Success with quality

of windows, glass, facades and doors

Surveillance, testing and certification of window characteristics

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Research, Verification, Certification, Training

Testing Body

- Research & Development
- Testing of construction products
- Technical analysis and evaluation

Services

- Standardization & guidelines
- Technical hot line
- Publication and literature
- Test rigs, test centers, calibration

Certification

- Management systems
- product certification
- Surveillance

Training

- Seminars, Workshops, In-house trainings
- Congresses

All services from a single source!

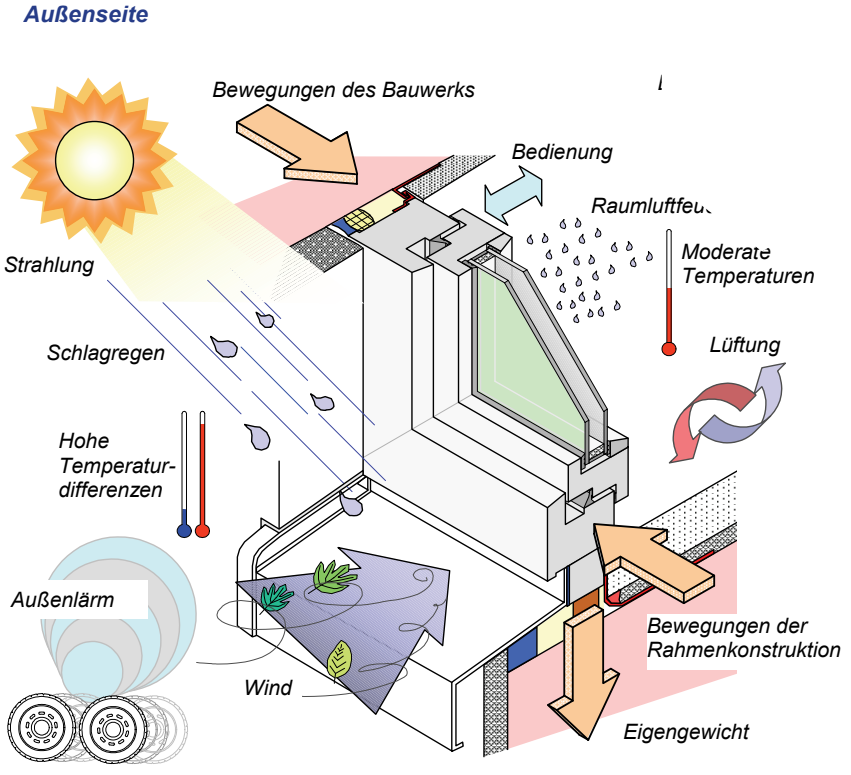
Influences on windows and external pedestrian doors

