2021

# ertex Tempered glass

for buildings and other structures

ertl-glas.at

## ertex TEMPERED GLASS

Thermally toughened glass that is largely resistant to mechanical and thermal impact and shows the normatively mandated breaking behaviour.

Built with safety

ertl glas

EGGER GLAS

ERTL GLAS GROUP OF COMPANIES

# Production options

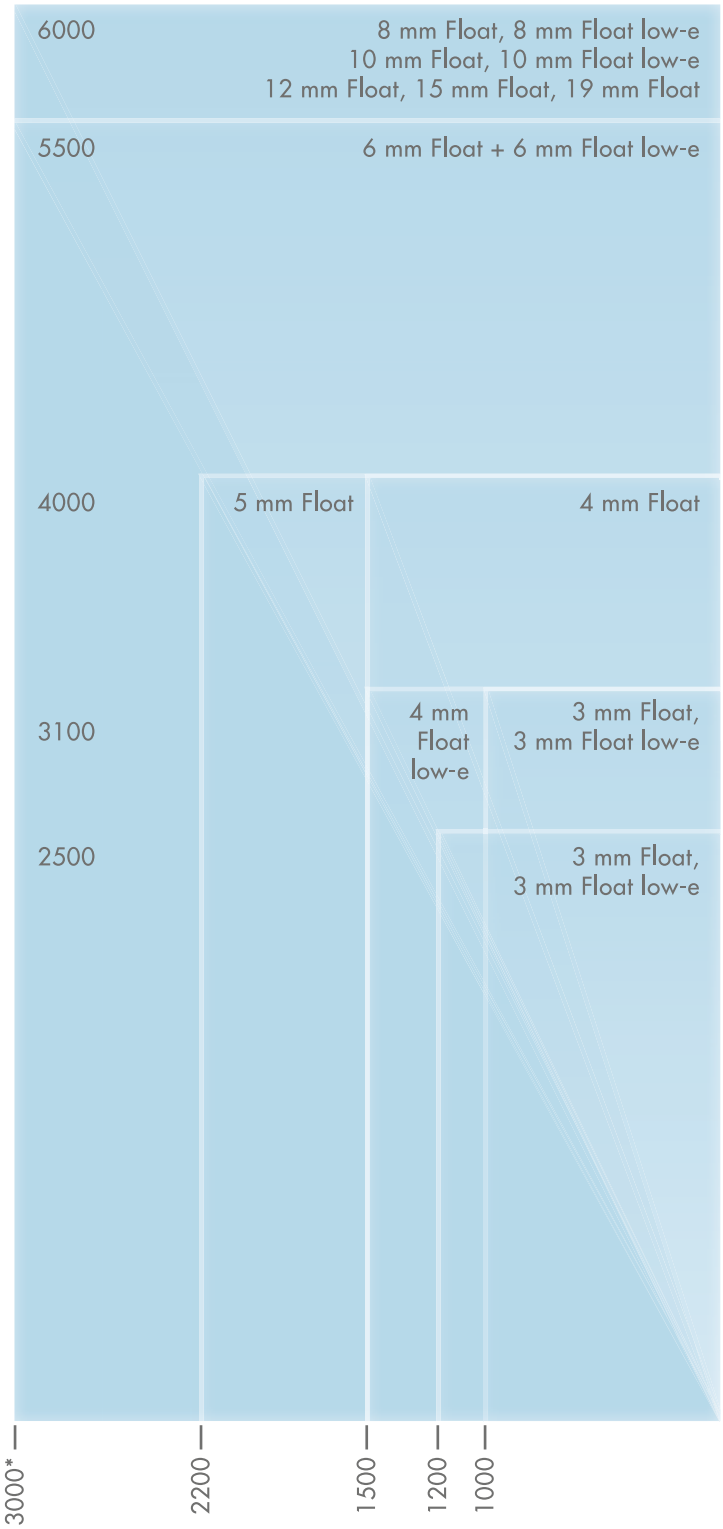
**ertex ESG, Generation 2018**

## Technical Data

**› Glass thicknesses:**
3 mm to 19 mm

**› Production sizes:**
3 mm min. 400 x 150 mm
4 to 19 mm min. 250 x 150 mm
Depending on glass thickness,
max. 6000 x 3000 mm

**› Aspect ratio:**
max. 1:20




## Production size diagram, independent of load / stress exposure in construction

* Please get in touch with us for edge lengths > 3000 mm, for the general clarification of limit dimensions and for planning the corresponding edge processing – we are happy to assist.

