Research

Light dispersion should be considered as well; we will utilize prisms to emulate the extremes of light dispersion. This should also show how well different light sources light up…

We need to determine how light behavior affects the environment.

An excess of artificial light has begun to negatively impact the environment. Light pollution, which is the improper or unnecessary use of outdoor lighting, is affecting human health, disrupting wildlife behavior, and obstructing our ability to observe the night sky.

Some cities have enacted laws to regulate outdoor lighting. Manufacturers have even begun designing high-efficiency light sources that conserve energy and minimize light pollution.

What does higher refraction versus lower reflection mean

Refraction is the change in direction of a wave as it passes from one medium to another with a different density due to a change in its speed. Higher refraction will cause a larger change in the direction of the light passing through the material.

Reflection is the abrupt change in the direction of propagation of a wave that strikes the boundary between different mediums. Lower reflection will allow more light to pass through the material.

What does higher versus lower dispersion and divergence mean?

Dispersion in wave motion refers to any phenomenon where individual waves propagate at speeds that vary based on their wavelengths. Higher dispersion will cause the waves to spread out and separate further apart. While lower dispersion will keep the wave stay closer together.

Data

Construction glass materials:

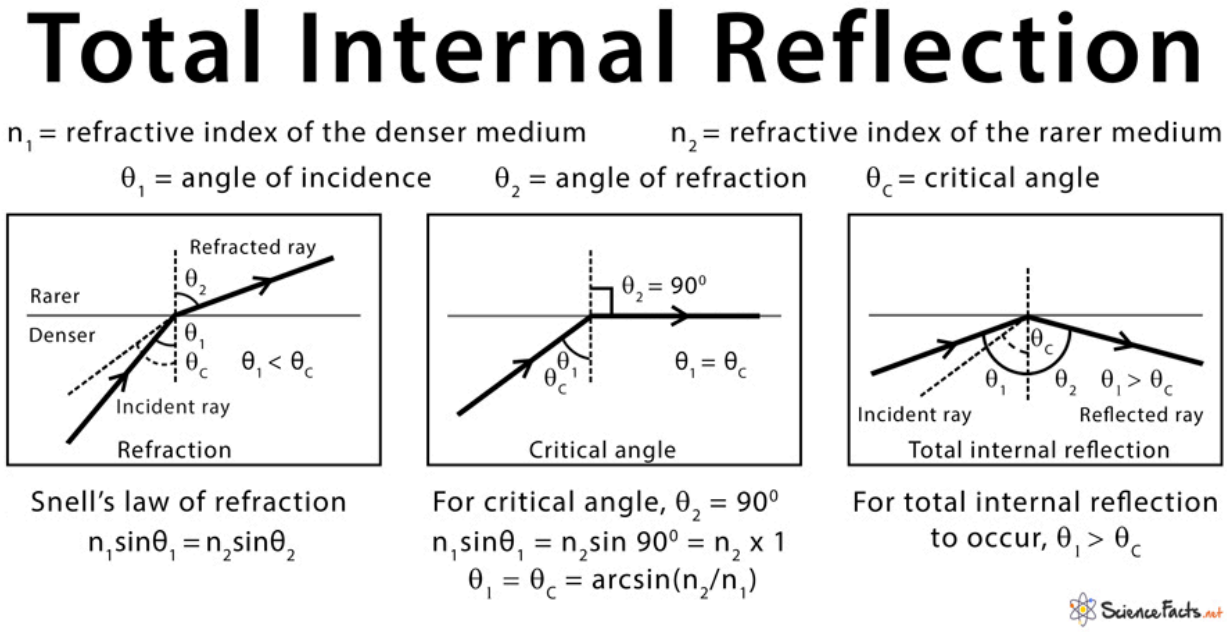
- Annealed float glass for windows
- Float glass
- Tempered glass

The index of refraction is given by the equation:

- n = c / v
- c = speed of light
- v = speed of light in a material

Snell law is given by the equation:

- n1sin(theta1)= n2sin(theta2)
- n1= index of refraction of medium 1
- n2= index of refraction of medium 2
- theta1= angle of incidence
- theta2= angle of refraction



Refractive Indices

Material	**Refractive Index (n)**
Water	1.33

Air	1.0
Acrylic Glass	1.49
Float Glass	1.51
Flint glass	1.75
Plastic	1.6

Wavelengths

Lightsource	**Wavelength (nm)**
Sunlight	580
Moonlight	400
White LED	450
Sodium-vapor lamp (fluorescent)	589
Mercury-vapor lamp (UV-C)	250

Beam divergence

$$\theta = \tan^{-1}\left(\frac{\omega_f}{f}\right)$$

λ is your laser wavelength and ω_0 is the beam's natural waist: its smallest dimension along the z-axis.

$$(1) \quad Albedo = \frac{The\ reflected\ light\ (Wm^{-2})}{The\ incident\ light\ (Wm^{-2})}$$

The intensity is defined as power per unit area, and power is defined as energy per unit time. Thus:

$$I = \frac{P}{A} = \frac{E}{\Delta t}\frac{1}{A}.$$

Sources

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