External influences

Rain, wind, temperature, humidity

Solar radiation

Mechanical attack, e.g. burglary



Internal influences

Climate, operation, building

Room air temperature humidity

Operational forces, impact load

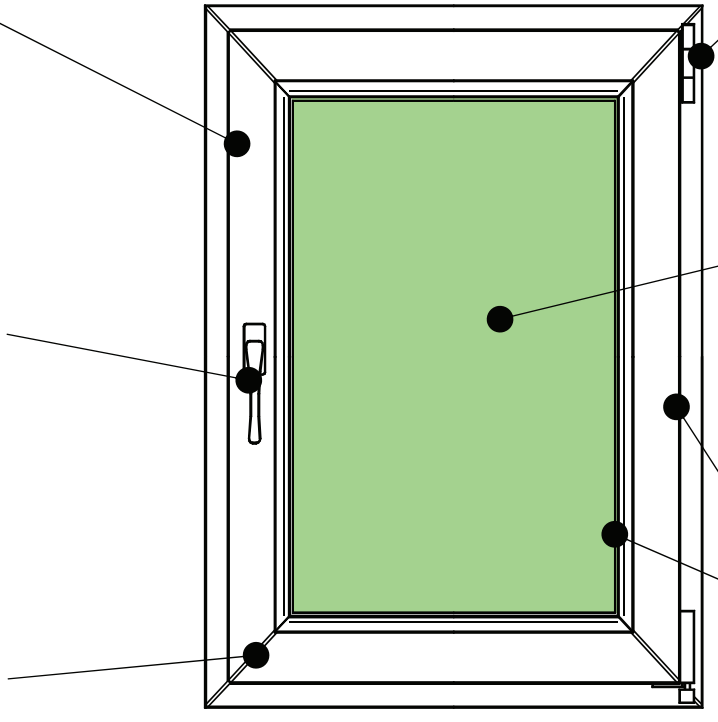
Movement of the building, tolerances

Window parts are working like a winning team

Frame =
Stability +
Design

Handle =
Function,
Locking +
Design

Corner =
Stability



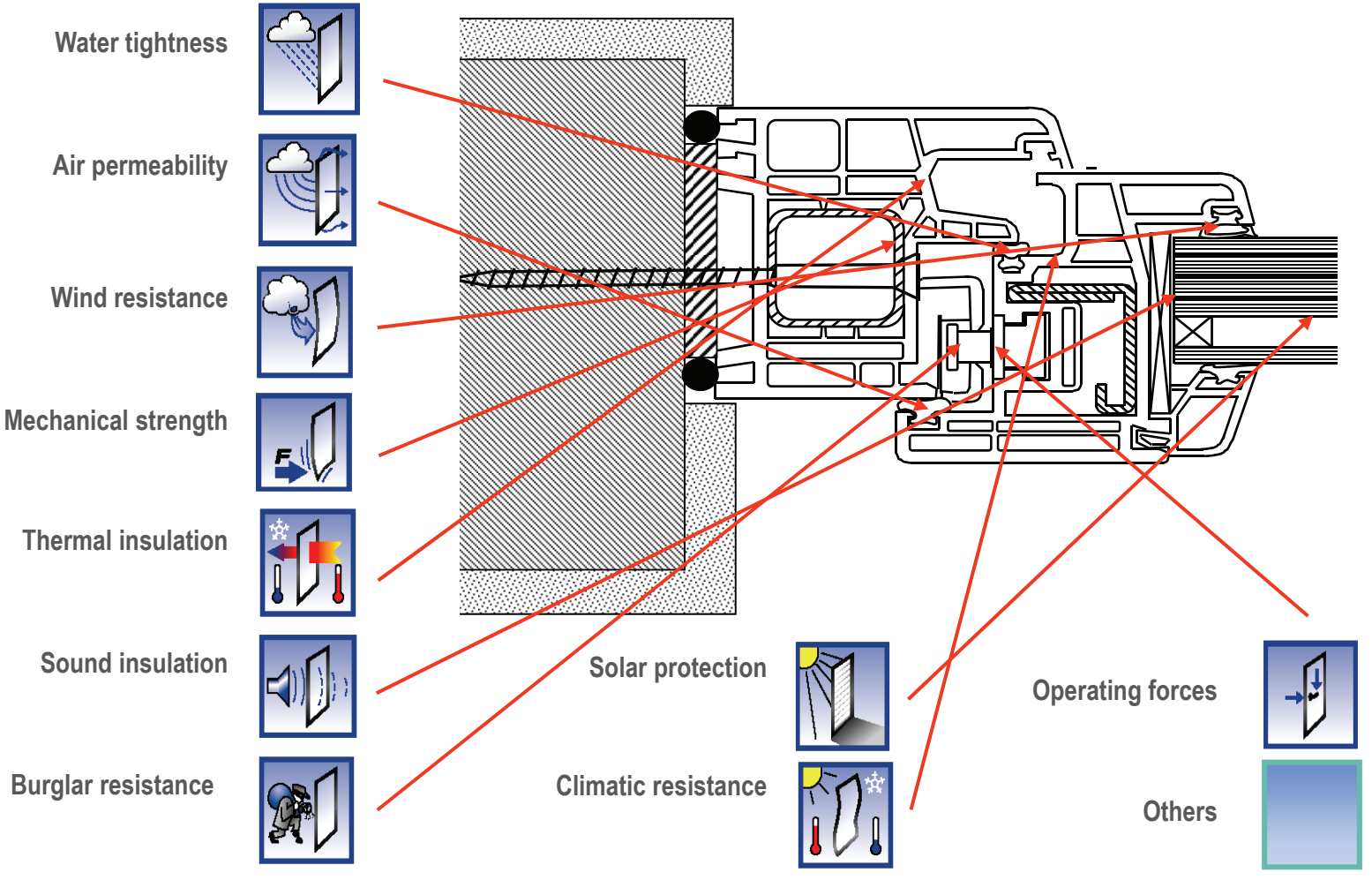
Hardware =
Function, Movement

Glass =
Transparency,
Insulation
Safety

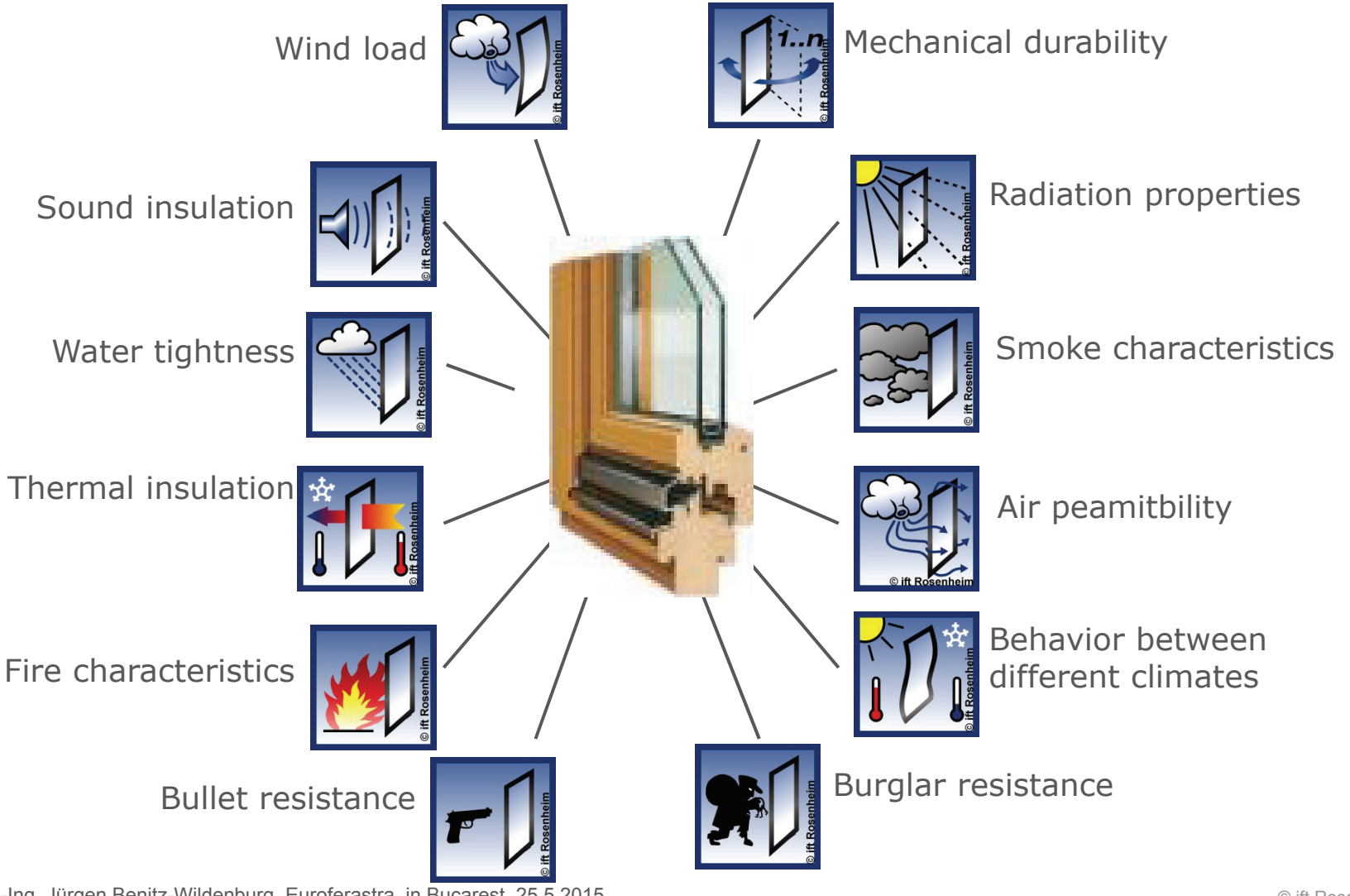
Sealing profiles =
Tightness

Plus many other invisible parts!

