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VEO-E202403

Vieworks Industrial Lens

VEO LENS SERIES

VIEWORKS

Vieworks Industrial Lenses

VEO Lens Series

Working closely with Schneider Kreuznach, a global leader in industrial lenses, Vieworks has co-developed a line of lenses optimized for Vieworks' area scan and line scan cameras. VEO Series lenses are precisely designed to deliver optimal performance when coupled with Vieworks cameras.

VEO Series lenses demonstrate high performance regarding modulation transfer function (MTF), a measurement of a lens' ability to resolve fine detail. Particularly effective in detecting submicron defects, VEO Series lenses are perfect for flat panel display inspection where large area, high speed inspection is essential.

Introducing VEO industrial lenses, Vieworks marks its very first step toward providing complete vision solutions. Vieworks offers solutions that meet user needs by integrating high-performing cameras and lenses, optimized illumination solutions, and autofocus units with Vieworks' proprietary smart camera technology. As your vision partner, Vieworks delivers comprehensive and custom solutions, not just parts of a solution.

Overview

	VEO JM Series	VEO JK Series	VEO CS Series
			
Max. Sensor Size	82 mm	82 mm	62.5 mm
	(23k / 3.5 µm, 16k / 5 µm)	(23k / 3.5 µm, 16k / 5 µm)	(12k / 5 µm)
Best Used with	VT Series (M95)	VT Series (M95) Large Format Cameras	VT Series (M72)
Magnification	5.0x, 3.33x, 2.5x, 1.67x, 1.43x	5.0x, 3.33x, 2.5x, 1.67x, 1.43x	5.0x, 3.33x, 2.5x, 1.67x, 1.143x, 0.07x
Interface	V90, V110 Mount	V90, V110 Mount	V70 Mount
Wavelength	400 nm – 700 nm	400 nm – 1000 nm	400 nm – 1000 nm
Beam Splitter	Coaxial type (25T / 35T)	–	Coaxial type (25T)

	VEO HJ Series	VEO YK Series
		
Max. Sensor Size	90 mm – 60 mm	43.2 mm
Magnification	0x – 0.5x	0x – 0.167x
Interface	V38 Mount	V48 Mount
F/# Range	F/4 ... F/64	F/2.2 ... F/16
Wavelength	400 nm – 1000 nm	400 nm – 1000 nm

VEO_JM DIAMOND 5.0X / F1.3

VEO_JM DIAMOND 5.0X / F1.3 is a high resolution industrial lens optimized for 16k TDI line scan cameras.

- Magnification up to 5.0x
- Optimal aperture F/1.3
- Optimized for 82 mm (16k / 5 µm) line scan sensors
- Resolves 1.1 µm in object plane
- Detects 0.4 µm pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	5.0 (4.9 ... 5.1)	
F/# range	F/1.3 ... F/2.8	Optimum F/1.3
Numerical aperture	0.305	Object Plane
Max. sensor size [mm]	82	
Infinite F/#	F/1.3	
Focal length [mm]	100	
Depth of field [µm]	6.2	@ P. CoC 10 µm
Distortion	< 0.1%	
Wavelength [nm]	400 ... 700	Visible
Working distance [mm]	31 (32 ... 30)	B/S ... Object
Beam splitter size	35 × 35 × 80	
Total length [mm]	691 ± 2	from Object to Sensor
Interface	V110 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/1.3
Weight [g]	3547	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	3.2
Effective focal length	f'eff [mm]	100.18
Front focal length	SF [mm]	−12.46
Back focal length	S'F' [mm]	−62.55
Principal plane distance	HH' [mm]	−28.32
Pupil magnification	β 'P	0.79
Entrance pupil position	SEP [mm]	114.28
Exit pupil position	S'AP [mm]	−141.73
Vertex width	Σd [mm]	222.12

VEO_JM DIAMOND 3.33X / F2.1

VEO_JM DIAMOND 3.33X / F2.1 is a high resolution industrial lens optimized for 16k TDI line scan cameras.

