

TintTector Alpha[®]

For measuring the transmittance of
Tinted Vehicle Windscreens, Windowpanes
and other Glass Products

Tinting of vehicle windows Under scrutiny

Tinted car windows are in fashion. However, for safety reasons the transmittance of tinted car windows is regulated by law.

The innovative **TintTector Alpha** measures the transmittance of tinted car windows and indicates the transmittance in percentage* on demand.

The gauge is intended for use at technical car inspection centres, during routine police checks for compliance with new regulations and during the production of the vehicle windows and/or the maintenance thereof.

To this effect the gauge complies with ISO 3538 and is suitable for a single person to operate – it's so simple, fast and easy to use.

And this is how it works:

Attach the illuminant source to the clean outside windscreen or side window with the aid of the integrated suction cups and place the detector head on the inside of said window, carefully aligning the two parts.

Integrated magnets in both the light source and the detector protect them from falling.

The result* is displayed after a few seconds on the LCD screen once the measurement sequence has been initiated.

*The indicated measurement is the transmittance in percentage, defined as the ratio of the light absorbed by the glass to the incident light onto the glass.

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1 Technical parameters

Illuminant source	Type A
Color temperature of illuminant source	2856 K \pm 50 K
	Complying with the spectral response of the human eye $V(\lambda)$ during daytime (CIE)
Optical detector	
Measured quantity	% light transmitted
Measuring range	0.0 – 100.0 %
Maximum glass thickness	10 mm
Measuring accuracy for entire range	\leq 2 %
Temperature range	5 – 40° C
Relative humidity	< 90 %
Atmospheric pressure	860 – 1060 hPa

Technical details subject the change without notice

2 Characteristics

- high repeatability \leq 0.2 %
- precise characteristics complying with the spectral response of the human eye during daytime
- simple calibration procedure
- high quality certified optical system
- optical characteristics comply with DIN ISO 3538

3 Scope of delivery for the gauge

- illuminant with white light source type A and colour temperature 2856 K \pm 50 K.
- measuring head with a detector having the spectral sensitivity of a human eye $V(\lambda)$ during daytime (CIE).
- main gauge body with LCD and integrated re-chargeable batteries.
- 12 V, 200 mA battery re-charger.

All of the above as well as a known calibration standard for easy self-testing are stored in a handy plastic carrying case for convenience.

4 Operating

<p>The device ought to be calibrated before use. To calibrate put illuminator with measuring head together and press button CAL. After few seconds calibration is done. <u>Take care that the dot and the arrow are in line.</u></p>	 A black cylindrical device with an orange cable attached. A small white label on the side shows a dot and an arrow pointing to the right, indicating calibration.
<p>Fasten the illuminator on the outside of windscreen or side-window using the integrated suction cup. Put the measuring head on the other side aligned. The magnet rings in both units protect them additionally.</p> <p>Press the button MEA and read out the measurement. <u>Take care that the dot and the arrow are in line.</u></p>	 A hand holds a blue handheld device with a digital display showing '59.5%'. The device is connected to a black cylindrical illuminator unit which is attached to a car window using a suction cup.
<p>The whole set is packed in a carrying case fitted for transportation and storage. To test the instrument there is a glass plate for sampling attached.</p>	 A black carrying case with orange interior compartments. The blue handheld device and the black cylindrical illuminator are neatly packed inside, along with their respective cables.

Please keep dot of illuminator and arrow of measurement head in line while measuring and calibrating.

5 Diagrams

TintTector Alpha®

The **TintTector Alpha** is based on the standard recommendations of the norm ISO 3538.

Figure 1 presents the color temperature characteristic curve essential for tint meters.

Figure 2 shows the ideal color temperature characteristic curve recommended for the measuring head of a tint meter according to CIE.

Both curves are compared on **figure 3**. There is a visible shift between the curves.

Dividing the ordinates of the color temperature characteristic curve reached by the tint meter (**Fig. 1**) by the ordinates of the ideal color temperature characteristic curve recommended for the measuring head (**Fig. 2**) we obtain a curve illustrating the color characteristic of the illuminant type A with a color temperature 2856K (**Fig. 4**).

