kg Toughened glass

Toughened, or tempered glass is made from flat glass that has been strengthened. Flat glass is made from a combination of silica, soda, lime, dolomite and aluminium oxide. The raw materials are melted at high temperature and the molten glass is then formed into flat glass using a variety of processes. A floating process, where the molten glass is floated on a bed of tin, is most common for manufacturing window glass. The glass is then gradually cooled (annealed) and cut to size.

To produce toughened glass, the flat glass is then heated and rapidly cooled, increasing compressive stress on the outer surfaces of the glass. This produces glass that is 5 times stronger than standard flat glass.

Toughened glass is commonly used for windows, glass doors, balustrades, shower screens and pool fences. It provides added safety over flat glass as when broken, the glass shatters into small even pieces.

Category *Glass*

Type *Glass*

Functional unit *kg*

Specific heat *840 J/(kg·K)*

Density *2 600 kg/m³*

Common uses
Windows, doors, partitions, skylights, ballustrades, shower screens

Process name
Tempered glass (custom)

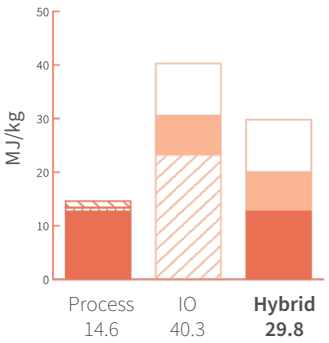
Input-output sector
Glass and Glass Product Manufacturing

Further information
doi.org/10.26188/5da5589913df4

Material variations	Unit	Energy (MJ/unit)	Water (L/unit)	GHG emissions ($kgCO_2e$/unit)
Toughened glass	*kg*	*29.8*	*30.2*	*2.2*
Toughened glass sheet - 3 mm	m^2	232	235	17.1
Toughened glass sheet - 4 mm	m^2	310	314	22.8
Toughened glass sheet - 5 mm	m^2	387	392	28.5
Toughened glass sheet - 6 mm	m^2	465	471	34.2
Toughened glass sheet - 10 mm	m^2	775	785	56.9
Toughened glass sheet - 12 mm	m^2	929	942	68.3

TOP THREE INPUTS

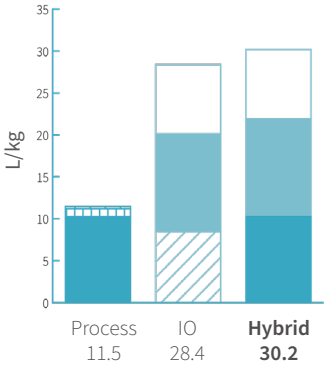
- 34.3% Flat glass, uncoated, at plant/RER U/AusSD U
- 9.1% Road Transport
- 1.9% Structural Metal Product Manufacturing



ENERGY
29.8 MJ/kg

TOP THREE INPUTS

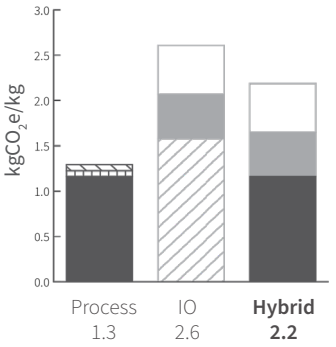
- 30.3% Flat glass, uncoated, at plant/RER U/AusSD U
- 2.2% Structural Metal Product Manufacturing
- 2.1% Wholesale Trade



WATER
30.2 L/kg

TOP THREE INPUTS

- 44.0% Flat glass, uncoated, at plant/RER U/AusSD U
- 3.9% Road Transport
- 2.0% Structural Metal Product Manufacturing



GREENHOUSE GAS EMISSIONS
2.2 $kgCO_2e$/kg