



REHAU®

Profiles for Air Conditioning



Technical Information T80600 EN

Valid from December 2005 / Subject to technical modifications

Note

This Technical Information relates to the standard range "REHAU recifier and collector profiles". Details on non-standard shapes, packaging, make-ups, colours etc. can be found in the Product Range T80.200 brochure.

Area of application

REHAU collector profiles are specially developed for use in air conditioning machines. Their shape and performance data allow collection problems in this area to be solved with high degrees of collection and low pressure loss.

Material: REHAU-compounded, mineral-reinforced polypropylene with a heat resistance of up to 130°C (RAU-PP 1381).

Principle

The REHAU collector utilises the principle of the collision surface. The current of air to be cleaned is separated into individual currents, and the direction is changed. This leads to inertial forces being exerted on the water droplets, causing the droplets to collide with the profile. The droplets form a liquid film which is driven forwards by the current. The actual collection of the liquid film from the air current occurs in the phase collection chambers, where the settled liquid runs down under the force of gravity and can be removed from the system. The design of the phase chambers prevents swirling and detachment. Smaller droplets reach the next profile, and are collected in the area of the coextruded ridges or the small profile projection which is positioned behind them.

Criteria for profile selection

The degree of collection is largely determined by the size and number of droplets to be collected, the cur-

rent speed and the endurance of the gas, as well as the collector design. The wetting conditions are also a factor if plastic profiles are used, as new profiles only achieve the desired level of performance after several hours of operation. In theory, the ideal arrangement of collectors and the collector cross-section is different for every gas current. However, in practice, the cross-sections presented here maintain a constantly high degree of collection for a relatively wide range of speeds.

■ Boundary droplet

The boundary droplet is of great importance. It is the smallest droplet which is still collected. The diameter of the boundary droplet decreases as the current flow increases because of the higher impulse and the related increase in mass inertia, which is why it is limited in its ability to follow the current.

We have measured the largest boundary droplets with article 636794, the smallest with article 636804.

■ Droplet build-up

If large, visible drops form behind the collector, then we speak of build-up. Under laboratory conditions, we were only able to provoke this build-up with article 613992 at 33 mm apart, and extremely high current speed.

■ Pressure loss

Another criterion for profile selection is pressure loss. Loss in pressure is caused mainly by the profile geometry and to a lesser extent by the distance between the profiles. With a profile geometry creating lower pressure loss it is to be expected that the collection performance is worse.

Droplet groups with a high proportion of tiny droplets in the form of mist should be combined to form larger drops by means of a wire mesh or similar, to improve collection.

Collector efficiency is ultimately determined by the combined effect of profile cross-section, surface finish, pressure loss and pressure drop, degree of separation and boundary droplet size, corrosion, spacing, heat resistance and guarantee of perfect hygienic conditions.

In addition to removing moisture from the air, the collector also ensures that harmful substances which are transferred to the liquid in the air wash chamber are not emitted with the air, not least because machine parts must not be damaged by corrosion and the machine must not be turned off early because of blockages in the subsequent channels.

Examples of applications

Collectors are used:

- prior to gas washing
- between the washing stages of a multi-stage wash chamber (abrupt transfer)
- after the wash chamber in the pure gas lines
- and in other machines to avoid the build-up of droplet emissions

Examples:

- steam-drying machines
- humidifiers and air conditioning machines
- gas cleaners and washers
- drying equipment behind cooling registers
- air intake channels, including in the offshore sector
- cooling towers

The combined use of collector and rectifier profiles is possible.

Profile	REHAU air conditioning profiles, popular areas of application			Inst. depth (mm)
	Collector for air cooler	Collector for air washer	Rectifier	
613992	X	-	-	105
636814	X	-	-	106
636804	-	X	-	154
636794	X	X	X	175

REHAU air conditioning profiles properties are listed below:

