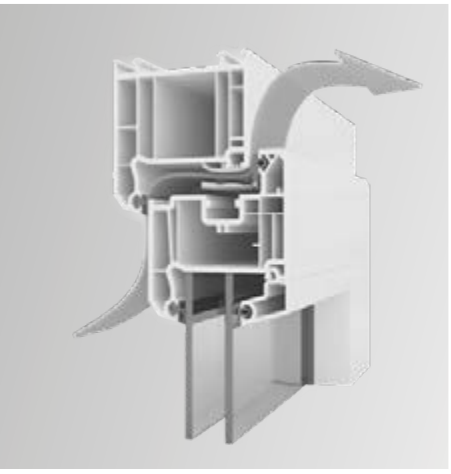
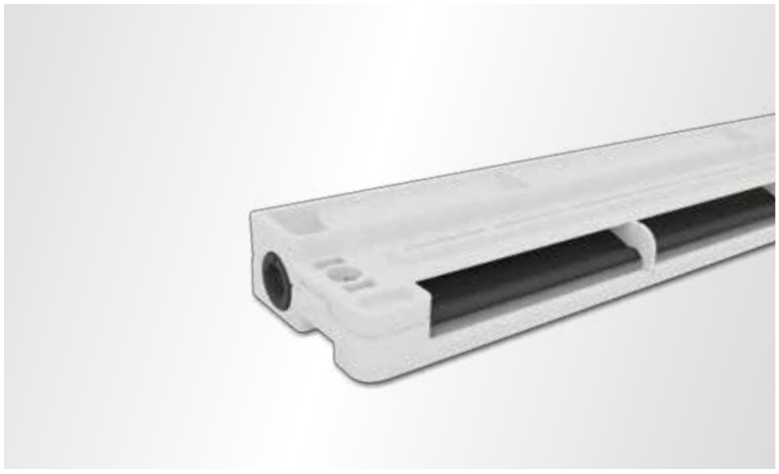
TECHNOLOGY IN MOTION

MACO VENT

VENTILATORS





Catalogue

www.maco.eu

MACO VENT

Symbols

№	Order No.
	Packing unit
L	Overall component length
	Groove width
BWA	Operating and maintenance instructions
RV	Extendable
NV	Non-extendable

MACO VENT

MAYER & CO
BESCHLÄGE GMBH
ALPENSTRASSE 173
A-5020 SALZBURG

Confirmation for retailers:

Dear Sirs and Madams,

This MACO catalogue has been prepared to provide you with a comprehensive overview of our product range. For legal reasons we must inform you that Mayer & Co is responsible only for the functionality and safety of our ventilation products.

The **responsibilty** for **correct installation** of hardware elements to the frame material (sashes and frames) and compliance with assembly instructions in this catalogue lies with the manufacturer.

Regarding correct use and proper storage please refer to paragraph 1.8 "Operating and maintenance instructions" in this catalogue.

Assembly instructions are available for download at the MACO Extranet (extranet.maco.eu) and at www.maco.at.
Instructions included on our package leaflets must be followed.

MACO provides operating and maintenance instructions to pass on to the home owner for download at www.maco.at.

Instruction for retailers:

MACO provides a sufficient number of package leaflets. The retailer must ensure that a sufficient number of package leaflets shall be included with the product. The retailer must also ensure that the customer is informed about the relevant legally binding instructions and legal aspects of this document.

It is important to check the content of this document regularly as we amend and improve it frequently. Failure to comply with instructions may adversely affect the safe operation of windows and casement doors and may result in personal injury or property damage.

We trust that we have provided you with a valuable document that will prove helpful in your daily work!

Please fill in completely!

We confirm receipt and approvingly acknowledge its contents.

Stamp:

_____
Please print your name in capital letters

Date: _____ Signature: _____

MACO sales manager: _____

MAYER & CO
BESCHLÄGE GMBH
ALPENSTRASSE 173
A-5020 SALZBURG

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MACO VENT

1 Technical and general information

1 Technical and general information

1.1 How to use the catalogue

If not otherwise specified, all dimensions are stated in millimetres and packing units in items per box.

Drawings and diagrams are not to scale.

The content of this document is constantly being updated, so regular comparision is necessary.

No liabilities are accepted for possible printing errors, mistakes or changes.

The current version is downloadable from our website (www.maco.eu).

Please send comments or suggestions about our catalogues by email to feedback@maco.eu.

1.2 Information on product safety and product liability for window

Information on product safety and product liability for window

In accordance with the manufacturer's liability for his products defined in the Product Liability Act (PHG in Austria, ProdHaftG in Germany, PrHG in Switzerland, Codice del Consumo in Italy), the following information on turn-only and turn&tilt hardware for sashes in window and window door must be heeded. Non-compliance shall release the manufacturer from this liability.

1.2.1 Product information and proper use

Turn-only and turn&tilt hardware in the terms of this definition are hardware for turn and/or tilt sashes in windows and window doors made of timber. They are used to bring windows and/or window doors to a turn position or to a tilt position that is restricted by the scissor stay design when the manual lever is operated. When closing the sash and locking the hardware, it is generally necessary to overcome the counter-force of the seal.

The sashes that are equipped with this turn-only and turn&tilt hardware can:

- turn-only
- turn and tilt or
- tilt before turn or
- tilt-only.

Turn-only and turn&tilt hardware are used on vertically installed windows and window doors made of timber, PVC, aluminium or steel and their corresponding material combinations. Proper use includes compliance with all specifications made in the corresponding product documentation.

Differing applications do not correspond to their proper use. Burglar-resistant window and window doors, windows and window doors for damp rooms and those for use in environments with aggressive, corrosive air content, require hardware that has been adapted to the particular application and specifically agreed performance features. Open windows and window door sashes achieve only a shielding function and do not satisfy the requirements for joint seals, protection against driving rain, sound absorption, thermal protection and burglary resistance.

In the case of wind and draught, the windows and window door sashes must be closed and locked. Wind and draught in the terms of this definition apply when a window or window door sash that is in one of the opening position opens or closes autonomously due to air pressure or draught and in an uncontrolled manner. The resistance against wind loads in a closed and locked state is dependent on the respective designs of windows & window doors. Should wind loads in accordance with DIN EN 12210 (in particular pressure test p3) be accommodated, suitable hardware set combinations must be agreed for the respective window design and frame material and approved individually Generally speaking, the hardware sliding fulfils the requirements for barrier-free apartments in accordance with DIN 18025, ÖNORM B 1600 or SIA 500. This requires corresponding combinations and installation of hardware sets for windows and window doors, which must be coordinated and agreed individually.

1.2.2 Incorrect use or misuse

The following cases, in particular, shall be deemed to be product misuse - i.e. utilization turn-only and turn&tilt hardware for windows and window doors for purposes other than their specified proper use:

- If obstacles are inserted in the opening area, thereby preventing proper use of the product
- Additional loads act on windows or window door sashes
- When opening and/or closing (turning or tilting), handling between the cover frame and the sash or when a person or limb is present in this area
- When the sash is not guided manually over the entire range of motion to the absolute closing or opening position
- The sash is pressed against the opening edge (window reveal).

1.2.3 Principles of liability

The relevant entire hardware set may only consist of hardware components from the MACO turn-only and turn&tilt MULTI-MATIC hardware. The component combination may neither be modified, extended nor restricted. In the case of non factory-approved combinations by and/or inappropriately assembled hardware, and/or the use of non-original and/or non factory-approved accessory components, no liability will be accepted.

All hardware for windows and French casement windows must be inspected and serviced systematically by qualified experts to ensure their functional integrity and safety. This maintenance must be carried out - verifiably and documented - in accordance with our maintenance documentation: otherwise, no liability can be accepted.

Our processing specifications in the product catalogues, installation instructions/information and leaflets are binding and must be heeded without restriction; otherwise, no liability can be accepted for the safety and/or durability of the hardware.

Where timber, PVC, light-metal or steel profiles are used, the specifications the profile manufacturer and/or system owner must be observed. The window fabricator is essentially responsible for ensuring compliance with the specified system-related dimensions (for example, the gasket gap dimensions). These specified system-related dimensions must be checked regularly, in particular when using new hardware components for the first time, and also during production as well as during the window installation process. The hardware components are designed to permit partial or full adjustment of the certain system-related dimensions, provided that the hardware can have an effect on these. Should there be a deviation from these dimensions, resulting in a fault that has not been noted prior to window installation, no liability shall be accepted for the additional expenses incurred.

1.2.4 Product performance

The fundamental principle for the suitability of use of MACO hardware is compliance with all specification in the product documentation supplied by MACO. The documents are maintained in a document management system and the current edition is available at www.maco.eu. The classification of the products according to EN 13126-8:2006 is shown at Certificates.

1.2.4.1 Maximum sash weights and sash rebate dimensions

The defined maximum sash weights for the individual hardware versions may under no circumstances be exceeded. The component that has the lowest permissible load-bearing capacity determines the max. Application diagrams, installation instructions/information and component assignments must be observed.

1.2.4.2 Hardware composition

The manufacturers guidelines regarding hardware composition (e.g. positioning of exterior handles, hardware design for burglary-resistant windows and window sashes) are legally binding.

1.2.4.3 Fixing of hardware

MACO guarantees as a hardware manufacturer and deliverer, the quality and serviceability of its products. Because of different installation situations there are no general valid instructions for the screw fixing of hardware possible. The TBDK guideline Gütegemeinschaft Schlösser und Beschläge (quality community for locks and hardware - www.beschlagindustrie.de) is usually a help for the specifications of screw fixing. This guideline is similar to a standard an industry standard for the instructions of screw fixing of bearing components.

1.2.5 Product maintenance

1.2.5.1 General

Inspection and service are fundamental components of maintenance. The verified maintenance is in turn basis for the legal warrant and/or our guarantee.

All inspection intervals and maintenance instructions must be observed. These details must be evident from the operating and maintenance instructions for the corresponding turn-only and/or turn&tilt hardware.

Settings and adjustments for the hardware, as well as replacement of components may only be carried out by specialists. Similarly, inserting and/or removing the sashes may only be carried out by specialists. When treating surfaces - e.g.: painting or glazing windows and window doors, all hardware components must be excluded from this treatment and protected to prevent contamination.

1.2.5.2 Retaining the surface quality

The electrolytically applied zinc coatings are not affected in a normal room climate if no condensation collects on the hardware components (or occasional condensation can dry off quickly). To retain the surface quality of the hardware components over the long term and prevent damage due to corrosion, it is essential to observe the following points:

- The hardware and/or the rebate areas must be ventilated sufficiently – in particular during the building phase – so that they are not exposed to direct wetness impact or to condensation. If systematic ventilation is not possible, because fresh screed cannot be accessed or does not tolerate draughts, bring the windows to the tilt position and seal them off air-tight at the room side. Use condensation dryers to remove any humidity from the room air to outside the area.
- The hardware must be kept free of deposits and soiling through construction material (building dust, gypsum plaster, cement etc.). Aggressive vapours in the rebate area (e.g.: due to formic or acetic acids, ammonia, amine or ammonia compounds, aldehydes phenols, tannic acids, etc.) in conjunction with small formations of condensation can lead to fast corrosion on the hardware components. If such aggressive vapours do occur, a sufficient supply of fresh air to the rebate areas must generally be provided for windows and window doors. This applies in particular to windows and window doors made of oak or other wood types that have a high share of tannic acid. No acetic-acid or cross-linked acidic sealing compounds or those with the above mentioned contents may be used, since both direct contact with the sealing compound and its vapours can attack the surface.
- The hardware may only be cleaned with mild, pH-neutral cleaning agent in diluted form. Never use aggressive, acidic cleaning agents or abrasive cleansers that contain the ingredients listed in the section above.