Integrated construction – sample window



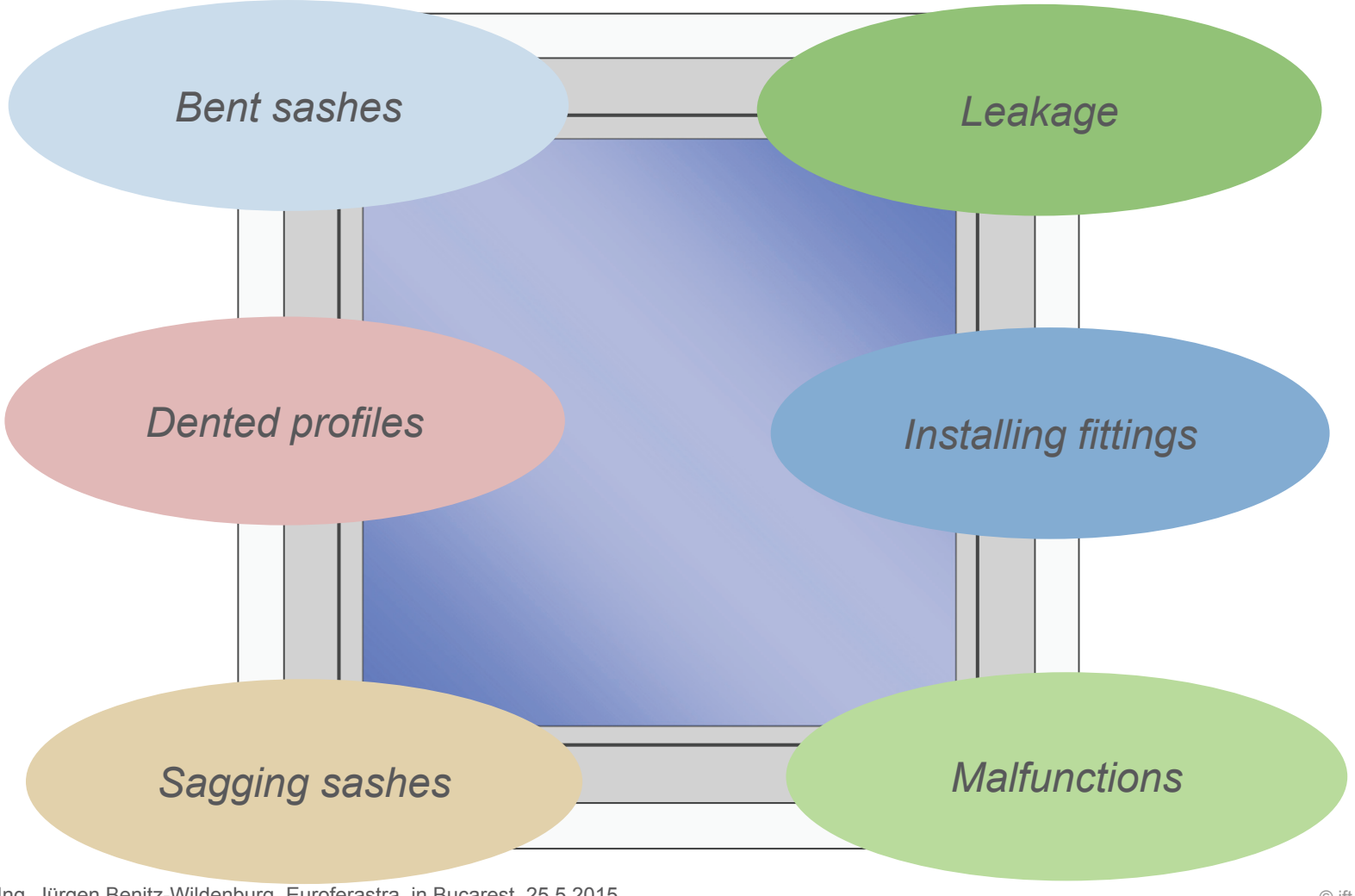
Important characteristics



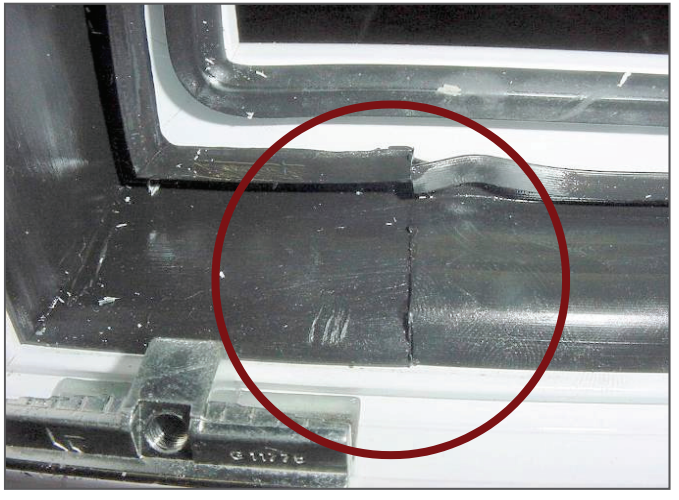
Examples

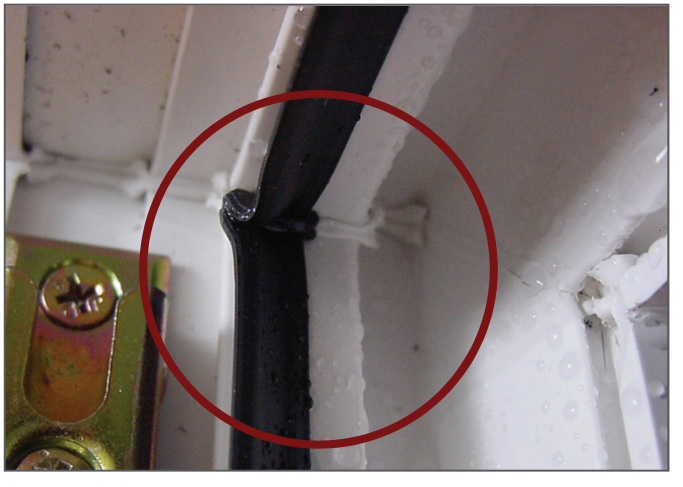
- of weak constructions
- processing failures and
- meaning of characteristics