- Magnification up to 3.33x
- Optimal aperture F/2.1
- Optimized for 82 ㎜ (16k / 5 ㎛) line scan sensors
- Resolves 1.86 ㎛ in object plane
- Detects 0.6 ㎛ pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	3.33 (3.2 ... 3.4)	
F/# range	F/2.1 ... F/4.0	Optimum F/2.1
Numerical aperture	0.18	Object Plane
Max. sensor size [㎜]	82	
Infinite F/#	F/2.1	
Focal length [㎜]	121	
Depth of field [㎛]	16.4	@ P. CoC 10 ㎛
Distortion	< 0.05%	
Wavelength [㎚]	400 ... 700	Visible
Working distance [㎜]	39 (40 ... 38)	B/S ... Object
Beam splitter size	25 × 25 × 80	
Total length [㎜]	665 ± 2	from Object to Sensor
Interface	V110 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/2.1
Weight [g]	3101	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	4.2
Effective focal length	f'eff [㎜]	121.5
Front focal length	SF [㎜]	−3.47
Back focal length	S'F' [㎜]	27.25
Principal plane distance	HH' [㎜]	−19.23
Pupil magnification	β 'P	0.95
Entrance pupil position	SEP [㎜]	125.06
Exit pupil position	S'AP [㎜]	−87.57
Vertex width	Σd [㎜]	193.01

VEO_JM DIAMOND 2.5X / F2.6

VEO_JM DIAMOND 2.5X / F2.6 is a high resolution industrial lens optimized for 16k TDI line scan cameras.

- Magnification up to 2.5x
- Optimal aperture F/2.6
- Optimized for 82 mm (16k / 5 µm) line scan sensors
- Resolves 2.5 µm in object plane
- Detects 0.7 µm pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	2.5 (2.4 ... 2.6)	
F/# range	F/2.6 ... F/5.6	Optimum F/2.6
Numerical aperture	0.134	Object Plane
Max. sensor size [mm]	82	
Infinite F/#	F/2.6	
Focal length [mm]	119	
Depth of field [µm]	29.2	@ P. CoC 10 µm
Distortion	< 0.05%	
Wavelength [nm]	400 ... 700	Visible
Working distance [mm]	59.2 (60 ... 58)	B/S ... Object
Beam splitter size	25 × 25 × 80	
Total length [mm]	570.4 ± 2	from Object to Sensor
Interface	V90 Mount	0.75 Pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/2.6
Weight [g]	1510	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	5.6
Effective focal length	f'eff [mm]	119.7
Front focal length	SF [mm]	−12.39
Back focal length	S'F' [mm]	67.10
Principal plane distance	HH' [mm]	−16.55
Pupil magnification	β 'P	1
Entrance pupil position	SEP [mm]	106.80
Exit pupil position	S'AP [mm]	−53.11
Vertex width	Σd [mm]	143.36

VEO_JM SAPPHIRE 1.67X / F3.0

VEO_JM SAPPHIRE 1.67X / F3.0 is a high resolution industrial lens optimized for 16k TDI line scan cameras.

- Magnification up to 1.67x
- Optimal aperture F/3.0
- Optimized for 82 ㎜ (16k / 5 ㎛) line scan sensors
- Resolves 3.35 ㎛ in object plane
- Detects 1.0 ㎛ pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	1.67 (1.62 ... 1.72)	
F/# range	F/3.0 ... F/5.6	Optimum F/3.0
Numerical aperture	0.103	Object Plane
Max. sensor size [㎜]	82	
Infinite F/#	F/3.0	
Focal length [㎜]	118	
Depth of field [㎛]	57.4	@ P. CoC 10 ㎛
Distortion	< 0.05%	
Wavelength [㎚]	400 ... 700	Visible
Working distance [㎜]	50 (51 ... 49)	B/S ... Object
Beam splitter size	25 × 25 × 125	
Total length [㎜]	495 ± 2	from Object to Sensor
Interface	V90 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	95%	@ F/3.0
Weight [g]	1847	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	7.3
Effective focal length	f'eff [㎜]	117.88
Front focal length	SF [㎜]	19.35
Back focal length	S'F' [㎜]	69.92
Principal plane distance	HH' [㎜]	−7.88
Pupil magnification	β 'P	0.97
Entrance pupil position	SEP [㎜]	140.59
Exit pupil position	S'AP [㎜]	−44.70
Vertex width	Σd [㎜]	177.32

VEO_JM SAPPHIRE 1.43X / F3.0

VEO_JM SAPPHIRE 1.43X / F3.0 is a high resolution industrial lens optimized for 16k TDI line scan cameras.