1.2.6 Information and instruction duties

The following is available to comply with information and instruction obligation duties and perform maintenance work in accordance with the product liability legislation:

- for dealers: Catalogues, operation and maintenance instructions, installation instructions/information and leaflets for components
- for processors: Catalogues, tool drawings, operation and maintenance instructions, installation instructions/information and leaflets for components
- for owners and end users: Operating and maintenance instructions

To ensure the functional integrity of sliding hardware for the sashes of window and window doors:

- Designers must request all relevant product information from the manufacturer and observe the details provided.
- Specialised dealers are obliged to comply with all relevant product information and, in particular, request installation instructions/information, factory drawings, component leaflets, as well as operating and maintenance instructions from the manufacturer and hand these over to the processors.
- Processors are obliged comply with all relevant product information and, in particular, request operating and mainte-

nance instructions from the manufacturer or specialized dealers and forward these to the end user.

All above mentioned reference material is available for download from the MACO website (www.maco.eu).

1.2.7 Application for similar hardware

Hardware for sliding folding doors must be treated analogously with respect to product information for proper use, misuse, product performance, product maintenance, information & instruction obligations as the features apply.

1.2.8 Disclaimer

The manufacturer's liability can also be excluded, among other things:

- If the fault is attributed to a regulation or an official ruling, to which product compliance was stipulated.
- Characteristics of the product, which have given rise to the claim (against the manufacturer), could not be identified as a fault according to the conditions of science and technology at the time.
- The claim (against the manufacturer) only involves a basic material or a part product that was manufactured, and the fault is due to the construction of the product that was incorporated into the basic material or the part product, or as a result of instructions issued by the manufacturer of this product.

In connection with Section 1.2 and its subsections, the guideline - Hardware for windows and balcony doors - Guidelines/ advice on the product and on liability (VHBH) of the Quality Assurance Association: Locks and Hardware (Gütegemeinschaft Schlösser und Beschläge e.V.) must be observed. Download at www.beschlagindustrie.de.

1.3 Information on product safety and product liability for ventilation

1.3.1 Legally binding information

The following information is binding and must be followed by all users of the ventilation products. The following information for the selection and operation of appropriate facilities providing for the disposal of pollutants in breathable air, even indoors.

The principal requirements for respiratory air ventilation is based on the requirements of DIN 1946-6.

The information given is intended primarily for topics concerning

- Regulating room temperature or dampness
- Room ventilation exacerbated by the presence of people.
- Room ventilation improved by the absence of people.

Changes to indoor air quality can have the following effects

- Body odour
- Tobacco smoke
- Cooking, showering, laundry washing
- CO_2 content changes due to exhaled air
- Influence due to defective gas heaters

1.3.2 Terminology definition

The provisions for ventilation is described as follows in section 1.2.2.1 - 1.2.2.11.

1.3.2.1 Living space ventilation

The replacement of impure or contaminated air with clean air by free or mechanical ventilation.

Systems are differentiated by supply and exit air systems via individual devices or central equipment and supply, exit air as well as air supply and exit air systems on a mechanical basis.

1.3.2.2 Air contamination

This concerns the undesirable addition of moisture accumulation, gases, particulate matter, volatile heavy metals , vapours , aerosols , dust or smoke. The smoke hereby accounts for chemical or thermal processes due to solid particles. In general this accounts for some of the dust composition. Of particular note are hazardous substances, in accordance with § 3-5 Hazardous Substances Act.

1.3.2.3 Explosive atmosphere

Explosive atmospheres therefore arise from mixtures of gas , vapour, mist or dust under atmospheric conditions with air.

1.3.2.4 Free ventilation

Natural ventilation involves the ventilation of room air with outside air due to pressure differences. This can take place via wind pressure or temperature differences. According to DIN EN 1946-6, openings must be created for incoming and outgoing air in the room.

1.3.2.5 Mechanical ventilation

In the case of mechanical ventilation air delivery is leveraged by fans or exit air elements.

Types of machine ventilation can be:

- Extraction - localised mechanical air removal
- Air-conditioning system - mechanical air delivery to meet air-conditioning requirements

1.3.2.6 Exit air

Describes the air discharged from the room.

1.3.2.7 Outside air

That from the outdoor air, i.e. from the free air drawn inwards.

1.3.2.8 Exhaust air

Described as discharged air which is diverted to the outdoors once again. It should be noted that any short-circuit between the supply air and exhaust air is to be prevented.

1.3.2.9 Supply air

This is the air supplied throughout the whole building.

1.3.2.10 Circulating air

This is the exit air which is used in an-air conditioning system as supply air and partly cleaned again.

1.3.2.11 Air flow volume

The air volume V is referred to as air flow and describes the amount of delivered air per unit of time (m^3/h , m^3/s , l/s).

1.3.3 Requirements for air in living space

In living spaces, the air must be such that

- in the breathing zone no health risks may be present
- There can be no combustible air contaminants which can lead to fire or explosion in the target living space ventilation area.

Materials which may risk leading to explosive atmospheres are:

- Solvents when using cold cleaners, various gases, adhesives, plastics, various types of fertilizer, outgassing of materials
- Carbon monoxide forming and carbon dioxide forming substances
- Fumes from motor gasoline
- Fly ash from coal, aluminium, magnesium, flour, timber
- Paint and colour coating powder in layers

Ventilation provisions are always to be carried out as state-of-the-art. This can also be to the extent that full coverage is not possible. Ventilation provisions of any type are ventilation systems that are effective in the whole or a part of the premises. A ventilation measure is carried out in such a way that the dilution or displacement of polluted room air takes place.

1.3.4 Requirements for mechanical ventilation

The supply air during mechanical room ventilation consists of 100% outside air. For energy reasons, the outside air can be purified via filtering stages or processed by providing opportunities for preheating.

According to DIN EN 1946-6, it is assumed that the exterior air component supplied is calculated so that the air supply for the room is sufficient at all times.

1.3.5 Free and mechanical ventilation

For free and fan-assisted ventilation, the quality of the supply air cannot be influenced. In this case the supply air always corresponds to the quality of the external air.

1.3.6 General information regarding supply air and exit air

The requirements for air pollution carried along and in terms of external influence of noise emissions are to be considered in relation to both the supply air and outgoing air.

1.3.7 Air control measures

1.3.7.1 Ventilation installations

This must be dimensioned in such a way that optimal air exchange takes place despite fluctuating weather conditions. Structural conditions in the form of narrow or windowless rooms, various operating loads, basement areas etc., can significantly influence operation. In this case, the supply and exit air channels must be arranged in such a way that the air channel covers all exposed areas allowing replacement with fresh air. Cross sections and sizes of openings for supply and extraction units shall be chosen in such a way (see calculation tool) that effective ventilation is guaranteed even under unfavourable conditions.

Openings shall be provided with safe -to-use control devices to allow for regulation of the supply and exit air streams.

1.3.7.2 Mechanical ventilation systems

Systems for mechanical ventilation are based upon requirements for supportive ventilation with fans. Fans shall be sized so that they assure the required operating conditions. The design depends on the air flow rate, the air density and the flow resistance of the ventilation system.

Fans must be designed with reference to corrosion and wear conditions, so that the use of proper protection methods and the design of the flow rate play a significant role.

- The degree of protection must be carried out in accordance with the requirements of EN 60529 "Protection methods provided by enclosures (IP Code)"
- Avoidance of hazards via electrostatic charge (German BG rule)

Harmful and explosive atmospheres may be reduced by ventilation provisions. Here, however, there is no guaranteed method to avoid dangerous or explosive atmospheres. If such a situation arises, everything possible should be done to take adequate steps to isolate the cause as soon as possible. Protective measures can be largely dispensed with, if it can be guaranteed that dangerous or explosive atmospheres cannot form or be apparent at any point and at any time.

In the case of dust deposits of any kind, ventilation provisions generally afford only adequate protection if the dust is extracted at the point of origin and additional dust deposits can be prevented.

1.3.7.3 Organisational measures for operation of mechanical ventilation systems

Works involving the maintenance and cleaning of the ventilation system, dealing with faults and testing the operating instructions should be carried out according to manufacturer specification.

1.3.7.4 Intended operation of mechanical ventilation systems

The ventilation system may under no circumstances be taken out of service without authorisation, additionally the ventilation system must be operated as intended.

As a general rule, sensing elements are designed so that they guarantee the detection of air pollution. The air supply must be devised in such a way that draught occurrence is best avoided.

1.3.7.5 Maintenance and cleaning

Maintenance and cleaning of air conditioning systems must be performed regularly. To this end the maintenance and cleaning schedules are to be observed and adhered to. After setting up the system, the cleaning instructions of the supplier or manufacturer must be observed.

The scope and frequency of maintenance, inspection and cleaning depend fundamentally on

- The type and quantity of air pollution
- Size and type of plant
- Application suitability / range

1.3.8 Testing

The functionality of ventilation systems must be checked at regular intervals. Checking a system also implies simultaneously cleaning it.

The system must be checked before commissioning to ensure proper installation, function and deployment. The system must be cleaned and serviced at regular intervals, according to manufacturer's instructions at least quarterly (see German BWA 6.2) In cases of modification or major interventions into the ventilation system, a competent person must inspect the system for operability. If the system is modified, the following situations can arise:

- Replacement by different system parts
- Change to air openings, sensing elements and channels
- Expansion or reduction of a system

A test report or a list of results must be completed for proper confirmation.

If a CE mark is present which leads to modification of the system that does not conform to the intended purpose of the system or not to the data specified in the manufacturer instructions then a new system with new application and specification areas is to be put in place. This must then proceed via a professional i.e. a knowledgeable technician who has specialised training and experience in the system, assessed according to the generally accepted rules of technology or according to work safety regulations and prevention of accidents and then checked again.

1.3.9 Heat energy recovery in mechanical ventilation systems

Above all in colder seasons, ventilation between outside and room air leads to energy losses. However, this may be offset by energy management influences.

- Supply of electric energy - again with some energy consumption.
- Use of thermal radiation - use of the available thermal radiation of the interior on the window unit.

For the supply air heating, the ratio of radiant heat of the indoor air to the incoming exterior air is used. Depending on the temperature conditions, a different preheat rate of the fresh air supply is possible. This heating requires, contrary to pure heat recovery systems , no additional energy supply in the form of electricity and primary energy.

1.4 Condensation

According to the standard DIN 4108-2 : 2013-02 (heat insulation and energy saving in buildings - minimum requirement for thermal insulation), the formation of condensation is temporary and permitted in small quantities on windows, if the surface cannot absorb moisture.

Condensate formation on component surfaces is substantially influenced by the absolute water content of the room ventilation and the surface temperature of a component. As soon as the surface temperature (dependent on the moisture content in the air) drops below the dew point temperature, condensation builds up.

Therefore, low levels of dew formation can also occur when using ventilation elements in exceptional cases. This is not a defect , since the resulting condensate is discharged via drainage slots again.

The condensate in the window rebate may occur with large temperature differences between indoor and outdoor air when the ventilation elements are operated in cross ventilation and in the slow flowing room ventilation on cold component surfaces.

In order to best avoid the occurrence of condensation in the window rebate, the professional design and proper function of the cross ventilation is to be inspected and guaranteed.

- Correct installation of ventilation elements
- Optimal function of the air channel according to manufacturer specification
- Regular cleaning of air supply see 1.2.7.5
- Windows on at least two sides of the façade each with properly sized ventilation elements
- Interior doors not kept closed as far as possible (air passage within the living spaces; the undercut must be set to at least 7 mm ground clearance across the entire door panel width)
- Correct heating of the individual rooms

In the case of high moisture levels, additional booster ventilation must absolutely be provided since the formation of condensation on the window or the window rebate may arise due to the following factors:

Indirect heating processes

- Rarely used rooms such as store rooms, bedrooms, etc.

Convective heat transfer

- Heat transmission by radiation to the component surfaces

Increased accumulation of moisture

- Drying laundry indoors
- Washing laundry indoors
- Many plants
- Above average number of inhabitants
- Humidifiers etc.