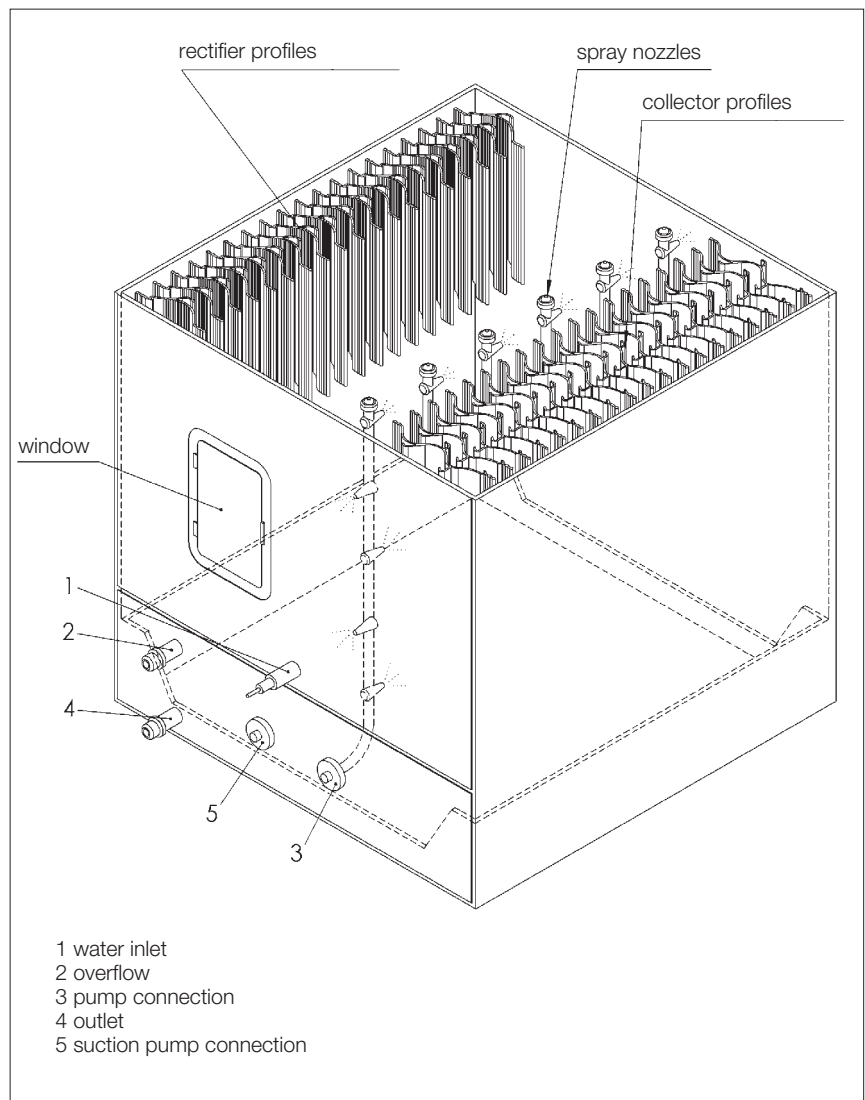
- excellent anti-corrosion properties
- hygienic
- long life
- high heat resistance up to 130°C

Profile installation

When installing the profiles, please bear the following in mind:

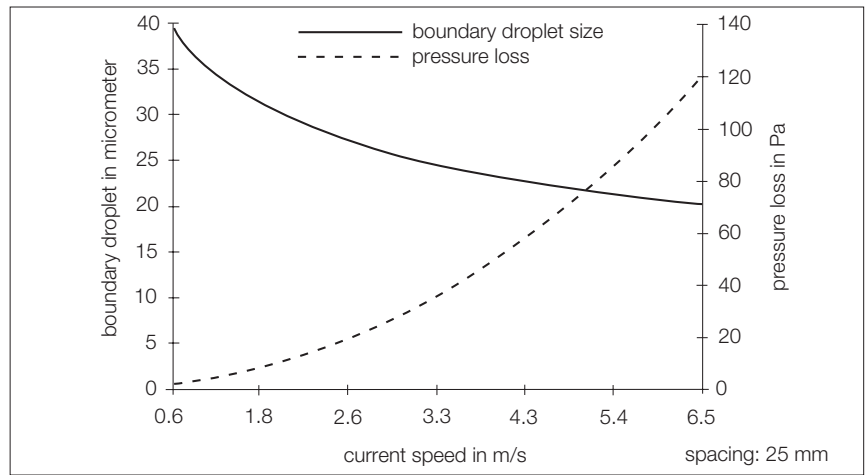
The collector profiles should end at the base of a collection trough. The collection trough should be no less than 100 mm deep, to ensure sufficient separation of liquid and gas current, and thus prevent the liquid being carried along. There must be coverings on the side walls which prevent the liquid building up. In air wash chambers, in particular, a suitable form of side and top covering is to be used to prevent uneven entry of water in to the collector.