- Magnification up to 1.43x
- Optimal aperture F/3.0
- Optimized for 82 ㎜ (16k / 5 ㎛) line scan sensors
- Resolves 3.35 ㎛ in object plane
- Detects 1.2 ㎛ pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	1.43 (1.38 ... 1.47)	
F/# range	F/3.0 ... F/5.6	Optimum F/3.0
Numerical aperture	0.1	Object Plane
Max. sensor size [㎜]	82	
Infinite F/#	F/3.0	
Focal length [㎜]	120	
Depth of field [㎛]	71.2	@ P. CoC 10 ㎛
Distortion	< 0.06%	
Wavelength [㎚]	400 ... 700	Visible
Working distance [㎜]	50 (51 ... 49)	B/S ... Object
Beam splitter size	25 × 25 × 120	
Total length [㎜]	494 ± 2	from Object to Sensor
Interface	V90 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/3.0
Weight [g]	1954	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	8
Effective focal length	f'eff [㎜]	119.53
Front focal length	SF [㎜]	32.42
Back focal length	S'F' [㎜]	76.78
Principal plane distance	HH' [㎜]	−1.12
Pupil magnification	β 'P	0.984
Entrance pupil position	SEP [㎜]	153.89
Exit pupil position	S'AP [㎜]	−40.85
Vertex width	Σd [㎜]	193.6

VEO_JK DIAMOND 3.33X / F1.9

VEO_JK DIAMOND 3.33X / F1.9 is a high resolution industrial lens optimized for 16k & 23k VT Series (M95) and high resolution area scan cameras.

- Magnification up to 3.33x
- Optimal aperture F/1.9
- Optimized for 82 mm (23k / 3.5 µm, 16k / 5 µm) line scan sensors
- Resolves 1.89 µm in object plane
- Detects 0.7 µm island defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection.

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	3.33 (3.28 ... 3.38)	
F/# range	F/1.9 ... F/2.8	Optimum F/1.9
Numerical aperture	0.18	Object Plane
Max. sensor size [mm]	82	
Infinite F/#	F/1.9	
Focal length [mm]	82	
Depth of field [µm]	18.2	@ P. CoC 10 µm
Distortion	< 0.1%	
Wavelength [nm]	400 ... 1000	Visible ~ NIR
Working distance [mm]	74.9 (75.9...73.9)	Lens ... Object
Total length [mm]	652.9± 2	from object to sensor
Interface	V110 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/1.9
Weight [g]	2474	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	8.1
Effective focal length	f'eff [mm]	118.67
Front focal length	SF [mm]	45.24
Back focal length	S'F' [mm]	19.1
Principal plane distance	HH' [mm]	−14.09
Pupil magnification	β 'P	0.86
Entrance pupil position	SEP [mm]	92.79
Exit pupil position	S'AP [mm]	−82.57
Vertex width	Σd [mm]	158.51

VEO_JK DIAMOND 2.5X / F2.6

VEO_JK DIAMOND 2.5X / F2.6 is a high resolution industrial lens optimized for 16k & 23k VT Series (M95) and high resolution area scan cameras.

- Magnification up to 2.5x
- Optimal aperture F/2.6
- Optimized for 82 ㎜ (23k / 3.5 ㎛, 16k / 5 ㎛) line scan sensors
- Resolves 2.5 ㎛ in object plane
- Detects 0.9 ㎛ island defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection.

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	2.5 (2.4 ... 2.6)	
F/# range	F/2.6 ... F/2.8	Optimum F/2.6
Numerical aperture	0.134	Object Plane
Max. sensor size [㎜]	82	
Infinite F/#	F/2.6	
Focal length [㎜]	82	
Depth of field [㎛]	30	@ P. CoC 10 ㎛
Distortion	< 0.1%	
Wavelength [㎚]	400 ... 1000	Visible~NIR
Working distance [㎜]	97.8 (98.8 ...96.8)	Lens ... Object
Total length [㎜]	563 ± 2	from object to sensor
Interface	V90 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/2.6
Weight [g]	1201	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	11.2
Effective focal length	f'eff [㎜]	120.01
Front focal length	SF [㎜]	59.35
Back focal length	S'F' [㎜]	−31.82
Principal plane distance	HH' [㎜]	−28.17
Pupil magnification	β 'P	0.99
Entrance pupil position	SEP [㎜]	67.8
Exit pupil position	S'AP [㎜]	−62.16
Vertex width	Σd [㎜]	101.77

VEO_CS DIAMOND 5.0X / F1.6

VEO_CS DIAMOND 5.0X / F1.6 is a high resolution industrial lens optimized for 12k TDI line scan cameras.

