

# VEO\_HJ Apo 4.5 / 90

For V38 Mounts

## Key Features

VEO\_HJ Apo 4.5 / 90 is a high-performance industrial lens optimized for large format area scan and line scan cameras with image circle diameters of 90 mm.

- V38 Mount
- 90 mm image circle
- Apo chromatic correction & low distortion
- 400 – 1000 nm broadband AR-coating

## Applications

- FPD inspection
- PCB inspection
- Web inspection
- Measurement systems
- Package sorting / logistic

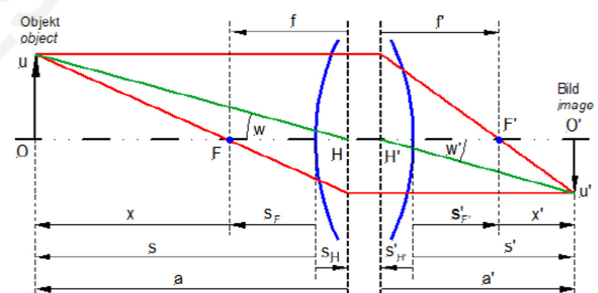
## Performance

| Parameter                | Specification           | Remarks       |
|--------------------------|-------------------------|---------------|
| Magnification range      | $\times 0 - \times 0.5$ | -             |
| F/# range                | F/4.5 ... F/64          | -             |
| Numerical aperture       | 0.11                    | Image plane   |
| Max. sensor size [mm]    | 90                      | -             |
| Focal length [mm]        | 90                      | -             |
| Wavelength [nm]          | 400 – 1000              | Visible – IR  |
| Distortion [%]           | < 0.2                   | -             |
| Working distance [mm]    | 246 ... $\infty$        | -             |
| Total length [mm]        | 2466                    | 0.04 $\times$ |
|                          | 1102                    | 0.1 $\times$  |
|                          | 486                     | 0.33 $\times$ |
| Interface                | V38 mount               | -             |
| Iris                     | Changeable              | -             |
| Weight [g]               | 134                     | -             |
| Storage temperature [°C] | -25 ~ 70                | -             |
| Filter thread [mm]       | M37 * 0.75 pitch        | -             |



