USER INFORMATION

DROPLET ELIMINATORS

SERIES TRA
Droplet eliminators
Series TRA

Use in ventilation, air conditioning, and process technology

High chemical resistance by optional manufacture of PVC or PPs (PE, PVDF, conductive plastics)

Manufacturing series with 21 standard sizes and three design types each for rates of volumetric flow of up to 100,000 m³/h

Elimination degree of 99 % for droplets exceeding the limit droplet size

Elimination of droplets above 4 µm approximately

Connection of other components according to standard by adapters and transition ducts as accessories

In combination with spray modules also suitable for elimination of dusty media

Data specified herein are subject to alteration without prior notice. They will not be valid without written confirmation by the manufacturers.

eliminator profil

direction of flow
Droplet eliminators of plastic material
Series TRA 125

APPLICATION

The droplet eliminators of plastic material are used for the separation of liquid droplets in ventilation, air conditioning and process technologies, especially in combination with air scrubbers and gas cleaning plants and for resource recovery as well. The use of high-quality plastics leads to high corrosion resistance and makes them suitable for aggressive gases and vapours in particular. The specific design of eliminator profiles leads to elimination rates of more than 99% for droplets exceeding the limit droplet size. Pressure losses are low in spite of high flow velocities. Droplets from spray nozzles (droplet size 10 … 100 µm) as well as smallest droplets (below 10 µm) can be eliminated with good efficiency. Demands on equipment and energy are relatively low so that the eliminators are a convenient solution for separation of dangerous substances at favourable cost.

In cases of heavily dust-laden, sticking and crystallizing media we recommend the use of rinsing modules for moistening of the eliminator profiles to prevent sticking of solid matter and clogging of profiles. Droplet eliminators with preceding rinsing modules can also be used as gas washers or scrubbers for plain gas cleaning processes (short-path washers). In this case a washing liquid is sprayed into the medium across the entire flow area. Dangerous substances will then pass by absorption from the gas to the liquid which has to be aftertreated in a following process.

TECHNICAL DESCRIPTION

The sinusoidal bending of eliminator profiles leads to a distinct change of gas flow direction. Droplets carried over by the gas stream cannot follow this direction change unless they are very small. Due to inertia, droplets above a certain size (limit droplet size) impinge on the profile wall, form a liquid film which will then run down into a container.

Drain-off of the separated liquid is supported by special phase separator chambers and guide grooves on the profiles.

Droplets below the limit droplet size are separated to a certain extent only. This fraction elimination degree can be increased for such droplet shares by another row of eliminator profiles arranged behind the first one. Another improvement, for smallest droplets in particular, is possible by a demister arranged in between. It consists of a fine knitted plastic mesh to hold the small droplets. These form bigger droplets which run downward or are eliminated in the following profile. It is thus possible to separate even droplets of about 5 µm by more than 95% from the gas stream.

The limit droplet size can be reduced by an increase of free stream velocity. This, however, is accompanied by higher pressure losses. The design allows flow velocities of up to 10 m/s. The most favourable working range amounts to 3 … 8 m/s. 5 m/s should not be exceeded if the eliminators are equipped with demisters.

DESIGN

The plastic droplet eliminator consists of a square duct with dimensions of a x b x L in which the eliminator elements are arranged. Integration into the line system is possible by different duct connection components (frames, adapters or pipe fittings).

The eliminators (profiles inserted vertically, demister mesh) are inserted either as single elements or as cassettes. Eliminator elements for cassettes are arranged in a frame and put as a complete unit into the duct. This is advantageous for maintenance, cleaning and repair in particular.
Droplet eliminators of plastic material
Series TRA 125

The eliminators are accessible through a cleaning opening on top and can thus be cleaned or removed easily. The opening can also be on the side if the eliminator elements are of cassette design.

The separated liquid is collected in a collector tray arranged underneath and led out through outlet fittings. Suitable components (siphons, collecting containers) have to ensure that air cannot be conveyed through the water outlet pipe. The collector tray has been designed as a base to place the complete droplet eliminator on even ground. The axis height is free to be chosen so that it can be adapted to the axis height of a fan arranged immediately behind the eliminator. The outlet fittings are arranged laterally.

The bottom of the collector tray can optionally be made as a baseplate. This allows arrangement on wall consoles or a suitable steel substructure. Outlet fittings are led out downward.

Materials: housings and connecting components PVC, PPs (on request: PE, PVDF, conductive plastics)
eliminator profiles PP glass fibre-reinforced, PVC
knitted plastic mesh PP

CONDITIONS OF USE

temperature range PVC: 0 … 40 °C PPs: 0 … 70 °C
permissible vacuum 1,000 Pa (use in overpressure range after consultation with manufacturers only)

Droplet eliminators should not be used outdoor because they may freeze up.

The applied materials have good chemical resistance to many substances. However, it should be considered that even plastics are attacked by certain chemicals.