- Magnification up to 5.0x
- Optimal aperture F/1.6
- Optimized for 62.5 ㎜ (12k / 5 ㎛) line scan sensors
- Resolves 1.28 ㎛ in object plane
- Detects 0.5 ㎛ pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	5.0 (4.9 ... 5.1)	
F/# range	F/1.6 ... F/2.8	Optimum F/1.6
Numerical aperture	0.261	Object Plane
Max. sensor size [㎜]	62.5	
Infinite F/#	F/1.6	
Focal length [㎜]	82	
Depth of field [㎛]	7.68	@ P. CoC 10 ㎛
Distortion	< 0.05%	
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	34 (34.3 ... 33.6)	B/S ... Object
Beam splitter size	25 × 25 × 80	
Total length [㎜]	582 ± 2	from Object to Sensor
Interface	V70 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/1.6
Weight [g]	1170	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	3
Effective focal length	f'eff [㎜]	82.23
Front focal length	SF [㎜]	−18.53
Back focal length	S'F' [㎜]	−31.82
Principal plane distance	HH' [㎜]	−17.62
Pupil magnification	β 'P	0.813
Entrance pupil position	SEP [㎜]	82.43
Exit pupil position	S'AP [㎜]	−98.67
Vertex width	Σd [㎜]	160.13

VEO_CS DIAMOND 3.33X / F2.3

VEO_CS DIAMOND 3.33X / F2.3 is a high resolution industrial lens optimized for 12k TDI line scan cameras.

- Magnification up to 3.33x
- Optimal aperture F/2.3
- Optimized for 62.5 ㎜ (12k / 5 ㎛) line scan sensors
- Resolves 2.1 ㎛ in object plane
- Detects 0.7 ㎛ pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	3.33 (3.2 ... 3.4)	
F/# range	F/2.3 ... F/4.0	Optimum F/2.3
Numerical aperture	0.157	Object Plane
Max. sensor size [㎜]	62.5	
Infinite F/#	F/2.3	
Focal length [㎜]	116	
Depth of field [㎛]	18.4	@ P. CoC 10 ㎛
Distortion	< 0.05%	
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	55.5 (56.5 ... 54.5)	B/S ... Object
Beam splitter size	25 × 25 × 80	
Total length [㎜]	653.8 ± 2	from Object to Sensor
Interface	V70 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/2.3
Weight [g]	2260	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	3.5
Effective focal length	f'eff [㎜]	116.14
Front focal length	SF [㎜]	−21.64
Back focal length	S'F' [㎜]	33.40
Principal plane distance	HH' [㎜]	−0.42
Pupil magnification	β 'P	0.97
Entrance pupil position	SEP [㎜]	98.21
Exit pupil position	S'AP [㎜]	−79.13
Vertex width	Σd [㎜]	176.8

VEO_CS DIAMOND 2.5X / F2.9

VEO_CS DIAMOND 2.5X / F2.9 is a high resolution industrial lens optimized for 12k TDI line scan cameras.

- Magnification up to 2.5x
- Optimal aperture F/2.9
- Optimized for 62.5 ㎜ (12k / 5 ㎛) line scan sensors
- Resolves 2.77 ㎛ in object plane
- Detects 0.9 ㎛ pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	2.5 (2.4 ... 2.6)	
F/# range	F/2.9 ... F/5.6	Optimum F/2.9
Numerical aperture	0.121	Object Plane
Max. sensor size [㎜]	62.5	
Infinite F/#	F/2.9	
Focal length [㎜]	105	
Depth of field [㎛]	32.48	@ P. CoC 10 ㎛
Distortion	< 0.05%	
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	64.6 (65.6 ... 63.6)	B/S ... Object
Beam splitter size	25 × 25 × 80	
Total length [㎜]	529.1 ± 2	from Object to Sensor
Interface	V70 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/2.9
Weight [g]	1350	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA [°]	4.8
Effective focal length	f'eff [㎜]	105.12
Front focal length	SF [㎜]	−23.56
Back focal length	S'F' [㎜]	58.27
Principal plane distance	HH' [㎜]	13.75
Pupil magnification	β 'P	1.04
Entrance pupil position	SEP [㎜]	77.80
Exit pupil position	S'AP [㎜]	−50.76
Vertex width	Σd [㎜]	142.17

VEO_CS SAPPHIRE 1.67X / F3.2

VEO_CS SAPPHIRE 1.67X / F3.2 is a high resolution industrial lens optimized for 12k TDI line scan cameras.

- Magnification up to 1.67x
- Optimal aperture F/3.2
- Optimized for 62.5 ㎜ (12k / 5 ㎛) line scan sensors
- Resolves 3.25 ㎛ in object plane
- Detects 1.2 ㎛ pinhole defects (threshold value of 15)
- Application: Flat panel display (FPD), semiconductor, web inspection

