

**GENERAL TECHNICAL TERMS
OF KÖNIG KFT
K-MF**

I have read and accept the General Technical Terms of KÖNIG Ltd

Client
(Date, Signature)

Content

1. Subject of Technical Terms.....	3
2. Characteristics of vehicle windows	3
2.1. Materials used	3
2.2. Surface treatment:	6
2.3. Welding	6
2.4. Glueing	6
3. Technical requirements.....	7
3.1 Technical requirements of the vehicle windows	7
3.2 Esthetical aspects of the vehicle window.....	7
3.3 The building-in possibilities of the vehicle windows	7
3.4 Conditions of the application – usage of the vehicle windows	9
4. Qualification	9
4.1 Test to be applied for qualification	9
4.2. Control methods and parameters	10
4.3. Documentation of the results gained during the tests.....	10
5. Quality certificate, application of identification.....	10
5.1 Quality certificate:	10
5.2 Labelling of the windows:	10
6. Warranty	11

1. Subject of Technical Terms

The fabrication of light-structure vehicle windows for passenger and utility vehicles, trams, power and lifting machines, railway and other vehicles.

2. Characteristics of vehicle windows

2.1. Materials used

2.1.1. Aluminium profiles

Material: acc to EN AW-6060 EN 755-2:1997

Heat-treatment state: T5, T64, T66

Mechanical characteristics:

Tear resistance: $R_{m\ min} = 160-215\ MPa$

Flow limit: $R_{p\ 0,2min} = 120-160\ MPa$

Elongation: $a\% = 8-12\%$

Tolerances of dimensions and shape: acc. to EN 12020-2:2001

Quality certificate: acc. to EN 10204:2005 3.1

2.1.2. Glasses

The window constructions are produced with ESG tempered, float glass, with VSG laminated glass, with DSG isolated tempered glass or with heated glass in clear or tinted finishes.

ESG tempered float glass

Clear or tinted finish acc. to Table 1

The thickness of glasses: 4 and 5 mm (thickness tolerances acc to SAE J673)

On special request different dimensions are available.

The glasses bear ECE 43 R homologation mark.

Upon client's request the glasses can marked by the DOT mark.

VSG laminated glass

Clear or in tinted finish acc. to Table 1

The thickness of glasses: 5,3; 5,8; 6,2 and 6,7 mm (thickness tolerances acc. to SAE J673)

DSG tempered isolated glass

In clear or in tinted finish acc. to Table 1

Thickness-dimension: 12; 14; 16; 18 and 20 mm (thickness tolerances acc to SAE J673)

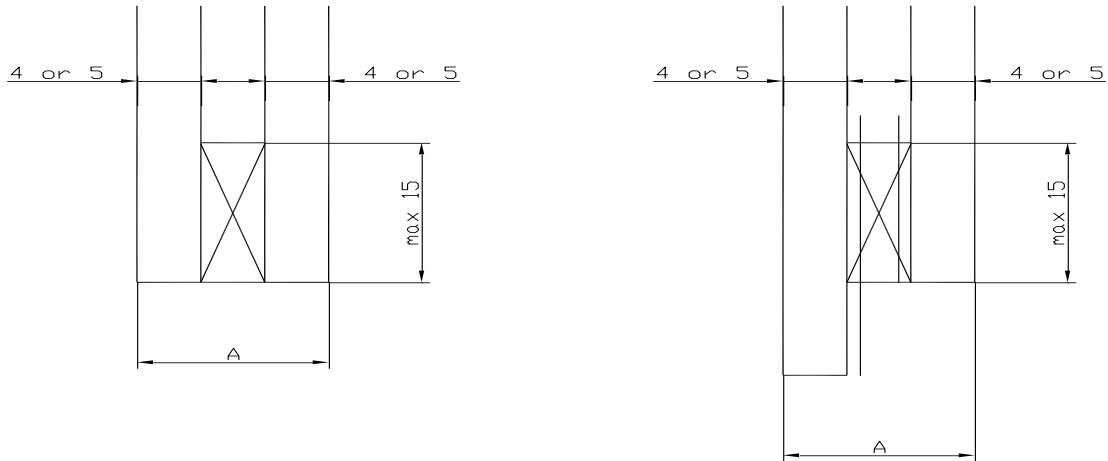


Figure 1: DSG isolated glass

Heated glass

Clear or tinted finish acc. to Table 1

The thickness of glasses: 4 - 5 mm (thickness tolerances acc to SAE J673)