For well-functioning ventilation, a minimum air flow rate is to be enabled according to the living space and usage pattern. Influencing factors must be taken into account in order to enable this

Negative influences on the room ventilation canoccur due to the following factors:

- Shutters which are completely closed day or night.
- Fly screens
- Bulky items in front of the windows
- Curtains and Draperies

1.5 Information on transport and handling of window units

Improper handling and improper transport of the windows and/or casement door elements can produce hazardous situations and cause serious accidents or lethal injury. To prevent this, the following instructions must be heeded:

- During loading and unloading, select force application points which exclusively create reaction forces appropriate to the designed layout of the hardware components for the intended installation location.
- During handling and transport, ensure that the hardware is in the locked position to prevent the sash from opening unexpectedly. Use suitable securing equipment to do this.
- Use only transport fastenings designed for the respective clearance.
- Wherever possible, transport the windows in the intended installation position. If transport in the intended installation position is not possible, unhinge the sash, and transport it separately from the frame to which it belongs.
- During transport, loading, and unloading, especially if auxiliaries such as suction cups, transport nets, forklifts, or cranes are used for support, reaction forces may arise which could damage or overload the installed hardware. Therefore, observe the following instructions during all transport, loading, and unloading.
- The type and the force application points when transporting, loading, and unloading have a significant effect on the reaction forces which arise.
- Always choose the force application points so that the resulting reaction forces are dissipated appropriate to the design of the hardware components for the intended installation location. This applies particularly for the hinge positions.
- During transport, loading, and unloading, especially if auxiliaries such as suction cups, transport nets, forklifts, or cranes are used for support, reaction forces may arise which could damage or overload the installed hardware.
- Always use transport securing measures appropriate to the actual clearance (e.g. spacer blocks), in order to hold the sash in the intended position in the frame during transport, and thus to dissipate the resulting reaction forces directly from the sash via the frame.
- Wherever possible, always transport window elements in the intended installation position, so that the resulting reaction forces are dissipated appropriate to the designed layout of the hardware components for the intended installation location. This applies particularly for the hinge positions. If transport in the intended installation position is not possible, unhinge the sash, and transport it separately from the frame to which it belongs.

1.6 Classification according to standards and guidelines

1.6.1 DIN EN 1946-6

Minimum requirements according to DIN EN 1946-6

The DIN 1946-6 standard was disclosed in a newly regulated form in May 2009. The most important element of a dense construction is permanently functioning ventilation to support a fully sealed construction for renovated or new constructions (regulated under the Energy Saving Ordinance (EnEv) 2009, DIN 1946-6). According to EnEV 2009, the primary energy requirement must not be exceeded in the reference building. A central exit air ventilation system to supply exit air is required as indicated with a regulated DC fan. DIN 1946-6 itself both regulates and differentiates measures applicable to ventilation.

The DIN 1946-6 standard applies fundamentally both for passive and fan-assisted ventilation of residential units or occupied spaces. The Standard regulates planning, implementation and commissioning. Two substantial fundamentals apply here. It is necessary to produce a ventilation plan for new or modernised buildings with modifications to the ventilation systems. Changes to ventilation are required therefore, if the renewal of at least 1/3 of the roof surface or the replacement of at least 1/3 of all windows takes place.

1.6.2 EnEV 2009 and 2014

Regulation as set out by EnEV 2009 and 2014

The abbreviation EnEV stands for the German Energy Saving Ordinance for private and commercial building construction (residential and commercial). This forms the legal basis for limiting maximum energy consumption requirements for buildings. The German Thermal Insulation Act 1995 (WSchV) and the German Heating Systems Act (HeizAnlV) have been combined and standardised within the framework of the Energy Saving Ordinance.

The initial unification of the Energy Saving Ordinance was defined in 2002. The second version came into force in 2004, the third in 2007 and the final version in 2009. EnEV 2014 was adopted on 16/10/2013 by the Federal Government. The applicable version for 2014 will come into force in May.

The applicable energy conservation regulation must be taken into account nowadays when building, extending or renovating. The Energy Saving Ordinance (EnEv) applies in the whole of Germany already and from 2016 in Austria. The individual federal states are hereby responsible for its implementation. The proposed amendment by the federal government (EnEV 2014) was confirmed from 16th October 2013 onwards. This came into force subsequent to publication in the Federal Gazette approximately 6 months later (early summer 2014). It was thereby defined that the Energy Saving Ordinance (EnEv) 2014 requires an increase in adherence (to the energy requirements) for renovation and new construction from 1st January 2016 to 25 percent of the regulated energy conservation requirements (EnEV 2009).

1.6.3 DIN EN 18017-3

Requirements in accordance with DIN EN 18017-3

This was disclosed in September 2009. The regulated standard DIN 18017-3 defines specifically the exit air spaces in the sense of ventilator assisted bathrooms and toilet rooms without exterior windows. These are usually provided as standard in renovation and new construction. DIN 18017-3 describes how the volumetric exit air flow can be reduced by half with low air requirement (less than 12 hours per day). In addition, the standard specifies that the exit air volumetric flow corresponding to the outdoor air flow can flow through leaks in the building shell and / or outside air openings. Preliminary determinations must therefore clarify whether there is enough air flow by infiltration. To avoid such, an additional slipstream via outdoor air passages must be allowed for. The diagram part 4.2 according to DIN 18017-3 is used as a basis

1.7 Standards for burglary resistance

1.7.0.1 Deterring burglary according to ÖNORM B 5338/ S 6055 1-4 and German industrial standard DIN-V ENV-V 1627-30 including FFV

Fittings in accordance with the previous opening types texts (see A-M); Burglar-resistant implementation according to ÖNORM or DIN, 1.2 or resistance classes . 3

Note: These standards dictate a complete examination of the-finished window.

This includes the following areas:

a) Glazing

b) Hardware

c) Assembly and/or securing the window within the wall

The inspection should normally be implemented by the processor. We can provide a test certificate under certain conditions. The hardware must be matched properly to the material used. Our technical advisers are available for any additional information.

1.8 Tender specifications

"Window rebate valve with automatic volumetric flow rate control and active / inactive switching for PVC windows"

Physical building requirements for apartment ventilation

In order to control the relative humidity in the apartment and to improve air quality, the window rebate valves must be installed in the frame to counter wind pressure.

The following requirements must be met here:

- When introducing the venting mechanism, the window must not optically altered on the interior or exterior.
- With the windows closed the ventilation holes must not be visible in their open state, however they must be accessible and easy to clean.
- It must be ensured that that the windows can be shifted back to their original state, both optically and functionally again.
- For hygiene reasons, additional milling is not permissible due to the risk of contamination and pollution.
- The air entering the living space should be at the top of the window. The fan floor must be smooth and should not be vulnerable to dirt or mould.
- The control flaps must not be made of metal in order to deter condensation from forming on them.
- To avoid draughts as far as possible, it must be verified that a clear reduction in the amount of air from an air pressure of greater than 20 Pa takes place.
- The automatic wind pressure control should be below 50 Pa. If requested, evidence of the fan performance testing according to DIN 13141-1 must be submitted.
- From higher wind speeds of at least 20 Pa, the window rebate valve must independently minimise the pressure by valve switching.
- According to DIN 1946-6, para. 9.1.2.2 an air permeability value of 5 m3 / h at 10 Pa. shall not be exceeded in the closed state of the window rebate valve.
- Watertightness up to 600 Pa. must be ensured in accordance with DIN EN 12208.
- Evidence of airborne sound insulation as per EN ISI 1 0140-1 and -2, must be provided upon request according to the requirements.
- Self-tapping screws to DIN 7504 N should be used for ease of installation of the window rebate valves,
- The plastic used exhibits the property that the strength of the flap valve is ensured even at higher air pressures.
- Unless the individual items are not requested in a different form, all sash units with window rebate valves are to be equipped according to the manufacturer guidelines and assembly instructions.
- Window rebate valve MACO VENT Basic or similar.
- The materials used must be free from PVC parts.

1.9 Operating and maintenance instructions

1. MACO concealed window valve

The concealed window valve is a reliable, durable and above all, largely maintenance free ventilation product. The air inlets automatically regulate the airflow into the interior. Flaps serve to limit the airflow depending on wind and weather conditions. This means fresh air is evenly distributed into the living space.

2. Product liability advice

- Your window is equipped with a concealed window valve. Operation is straightforward and trouble-free; nevertheless you should read and observe these instructions carefully.
- In your own interests; please do not forget to read the hazard and safety information (under point 5).
- Keep these operation and maintenance instructions safe in case they are needed and also inform other users of the contents of these instructions.
- Please observe the operating instructions and maintenance information in order to ensure that your concealed window valve works for many years to come.
- When used correctly, the ventilation product serves to prevent mould and moisture damage according to DIN 1946-6.

3. Functional areas in detail

Suitable for fresh air supply and exit air	**Wind and weather** No draughts in windy	
Suitable for living rooms	**Security** The window remains closed	
Also suitable for use in bedrooms	**Pests** No access	
Ventilation during periods of absence Optimal minimum air exchange	**Heat** Controlled fresh air replenishment	
Humidity Moisture removal		

TECHNOLOGY IN MOTION

4. Interlocking mechanism

The valve can be locked by means of an actuating mechanism. Once the valve is locked, the minimum ventilation to prevent moisture damage is no longer ensured. Fresh air still flows in, but is kept to a minimum.

Permanently locking the ventilation flap can lead to a high increase in air moisture, thereby causing serious moisture damage.

5. Hazard and safety information

5.1 Never seal up

Never seal the air inlet with adhesive tape or other means of covering. Doing so would cause the fresh air supply to be interrupted and thus lead to changes in the ambient air (increased moisture, bad odours or mildew and bacterial growth).

5.2 Never use aggressive cleaning agents

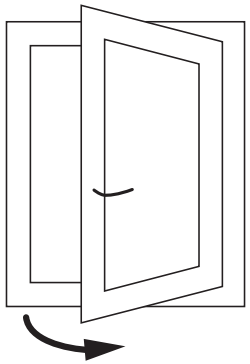
MACO VENTILATION

MACO concealed window valve operating and maintenance instructions

PVC

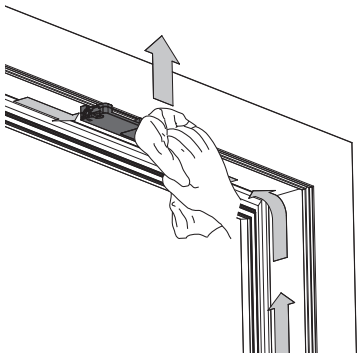
6. Operating and maintenance instructions

6.1 Open sash.

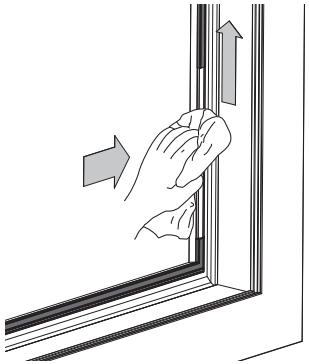


6.2 Clean MACO concealed window valve every three months using a cleaning cloth.

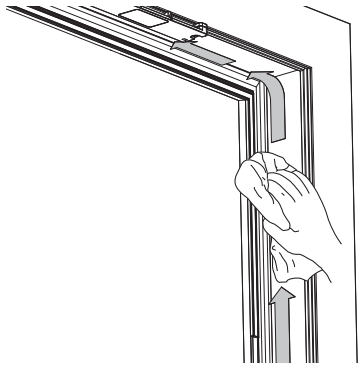
Fully remove moisture at least 1 x per month when using as a vertical transverse flow system.
Clean the window rebate and the air inlet area with a cleaning cloth.
Remove dust particles / water droplets.
Take care not to damage the PVC parts



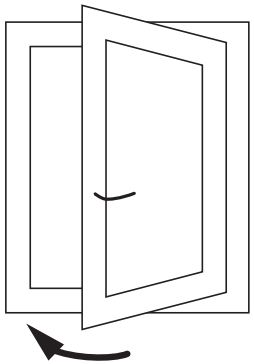
6.3 Clean air inlet area.



6.4 Clean window rebate area.



6.5 Close sash.



7. General advice for your room climate

- All window elements should serve for additional ventilation when you are present.
- Vertical transverse flow is the most effective window ventilation (5 – 10 min. per procedure).
- Each ventilation process serves to exchange the air in the room, however, excessive ventilation can lead to cooling of the walls, ceilings and floors (excessive energy loss).

