MCSM1-01X | DATASHEET

OPTO ENGINEERING

Macro lens for 2/3" sensors, magnification from 0.1x to 1x, C-mount, Scheimpflug adjustment

KEY ADVANTAGES

Precision Scheimpflug mount
Image focus is retained across any tilted plane.

Compatible with any C-mount cameras
The back focal length meets the C-mount standard.

Application flexibility
Supports a wide range of magnification factors and viewing angles.

MCSM1-01X is a variable macro lens expressly designed for 3D measurement and imaging applications where the object plane is not perpendicular to the optical axis. A precise built-in adjustment mechanism allows the lens to accurately meet the Scheimpflug condition and to image tilted planes in perfect focus.

SPECIFICATIONS

Optical specifications

Magnification range		0.1x - 1x
Image circle	(mm)	11
Max sensor size		2/3"
Working distance at 0.1x[1]	(mm)	271
Working distance at 1.0x[1]	(mm)	46
Focal length	(mm)	28
f/*N*		6.2
w*f*/*N* at 0.1x[2]		6.9
w*f*/*N* at 1.0x[2]		12.5

Mechanical specifications

Mount		C
Max mount tilt	(°)	20
Phase adjustment		Yes
Length[3]	(mm)	50.8
Width	(mm)	55.0
Height	(mm)	40.0
Front diameter	(mm)	23
Mass	(g)	164

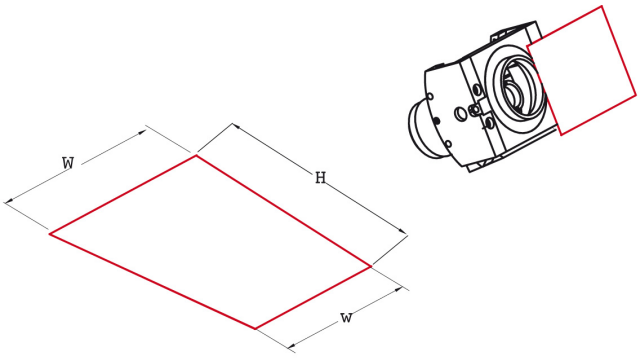
[1] Working distance: distance between the front end of the mechanics and the object. Set this distance within $\pm 3\%$ of the nominal value for maximum resolution and minimum distortion.
[2] working *f*/*N*: the real *f*/*N* of a lens in operating conditions.
[3] Measured from the front end of the mechanics to the camera flange.

COMPATIBLE PRODUCTS

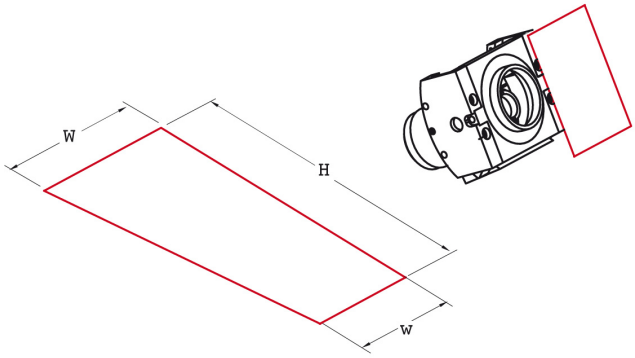
Full list of compatible products available *here*.

A wide selection of innovative machine vision components.

MAGNIFICATION AND FIELD OF VIEW FOR 2/3" SENSOR (8.8mm x 6.6mm)