Connected voltage: 24 V (max. 28 V)

Heated area: Figure 2 (marked by dashed line)

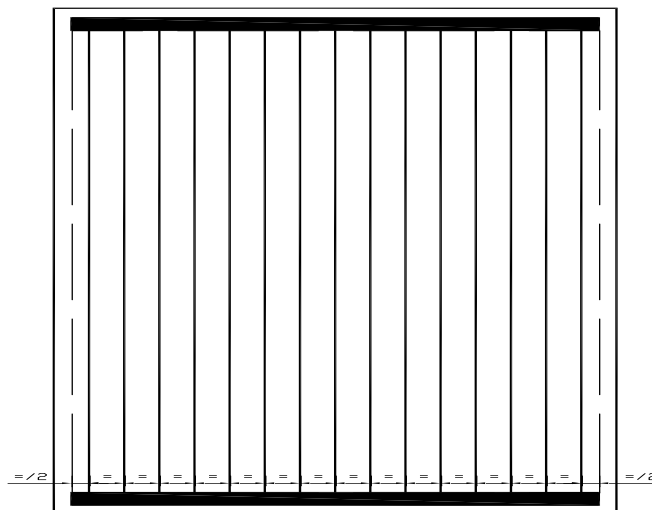


Figure 2: Heated glass

Details of glass thickness, colour and light transmission

Colour	Glass-thickness	TL	TE
Clear	4	89	83
Clear	5	88	80
Parsol green	4	78	53
Parsol green	5	74	48
Parsol bronze	4	60	60
Parsol bronze	5	54	54
Parsol grey	4	57	56
Parsol grey	5	48	50
VV55 green	4	49	26
VV55 green	5	42	21
VV35 green	4	28	16
VV35 green	5	21	11
VG40 grey	4	35	22
VG40 grey	5	27	16
VG10 grey	4	10	8
VG10 grey	5	6	5

Table 1: Characteristics of the ESG glasses

Other characteristics concerning glasses are contained in the standard **K-MF-Ü** "Technical condition and requirements of the flat, tempered and silk-printed security glasses and the criteria of their approval".

2.1.3. Rubber and plastic parts

The selection of the material of rubber and plastic parts is carried out acc. to the applicable standards and in compliance with the field of application. The quality and technical parameters are incorporated in the technical terms and drawings agreed on with the supplier. Their control is carried using templates.

2.1.4. Electrical lifting mechanism and engine

Applying standard:

Engine acc. to IP53. Lifting mechanisms acc. to standard EU 2004/104/CE and Appendix 9 (Version 2) of the Regulation 10 of the ECE/ONU concerning the radio-electrical perturbation of the electrical vehicles and parts and acc. to regulation 00/10/18-i 2000/53/CE from 18.10.2000 regarding the end of the life-cycle of vehicles.

The characteristics of the engines of the electrical lifting mechanisms:

- Feeding voltage: 12V or 24V (max. 14,5 resp. 28 V)
- Current intake: 2-4,5 A
- Operating performance: 24-110W with opening – closing speed acc. to request
- the motor on lifting mechanism contains heat release (on 120°C) and fuse (30A).

Noise-load:

The general noise level of the engine is bellow 62 dB under 4Nm momentum in a distance of some 30 cm from the driving cog-wheel.

Type of connector:

Two quick connectors

Operation:

With toggle button

2.2. Surface treatment:

Anodic oxidation

The **anodic oxidation** of the window frames is carried out acc. to standard **K-MF-F** of König Ltd

Electrostatic powder-coating

The **powder coating** of the window frames is carried out acc. to standard **K-MF-F** of König Ltd

2.3. Welding

The welding of the window frames is carried out acc. to standard **K-MF-H** of König Ltd

2.4. Glueing

In the assembly of the vehicle windows the following glues are used:

SIKAFLEX 265

SIKAFLEX 260

SIKATACK PLUS BOOSTER

SIKATACK ULTRAFAST II

SIKAFLEX 221

3. Technical requirements

3.1 Technical requirements of the vehicle windows

The windows secure the ventilation of the vehicle by manual or electrical operation.

