# TOURMALINE 2.0/20 TFL

This high resolution 1.3" TFL-Mount lens is compact and robust and therefore ideal for demanding imaging applications even in harsh environment. The optical design prevents shading with CRA sensitive sensors and the special broadband AR coating enables the use either in the visible 400 to 700 nm or in the NIR 700 to 1000 nm range.

## Key features

- Compact design
- Robust mechanics
- Image circle 24 mm
- Low chief ray angle

## Applications

- Machine Vision
- AOI (Automated Optical Inspection)
- 3D and 2D measurement
- Traffic and surveillance

## Technical specifications

| | |
|---|---|
| Type [standard] | TFL |
| ID [standard] | 1098778 |
| Interface | TFL-Mount |
| Focal length [mm] | 20 |
| F/# range | F/2 ... F/16 |
| Numerical aperture [object \| image] | - \| 0.24 |
| Max. sensor size [mm] | 24 |
| Max. angle of view [°] | 61 |
| Rec. magnification range | -0.1 ... 0 |
| Rec. working distance range [mm] | 194 ... ∞ |
| Min. working distance without extension tubes [mm] | 194 |
| Filter thread [mm] | M35.5 x 0.5 |
| Storage temperature [°C] | -25 … +70 |
| Net. weight [standard] [g] | 450 |
| Additional info | - |
| f'eff [mm] | 20.52 |
| SF [mm] | -5.62 |
| S'F' [mm] | 24.18 |
| HH' [mm] | 23.19 |
| ß'P | 2.97 |
| SEP [mm] | 12.53 |
| S'AP [mm] | -36.75 |
| Σd [mm] | 45.68 |

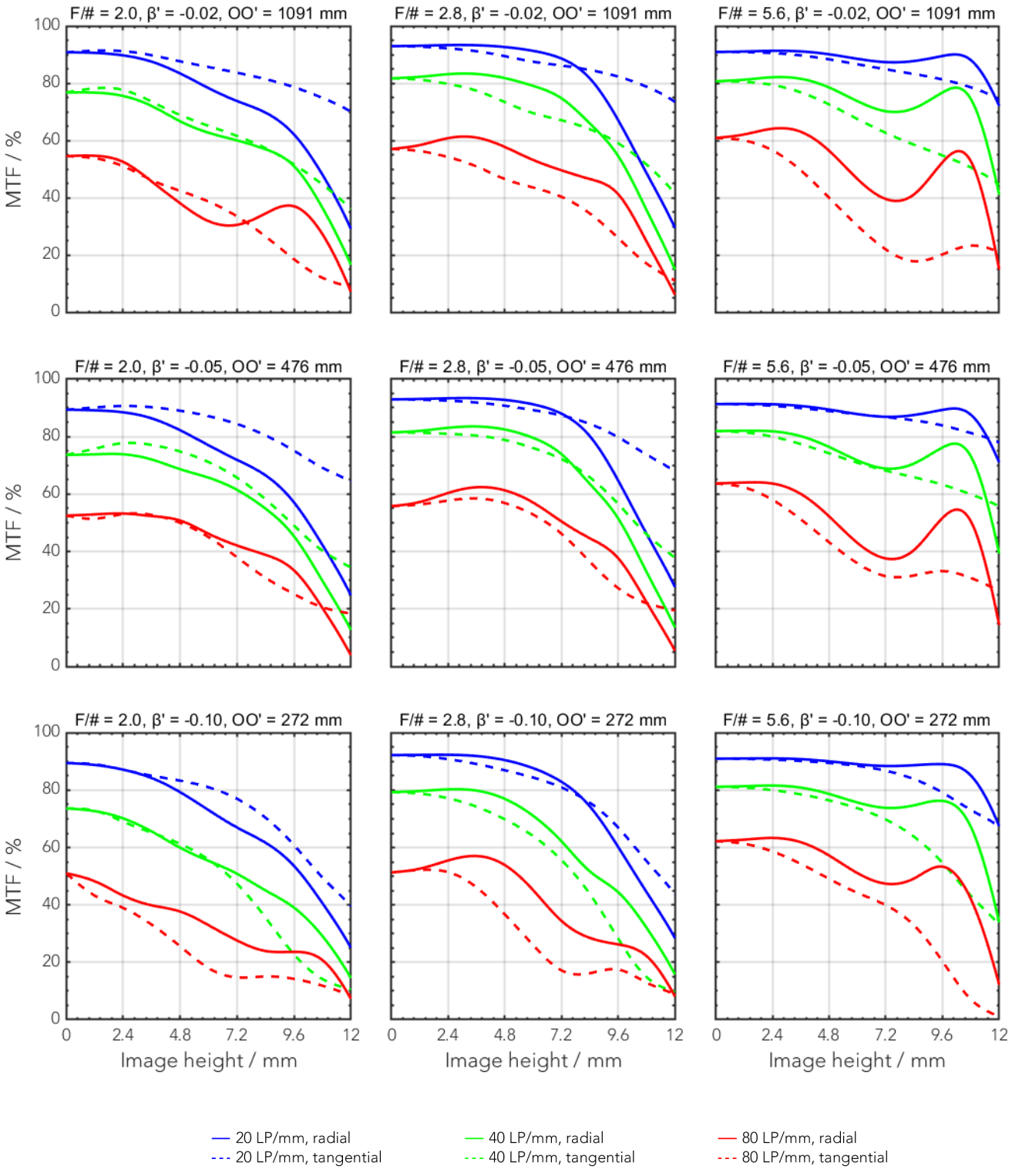
© Jos. Schneider Optische Werke
We accept no responsibility for an