Field of View with detector's long side set horizontal

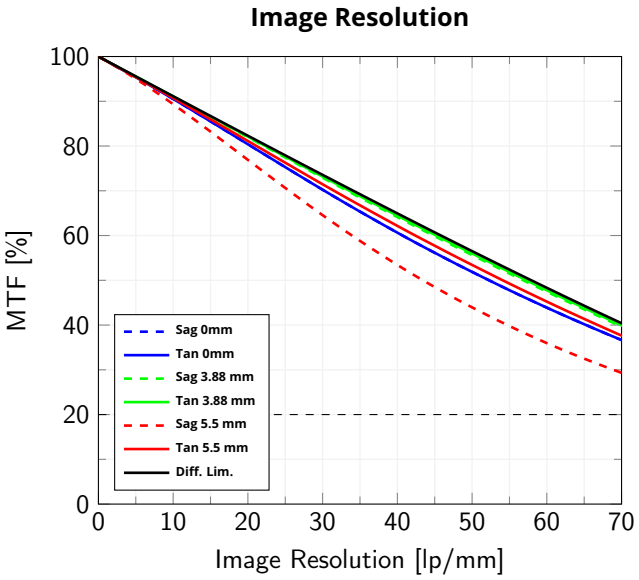


Field of View with detector's long side set vertical

Mag	WD[1]	*f*/*N*	w*f*/*N*[2]	Obj Tilt	Img Tilt	Long detector side horizontal			Long detector side vertical		
						w	W	H	w	W	H
(x)	(mm)			(°)	(°)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
1.00	46.0	6	12	0.0	0.0	8.8	8.8	6.6	6.6	6.6	8.8
				5.0	5.0	8.7	8.9	6.6	6.5	6.7	8.8
				10.0	10.0	8.6	9.0	6.6	6.4	6.8	8.8
				15.0	15.0	8.5	9.1	6.6	6.3	6.9	8.8
0.75	47.8	6	10	0.0	0.0	11.8	11.8	8.8	8.8	8.8	11.8
				7.5	5.7	11.6	12.0	8.9	8.7	9.0	11.8
				15.0	11.4	11.0	12.2	9.0	8.5	9.2	12.0
				20.0	15.3	11.0	12.3	9.1	8.4	3.4	12.1
0.50	59.6	6	9	0.0	0.0	18.0	17.7	13.0	13.0	13.2	17.7
				10.0	5.0	17.0	18.0	13.0	13.0	13.6	17.9
				20.0	10.4	17.0	18.4	14.0	13.0	14.0	18.6
				30.0	16.1	17.0	18.9	15.0	12.0	14.5	19.7
0.33	83.8	6	8	0.0	0.0	27.0	26.7	20.0	20.0	20.0	26.6
				15.0	5.1	26.0	27.4	21.0	19.0	20.9	27.6
				30.0	10.8	25.0	28.6	23.0	18.0	22.0	30.6
				45.0	18.3	24.0	30.1	27.0	17.0	23.6	36.7
0.20	135.3	6	7	0.0	0.0	44.0	44.0	33.0	33.0	33.0	44.0
				15.0	3.0	43.0	45.4	34.0	32.0	34.5	45.6
				30.0	6.7	41.0	47.2	38.0	30.0	36.3	50.9
				45.0	11.4	39.0	49.7	46.0	29.0	39.0	62.5
0.10	271.0	6	6.5	0.0	0.0	87.0	87.3	66.0	66.0	65.5	87.4
				15.0	1.6	85.0	90.2	68.0	63.0	68.4	90.6
				30.0	3.4	82.0	93.7	76.0	60.0	72.0	101.0
				45.0	5.8	78.0	98.9	93.0	57.0	77.6	126.0

[1] Working distance: distance between the front end of the mechanics and the object. Set this distance within $\pm 3\%$ of the nominal value for maximum resolution and minimum distortion.
[2] working *f*/*N*: the real *f*/*N* of a lens in operating conditions.

