

# UNIQUE STAIRCASE

- TRON KIRK LIBRARY PROJECT -

ECE GUL

# MOODBOARD

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# HELICAL STAIRCASE

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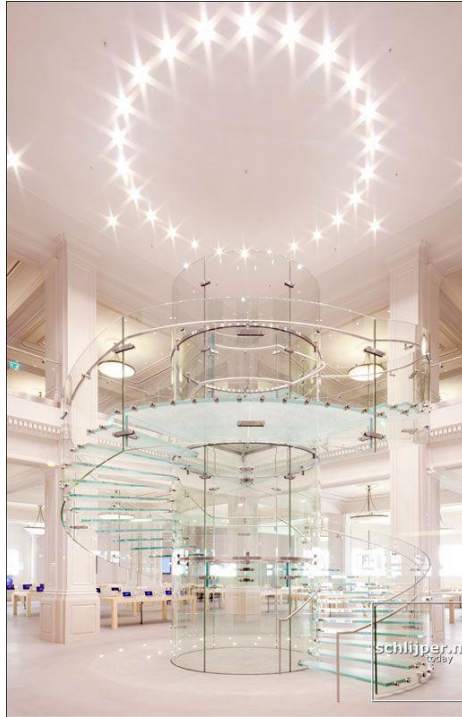


- Spiral and helical stairs; Due to their designs and maximum efficiency in the application area, they are widely preferred and known as the stairs that add aesthetics to the area where they are applied.
- Metal materials are used in spiral staircase designs, while steps obtained from glass, composite materials, wood and tree roots can be used in parts other than the keel and frame.





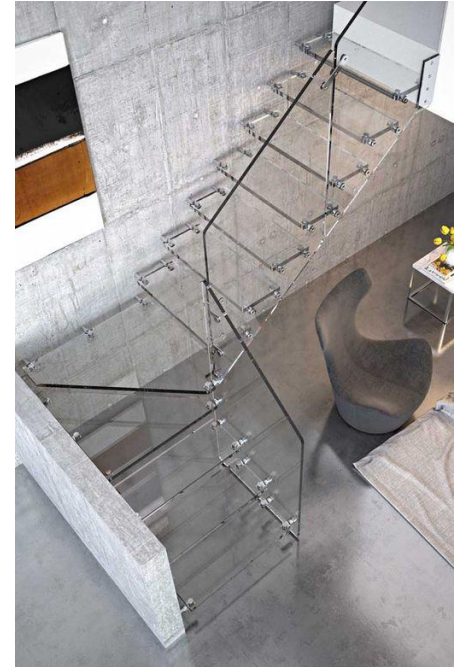
# GLASS STAIRCASE



# GLASS STAIRCASE

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- In order for glass stairs to remain safe, the treads are made of tempered glass, which is also referred to as “toughened” glass with a minimum thickness of 21,5 mm or 27/32 inches. The tempered glass is additionally laminated for glass stairs. These reinforcements make sure that the glass treads can support the weight of consistent foot traffic. This design also resists wear and tear, which can make the glass stairs easier to clean.
- Glass will also last much longer than traditional wood, which is subject to become severely weakened over time.



# COLORED GLASS

- Glass is “stained” through the manufacturing process, not by coloring it afterwards. The recipe for producing colored glass usually involves the addition of a metal to the glass. This is often accomplished by adding some powdered oxide, sulfide, or other compound of that metal to the glass while it is molten. The table below lists some of the coloring agents of glass and the colors that they produce. Manganese dioxide and sodium nitrate are also listed. They are decoloring agents - materials that neutralize the coloring impact of impurities in the glass.

Metals Used to Impart Color to Glass	
Cadmium Sulfide	Yellow
Gold Chloride	Red
Cobalt Oxide	Blue-Violet
Manganese Dioxide	Purple
Nickel Oxide	Violet
Sulfur	Yellow-Amber
Chromic Oxide	Emerald Green
Uranium Oxide	Fluorescent Yellow, Green
Iron Oxide	Greens and Browns
Selenium Oxide	Reds
Carbon Oxides	Amber-Brown
Antimony Oxides	White
Copper Compounds	Blue, Green, Red
Tin Compounds	White
Lead Compounds	Yellow
Manganese Dioxide	A "decoloring" agent
Sodium Nitrate	A "decoloring" agent



# COLORED GLASS

## THE CHEMISTRY OF COLOURED GLASS

Glass is coloured in 3 main ways. It can have transition or rare earth metal ions added; it can be due to colloidal particles formed in the glass; or it can be due to particles which are coloured themselves. This graphic shows some of the typical chemical elements that are used to colour glass.

### SODA-LIME GLASS

#### COMPOSITION

**SiO<sub>2</sub> 70-74%**

SILICON DIOXIDE

**CaO 10-14%**

CALCIUM OXIDE

**Na<sub>2</sub>O 13-16%**

SODIUM OXIDE

Soda-lime glass is the most common glass type, making up an estimated 90% of all manufactured glass. Its uses include containers, windows, bottles, and drinking glasses. The above percentages are a general composition only; other compounds are also present in smaller amounts.



IRON

Fe<sup>2+</sup>



IRON-SULFUR

Fe-S



COPPER

Cu<sup>2+</sup>



CHROMIUM

Cr<sup>3+</sup>



NICKEL

Ni<sup>2+</sup>



GOLD

Au



COPPER-TIN

Cu-Sn



MANGANESE

Mn<sup>3+</sup>



COBALT

Co<sup>2+</sup>



URANIUM

U<sup>4+/5+/6+</sup>



NEODYMIUM

Nd<sup>3+</sup>



ERBIUM

Er<sup>3+</sup>



SELENIUM-CADMIUM

Se-Cd



CADMIUM

as CdS

These are typical colours, and can be affected by the type of glass as well as the concentration of the colourant. Combination with other elements and compounds can also have an effect on the final colouration of the glass.



# COLORED GLASS

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