ADEPT TURNKEY
SMARTER IMAGING FOR BETTER LIVES
Perth: (08) 9242 5411 Melbourne: (03) 9384 1775 Sydney: (02) 9905 1551
Email: sales@adeptturnkey.com.au
Web site: www.adept.net.au

# TOURMALINE 2.0/20 TFL

## MTF charts

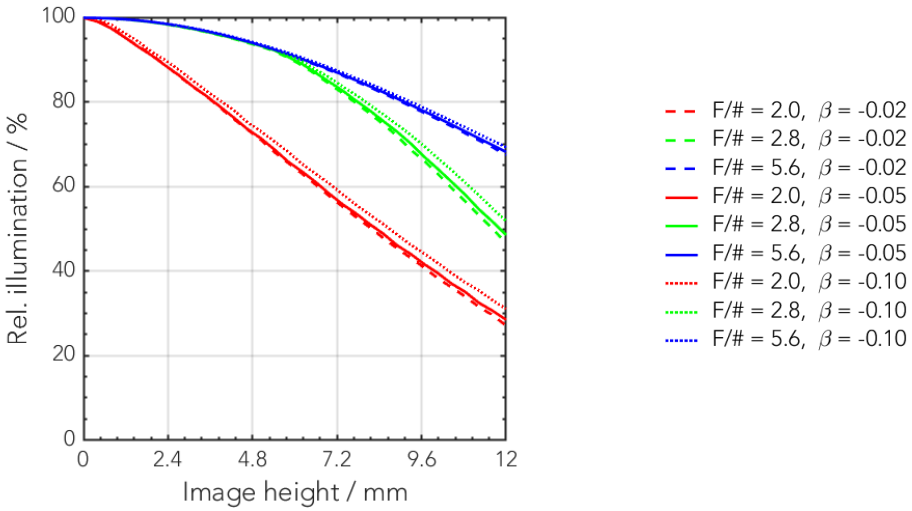
| Spectrum name | VIS | | | | | |
|---|---|---|---|---|---|---|
| Wavelengths [nm] | 425 | 475 | 525 | 575 | 625 | 675 |
| Rel. weights [%] | 8 | 16 | 23 | 22 | 19 | 13 |