MAGNIFICATION 1.00x, OBJECT TILT 0°



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

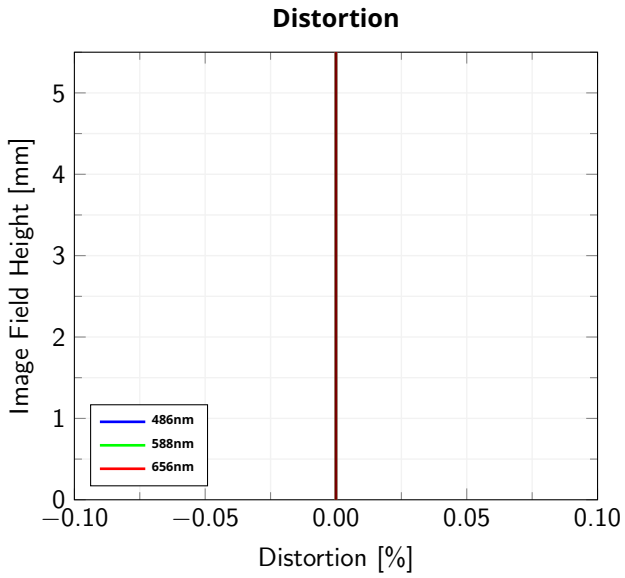
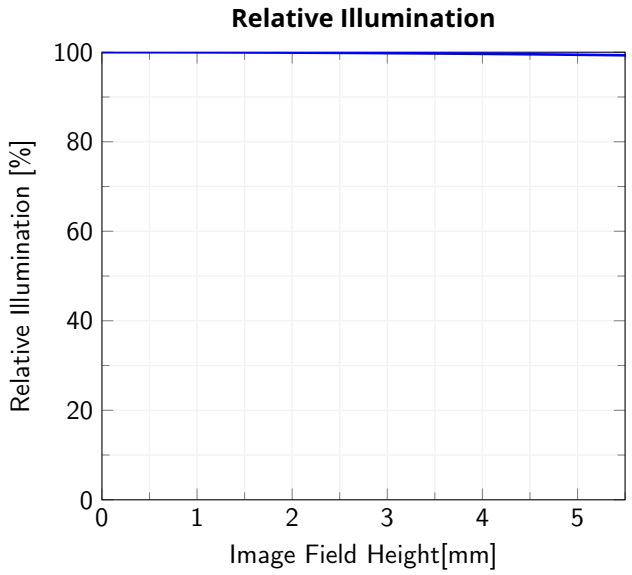
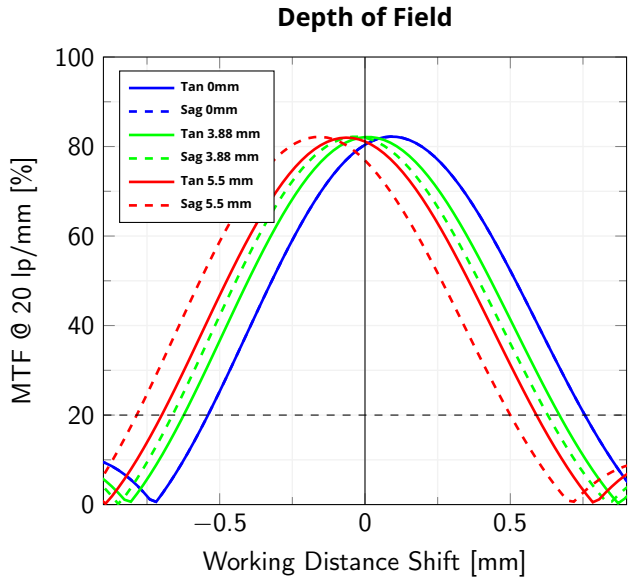


Image Field Height vs. Distortion, from the optical axis to the corner of the image