8. Further information

Please scan the QR code to obtain further information about our products:

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E-Mail: maco@maco.at
www.maco.at

MACO DOOR & WINDOW HARDWARE(U.K.) LTD
EUROLINK INDUSTRIAL
CENTRE CASTLE ROAD
SITTINGBOURNE KENT ME10 3LY
TEL +44 (0)1795 433900
FAX +44 (0)1795 433902
enquiry@macouk.net
www.macouk.net

Order no. 757052
Date: April 2014

MACO VENT

Technical and general information

Tender specifications

1.10 Certificates and test results

1.10.1 Overall classification for concealed window ventilator

1.10.1.0.1 Results of the joint and watertightness tests
Measured differential pressure according to DIN 1946-6 in Pascal [Pa] to determine the volumetric air flow rate [in m^3/h] *

- **Joint permeability according to DIN EN 12207**

→ Class 3 - unfixed fan

→ Class 4 - fixed fan

- **Soundproofing up to 43 dB according to**

→ DIN EN ISO 10140-1 +A1

→ DIN EN ISO 10140-2

→ DIN EN ISO 10140 717-1

- **Watertightness according to DIN EN 12208**
- **Ventilation properties according to DIN EN 13141-1**

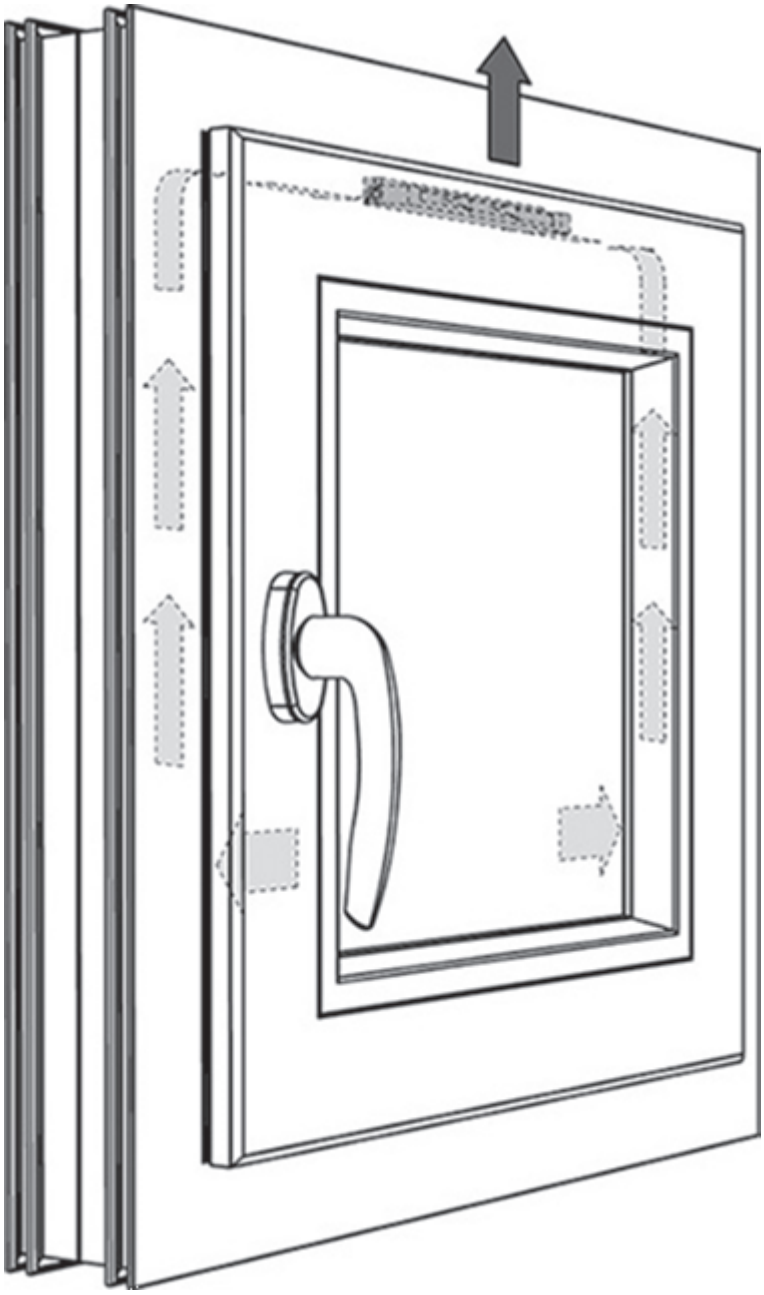
DIN 1946-6 [Pa]	2 Pa	4 Pa	8 Pa	10 Pa
1 pair MACO ventilators	3,1 m^3/h	4,0 m^3/h	5,5 m^3/h	6,5 m^3/h
* Switching action and air performance may vary depending on profile and hardware.				

1.11 Functional description

The MACO concealed window ventilator is a passive ventilation element that enables air exchange between outside air and inside air. Due to pressure differences the air flows generally inside a room.

The permanently active air flow controller limits air supply automatically at high wind speeds (above 21 km/h). Strong drafts are thus prevented. Operation is based on aerodynamic principles.

At low wind speeds (below 21 km/h) the ventilator opens fully and enables maximum supply of fresh air.



1.12 Assembly instructions

For assembly instructions please refer to package leaflets or download comprehensive information at www.maco.at/maco-vent.

2 Functionality for ventilation operation

2 Functionality for ventilation operation

2.1 Purposes of room ventilation

Ventilation of a residential unit must always be considered from two aspects:

- Energy
- Hygiene

Ventilation therefore, does not only involve moisture dissipation aspects.

Ventilation control in an apartment is necessary from several viewpoints.

- Constant room air moisture
- Continual replacement of interior air
- Supply of the required air supply for fan driven exit air systems.
- Air supply for fireplaces.

Types of natural ventilation:

Natural ventilation via joints and windows

Joint ventilation is known in the trade as infiltration. This includes all air leakage points in the building shell. The reason for such "air holes" is usually due to unavoidable structural engineering transitions and connections in wall and roof areas, but also leaks in window and door areas.

Types of joint ventilation:

- Window joints
- Building component connections
- Roller shutter housing
- Open fires
- Shafts
- Roof hatches
- Electrical installation trunking
- Kitchen ventilation

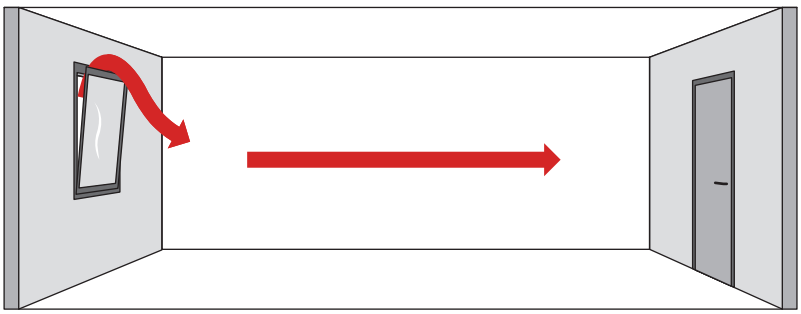
Prior to 1995 infiltration was responsible for the majority of the household air exchange. With older buildings air exchange rates between n = 0.3 to 1.0 h -1. can be assumed. For new and renovated buildings the air change rate is much lower which is in the order of n = 0.1 h -1. This air exchange is no longer sufficient without additional ventilation provisions.

Window ventilation takes place by means of manually operable ventilation. This represents the most time-consuming yet the most effective ventilation method. Air temperature, air humidity and air velocity can thus be difficult to control. The highest energy losses occur by opening the window for too long (e.g. by forgetting) accompanied by quite significant cooling of wall and ceiling areas.

In contrast, structural damage can also be caused by too seldom or too little ventilation. This results in condensation damage or even mould formation.

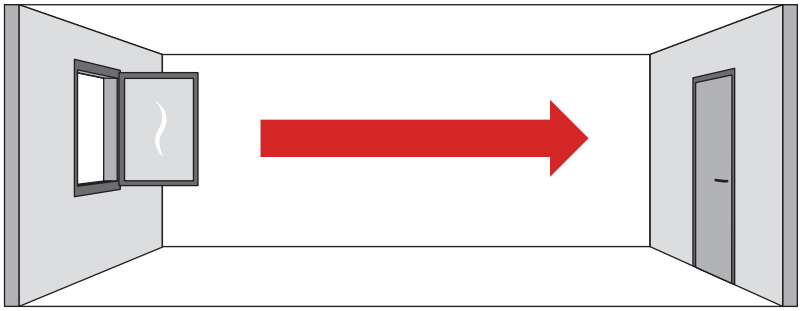
Night-ventilation

The window element is brought into the tilt position. This type of ventilation enables only a minor exchange of air, encouraging to keep the tilt position for many hours. The resulting negative effect is that exit air is not removed sufficiently despite the slightly open window. As the window reveal is cooling down condesation may occur! **Duration app. 1 hour**



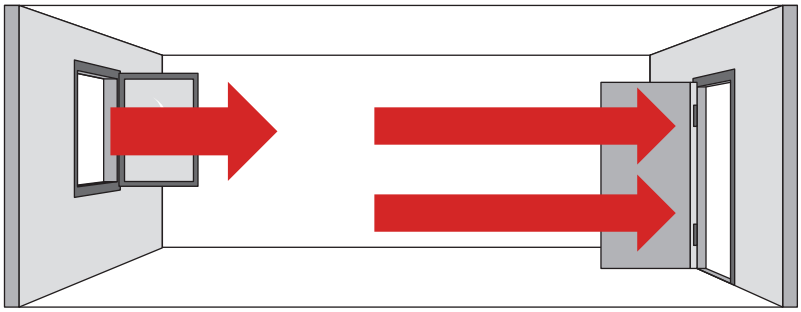
Shock ventilation

Shock ventilation requires the window sash to be opened fully (turn position). The inside air is exchanged completely within 5 to 10 minutes. The relatively short opening duration minimizes energy loss and reduces cooling down of the window reveal.



Cross ventilation

Cross ventilation is the most efficient form of manual ventilation. Within 2 to 5 minutes the entire air in the living unit is completely replaced. It is important to keep all windows and doors fully open during the entire process.



2.2 Modes of ventilation operation

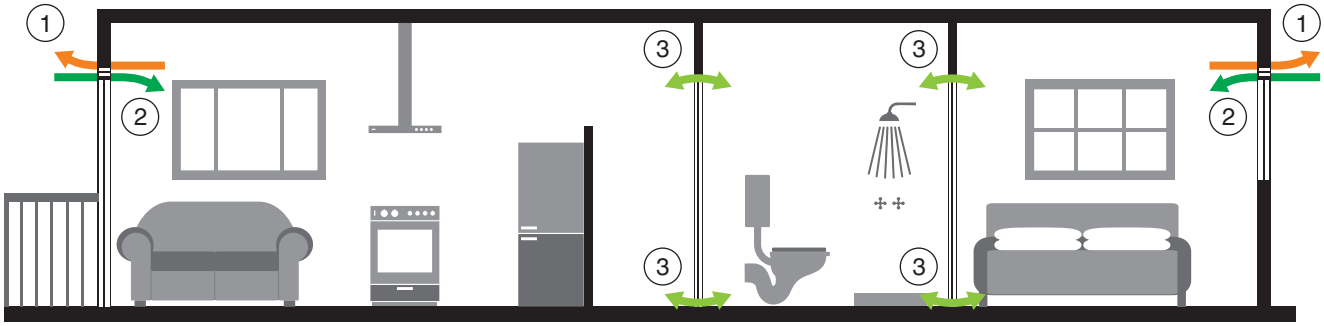
The intended ventilation specialists or those already involved (window manufacturers etc.) should always include the values pertaining to the "determination of ventilation for moisture protection " in their offer. Only from this stage onwards is the professional concerned under obligation to fulfil the requirement for ventilation provisions. In order to determine the correct air flow according to DIN 1946-6 and DIN 18017-3, please contact the respective MACO country office.