Typical problems with window constructions



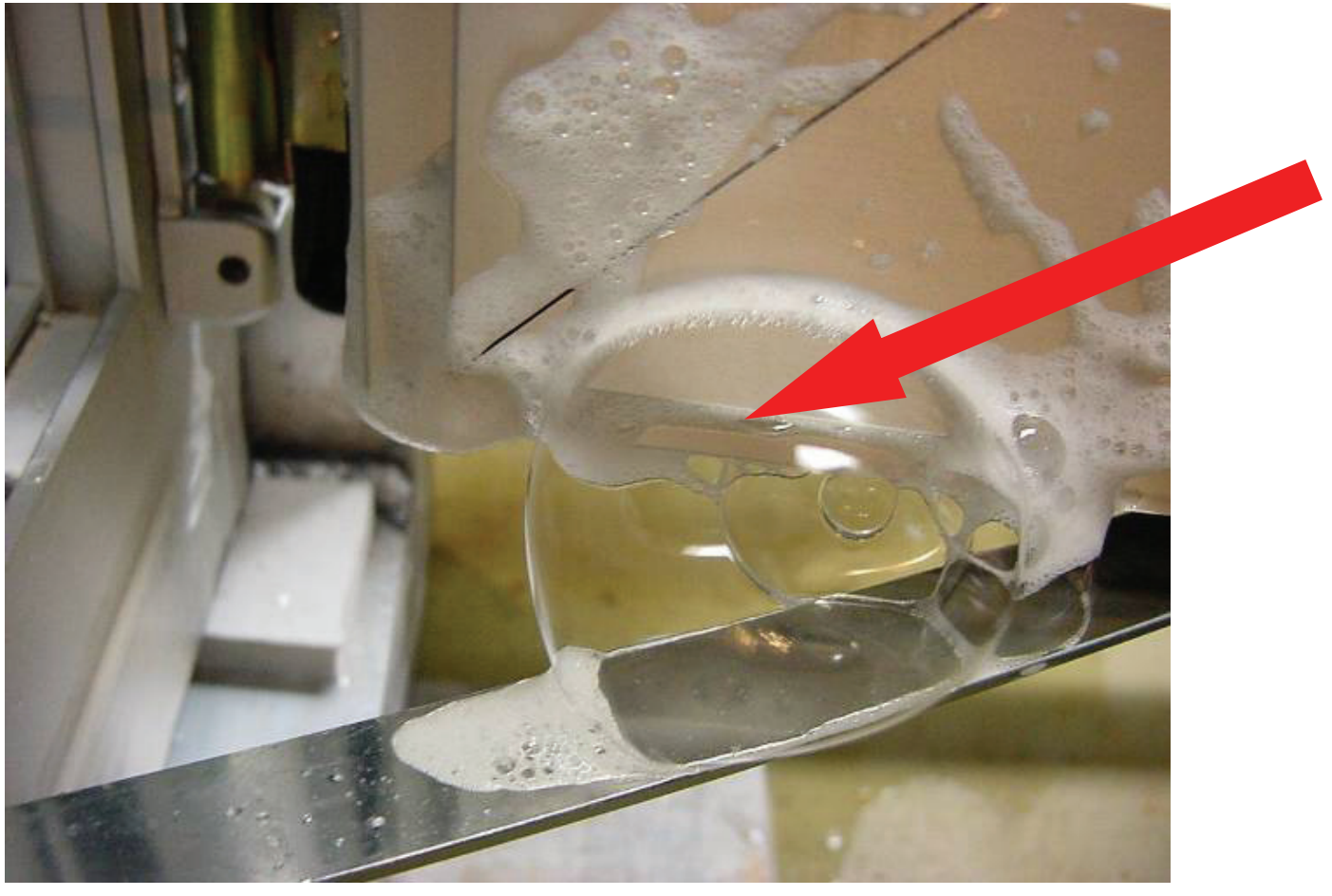
Poor processing of welded gasket





Open joints at ends of drainage system

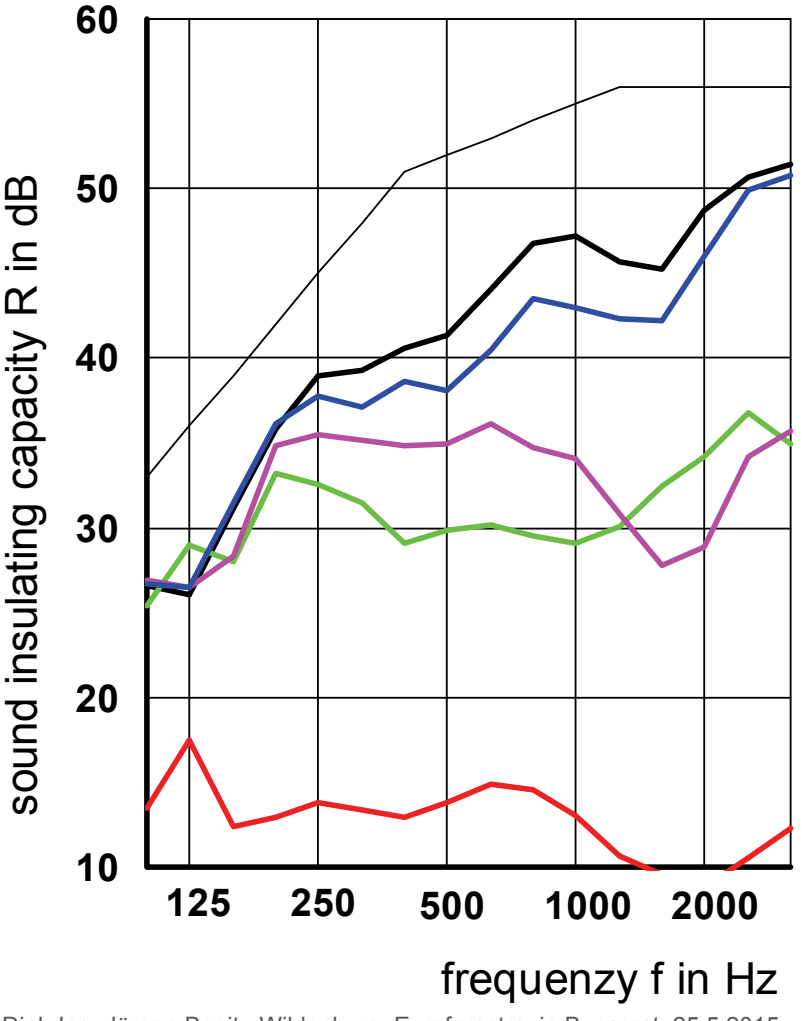
Finding of weak points – Dish soap test



Analyzing of the air permeability on site

Smoke testing
at lift-sliding doors

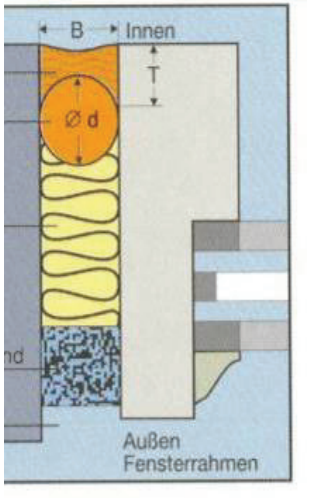
Reduction by installation joints



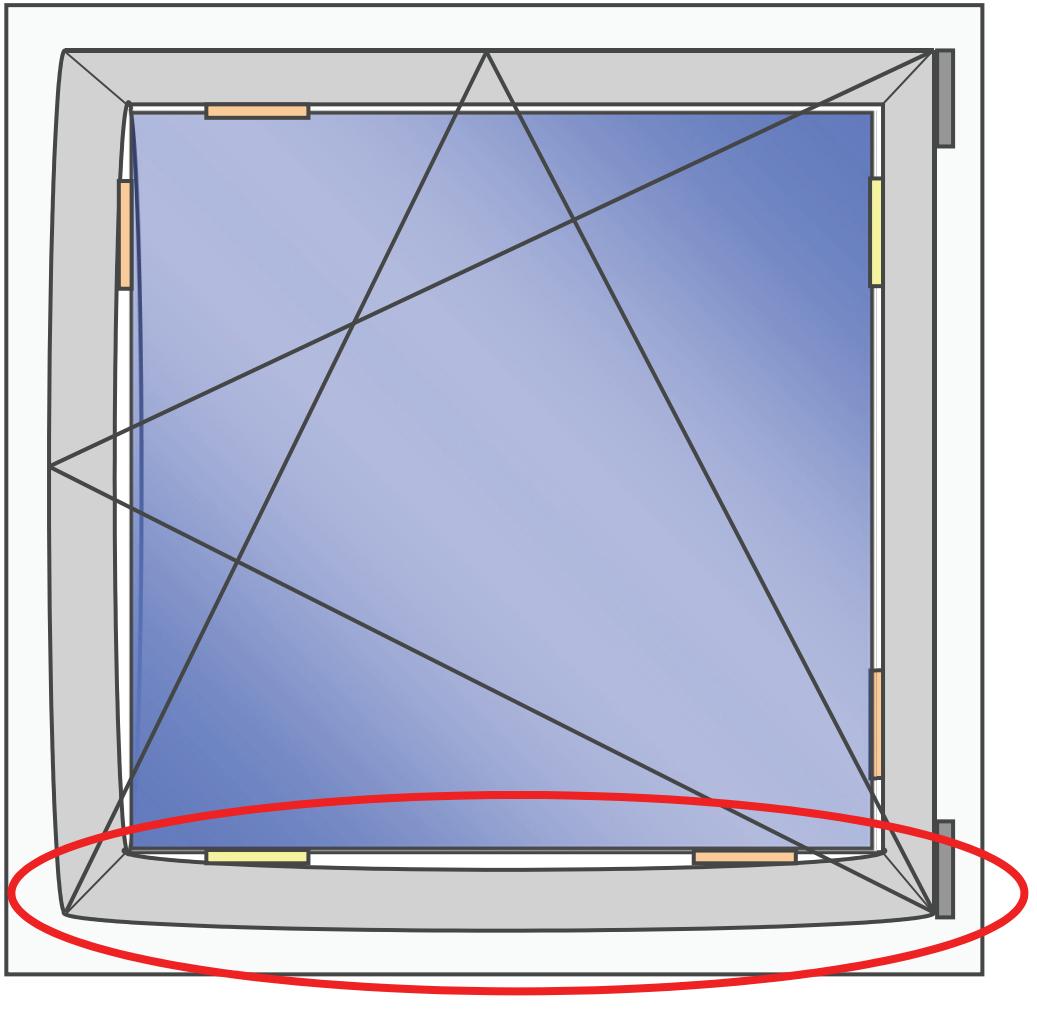
- Window, join **tight**
  $R_w(C;C_{tr})$ **= 45 (-1;-5) dB**
- Window with **empty** join
  $R_w(C;C_{tr})$ **= 12 (-1; 0) dB**