5.1 ISO 3538

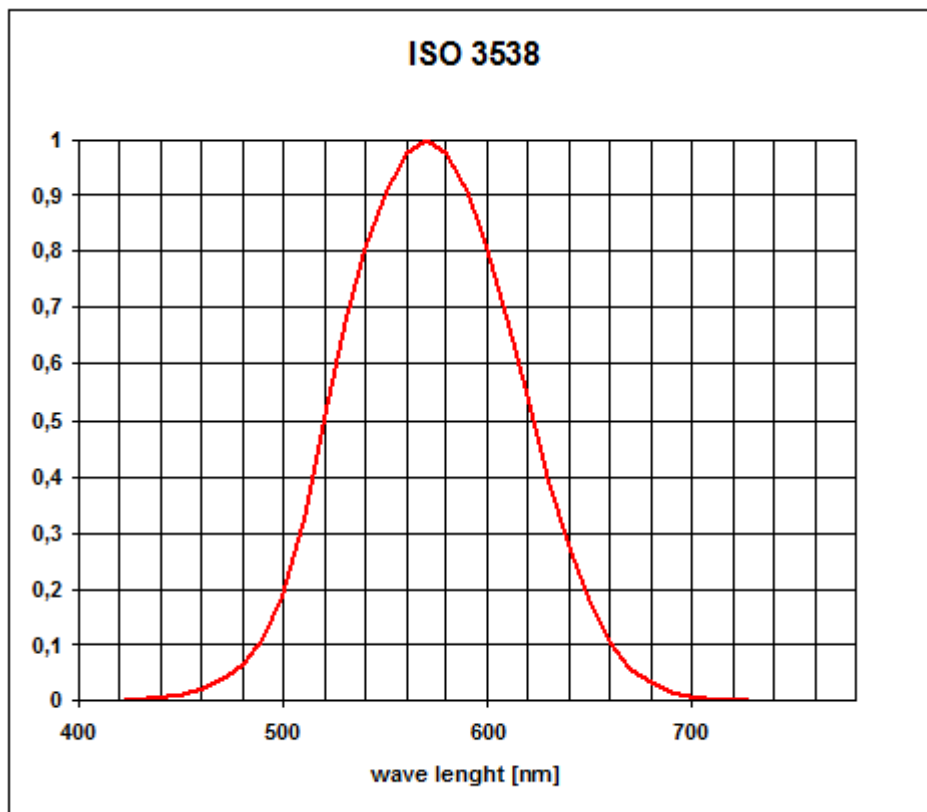


Fig. 1

5.2 Wave length

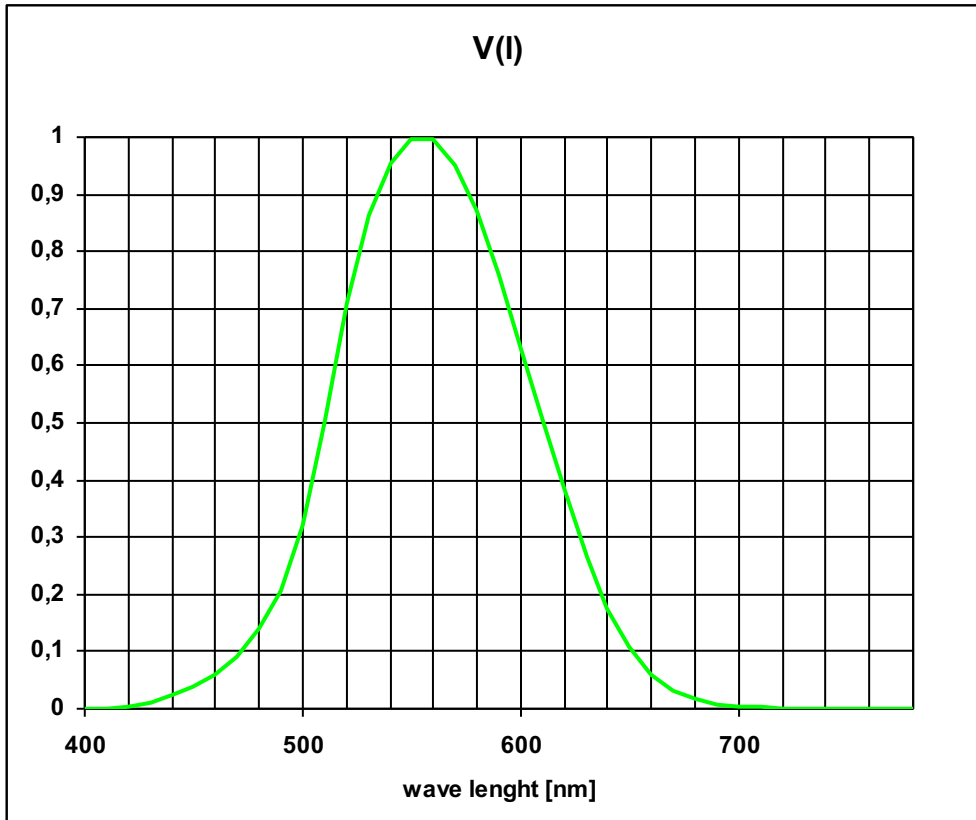


Fig. 2

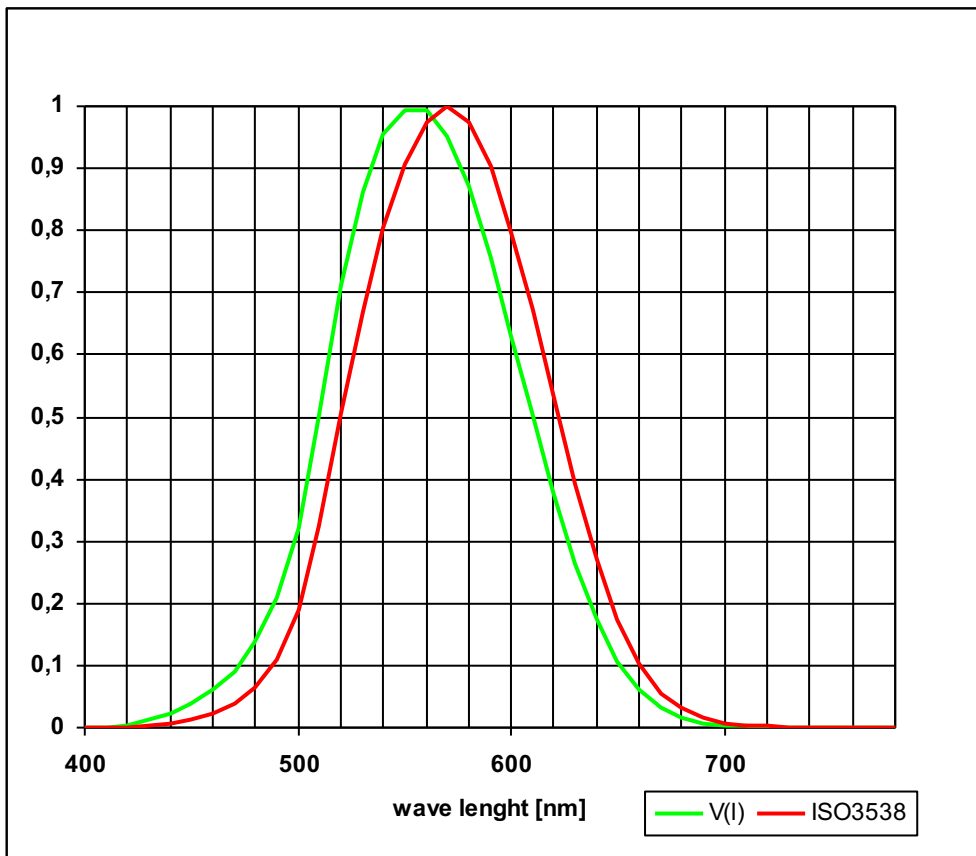


Fig. 3

5.3 Quotient

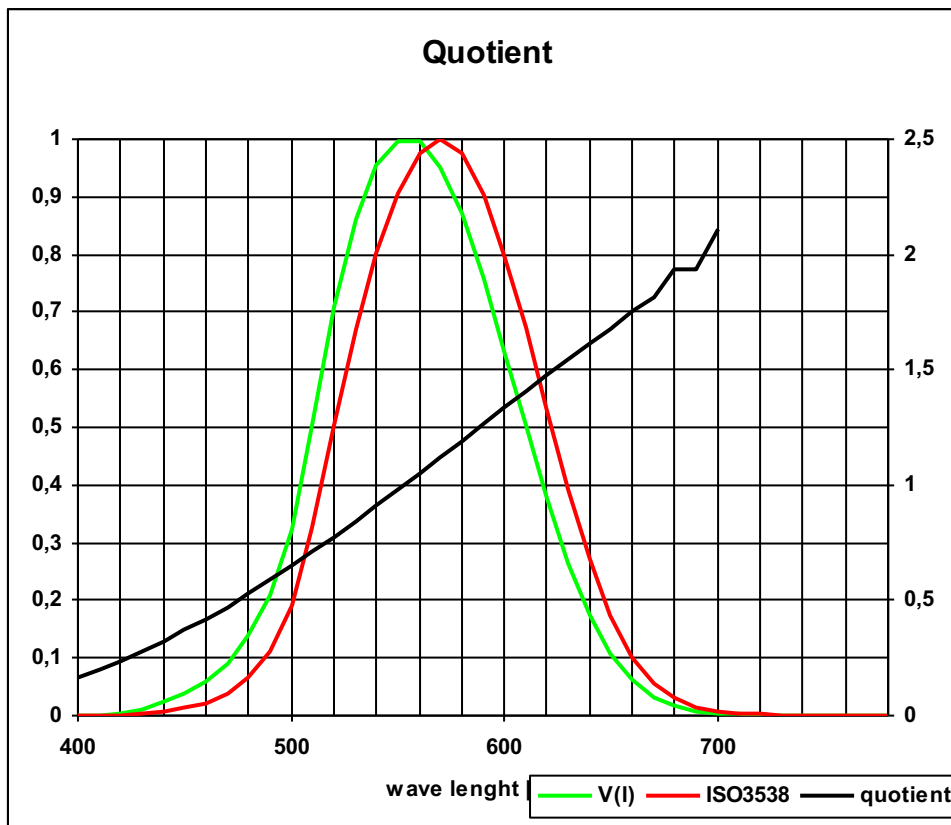


Fig. 4

The analysis of the curves explains without doubts the essential requirements of a measuring system for testing light transmittance through glass.

The measuring device should include:

- a white light source - illuminant type A with a color temperature 2856K
- a measuring head with color characteristic realizing the spectral sensitivity meeting relative sensitivity MKO – 1 for daily seeing according to CIE.

These requirements are necessary for a light transmittance measuring device, but do not ensure best possible measuring results.