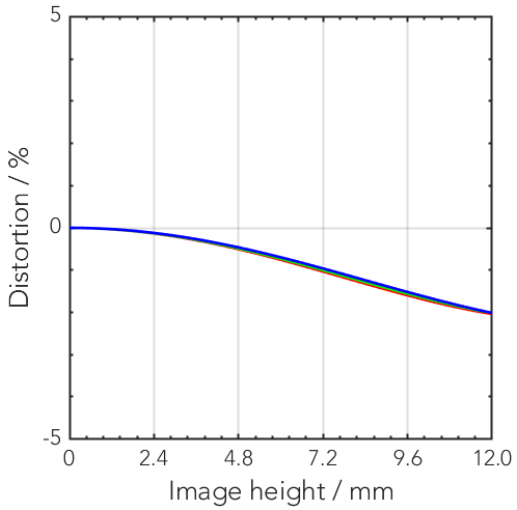

© Jos. Schneider Optische Werke GmbH | 12/2021 | Jos. Schneider Optische Werke GmbH is certified ISO 9001.
We accept no responsibility for any errors and reserve the right of modification without further notice.

# TOURMALINE 2.0/20 TFL

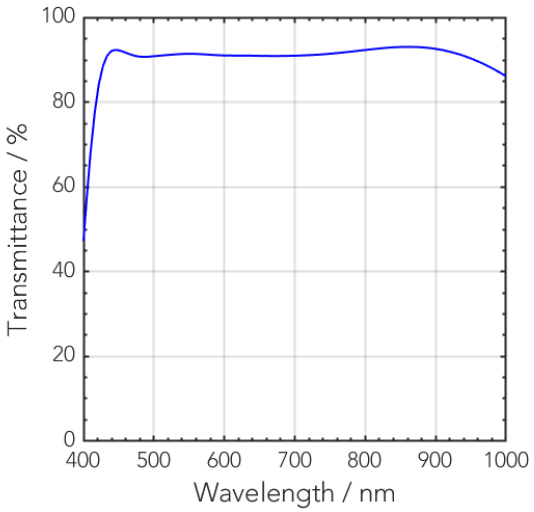
## Rel. illumination vs. image height




## Distortion vs. image height

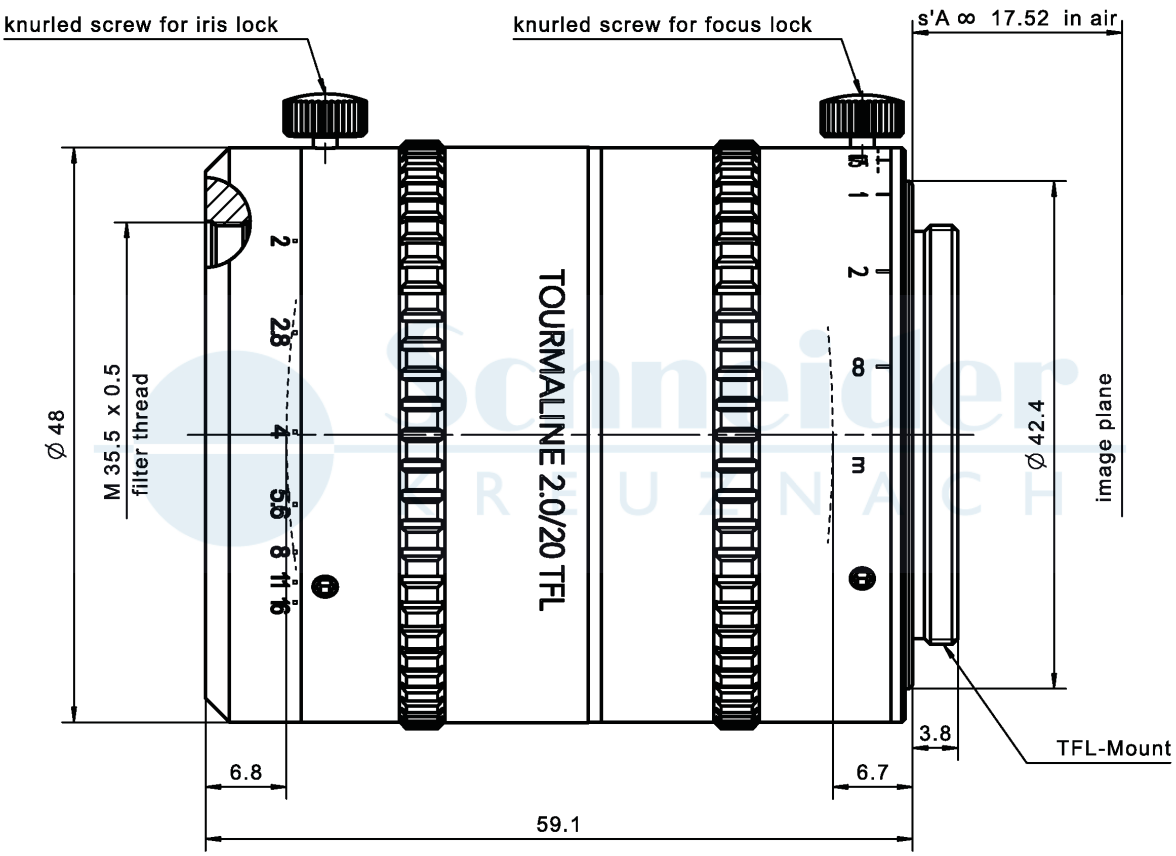



## Transmittance vs. wavelength




© Jos. Schneider Optische Werke GmbH | 12/2021 | Jos. Schneider Optische Werke GmbH is certified ISO 9001.
We accept no responsibility for any errors and reserve the right of modification without further notice.

## Technical drawings




© Jos. Schneider Optische Werke GmbH | 12/2021 | Jos. Schneider Optische Werke GmbH is certified ISO 9001.
We accept no responsibility for any errors and reserve the right of modification without further notice.

| Annotation | |
|---|---|
| Focal length | Nominal focal length |
| F/# range | Image space F-number range for infinity focus position |
| Numerical aperture | Maximum real numerical aperture (depending on recommended magnification range either for infinity or respective fixed magnification) |
| Max. sensor size | Image circle diameter |
| Max. angle of view | Angle of view associated with maximum sensor size (depending on recommended magnification range either for infinity or respective fixed magnification) |
| Rec. magnification range | Magnification range as recommended by Schneider-Kreuznach |
| Rec. working distance range | Working distance, i.e. distance between object and first mechanical element, associated with recommended magnification range |
| Max. mechanical focus travel | Maximum possible movement of the lens from infinity position (depending on recommended magnification range either for infinity or respective fixed magnification) |
| Net weight | weight of unpacked lens without lens cap |