Loose 30 dB

- Window **foamed**, hair join
  $R_w(C;C_{tr})$ **= 32 (-1;-2) dB**
- Window **foamed**, 1 cotter slot
  $R_w(C;C_{tr})$ **= 33 (-1;-1) dB**
- Join fully **foamed**
  $R_w(C;C_{tr})$ = **43 (-1;-4) dB**
- Reference curve according to DIN EN ISO 717-1



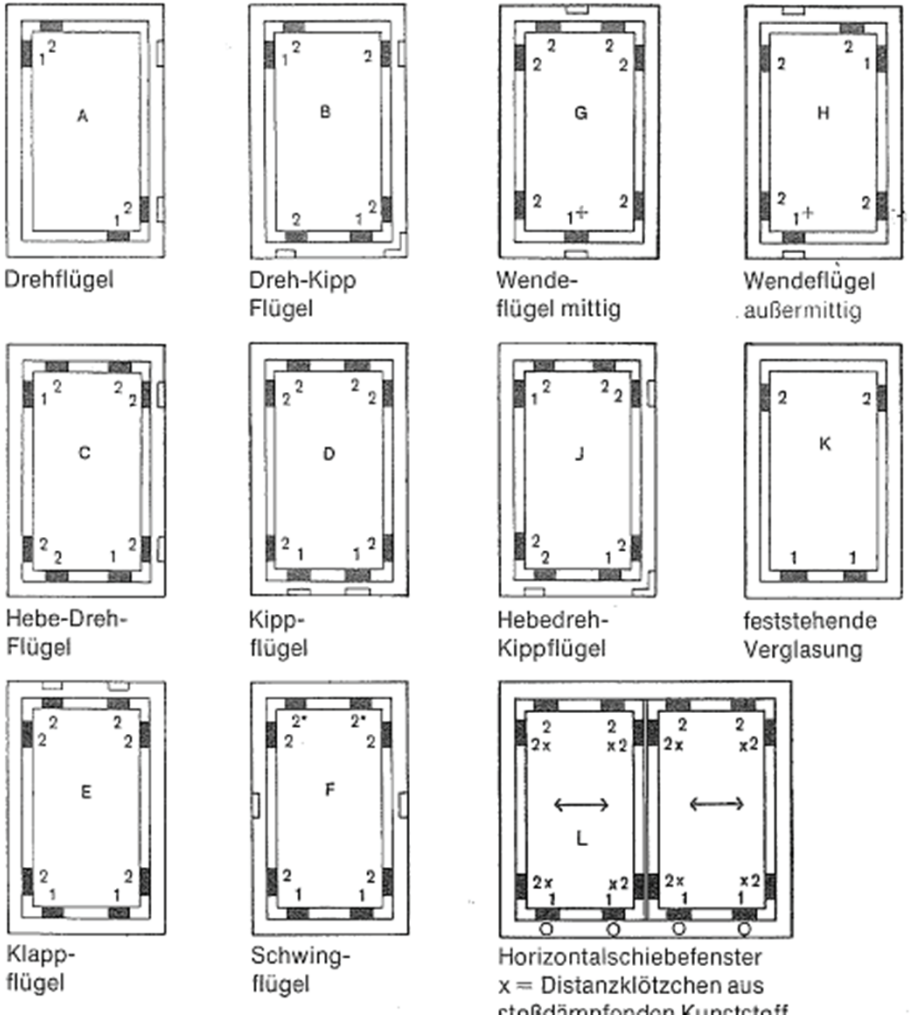
Profile deformation as a result of glass load

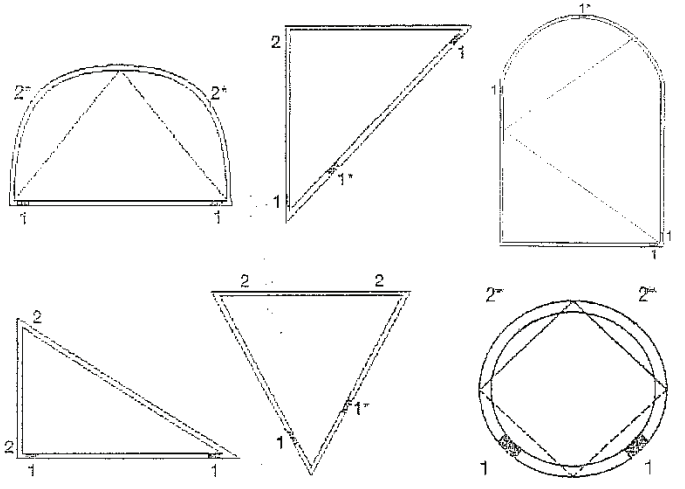


Problem:

- Increased glass loads require stiffer profiles
- Profile deformations jeopardise the functionality of the window

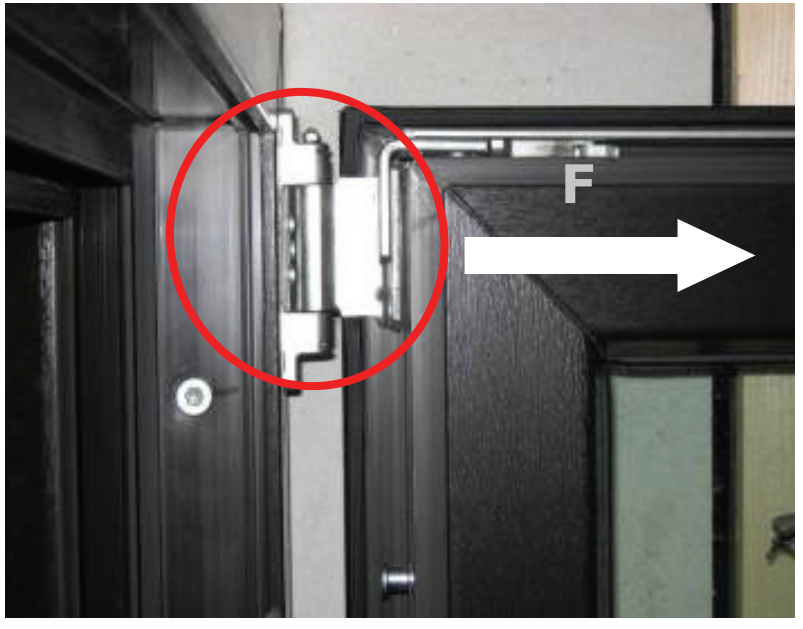
Rules for positions of glazing blocks





- Load bearing blocks transfers the weight of the glazing to the frame construction
- Spacer blocks ensures the distance between glass edge and rebate and ensures pressure-free installation