Notes:

Architectural influences, such as location, environment and implementation of structural engineering measures may influence the performance and effectiveness of the ventilation of a building.

2.2.1 Cross ventilation

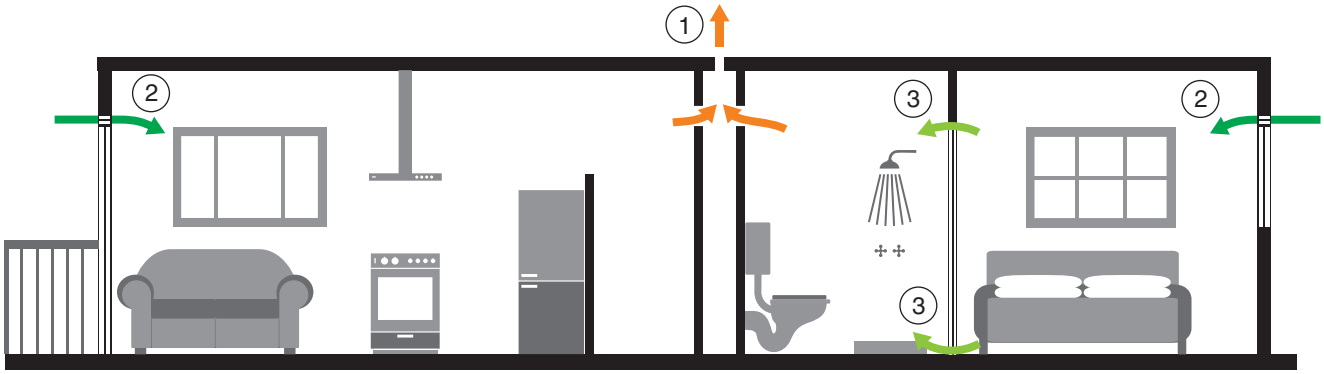
Example apartment



1. Exit air; 2: Supply air; 3. Air flow

2.2.2 Shaft ventilation

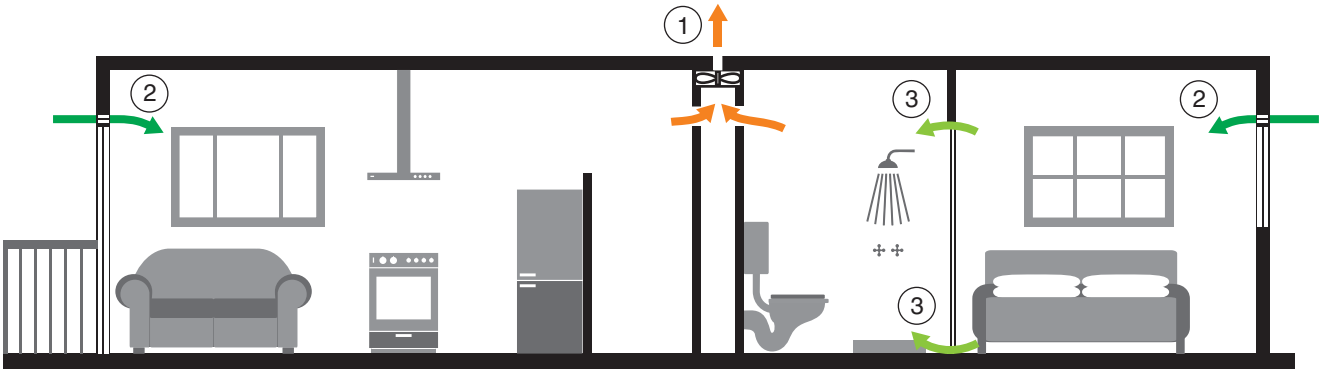
Example apartment



1. Exit air; 2: Supply air; 3. Air flow

2.2.3 Fan-powered ventilation

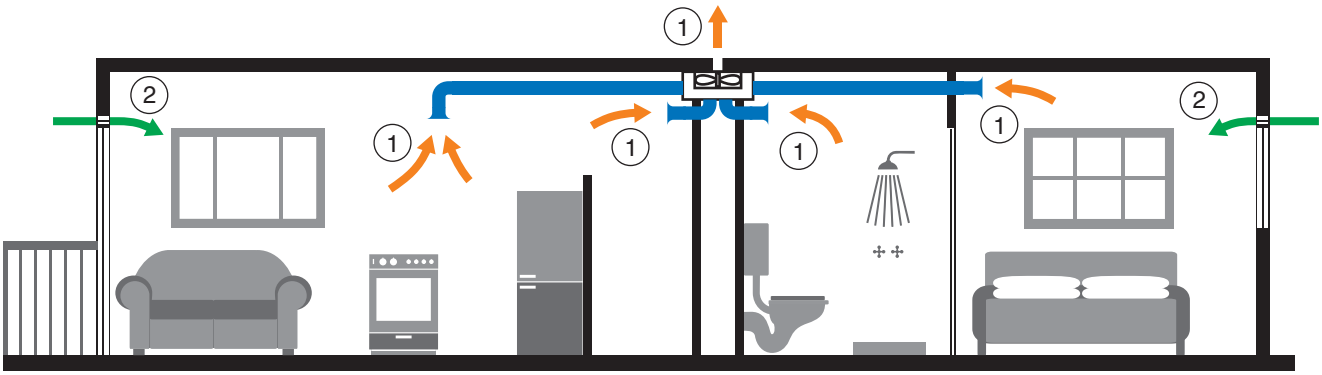
Example apartment



1. Exit air; 2: Supply air; 3. Air flow

2.2.4 Central exit air system

Example apartment



1. Exit air; 2: Supply air; 3. Air flow

2.3 Determining required ventilation elements for moisture protection

Ventilation provisions for the refurbishment and new construction are essential

The Energy Saving Ordinance 2014 (EnEV) requires that buildings to be erected or renovated are of an airtight design in terms of thermal transmittance of enclosing surfaces including joints. The performance characteristics are investigated by independent testing institutes, including air permeability according to DIN EN 12207 .

The measures implemented can drastically alter the ventilation of a building. Air exchange can no longer take place by highly insulating, sealed windows and façades. The consequences of this are damage to buildings and the influence on human health.

Therefore, the impermeability of the building is a major factor in the ventilation required. DIN 1946-6 sets out the planning and implementation of ventilation provisions. Such can take place with the help of a professional planner, architect or window manufacturer. In addition, the window manufacturer is obliged to at least make known the need to implement ventilation measures.

A ventilation plan can be created by any professional involved in either the modernisation of the building or otherwise involved in the planning and thereby engages in the ventilation of a building.

Ventilation provisions are required if...

Infiltration flow rate < Flow rate for humidity protection

Planning and design by calculation

In general, the principle holds that ventilation provisions shall be planned if the air flow rate by infiltration is less than than the required minimum to protect from moisture flow. This means that by changing the building shell, infiltration and hence air air exchange via leakage (i.e. the exchange of air through leaks for example via joints, slotting, etc.) to protect the building from ventilation moisture damage.

A ventilation plan can only take place in collaboration with the entire service unit. Any ventilation intervention in a service unit space can affect other living units spaces, for example DIN 18017-3 - windowless rooms which are ventilated by fan-based ventilation systems.

Window rebate ventilation or top attachment ventilators can be used in the introduction of ventilation measures for the window itself. The specifics of the particular product apply here. In addition, factors such as air permeability, water tightness - depending on the window element - acoustic properties, burglar deterrent according to ift guidelines LU-01 /1 as well as ALD locking must be ensured.

INFORMATION:

A ventilation plan must meet the minimum ventilation level for moisture protection and must operate in a user-independent fashion.

EXAMPLE:

Any residential unit (prior to 1995) shall undergo complete renovation / modernisation. A user-independent ventilation plan to ensure moisture protection using natural ventilation shall therefore be made possible using window fans.

Utilisation unit	Thermal insulation level	Wind	LTM required
Single-storey	Low	Weak	Yes
		Strong	Yes
	High	Low	Yes
		Strong	max. 140 m^2
Multi-storey connected	Low	Weak	max. 80 m^2
		Strong	no
	High	Weak	no
		Strong	no

Differential pressure		
Utilisation unit type	Wind area	
	Low-wind	High-wind
Single-storey utilisation unit	**2 Pa**	4 Pa
Multi-storey connected utilisation unit	5 Pa	7 Pa
Bold print = Case study		
Thermal insulation of apartment?		
Before 1995 (no thermal insulation act) → LOW thermal insulation		
After 1995 (thermal insulation act) → HIGH thermal insulation		

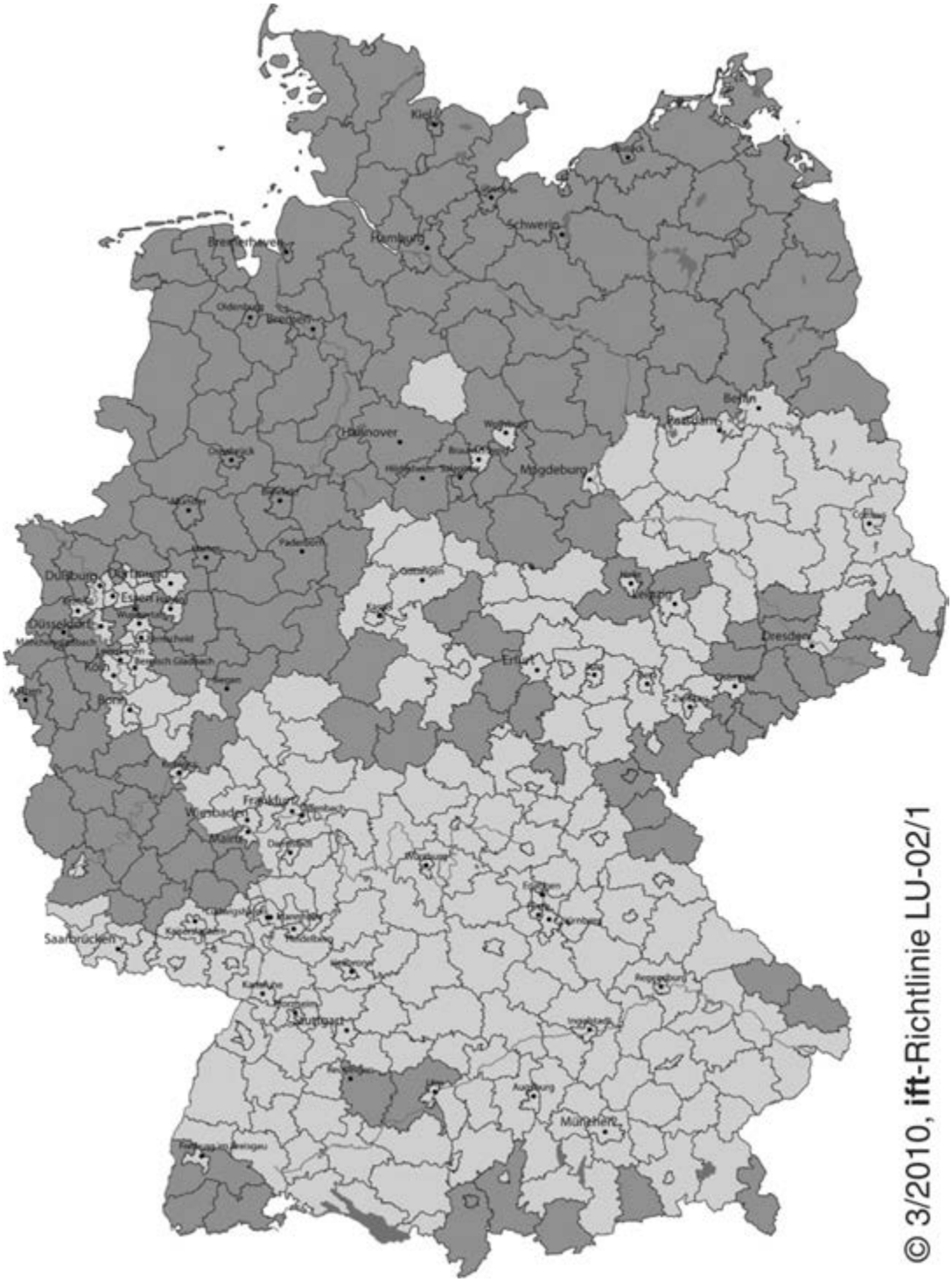
2

Which wind area applies to the living unit?