Relevant conditions are as follows: chemical composition and concentration of media
temperature and exposure time
mechanical loading and residual stress by processing

Many applications have led to good experience with "standard materials" such as PVC or PPs. For selection of suitable materials, please specify the purpose of use of the fan and kind of medium conveyed in your request or order.

The medium can be slightly dust-laden but higher wear must be expected in such cases.

TYPE SERIES

For meeting the demands arising from the majority of possible applications, the series consists of 21 standard sizes. Every size has three types differing by the number of eliminator rows:

TRA 125/1
One row of eliminator profiles.
Use for elimination of droplets from spray nozzles mainly with large droplets.

TRA 125/2
Two rows of eliminator profiles.
The second row of profiles increases the fraction elimination degree for droplets which are smaller than the limit droplet size.
Use for a larger share of smaller droplets.

TRA 125/3
Two rows of eliminator profiles with a demister between them.
Smallest droplets are eliminated in the demister by impingement. They form bigger droplets which run downward or are eliminated in the following profile.
Use if droplets of <10 µm down to mists and aerosols (range of 1 µm) have to be eliminated.
Droplet eliminators of plastic material
Series TRA 125

Dimentioning graph

Nominal size
(width = height)

Selection criteria
Droplet eliminators are selected according to
- volumetric flow
- limit droplet size
- pressure loss
- space required
- price

Information on size of particles to be eliminated is often very uncertain. Especially in cases of aggressive gases and vapours we recommend to select an eliminator type with two or three eliminator rows.

Dimensioning example
volumetric flow: 6.000 m³/h
dimensions chosen: 630 mm x 630 mm

Flow velocity can be read from graph above: applies to all types → c = 4.2 m/s
most favourable working range 3 ... 8 m/s

Limit droplet size read from middle graph:
TRA 125/1 and TRA 125/2 → dlim = 17 µm
TRA 125/3 (with demister) → dlim = 1 ... 7 µm
All droplets whose size exceeds this limit are eliminated, those below are eliminated to a certain extent only (fraction elimination degree).

Pressure loss read from lower graph:
TRA 125/1 → Δpl = 50 Pa
TRA 125/2 → Δpl = 100 Pa
TRA 125/3 (with demister) → Δpl = 200 ... 450 Pa

Criteria demanded will usually be fulfilled with eliminators of different dimensions. Consequently, several variants should be dimensioned and compared with one another in all cases.
Droplet eliminators of plastic material
Series TRA 125
Design with eliminators inserted individually

**DIMENSIONS**

**Design BE**
The bottom of the collector tray is above the level of fitting. The extended base allows adaptation to the height of ventilation lines.

Dimension c is free to be chosen in the range of 220 ... 500 mm.
The overall assembly height in such cases is (H + c - 200) mm.

Assemble on even floor and secure against slipping.
Outlet sockets are arranged laterally.
Optional: surrounding frame for fastening to floor.

**Design KE**
The bottom of the collector tray has been made as a baseplate.
Arrangement on wall consoles or steel substructure.
Outlet sockets lead downward.

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<th>size</th>
<th>flow cross section</th>
<th>TRA / 1 1-row</th>
<th>TRA / 2 2-rows</th>
<th>TRA / 3 3-rows</th>
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Value d5 for outlet applies to standard designs only. It may be larger in case of preset spray modules.
Droplet eliminators of plastic material
Series TRA 125
Design with eliminator cassettes to be pulled out laterally

**Design BK**
- The eliminators can be pulled out laterally as complete cassettes.
- The bottom of the collector tray is above the level of fitting. The base is extended and allows adaptation to the height of ventilation lines.
- Dimension c is free to be chosen in the range of 220 ... 500 mm.
- The overall assembly height in such cases is (H + c - 200) mm.
- Assemble on even floor and secure against slipping.

Outlet sockets are arranged laterally.
Optional: surrounding frame for fastening to floor.

**Design KK**
- The eliminators can be pulled out laterally as complete cassettes.
- The bottom of the collector tray is a baseplate.
- Arrangement on wall consoles or steel substructure.
- Outlet sockets lead downward.

### DIMENSIONS

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1) Value d5 for outlet applies to standard designs only. It may be larger in case of preset spray modules.
**ASSEMBLY / MAINTENANCE**

Unless agreed otherwise, the droplet eliminator has to be arranged for horizontal flow and with vertical eliminator profiles. The direction of flow is marked by an arrow on the housing. Flow against the body has to be as uniform as possible. The flow distance without obstacles should be at least the double side length (a or b). Sharp deflections and delays right preceding the eliminator must urgently be avoided because otherwise higher pressure losses and less efficiency have to be expected.

An outlet line with sufficient dimensions has to ensure free outlet of the eliminated liquid at any time (compare outlet diameter d₅). Aftertreatment of liquids is necessary according to the type of substances dissolved. Suitable measures have to be taken to prevent admixed air streams in the outlet line (e.g. siphons, collecting vessels or submerged pipes). Submergence has to be chosen according to the vacuum on the gas outlet side of the droplet eliminator.