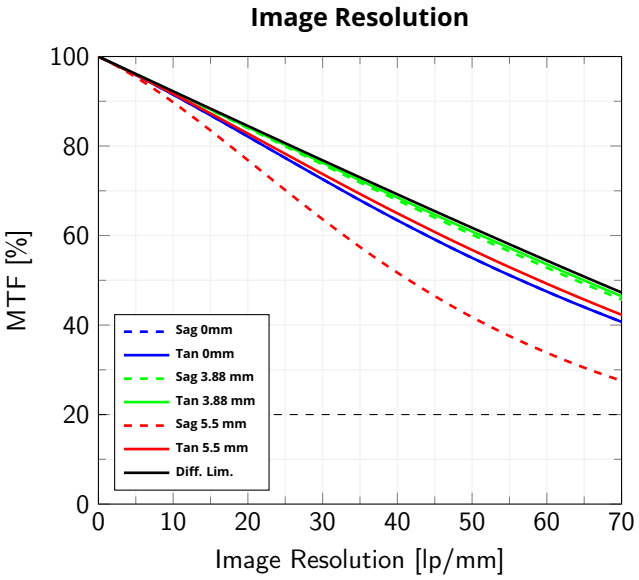


Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

MAGNIFICATION 0.75x, OBJECT TILT 0°



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

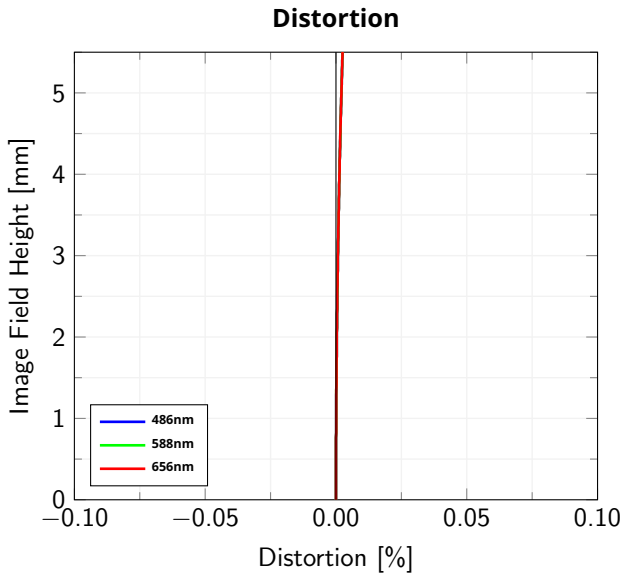
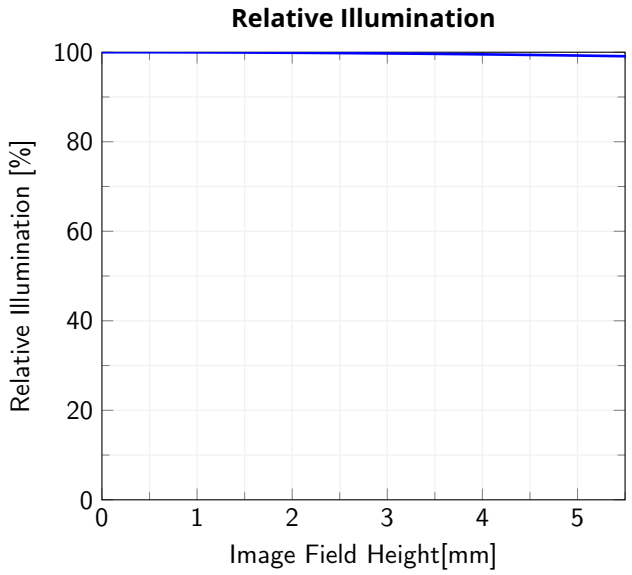
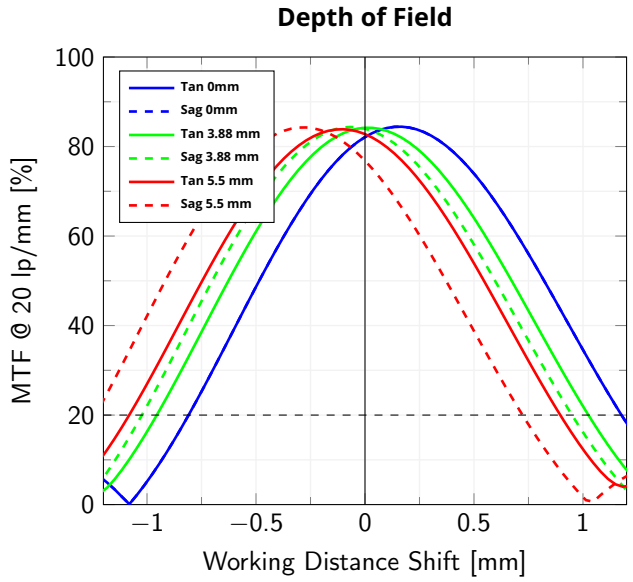


Image Field Height vs. Distortion, from the optical axis to the corner of the image