The glasses of the vehicle windows should in normal operation, in motion remain in the set position.

The window should prevent the influx of dust and water into the passenger compartment in closed resp. fixed state.

The back-opening of the lock-construction is max. 2 mm.

The windows should be opened easily.

The opening force is – lacking different specifications of the technical documents – the following:

- Tilting windows - 80 ± 20 N
- Sliding windows - 50 ± 20 N.

3.2 Esthetical aspects of the vehicle window

The vehicle windows should have an overall esthetical appearance.

The parts of the assembled window should join each-other complying with the technical and esthetical requirements.

Defects, mechanical damages, discolouring of the parts are not allowed.

3.3 The building-in possibilities of the vehicle windows

- The producer constructs its vehicle windows for building-in with a maximal declination of 8 degrees from the vertical plane longitudinally and with cross wards inclination of 1 degree. Building-in situations different from the above should be specified in the order. Based on the mentioned information the producer decides, if it can guarantee for the same degree of water tightness in case of such a building-in angle, or warrants only for a lesser grade of water tightness.
- Glasses equipped with heating grid can be built in only when regulated by thermo-switch or with a time-series switch.
- Constructions equipped by electrical window lifting mechanism can be operated only by the specified voltage and power-input.
- The sliding windows operation vertically, and having vertical heaters the bus-producer has to avoid that the glasses are heated in opened state of the window (using micro-switch). In closed state of the window the heaters are protected against short-cuts caused by the condensed water by a silk-print strip.
- The water treatment of the vertical operated sliding windows not concern to the parts below the window frame under vehicle cover. Window lead the water through the glass and the glassrails to the bottom part of the vehicle. Customer must provide that the water will eliminate from the vehicle!
- In case of building-in of the windows by gluing the minimal thickness of the glue is 4 mm. The glue type should be SIKAFLEX 265 or another brand with similar characteristics.
- During the building-in the client has to make sure that the nominal dimensions of the window will be kept.