A valve to be arranged in the drain line must be closed during operation.

The equipment has to be easily accessible to allow convenient cleaning or, if needed, exchange of eliminator elements.

Cleaning intervals have to be specified by the user in consideration of operating conditions. The profiles have to be cleaned by water jet of no more than 60 °C with a detergent added in cases of need from above after the cover on top of the droplet eliminator has been removed. Heavily soiled profiles have to be replaced. The valve of the drain line has to be opened for this purpose.

**APPLICATION EXAMPLE: SHORT-PATH WASHER**

The figure shows the combination of a droplet eliminator of type TRA 125/2 with a rinsing module for the separation of heavily dust-laden waste air. The fine dust binds to water droplets sprayed by the solid-cone nozzles and is thus removed from the gas.

Other applications of short-path washers:

- Removal of aerosols from the gas stream (binding to sprayed liquid leading to better separation)
- Material recovery from acid bath exhausts
- Elimination of droplets from exhaust gas washing plants
Droplet eliminators of plastic material
Series TRA 125
Accessories

Pipe adapters are welded directly to the basic body of the droplet eliminator. Flanges are made according to MIETZSCH standard MWS 53030 or to customers’ special wishes.
Dimensions listed are recommended standard values which should not be fallen below for the intake side at least.

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The siphon is used to prevent admixed air streams through the exhaust air line.
Length of the submerged pipe depends on the amount of vacuum on the air outlet side. All other dimensions are adapted to the corresponding droplet eliminator.

Inspection openings are arranged in suitable positions in the pipe adapter.
The glass-clear plastic window allows inspection of the spray function.
The window is opened for visual inspection of eliminators, for cleaning and exchange of spray nozzles.
**Droplet eliminator of plastic material**

*Mietzsch Lufttechnik - Baureihe TRA*

Object:

Corrosion-resistant droplet eliminator

Design:  
- TRA 125/1 1 row of interchangeable eliminator profiles of PP
- TRA 125/2 2 rows of interchangeable eliminator profiles of PP
- TRA 125/3 2 rows of interchangeable eliminator profiles of PP and with demister arranged in between

Kind of arrangement:  
- on even floor B / on console K

Eliminator installation:  
- individual E / in cassettes K

Cleaning opening: top / lateral

Entrance connection: smooth / frame

Outlet connection: smooth / frame

Optional housing material: PVC or PP

**TRA 125 / _ - _ ___ x _ - _ _ _ _ _ _ _**

<table>
<thead>
<tr>
<th>Eliminator type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width b</td>
</tr>
<tr>
<td>Height a</td>
</tr>
<tr>
<td>Arrangement</td>
</tr>
<tr>
<td>Eliminator insertion</td>
</tr>
<tr>
<td>Material</td>
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</tbody>
</table>

Volumetric flow : ___________ m³/h

Width b : ___________ mm

Height a : ___________ mm

Length L : ___________ mm

Number of
eliminator elements : ___________

Pressure loss : ___________ Pa

Limit droplet size : ___________ µm

Temperature of medium conveyed : ___________ °C

Weight : ___________ kg

**Purpose of use of medium conveyed:**

**Special accessories and special equipment:**

- Adapter fittings and adapter ducts
- Special demister designs
- Spray module, integrated or as additional assembly
- Siphon
- Special cleaning and inspection openings
Droplet eliminator with spray module

Eliminator cassette

Short-path washing plant
Droplet eliminator TRA 125/2
Spray module with pump and receiving vessel
Radial fan VRE

Spray nozzle preceding row of eliminator profiles
Our program of products and services

Radial fans of plastic material
Direct and belt drive
up to about 80 000 m³/h and 3 500 Pa

Explosion-proof fans
according to ATEX for zone 1 and zone 2

Roof fans
of all-plastic design
with many assembly accessories

Droplet eliminators and moisteners

Gas washers
for separation of gaseous dangerous substances,
dust/gas separators

Heat exchangers
for recovery of heat from moist and aggressive
exhaust air

Containers
of PVC, PP, PE
for liquids endangering water, according to water
resources regulations, containers of composite design
PVC/GFRP, PP/GFRP

Controlling and regulating elements and systems
Switches, motor protection devices, speed controllers,
frequency inverter, fan controls, flow supervision

Special designs
of plastic materials
Devices, linings etc.

Engineeering performances
Planning, calculation, and design, ventilation
measurement on standardized test stands, low and
high temperature test in company-own climatic test
chambers

Rectangular and cylindrical silencers,
silencing casings in corrosion-proof design

Planning, calculation, and design, ventilation
measurement on standardized test stands, low and
high temperature test in company-own climatic test
chambers

Planning, calculation, and design, ventilation
measurement on standardized test stands, low and
high temperature test in company-own climatic test
chambers