| f'eff | Effective focal length |
| SF | Distance between vertex of first lens surface and object space focal point |
| S'F' | Distance between vertex of last lens surface and image space focal point (back focal distance at infinity) |
| HH' | Distance between principal planes |
| ß'P | Pupil magnification (= exit pupil diameter / entrance pupil diameter) |
| SEP | Distance between vertex of first lens surface and entrance pupil |
| S'AP | Distance between vertex of last lens surface and exit pupil |
| Σ d | Distance between vertices of first and last lens surface |
| s'A | Flange focal distance (in air) for infinite object distance (depending on recommended magnification range either for infinity or respective fixed magnification) |
| ß' | Magnification (= image size / object size), negative value because image is inverted |
| OO' | Distance between object and image |

Unless otherwise stated all dimensions in this data sheet are in mm.

© Jos. Schneider Optische Werke GmbH | 12/2021 | Jos. Schneider Optische Werke GmbH is certified ISO 9001.
We accept no responsibility for any errors and reserve the right of modification without further notice.

## Headquarters Europe

**Jos. Schneider Optische Werke GmbH**
Ringstraße 132
55543 Bad Kreuznach
✆ +49 671 601 205
✉ cs@schneiderkreuznach.com
www.schneiderkreuznach.com

## Offices Worldwide

**America**
✆ +1 800 645 7239 (East Coast)
✆ +1 800 228 1254 (West Coast)
✉ info@schneideroptics.com

**Asia**
✆ +86 755 8832 1170
✉ info@schneider-asiapacific.com

ADEPT TURNKEY
SMARTER IMAGING FOR BETTER LIVES
**Perth:** (08) 9242 5411 **Melbourne:** (03) 9384 1775 **Sydney: (02)** 9905 1551
**Email**: sales@adeptturnkey.com.au
**Web site**: www.adept.net.au

© Jos. Schneider Optische Werke GmbH | 12/2021 | Jos. Schneider Optische Werke GmbH is certified ISO 9001.
We accept no responsibility for any errors and reserve the right of modification without further notice.