**Ornamental glass**
4 mm ≤ 1000 x 2000 mm
5 mm ≤ 1250 x 2250 mm
6 mm ≤ 1500 x 3000 mm
8 mm ≤ 2000 x 4000 mm
10 mm ≤ 2000 x 4000 mm

## Flat toughened basic glass types and products:

- Colourless float glass and/or low iron-oxide float glass
- Coloured glass with paints made of iron oxide and/or copper oxide
- Solar control float glass or coloured glass with a pyrolitic layer
- Special products with layers resulting from the Magnetron process
- Satin-finished glass
- Ornamental glass (cast glass)
- Further glass types on request!

# Conformity and properties

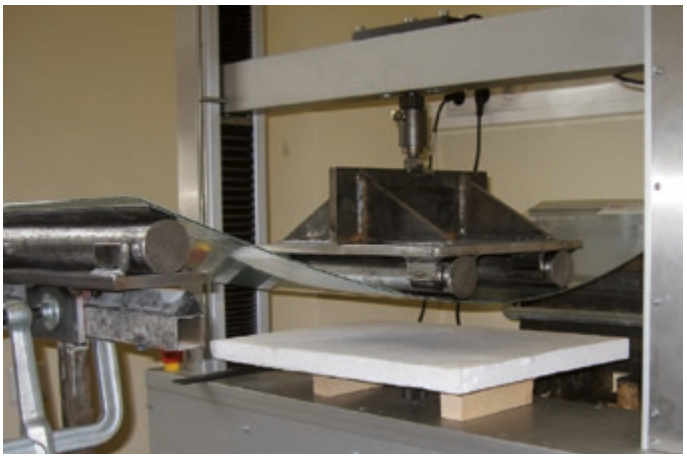
**ertex ESG** is manufactured including a factory production control as per harmonised product standard ÖNORM EN 12150, parts 1 and 2. The safety glass product demonstrably meets the characteristics laid down in the European Construction Products Regulation, and is sold with CE label.

## Breakage characteristics

In the event of excess load, the high residual stress energy stored in the tempered glass pane will cause it to shatter into small cube-shaped, and usually blunt-edged fragments. This reduces the risk of injury. This specific shattering pattern is typical for tempered glass. Despite the net-shaped cracks, the blunt-edged particles (glass crumbs) may form clod-shaped fractured pieces.

## Reasons for breakage

**Glass breakage is always triggered by a specific reason.** Due to its thermal tempering process, tempered glass has a higher mechanical and thermal load capacity than non-tempered glass. As it is a brittle material, however, it may still break due to overloading or improper handling, often with no obvious cause.



In this case it is often prematurely assumed that nickel-sulphide inclusions (NiSE) have caused the fracture. However, fractures can be caused by a number of possible factors such as: edge damage, incorrect block setting, unplanned restraints during installation, structural settling, contact of glass with hard materials, subsequent glass working, vandalism.

According to current scientific knowledge, in total seven matching characteristics must be confirmed by analysis in order to prove NiSE inclusions as breakage triggers.
(Source: BF-Bulletin 010/2011)

## Tolerances

The product standard, the "Guideline to assess the visual quality of glass for construction", and the "Glass Tolerances Handbook" (in its latest version) define the permitted tolerances as per the most up-to-date processes.

## Characteristic physical properties

A distortion caused by roller waves during the horizontal tempering process can be noticed particularly in the reflection. Glass with a thickness of ≥ 8 mm can show signs of small marks in the surface (roller marks).

# Areas of application

## Fields of use

- Ground-level glazing
  or glazing close to walkways and transit areas
- Applications in which
  thermal stress can be expected
- Semi-finished product for laminated safety glass
- Base product for all kinds of
  point-mounted glass systems
- Vertically arranged special constructions with
  required drill holes, milling, etc.
- Design products with surfaces
  with glass ceramic finish
- All-glass applications and all-glass door installations

## Component for insulated glazing units

**ertex** 3-pane IGU with **4 mm tempered glass** has passed the pendulum test (drop height 450 mm) on the "impact sides". The impact load resistance required by building law (OIB Guideline 4_5.1.2) has been met.

Therefore, the intermediate pane in all ertex 3-pane IGU products can be manufactured from any glass type. The (window) frame materials aluminium, wood, and plastics with max. glass dimensions of 1200 x 2500 mm (also in landscape format) fulfil these conditions. Test report by the authorised body, dated 28/06/2013.

## Use as safety glass

Both the legislation and ÖNORM (B 3716-7) assess tempered glass as a suitable safety glass to protect against impacts. Glazing in doors with a height of up to 1.50 m above ground level must be made of tempered glass. Other vertical glazing applications in residential areas and publicly accessible buildings must be made of safety glass up to a height of 0.85 m above ground level, and up to 1.50 m in buildings with potential gatherings of people.