Please note that a number of influencing factors must be taken into account in order to guarantee the optimum function of the collector. Our information is merely a guideline, and details need to be checked for specific applications.



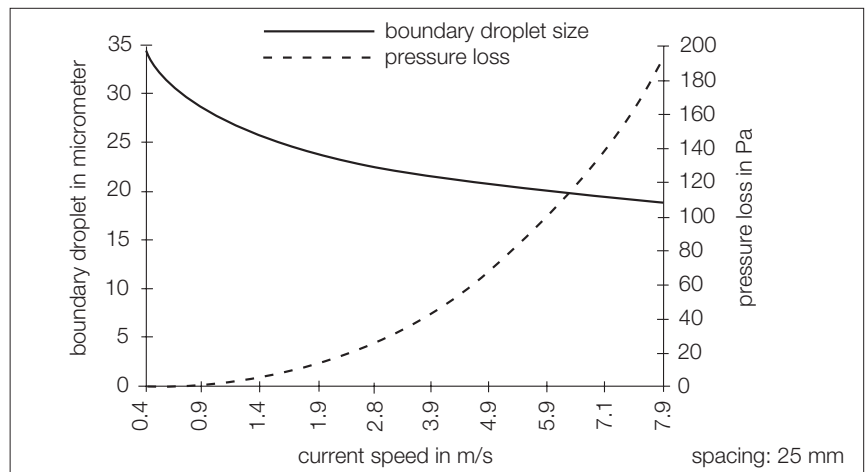
Article 613992

The preferred use of this proven article is as a droplet collector behind air coolers. In these machines, condensation builds up on the cooling ribs and is removed in drop form by the air current. Preventing build-up of condensation means that the subsequent elements and equipment is protected against corrosion. The best collection results are achieved with 1.5 - 4 m per second current speed and collector profiles spaced 25 mm apart. Good collection is still achieved with the profiles spaced 33 mm apart, however, the current speed in this case should be 2.5 - 4 m per second. In addition to low pressure loss, this article is characterised by its low installation depth, and thus space-saving construction. In addition, this article can be used as a rectifier at the entrance of the air wash chamber by rotating it around 180° (phase chamber in direction of current).



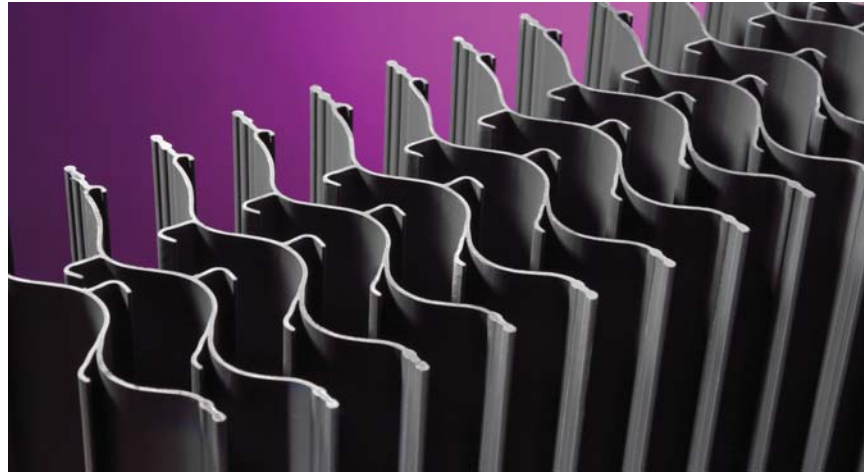
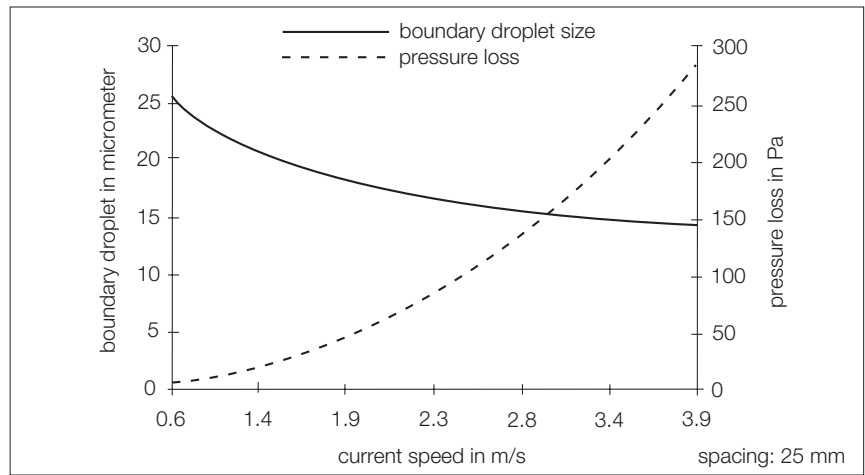
Article 636794