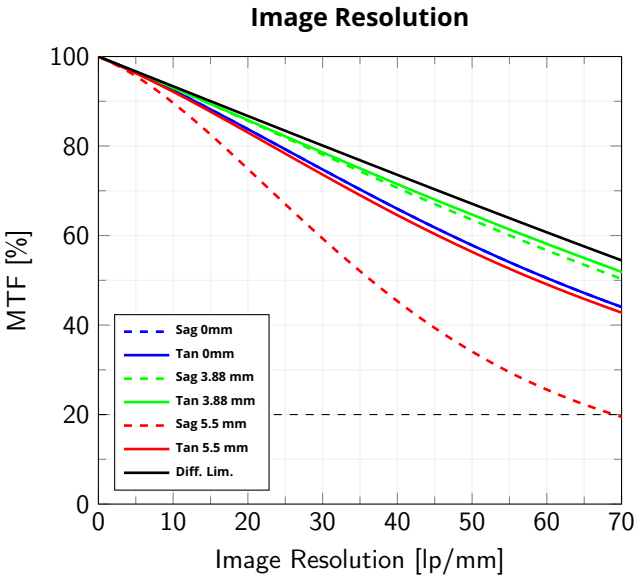


Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

MAGNIFICATION 0.50x, OBJECT TILT 0°



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

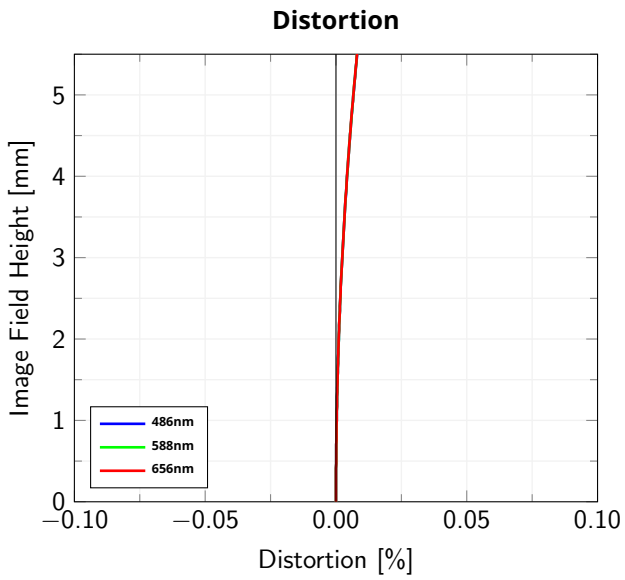
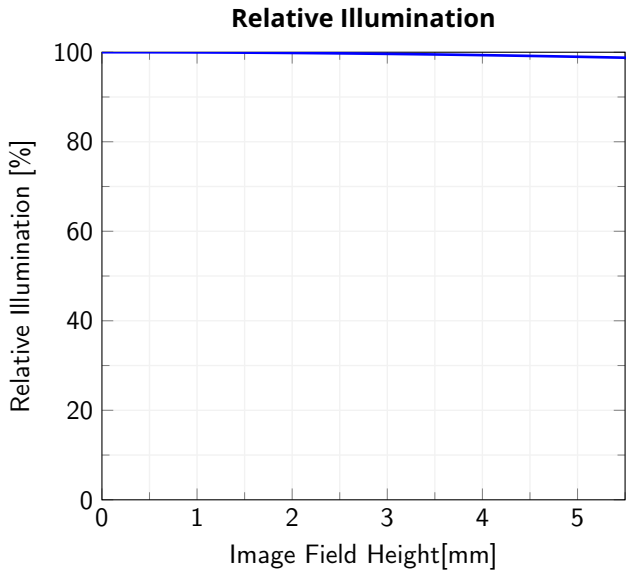
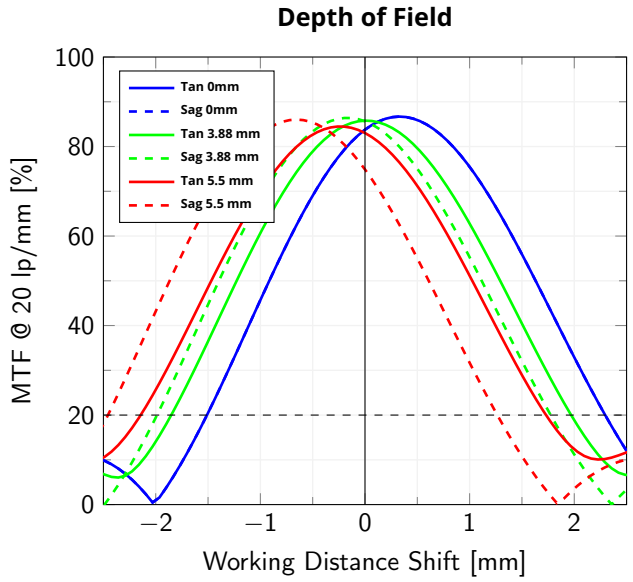


Image Field Height vs. Distortion, from the optical axis to the corner of the image