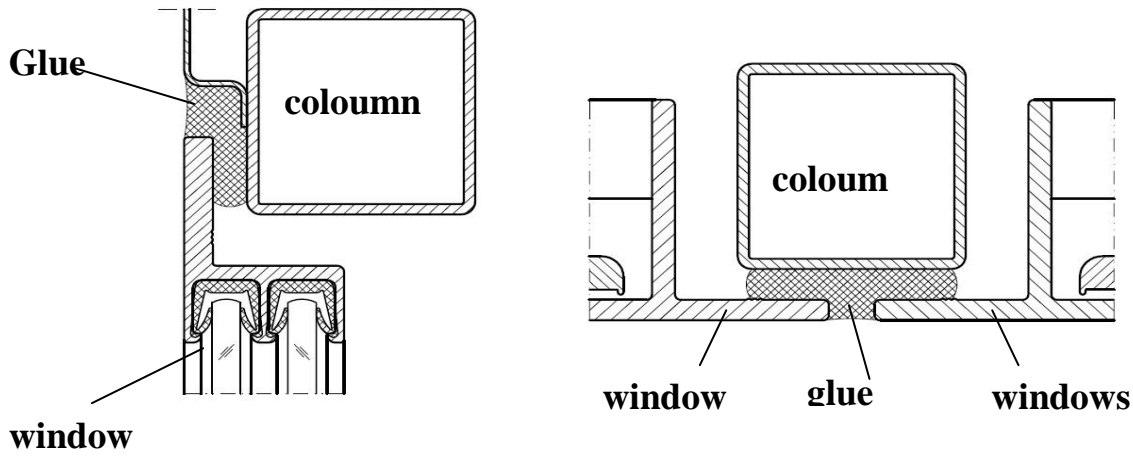


Figure 4: Building-in of the vehicle window by glueing

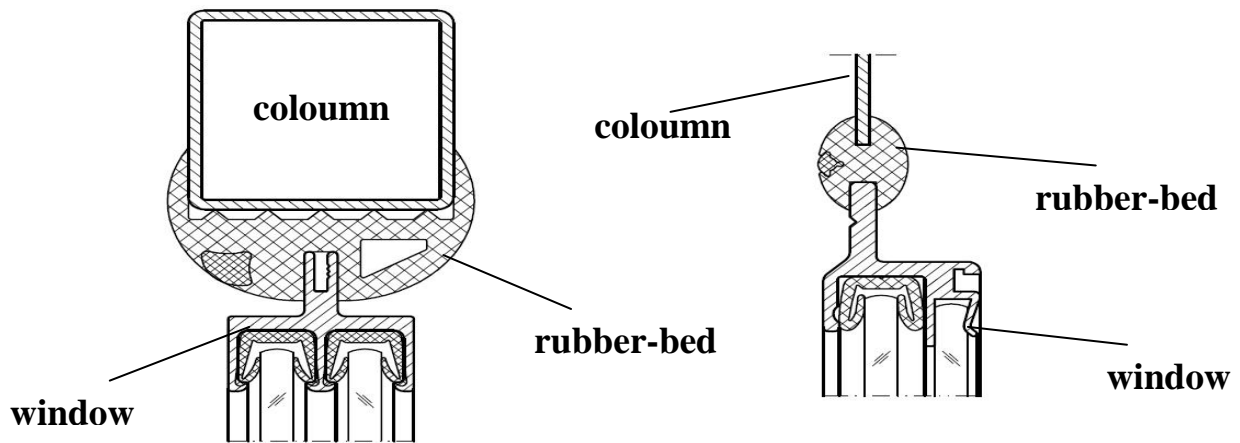


Figure 5: Building-in of the vehicle window in a rubber profile

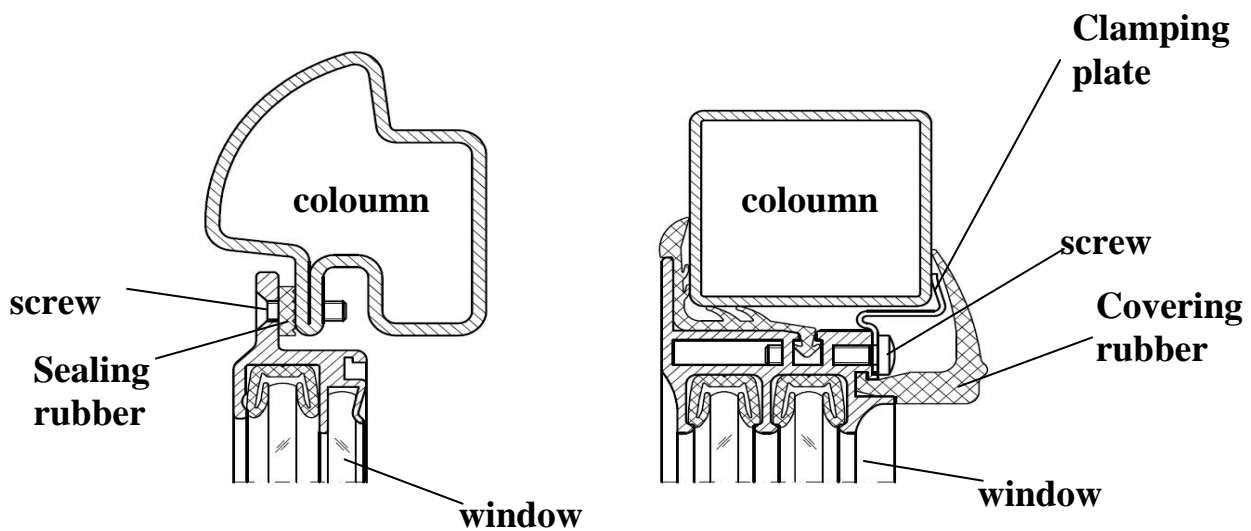


Figure 6: Building-in of the vehicle window by screws

3.4 Conditions of the application – usage of the vehicle windows

- The vehicle windows are constructed for application within temperate zone from -30°C till +45°C.
- No fierce alkaline, acidic or organic solvents can be used for cleaning.
- The opening and the opening further of the tilting window is possible by max. of 300 N.
- The tilting window is planned for application in a structure where the bodywork bears the load. The window itself is not carrying any load. If the window is loaded by constraints, the client is responsible for specifying the constraints, and for the controlling of their effects.
- Windows with double glass (DSG) or with electric moving mechanism are allowed to store only indoor place protected from rain.

If client intends to use the window under conditions different from the above, he is obliged to inform the producer about it. In this case the producer decides, if it can supply vehicle-windows for the operation under such conditions.

4. Qualification

4.1 Test to be applied for qualification

In the serial production the control of the windows is carried out by the end-control, in case of new construction by the first sample control.

4.1.1 End-control

- Control of the outer dimensions,
- Test of the operation ability (in case of electrical windows test run),
- Measurement of the operating force (in case of manually operated windows) (acc. to art. 4.2)
- Control of the lock structure,
- Control according to the esthetical aspects,
- Control of water tightness (if necessary), (acc. to art. 4.2)
- Control of electrical contact (in case of heated windows)

4.1.2. First sample control

- Control of outer dimensions
- Control of functionality
- Measurement of the opening force (acc. to art. 4.2)
 - Control of the state and operation of the lock structure
 - Control if the window can be opened from the outside
 - Control of the grade of opening-back
 - Control of glass play
- Water test (acc. to art. 4.2)
 - Control of glass-heating

- Control of surface quality
 - Layer-thickness control
 - Control of glass-surface
 - Control of the surface of the aluminium profiles
 - Control of the profile joints
 - Control of the joints of the rubbers
 - Control of gluing quality
 - Control of the sealing of the gaps