Each construction element can affect additive measuring errors, if the influence of a partial error on a total error won't be eliminated.

6 White light source

A halogen lamp fulfils the requirements for a illuminant type A as a light source in the best way. A suitable halogen lamp is stable and long working (up to 30 000 hours) light source for a tint meter.

It keeps the color temperature on a level of 2856K in a safe range of supply voltage.

Shortly described a halogen lamp is a glass bulb filled with an unbounded ion cloud of gas. It changes the illumination of the light beam depending on its position.

Therefore, it is necessary to hold the illuminator and the measurement head in the same position as calibrated when taking measurements (dot and arrow, **see 4 Operations**).

6.1 Measuring head

The measuring head is the most important element for a precise tint meter.

The color characteristics of the measuring head decide about the device's accuracy for measuring colored glass and quasi colorless glass transparency.

Obviously there is no truly colorless glass in reality. A quasi colorless glass has always an impurity of color.

Colored glass is represented by the filter types: BG18, VG12, GG13, GG10 as well as GG14 and quasi colorless glass is represented by the filter types: OG1, OG3, OG5, RG1, RG5, RG7 and RG8.

For the first filter types the **TintTector Alpha** has a measurement error of only 2.5%.

For the second filter types is the measurement error is even below 1%.

Therefore, the **TintTector Alpha** is one of the most accurate tint meters on the market.