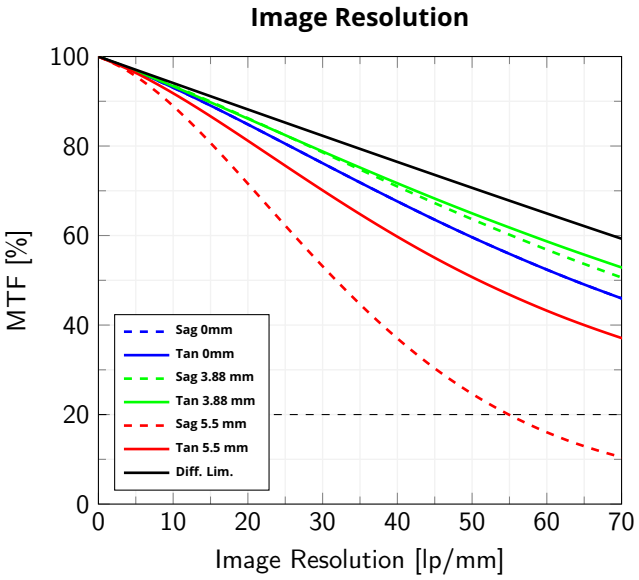


Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

MAGNIFICATION 0.33x, OBJECT TILT 0°



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

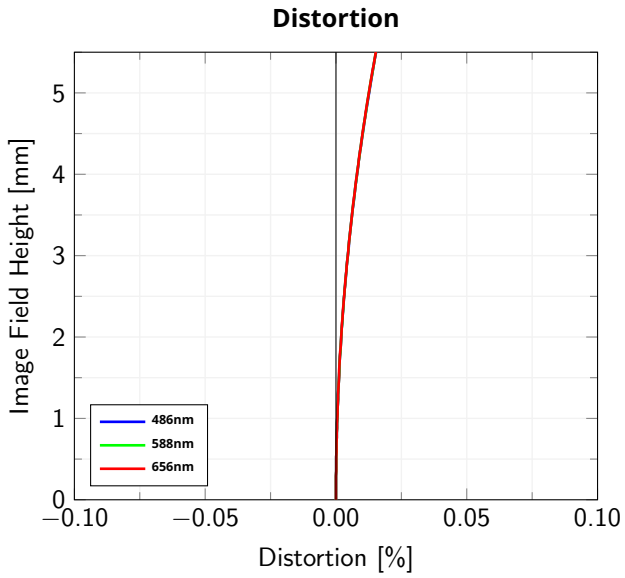
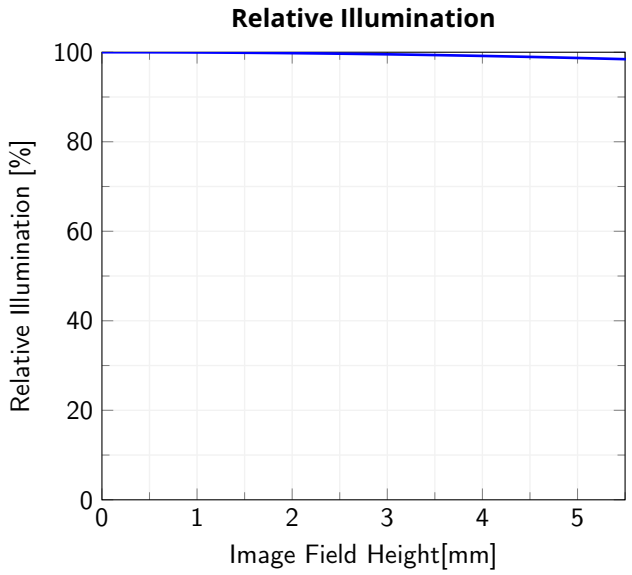
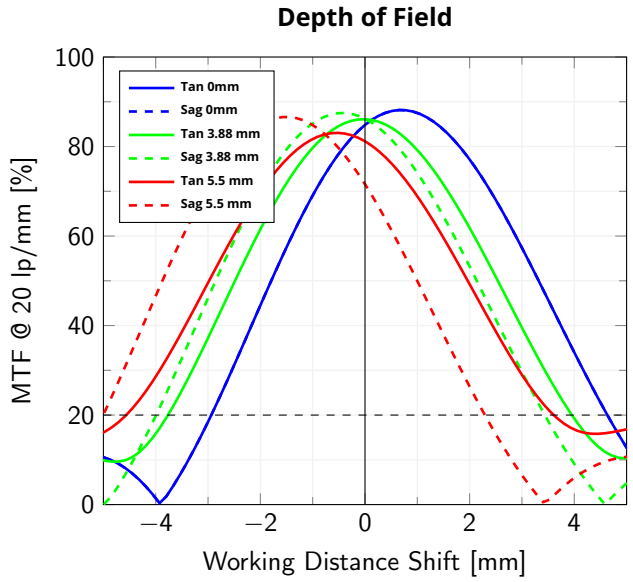


Image Field Height vs. Distortion, from the optical axis to the corner of the image