Mechanical strength of bearing points



Tensile force and shear forces
at the tilt mechanism pivot

Tensile and shear forces
at the corner pivot

Breakage of corner pivot

Repeated opening+closing according EN 1191

Breakage of the corner pivot during the testing procedure of 10.000 tilt and turn cycles

Classification for doors +windows

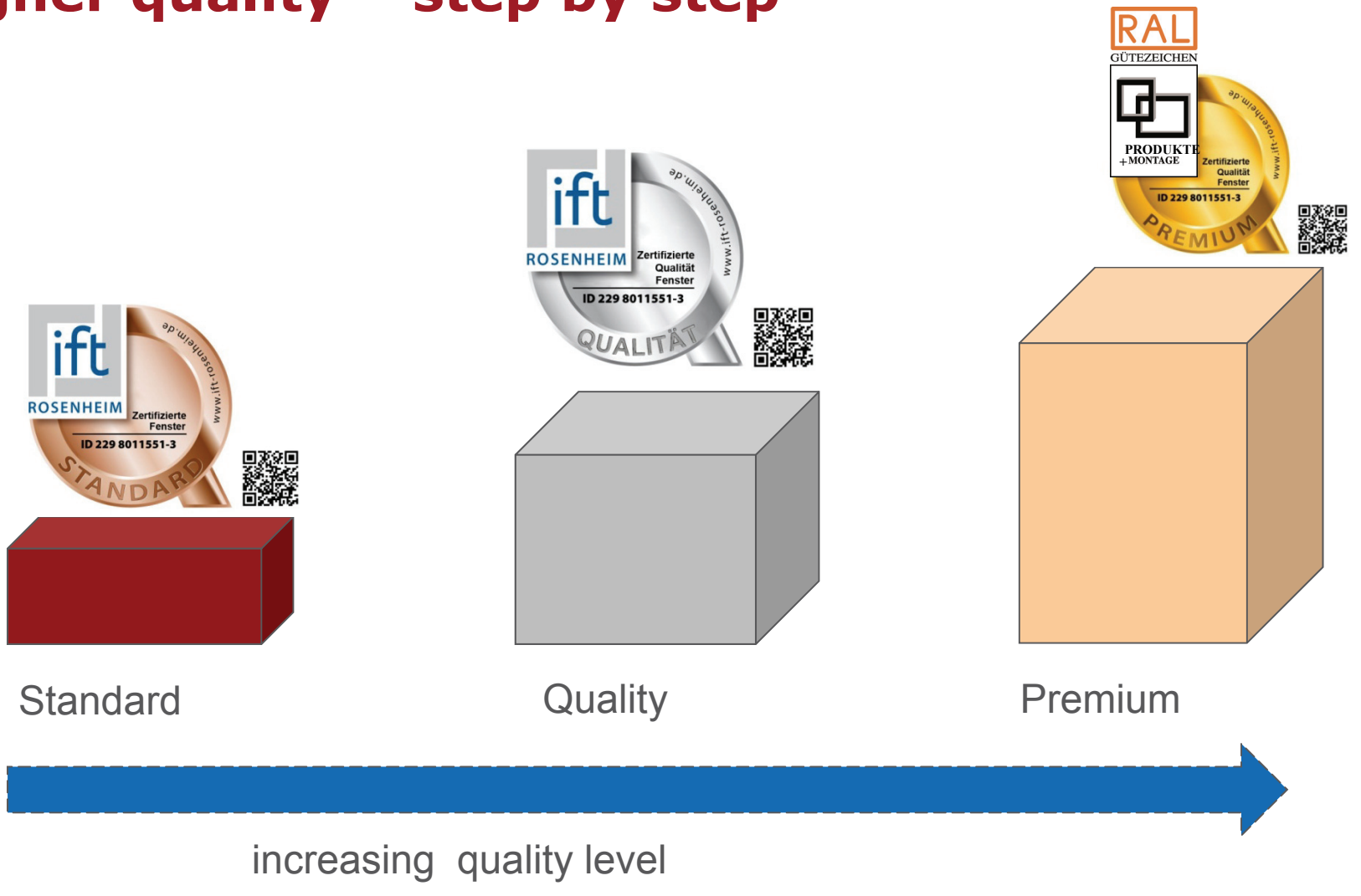
Class	No of cycles
0	No test
1	5000
2	10.000
3	20.000
4	50.000

Failure criteria:

- Damage, deformation, operation failure
- Classification of windows in class 2 (equivalent to 10 000 cycles)

Proposal for certification of ift quality

Higher quality – step by step



Target and requirements for manufacturer

Description/ content			
Objective target	• Fulfilment of the **standard** requirement • Legal certainty • Implementation FPC	• **Qualitative** characteristics • **Certified** components • Product **test**	• Quality determining characteristics • **Employee** qualification • Approved **installation**
Product and manufacturer requirements	• Statutory **minimum requirements** of the target market (marketability)	• **system test** by ift • Verification of **durability** • Minimum requirements	• **Additional** functional characteristics • Additional product test

Simple testing methods
for quality of window systems

Avoid risk and cost by
complaining of customers!

Evaluation for the quality of window systems
Example UPVC – Window systems

R

ift-RICHTLINIE FE-13/1
Oktober 2010

ift ROSENHEIM
Das Institut für
Fenster und Fassaden,
Türen und Tore,
Glas und Baustoffe