## Optical Parameters

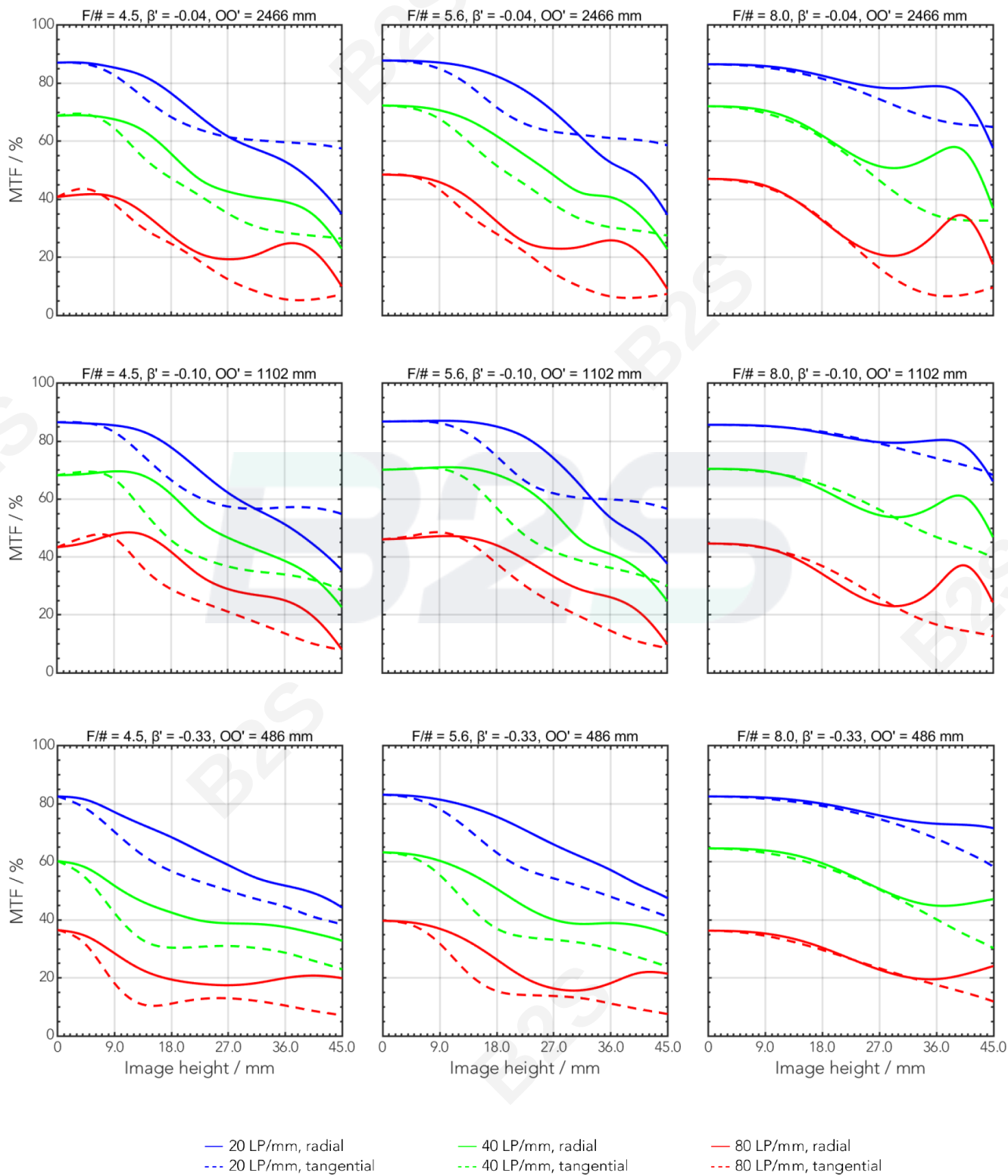
| Contents                               | Parameter       | Value  |
|----------------------------------------|-----------------|--------|
| Chief Ray Angle (Max.) in object plane | CRA[° ]         | 52°    |
| Effective focal length                 | f'eff [mm]      | 91.19  |
| Front focal length                     | SF [mm]         | -67.47 |
| Back focal length                      | S'F' [mm]       | 67.77  |
| Principal plane distance               | HH' [mm]        | -3.62  |
| Pupil magnification                    | $\beta'P$       | 1.01   |
| Entrance pupil position                | SEP [mm]        | 22.44  |
| Exit pupil position                    | S'AP [mm]       | -24.72 |
| Vertex width                           | $\Sigma d$ [mm] | 43.52  |