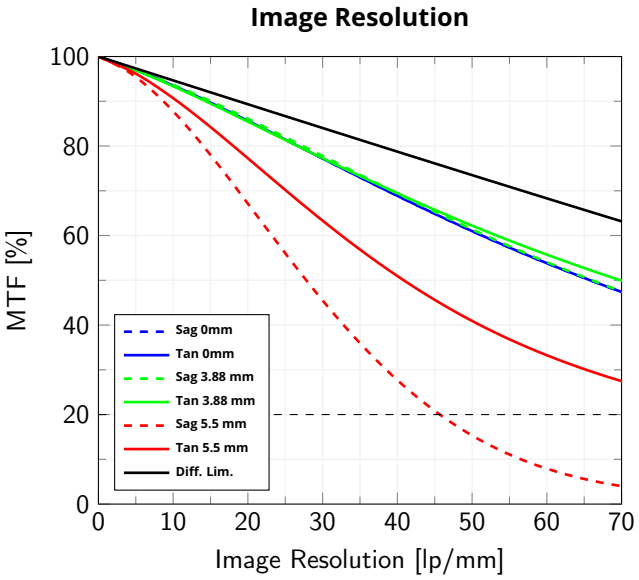


Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

MAGNIFICATION 0.20x, OBJECT TILT 0°



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

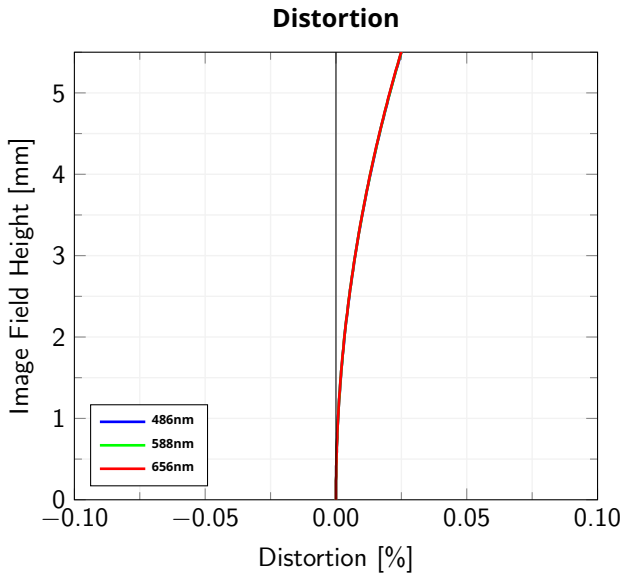
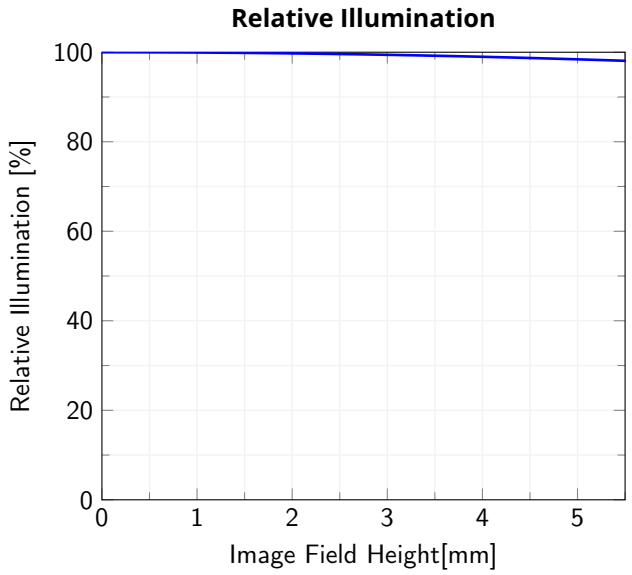
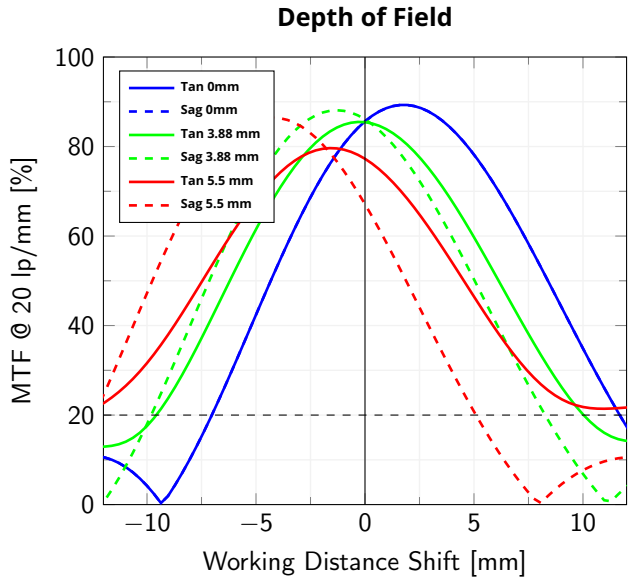


Image Field Height vs. Distortion, from the optical axis to the corner of the image

