bayer AG, Leverkusen	Germany
Bayer AG, Krefeld	Germany
Bremer Stahlwerke	Germany
Dürr, Filderstadt	Germany
Envorimax, Les Ulis Cedex	France
Europe Environnement, Vieux - Thann	France
Fresenius, Dortmund	Germany
Grande Moravia,	Brasil
Hoechst AG, Frankfurt	Germany
Huber Plastic, Walzbachtal	Germany
Kötterman, Uetze	Germany
Köster	Germany
Korea Zinc	Korea
Lavalin, Nancy	France
Lurgi, Frankfurt	Germany
Magnesitwerk, Aken	Germany
Omya, Holland	Netherlands
Omya, Österreich	Austria
Pflock & Meckeler, Sarstedt	Germany
Recymet, Aclens	Switzerland
Sevar, Karlsruhe	Germany
Sulzer AG, Wintherthur	Switzerland
Universität Hamburg	Germany
Universität Karlsruhe	Germany
VAW Aluminium AG, Bonn	Germany
Voest Stahl Alpine, Linz	Austria
Wasserelektrolyse Hydrotechnik, Karlsruhe	Germany
Wisstrans Umwelt GmbH, Göttingen	Germany

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