Light: Low-wind areas (< 3 m/s average per year)

Dark: High-wind areas (> 3 m/s average per year)

Source: Deutscher Wetterdienst, 2008



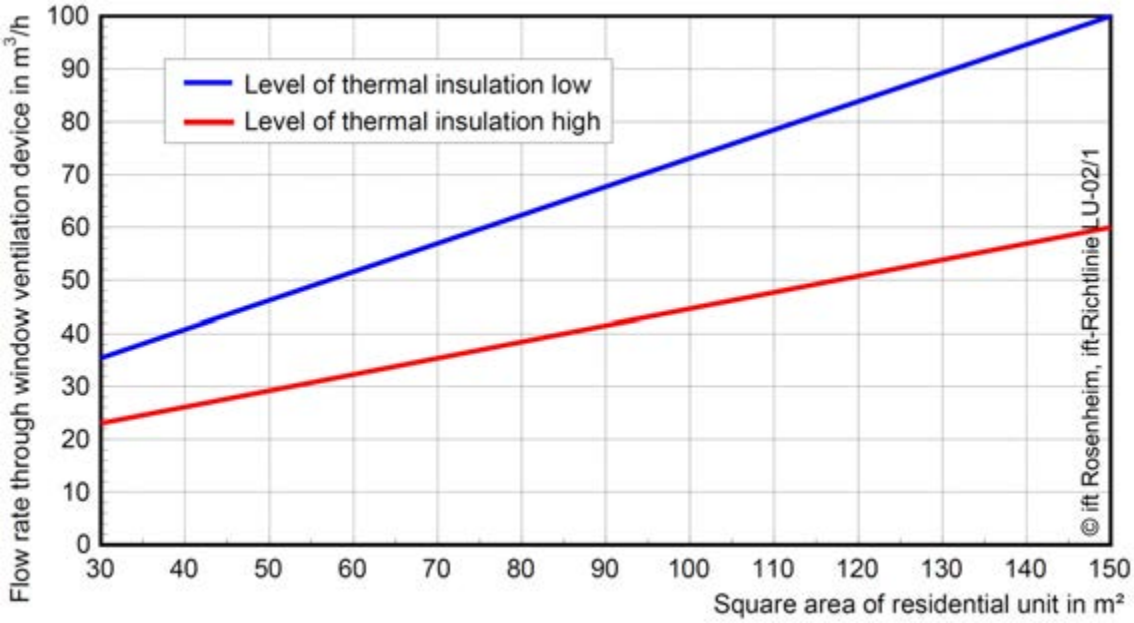
Source:

ift guideline LU-02/1 "Fensterlüfter Teil 2:

Empfehlungen für die Umsetzung von lüftungstechnischen Maßnahmen im Wohnungsbau"

Living unit size in m^2?

Determining air flow volumes for ventilators



2

Fig. 1: Required air flow volume across all ventilators for moisture protection depending on living unit size → single-storey living unit in low-wind area

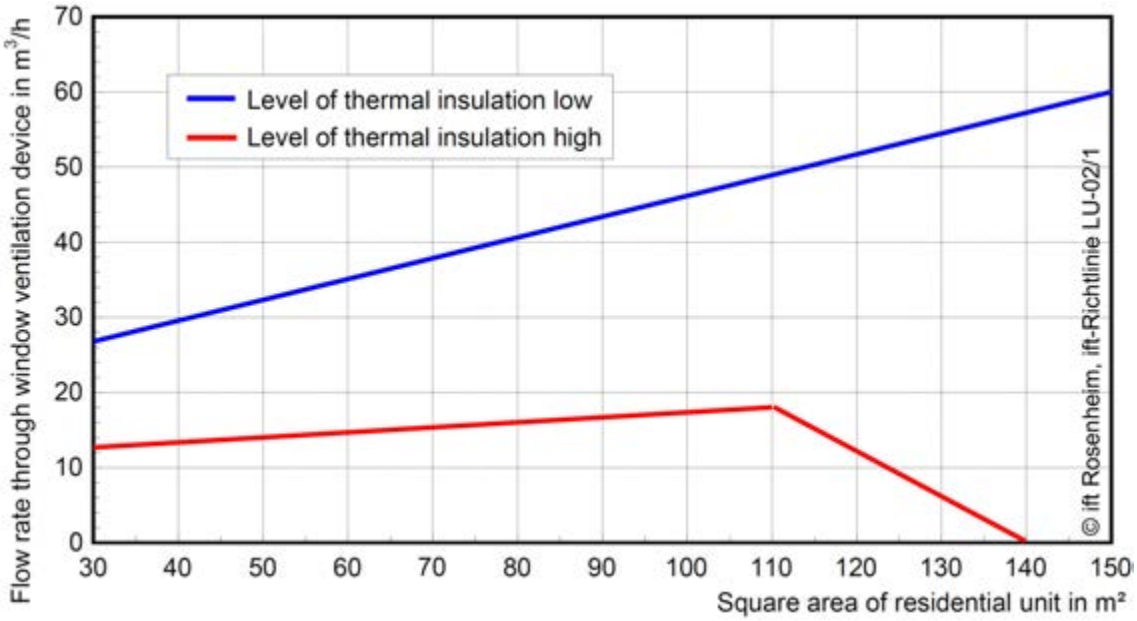
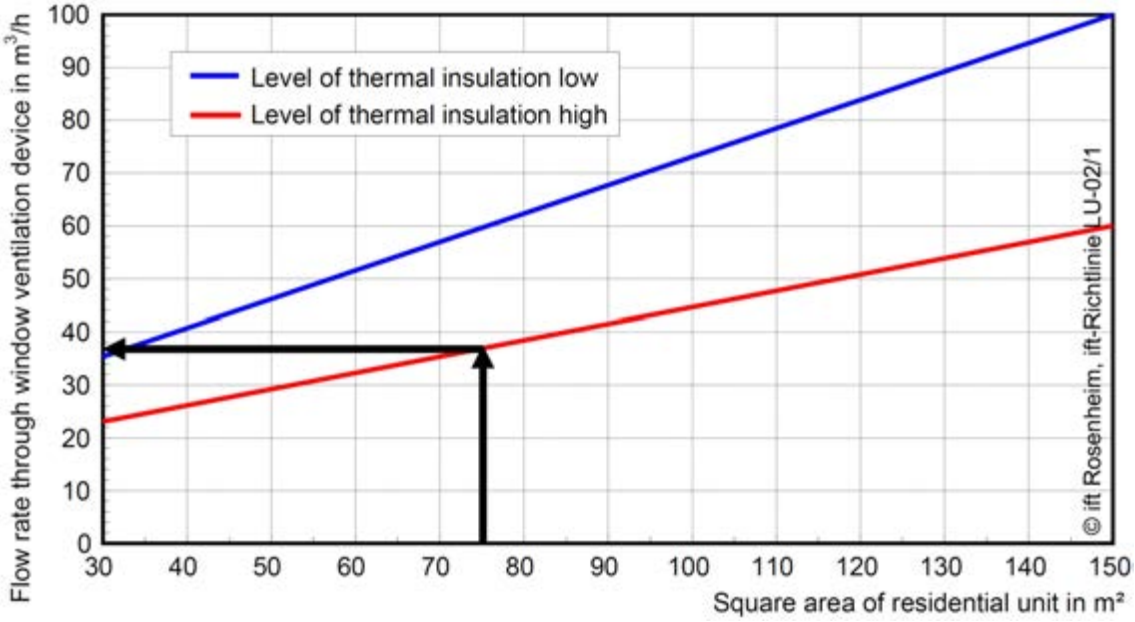


Fig. 1: Required air flow volume across all ventilators for moisture protection depending on living unit size → single-storey living unit in high-wind area

How many ventilators are required? Four simple steps:

1. Determine required air flow volume: Low-wind area / 37 m^3/h



2. Air flow volume per window: 7 windows

Air flow volume per window = total air flow volume / number of windows

Air flow volume per window = 37 m^3/h / 7 = 5.3 m^3/h

3. Check with measured differential pressures (see 1.7.1 - Test results acc. to FUS-test)

DIN 1946-6 [Pa]	**2 Pa**	**4 Pa**	**8 Pa**	**10 Pa**
1 pair MACO ventilators	3,1 m^3/h	4,0 m^3/h	5,5 m^3/h	6,5 m^3/h
* Switching action and air performance may vary depending on profile and hardware.				

4. Perform calculation:

Result = air flow volume per window / measured differential pressure

Result = 5.3 m^3/h / 3.1 m^3/h~ 1.7 $_{PAAR\ FFV}$

Result ~ 2 pairs MACO ventilators are required per window

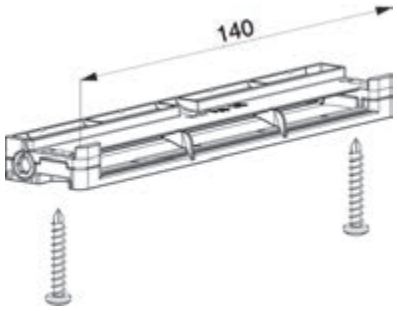
MACO VENT

3 Window ventilators for PVC

3 Window ventilators for PVC

3.1 Product range MACO VENT —Sample drawings

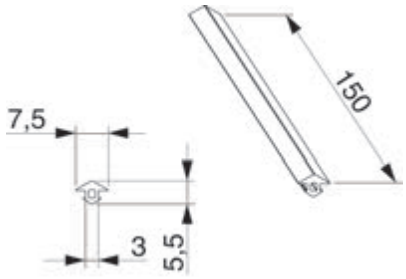
Concealed horizontal ventilator



Concealed vertical ventilator

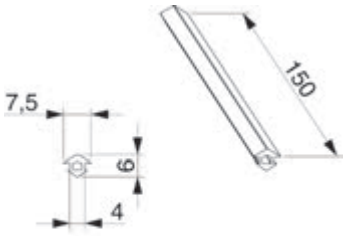
Frame gasket

Groove width 2.5 - 3.5 mm



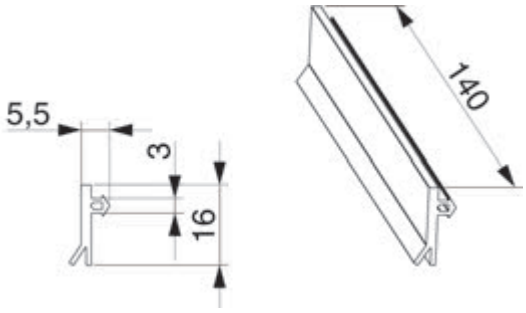
Frame gasket

Groove width 3.5 - 4.5 mm



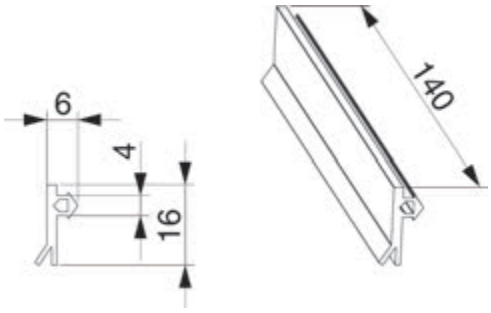
Sash gasket

Groove width 2.5 - 3.5 mm



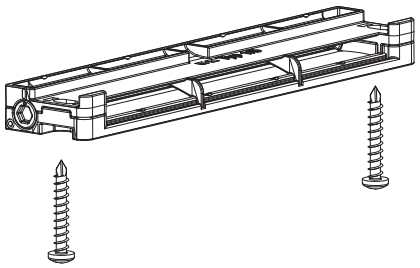
Sash gasket

Groove width 3.5 - 4.5 mm



3.2 Aluplast

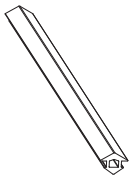
3.2.1 Aluplast Ideal 2000



104690

3.2.1.1 Concealed window ventilator

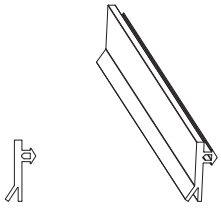
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468754