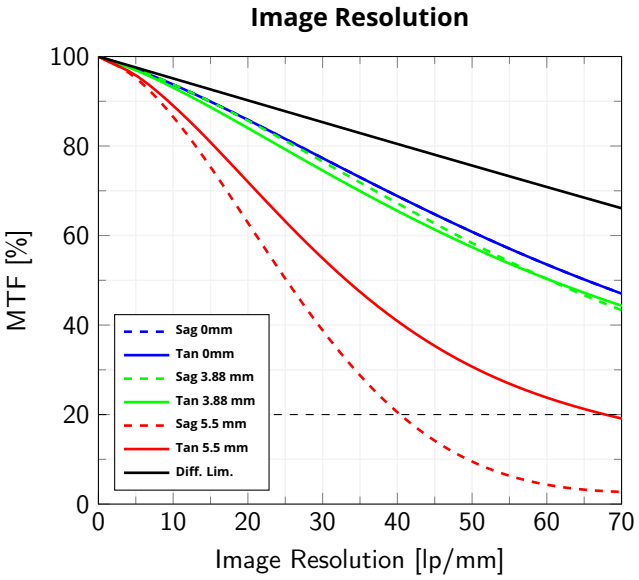


Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

MAGNIFICATION 0.10x, OBJECT TILT 0°



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

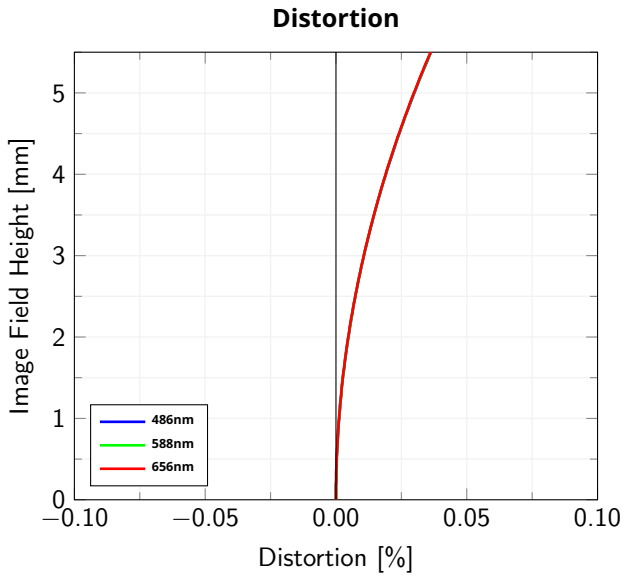
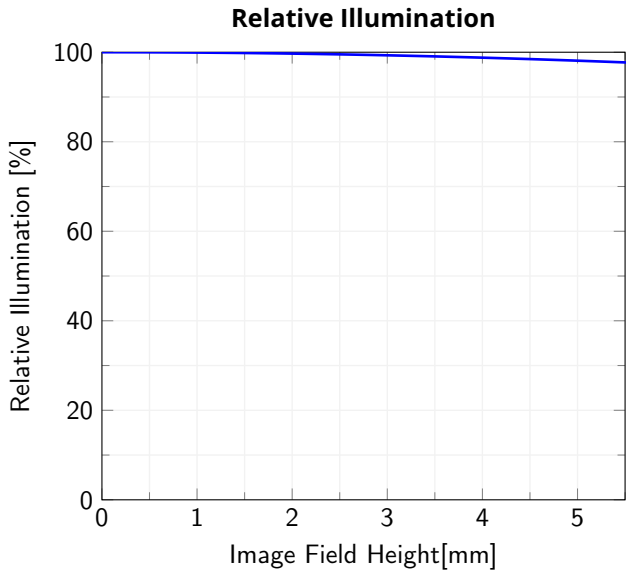
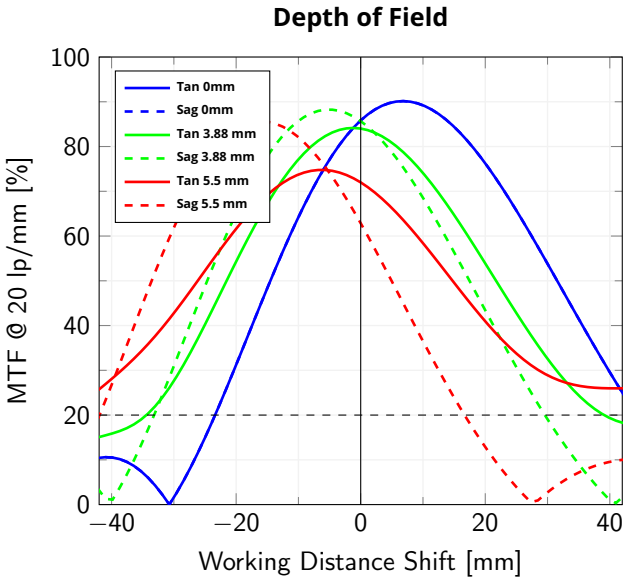


Image Field Height vs. Distortion, from the optical axis to the corner of the image



Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image