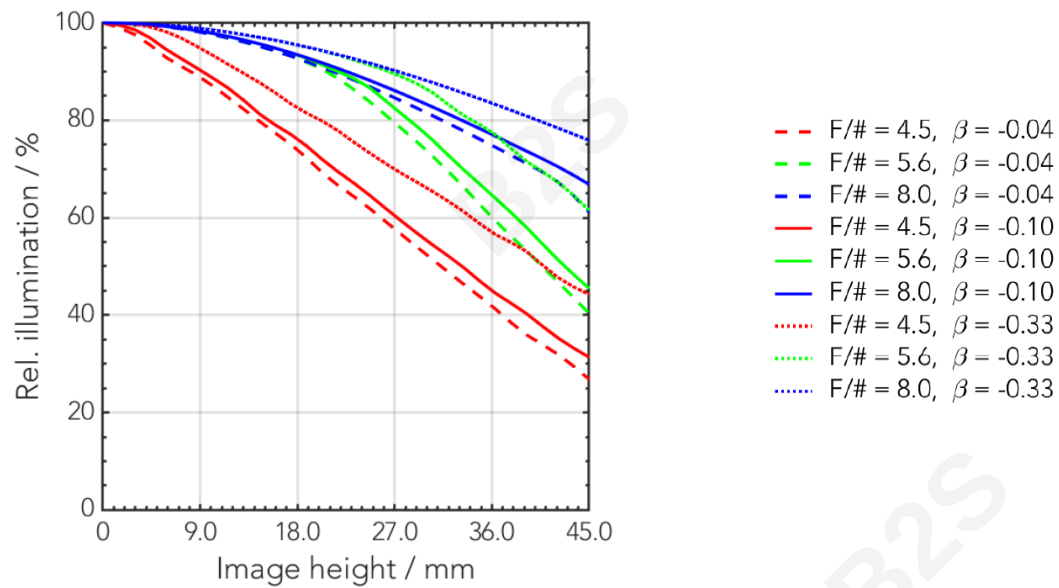
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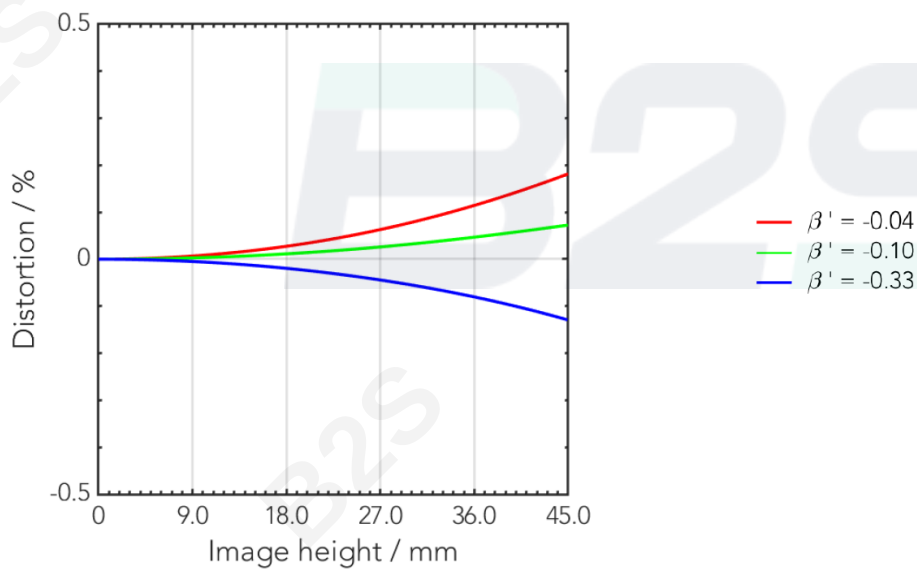
## MTF



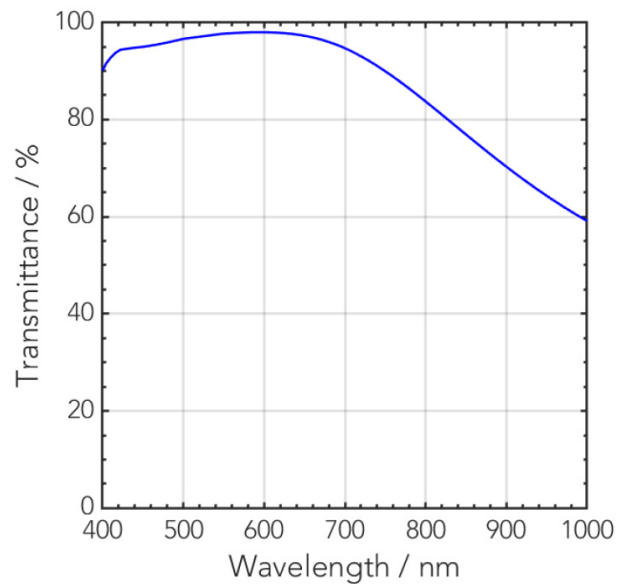
## Relative Illumination



## Distortion



## Transmittance vs. Wavelength



## Dimensions

Unit: mm