3.2.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

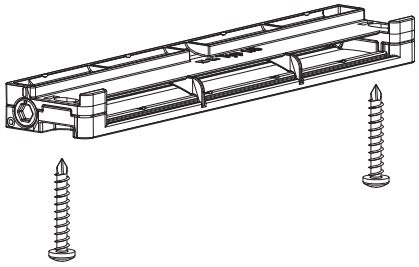


468752

3.2.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

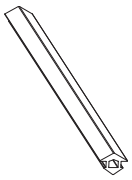
3.2.2 Aluplast Ideal 4000 / 5000 / 6000 / 7000 / 8000



104691

3.2.2.1 Concealed window ventilator

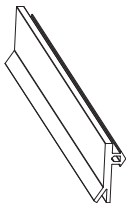
window rebate valve	type 2/10	white	horizontal	10	**104691**
				50	**104733**
			vertical	10	**104704**
				50	**104746**



468754

3.2.2.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

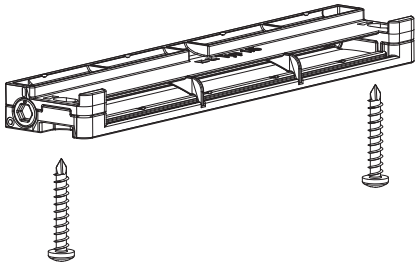


468752

3.2.2.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

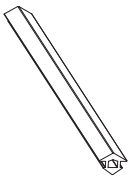
3.2.3 Aluplast Energeto 5000



104691

3.2.3.1 Concealed window ventilator

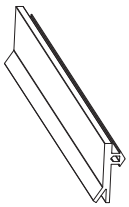
					№
window rebate valve	type 2/10	white	horizontal	10	**104691**
				50	**104733**
			vertical	10	**104704**
				50	**104746**



468754

3.2.3.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

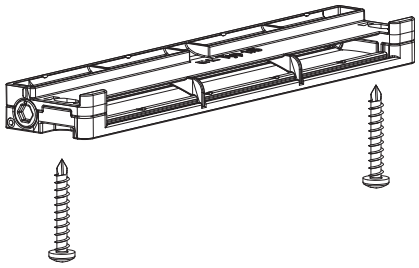


468752

3.2.3.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

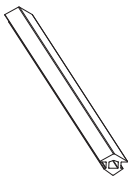
3.3 Actual



104690

3.3.1 Concealed window ventilator

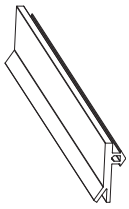
					№
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468754

3.3.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



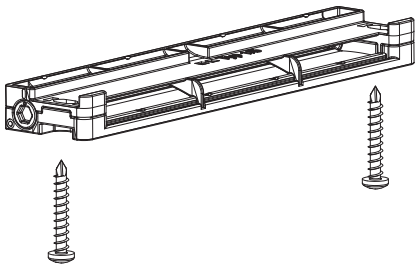
468752

3.3.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.4 Brügmann

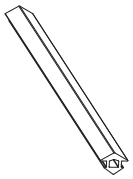
3.4.1 Brügmann AD



104690

3.4.1.1 Concealed window ventilator

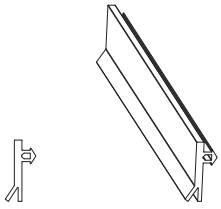
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468754

3.4.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



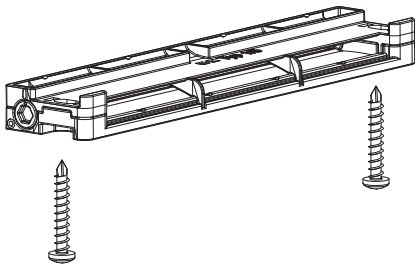
468752

3.4.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.5 Plustec

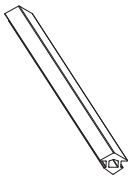
3.5.1 Plustec Euroline



104692

3.5.1.1 Concealed window ventilator

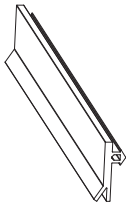
window rebate valve	type 4	white	horizontal	10	**104692**
				50	**104734**
			vertical	10	**104703**
				50	**104745**



468754

3.5.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



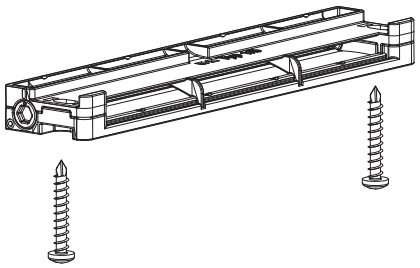
468752

3.5.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.6 Schüco Corona

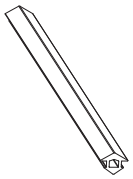
3.6.1 Schüco Corona CT 70 / Corona SI 82



104690

3.6.1.1 Concealed window ventilator

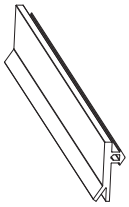
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468754

3.6.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

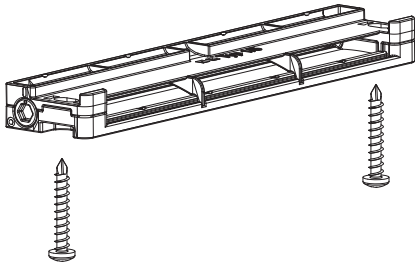


468752

3.6.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

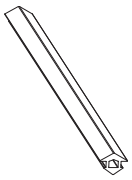
3.6.2 Schüco Corona AS



104691

3.6.2.1 Concealed window ventilator

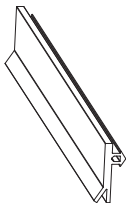
					№
window rebate valve	type 2/10	white	horizontal	10	**104691**
				50	**104733**
			vertical	10	**104704**
				50	**104746**



468754

3.6.2.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

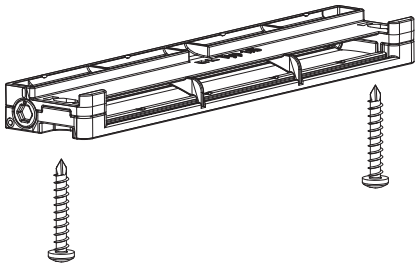


468752

3.6.2.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

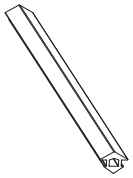
3.7 Veka



104690

3.7.1 Concealed window ventilator

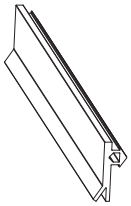
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468271

3.7.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	3,5 - 4,5	150	black	10	**468271**
				light grey	10	**468440**
				medium-grey	10	**469054**



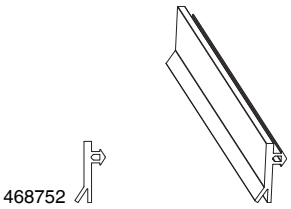
468269

3.7.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	3,5 - 4,5	140	black	10	**468269**
				light grey	10	**468439**
				medium-grey	10	**469056**

3.8 Alphacan

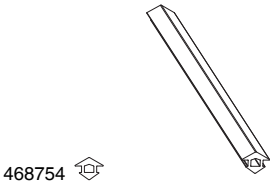
3.8.1 System Alpha 70 + 80



468752

3.8.1.1 Sash gaskets

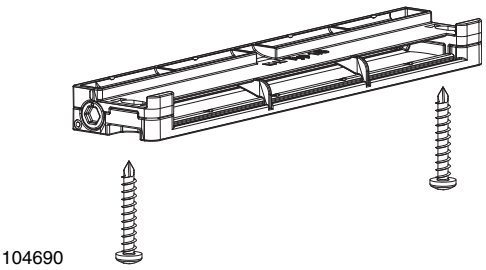
			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**



468754

3.8.1.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



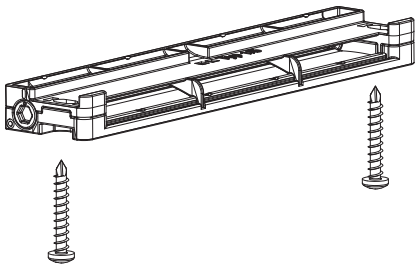
104690

3.8.1.3 Concealed window ventilator

					№
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**

3.9 Profine Trocal

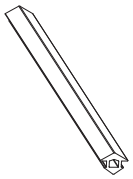
3.9.1 Profine Trocal Innonova 70 A3 / Innonova 70 A5 / Innonova 70 M5



104690

3.9.1.1 Concealed window ventilator

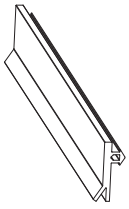
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468754

3.9.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

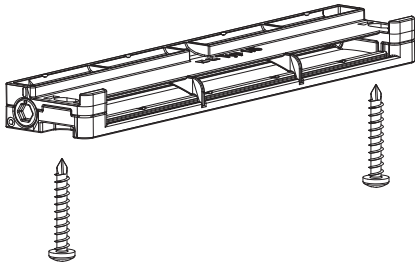


468752

3.9.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

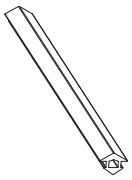
3.9.2 Profine Trocal System 88+ / Innonova 2000



104695

3.9.2.1 Concealed window ventilator

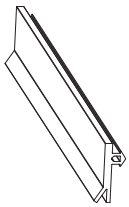
					№
window rebate valve	type 9	white	horizontal	10	**104695**
				50	**104737**
			vertical	10	**104700**
				50	**104742**



468754

3.9.2.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



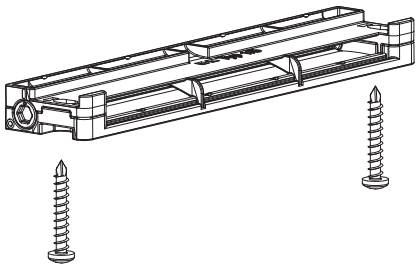
468752

3.9.2.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.10 Dimex Accord

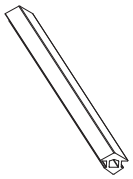
3.10.1 Dimex Accord System Contour 70 / Elegance 8.0



104690

3.10.1.1 Concealed window ventilator

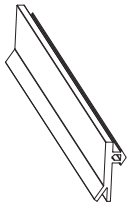
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468754

3.10.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

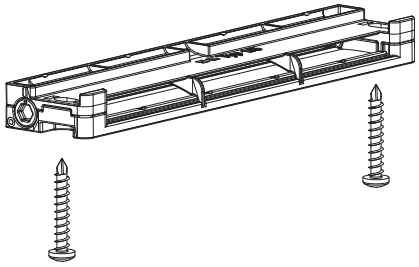


468752

3.10.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

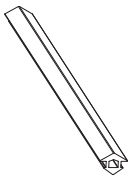
3.10.2 Dimex Accord System Komfort



104691

3.10.2.1 Concealed window ventilator

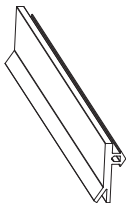
window rebate valve	type 2/10	white	horizontal	10	**104691**
				50	**104733**
			vertical	10	**104704**
				50	**104746**



468754

3.10.2.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



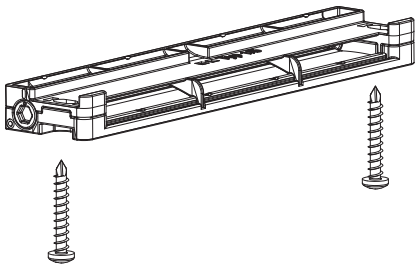
468752

3.10.2.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.11 Kömmerling

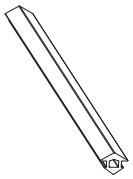
3.11.1 Kömmerling FMS / Solid MS



104690

3.11.1.1 Concealed window ventilator

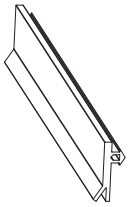
window rebate valve	type 1/5	white	horizontal	10	**104690**
				50	**104732**
			vertical	10	**104705**
				50	**104747**