 - Control of binding elements
 - Cleanness control

4.2. Control methods and parameters

- Water test in water testing equipment
Parameters: water pressure: 3bar
Number of the nozzles 12 pieces
Distance of the nozzles from the window: 1m
The minimum length of the test: min 3, max 10 minutes
- Opening force measurement
With hand force-meter pulled at a speed of 0,07m/s $\pm 10\%$ parallel with the opening direction of the window


4.3. Documentation of the results gained during the tests

The test results are documented in the end-control protocol or in the first sample report, the copy of which is handed over to the client on request.

5. Quality certificate, application of identification

5.1 Quality certificate:

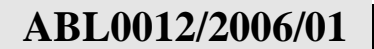
- Producer sends with the invoice a quality certificate according to EN 10204:2005 3.1.
- Producer uses only glasses with ECE homologation mark.

e.g.: 

- On special clients' request DOT homologation is applied, too.

5.2 Labelling of the windows:

Identification of the windows is carried by the serial number label referring to production.

e.g.: 

On the glasses of its own constructions producer marks its own brand name:



6. Warranty

Producer guarantees for its vehicle windows for 2 years (Civil Code 248§) after the delivery of the products. Within the warrantee period the client can any time report its complaint. Claims concerning esthetical defects (such as scratches and surface defects anywhere on the window) are to be reported to Producer within 5 days after the reception of the product by the client.

In order to validate its warrantee claim the client has to ensure producer the possibility of examination.

Producer does not warrant for damages caused be incorrect mounting, inappropriate use or by foreign objects.

Inappropriate usage is the application different from the specifications of Art. 3.3 and 3.4.

In case of faulty fulfilment the client can ask essentially the reparation of the defect or the replacement of the faulty product (Cc. 306§). If these are not possible, the client can ask price-reduction or can terminate the contract. In case of lesser defect there is no possibility for termination.

The following documents form an inherent part of the General Technical Terms:

K-MF-Ü (Technical Terms of the vehicle glasses and their quality criteria)

K-MF-H (Technical terms of the welding technology)

K-MF-F (Technical terms of the surface treatment)

Kerekegyháza, 08-02-2008

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Király Mónika
Managing Director