This article is used both in air wash chambers and behind air coolers. The profiles are usually spaced at 25 mm, and at higher current speeds good collection can be achieved with 33 mm spacing. In this case, low-cost solutions are possible because fewer profiles are needed, and pressure loss is still low. In extreme cases (e.g. collector with very high current speed of 8 - 12 m per second and very high demands on collection performance) we recommend installing two rows of profiles, one behind the other. Application in high-speed air wash chambers with 4.5 - 7 m per second and 25 mm spacing, or above this speed with 20 mm spacing if droplets are fine. Behind air coolers with 25 mm or 33 mm profile spacing and at the entrance to air wash chambers and spray dampers to create a laminar current with 33 mm between profiles as rectifier. Current speed of 4 - 7 m per second.



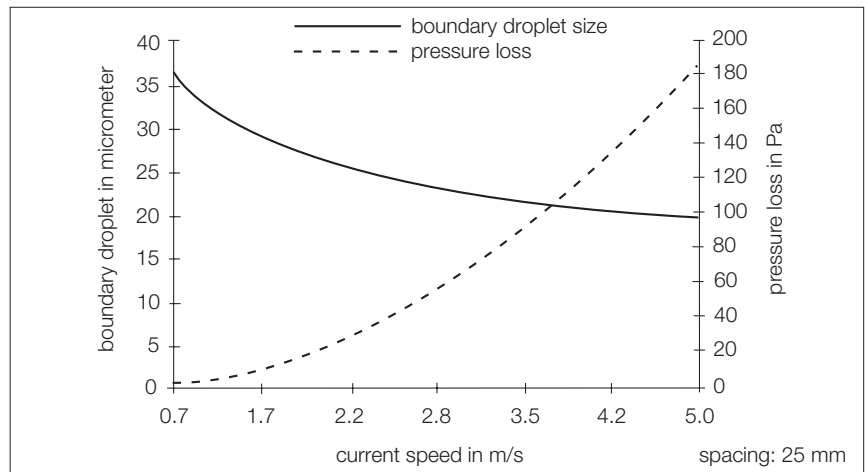
Article 636804

This article is the standard collector for air wash chambers. With spacing of 25 mm and 1 - 4 m per second current speed, attached to the damping device or positioned behind the air coolers to prevent condensation build-up, the profile provides excellent collection performance. Good results are also achieved with current speeds of above 3 m per second and spacing of 33 mm. Because of its special construction with three 90° bends (phase chambers), it is capable of collecting the finest droplets, even at low speed, and has good collection performance with excessively uneven water. However, this excellent collection function is achieved at the expense of a greater pressure loss. Because of its low sensitivity to fibres/dust particles, this article has proved particularly reliable in industrial equipment which is in danger of becoming dirty/ blocked (e.g. textile industry, tobacco industry).



Article 636814

This article is a further development to article 613992. Here, too, preferred use is as a droplet collector behind air coolers. In practice, somewhat higher pressure loss can be expected. Use is recommended at current speeds of 2 - 5 m per second and spacing of 33 mm, which means less profiles are required than in the case of article 613992. This means lower cost solutions are possible. It is possible to use the article as a rectifier.





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