468754

3.11.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

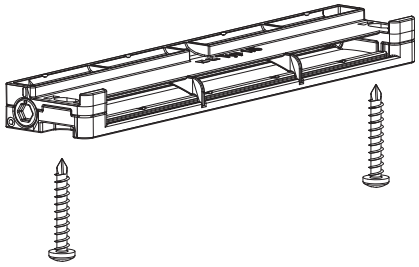


468752

3.11.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

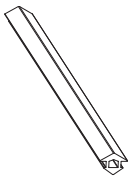
3.11.2 Kömmerling Euro Futur AD / Euro Futur MD / 88+ / K-Vision / Evolution 70 / Eurodur 3S



104697

3.11.2.1 Concealed window ventilator

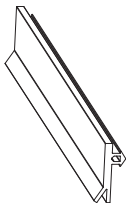
					№
window rebate valve	type 13/15	white	horizontal	10	**104697**
				50	**104739**
			vertical	10	**104698**
				50	**104740**



468754

3.11.2.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



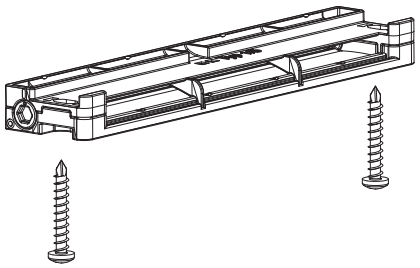
468752

3.11.2.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.12 Rehau

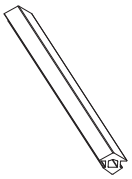
3.12.1 Rehau Basic Design



104692

3.12.1.1 Concealed window ventilator

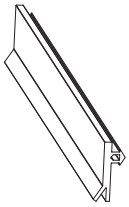
window rebate valve	type 4	white	horizontal	10	**104692**
				50	**104734**
			vertical	10	**104703**
				50	**104745**



468754

3.12.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

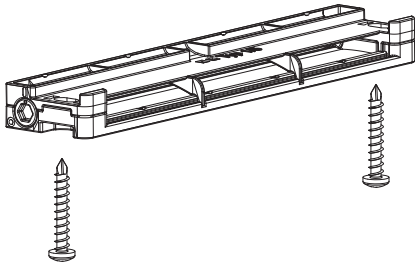


468752

3.12.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

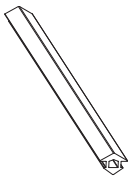
3.12.2 Rehau Geneo / Geneo AD+MD / S 730 / Brilliant Design / Clima Design



104694

3.12.2.1 Concealed window ventilator

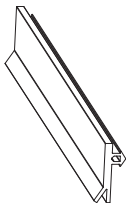
window rebate valve	type 3/6/8/14	white	horizontal	10	**104694**
				50	**104736**
			vertical	10	**104701**
				50	**104743**



468754

3.12.2.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

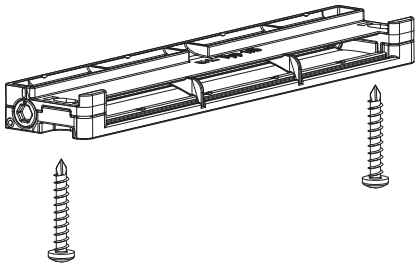


468752

3.12.2.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

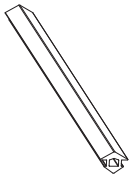
3.13 Gealan



104694

3.13.1 Concealed window ventilator

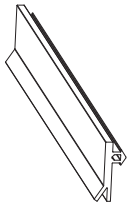
window rebate valve	type 3/6/8/14	white	horizontal	10	**104694**
				50	**104736**
			vertical	10	**104701**
				50	**104743**



468754

3.13.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



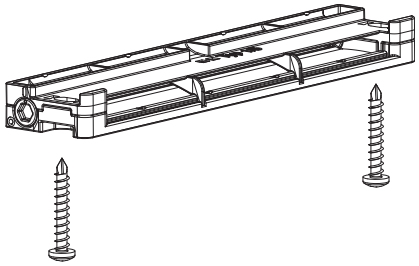
468752

3.13.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.14 Salamander

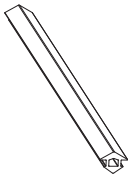
3.14.1 Salamander Streamline



104693

3.14.1.1 Concealed window ventilator

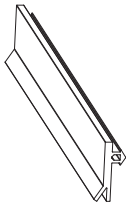
window rebate valve	type 7	white	horizontal	10	**104693**
				50	**104735**
			vertical	10	**104702**
				50	**104744**



468754

3.14.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

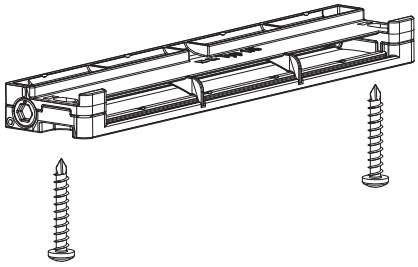


468752

3.14.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

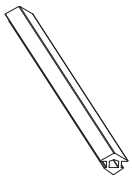
3.14.2 Salamander bluEvolution



104694

3.14.2.1 Concealed window ventilator

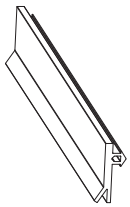
					№
window rebate valve	type 3/6/8/14	white	horizontal	10	**104694**
				50	**104736**
			vertical	10	**104701**
				50	**104743**



468754

3.14.2.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



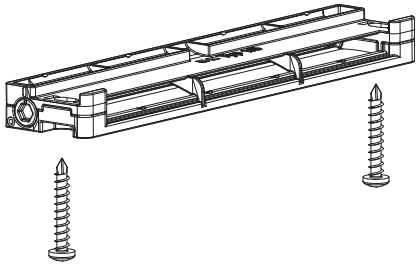
468752

3.14.2.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.15 KBE

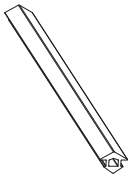
3.15.1 KBE 70 AD / 70 MD / System 88 / AD 13V



104694

3.15.1.1 Concealed window ventilator

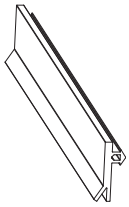
window rebate valve	type 3/6/8/14	white	horizontal	10	**104694**
				50	**104736**
			vertical	10	**104701**
				50	**104743**



468754

3.15.1.2 Frame gaskets

replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

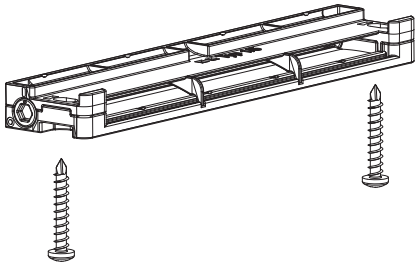


468752

3.15.1.3 Sash gaskets

replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

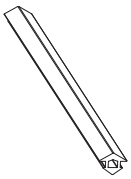
3.15.2 KBE Emotion 70



104697

3.15.2.1 Concealed window ventilator

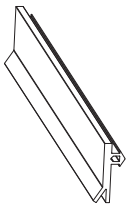
window rebate valve	type 13/15	white	horizontal	10	**104697**
				50	**104739**
			vertical	10	**104698**
				50	**104740**



468754

3.15.2.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

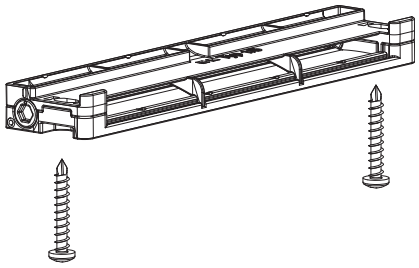


468752

3.15.2.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

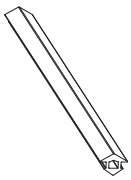
3.16 Inoutic



104696

3.16.1 Concealed window ventilator

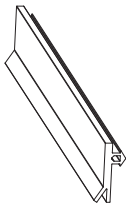
						№
window rebate valve	type 11/12	white	horizontal	10		**104696**
				50		**104738**
			vertical	10		**104699**
				50		**104741**



468754

3.16.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



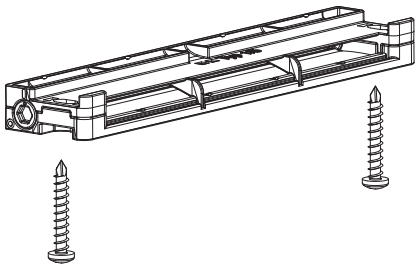
468752

3.16.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.17 Gromatic

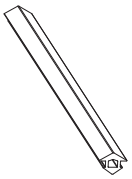
3.17.1 Gromatic AD 3001



104694

3.17.1.1 Concealed window ventilator

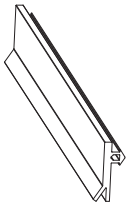
window rebate valve	type 3/6/8/14	white	horizontal	10	**104694**
				50	**104736**
			vertical	10	**104701**
				50	**104743**



468754

3.17.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**

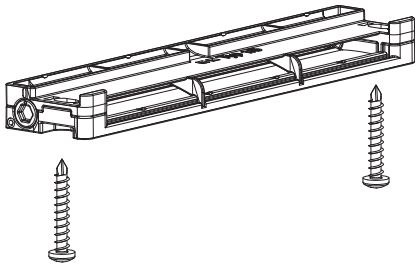


468752

3.17.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

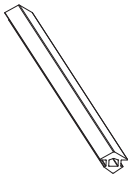
3.18 Deceuninck Zendow



104694

3.18.1 Concealed window ventilator

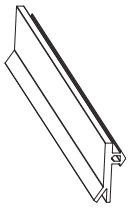
window rebate valve	type 3/6/8/14	white	horizontal	10	**104694**
				50	**104736**
			vertical	10	**104701**
				50	**104743**



468754

3.18.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



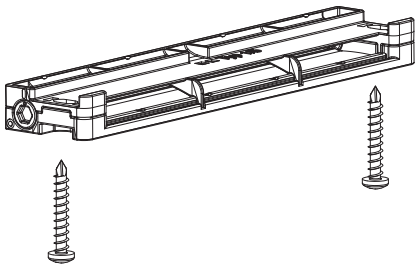
468752

3.18.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.19 Kompen

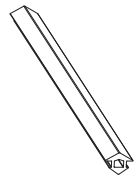
3.19.1 Kompen Termolin



104692

3.19.1.1 Concealed window ventilator

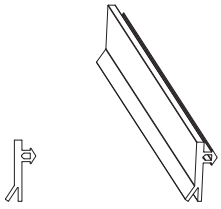
						№
window rebate valve	type 4	white	horizontal	10	**104692**
				50	**104734**
			vertical	10	**104703**
				50	**104745**



468754

3.19.1.2 Frame gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



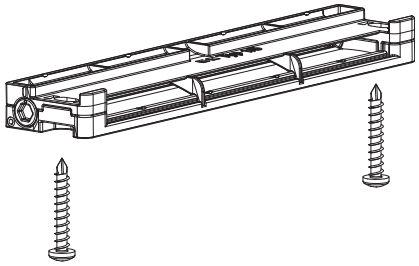
468752

3.19.1.3 Sash gaskets

			L			№
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

3.20 Wymar

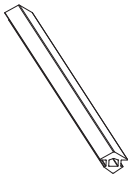
3.20.1 Wymar 3000 AD



104697

3.20.1.1 Concealed window ventilator

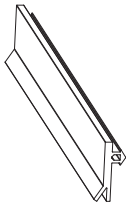
window rebate valve	type 13/15	white	horizontal	10	**104697**
				50	**104739**
			vertical	10	**104698**
				50	**104740**



468754

3.20.1.2 Frame gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	150	black	10	**468754**
				light grey	10	**468839**
				medium-grey	10	**469055**



468752

3.20.1.3 Sash gaskets

			L			
replacement gasket	for window rebate valve	2,5 - 3,5	140	black	10	**468752**
				light grey	10	**468840**
				medium-grey	10	**469057**

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