Eignung von Kunststofffensterprofilen
Prüfung und Klassifizierung

Suitability of PVC profiles for windows
Testing and classification

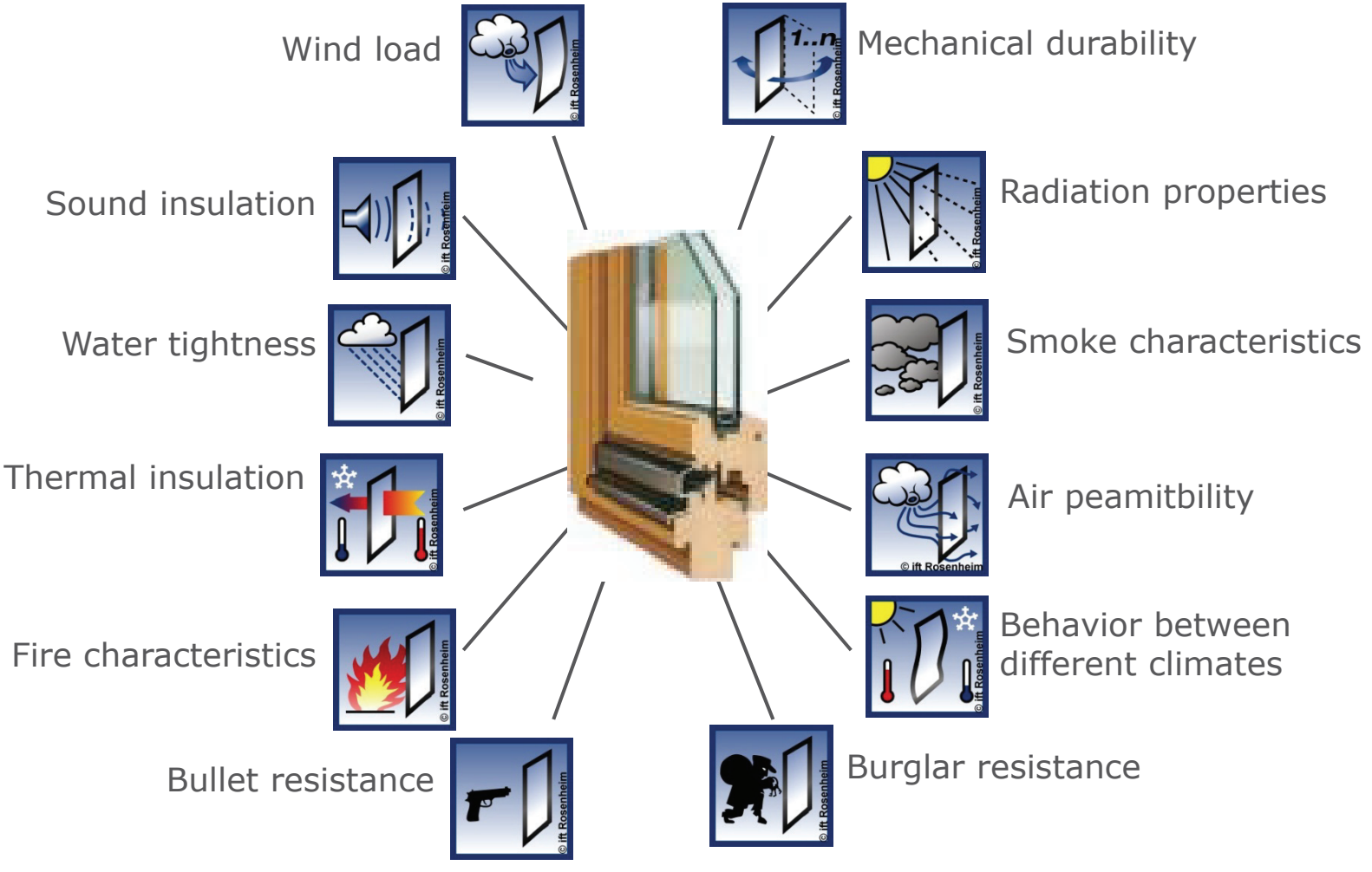
Inhalt

- 1 Anwendungsbereich 2
- 2 Mitgeltende Normen 2
- 3 Definitionen 3
- 4 Prüfverfahren 4
- Literatur 15

Basis for system testing
according ift certification and to
RAL and

ift-guideline FE-13/1 – Suitability of window profiles made of plastic

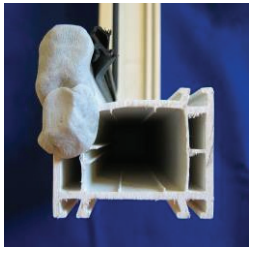
Important characteristics

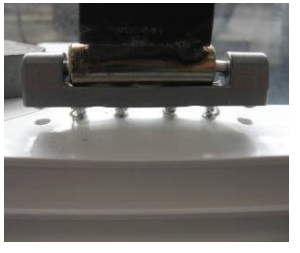


Sequence for testing of quality window systems

additional to testing according product standard EN 14351-1

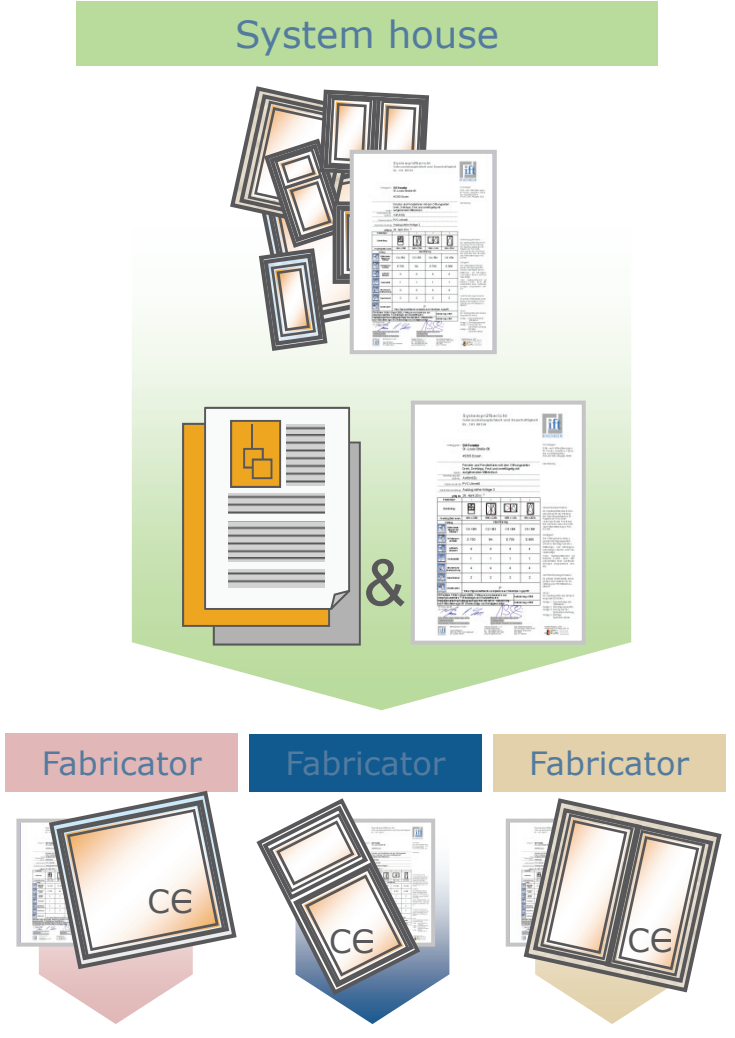
A	B	C
Permeability, deformation, resistance to climate and impact	Mechanical properties	Material-specific requirements





Reproducible technical characteristics

1. Realistic **selection** of samples for initial type tests (ITT)
2. Determination of realistic **classification**
3. Exact **description** of size, details and supplier products such as glass, hardware, sealant etc.
4. Detailed **production guidelines**
5. Strict description and guidelines for the factory production control (**FPC**)