## Protection against falling objects

OIB Guideline 4_Point 5.1.3 deals with the risk of consequential damage following tempered glass breakage with further dangerous glass fragments possibly falling down from a great height. If the potential fall height exceeds 4.0 m, appropriate safety and constructive measures must be taken. A continuous linear support on all sides (as per ÖNORM B 3716-2) and the demonstrable use of heat-soak tested tempered glass are considered a constructive measure.

## Warning and note

**ertex** glass is not unbreakable despite its robust security properties. The breakage factors are listed on page 4. As the externally monitored heat-soak test according to applicable standards (different product as per ÖNORM EN 14179) reduces the residual risk of spontaneous glass breakage to a negligible degree, a time-lapse test or tempering procedure conducted directly after the selection process has considerable importance. As a result, we have complied with our duty as a manufacturer to provide information.

Subsequent surface processing (e. g. sandblasting, acid-etching, etc.) of tempered ertex glass may have negative effects on its mechanical properties. When foils or similar products are applied over the entire glass surface, they will bind the small glass fragments in the event of breakage and can therefore cause a higher risk of injury.

# Areas of application

See-through room partition
made of tempered glass

Ground-level glass wall made of IGU
from tempered glass

Curtain façade made of heat-soak tested
tempered glass with design print

# Definition of production processes


**ertex ESG** is a thermally toughened soda-lime safety glass that is heated above a determined temperature and then cooled down quickly in a controlled manner. In this way, a permanent stress distribution is generated inside the glass that goes beyond its basic mechanical strength and gives the glass a considerably higher resistance against mechanical and thermal stresses, together with the mandated breaking behaviour.

TECHNICAL DATA

| | |
|---|---|
| Connected load: | 2.4 MW |
| Fan performance: | 65 $m^3$/sec. |
| Power consumption: | 5.7 kWh/$m^2$ 10 mm Glass thickness (average value) |
| Plant length: | 32 metres |
| Loading area: | 3250 x 6400 mm |
| Glass thicknesses: | 4 mm to 19 mm |

## Material characteristics

Due to the compressive stresses in the surface achieved in this way, surface defects can only develop their strength-reducing properties if tensile stress is applied to the surface by means of load or constriction. As such, also the thermal shock resistance of the glass is considerably increased due to the pre-tensioning procedure (approx. 200 K).

The glass can only be processed to a very limited extent due to the high residual stress energy stored in the glass after tempering. For this reason, edge processing, drilling or cut-outs must be performed before tempering. It should also be considered when planning that the thermal treatment of the glass can lead to dimensional deviations of drill holes and a slight precamber of the glass.

# Group of Companies

**ERTL GLAS AKTIENGESELLSCHAFT**
Franz-Kollmann-Straße 3
A-3300 Amstetten
info@ertl-glas.at
Phone: +43/7472/62 700
Fax: +43/7472/64 472
www.ertl-glas.at

**FILIALBETRIEB WAIDHOFEN/YBBS**
Urltalstraße 13
A-3340 Waidhofen a. d. Ybbs
Phone: +43/7442/52 568

**EGGER GLAS GMBH**
Isolier- u. Sicherheitsglaserzeugung
Gersdorf 170
A-8212 Pischelsdorf
office@egger-glas.at
Phone: +43/3113/3751-0
Fax: +43/3113/3751-21

**EGGER GLAS GMBH**
Isolier- u. Sicherheitsglaserzeugung
Holochergasse 11
A-1150 Wien
office.wien@egger-glas.at
Phone: +43/1/786 57 92
Fax: +43/1/786 57 92-13


**ERTL GLAS S.R.O.**
Zděbradská 60
CZ-25101 Říčany-Jažlovice
info@ertlglas.cz
Phone: +420 323637 480
Fax: +420 323637 485

**WMA-GLASS S.R.O.**
Školní 70
CZ-463 31 Chrastava
Phone: +420 724 955 297
Fax: +420 482 720 020
www.wma-glass.cz

**ERTL GLAS AG**
Sales Germany
Florian Fuchs
fuchs@ertl-glas.at
Phone: +49/177/21 44770

**HOTEL EXEL******
Alte Zeile 14
A-3300 Amstetten
office@hotelexel.com
Phone: +43/7472/25 888
Fax: +43/7472/25 888-25
www.hotelexel.com

**ERTL GLAS STEKLO PROIZVODNJA STEKLA D.O.O.**
Kolodvorska Ulica 22
SLO-1310 Ribnica
info@ertl-glas.si
Phone: +386 1 83 50 500
Fax: +386 1 83 50 510
www.ertl-glas.si

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