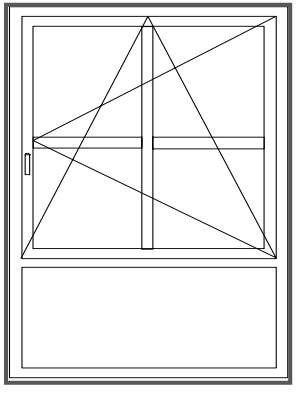


Representative test specimen for systems

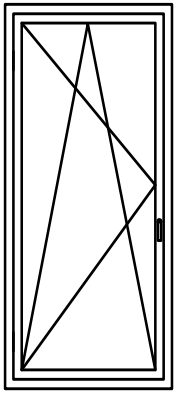
Air permeability

Watertightness

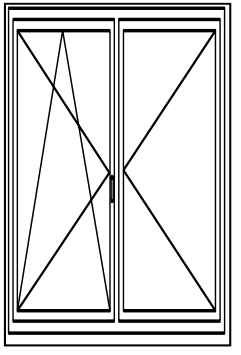
Wind resistance



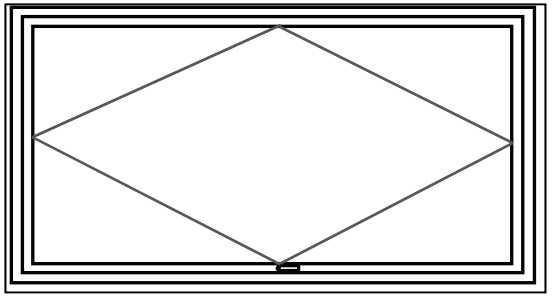
Tilt and turn casement with fixed sublight



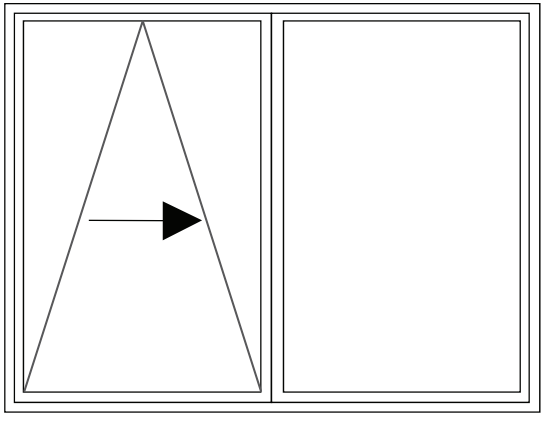
Tilt and turn casement door



Double-leaf door of overlapping design



Horizontal pivot casement

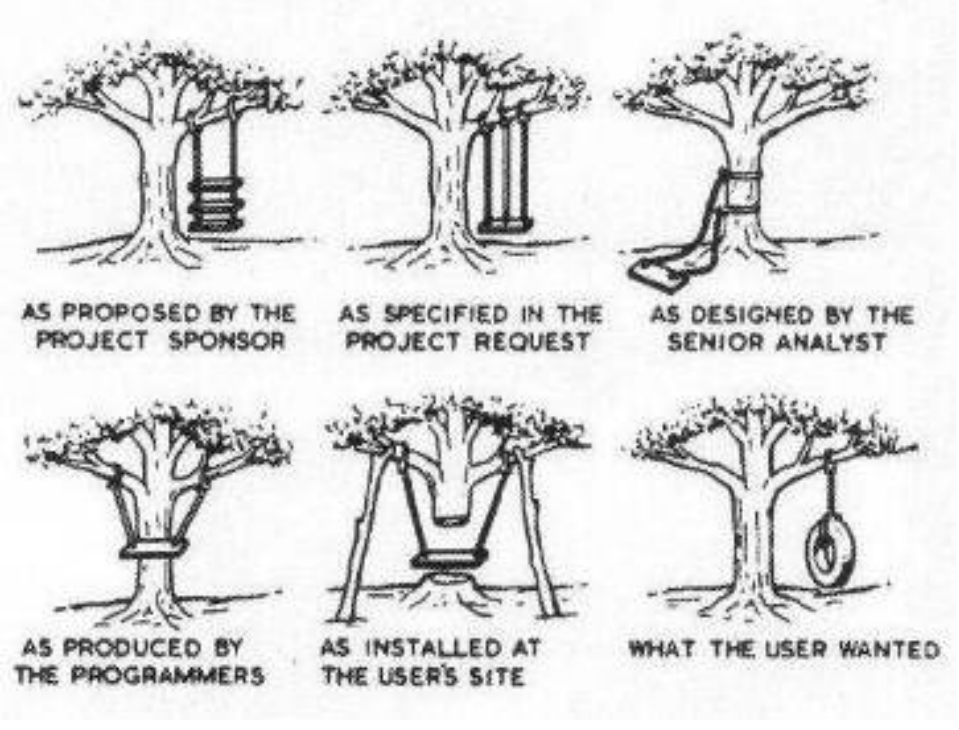


Parallel sliding bottom-hung door

Purpose of factory production control (FPC)

Aims

1. **Guaranty** for production of declared performance classes
2. **Production** according technical specification
3. Documentation of necessary **controlling procedures**
4. Identification and avoiding of trading of **non conformed** products and components



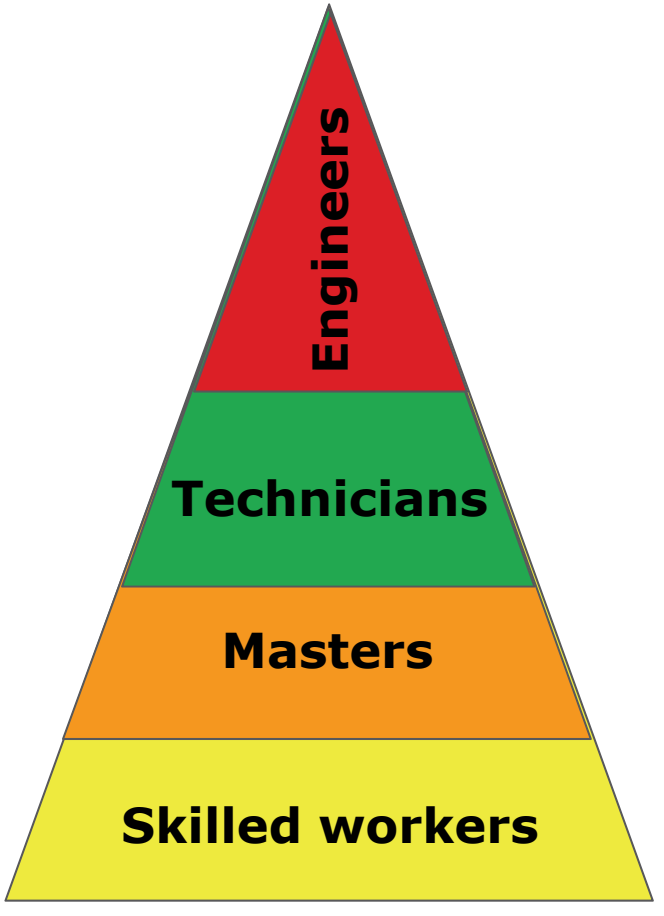
Installation of factory production control (FPC) and analyzing of production process

The analyze has to focus all relevant aspects of the production process including also the installation of building elements

Designing **Production** **Final product/ dispatch** **Installation**

Deviding of processes in suitable processes and documentation in the factory production control documents

Quality by training – From the bottom to the top



Thank you for your interest

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