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	1.67 (1.57 ... 1.77)	
F/# range	F/3.2 ... F/5.6	Optimum F/3.2
Numerical aperture	0.09	Object Plane
Max. sensor size [㎜]	62.5	
Infinite F/#	F/3.2	
Focal length [㎜]	88	
Depth of field [㎛]	57.8	@ P. CoC 10 ㎛
Distortion	< 0.05%	
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	64.4 (63.4 ... 65.4)	B/S ... Object
Beam splitter size	25 × 25 × 80	
Total length [㎜]	374.9 ± 2	from Object to Sensor
Interface	V70 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 95%	@ F/3.2
Weight [g]	935	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA	7.3
Effective focal length	f'eff [㎜]	87.8
Front focal length	SF [㎜]	−11.85
Back focal length	S'F' [㎜]	57.25
Principal plane distance	HH' [㎜]	0.16
Pupil magnification	β 'P	1.1
Entrance pupil position	SEP [㎜]	68.13
Exit pupil position	S'AP [㎜]	−39.13
Vertex width	Σd [㎜]	106.65

VEO_CS SAPPHIRE 1.143X / F2.8

VEO_CS SAPPHIRE 1.143X / F2.8 is a high resolution industrial lens optimized for 12k & 18k VT Series (M72) and high resolution area scan cameras.

- Magnification up to 1.143x
- Optimal aperture F/4.0
- Optimized for 62.5 ㎜ (12k / 5 ㎛) line scan sensors
- Resolves 3.35 ㎛ in object plane
- Application: Flat panel display (FPD), semiconductor, web inspection.

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	1.143 (1.08 ... 1.20)	
F/# range	F/2.8 ... F/8.0	Optimum F/4.0
Numerical aperture	0.1	Object Plane
Max. sensor size [㎜]	62.5	
Infinite F/#	F/4.0	
Focal length [㎜]	98	
Depth of field [㎛]	132	@ P. CoC 10 ㎛
Distortion	< 0.05%	@ 1.143x
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	127.6 (132 ... 123)	Lens ... Object
Total length [㎜]	379 ± 2	from Object to Sensor
Interface	V70 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 90%	@ F/4.0
Weight [g]	750	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	17
Effective focal length	f'eff [㎜]	97.5
Front focal length	SF [㎜]	−52.28
Back focal length	S'F' [㎜]	49.36
Principal plane distance	HH' [㎜]	−13.23
Pupil magnification	β 'P	0.96
Entrance pupil position	SEP [㎜]	48.79
Exit pupil position	S'AP [㎜]	−44.54
Vertex width	Σd [㎜]	80.13

VEO_CS SAPPHIRE 0.07X / F4.5

VEO_CS SAPPHIRE 0.07X / F4.5 is a low magnification industrial lens optimized for 12k & 18k VT Series (M72) and high resolution area scan cameras.

- Magnification up to 0.07x
- Optimal aperture F/5.6
- Optimized for 62.5 ㎜ (12k / 5 ㎛) line scan sensors
- Resolves 6.71 ㎛ in object plane
- Application: Flat panel display (FPD), semiconductor, web inspection.

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	0.07 (0.05 ... 0.12)	
F/# range	F/4.5 ... F/8.0	Optimum F/5.6
Numerical aperture	0.05	Object Plane
Max. sensor size [㎜]	62.5	
Infinite F/#	F/4.5	
Focal length [㎜]	95	
Depth of field [㎛]	20	@ P. CoC 10 ㎛
Distortion	< 0.05%	@ 0.07x
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	1400 (3209 ... 601)	Lens ... Object
Total length [㎜]	1552 ± 2	from object to sensor
Interface	V70 Mount	0.75 pitch
Iris	Changeable	
Relative illumination	> 80%	@ F/5.6
Weight [g]	735	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	34
Effective focal length	f'eff [㎜]	95
Front focal length	SF [㎜]	−50.28
Back focal length	S'F' [㎜]	53.16
Principal plane distance	HH' [㎜]	−1.92
Pupil magnification	β 'P	1
Entrance pupil position	SEP [㎜]	44.59
Exit pupil position	S'AP [㎜]	−41.96
Vertex width	Σd [㎜]	84.63

VEO_HJ APO 4.0 / 60

VEO_HJ APO 4.0 / 60 is a high performance industrial lens optimized for large format area scan and line scan cameras with image circle diameters of 60 ㎜.

- V38 mount
- 60 ㎜ image circle
- Apochromatic correction
- Optimized for short working distances
- 400 ㎚ – 1000 ㎚ broadband AR (Anti-Reflective) coating
- Application: Flat panel display (FPD), printed circuit board (PCB), web inspection, package sorting, logistics

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	0 ... 0.5	
F/# range	F/4.0 ... F/32	
Numerical aperture	0.12	Image Plane
Max. sensor size [㎜]	60	
Focal length [㎜]	60	
Wavelength [㎚]	400 ... 1000	Visible ... IR
Working distance [㎜]	156 ... ∞	
Total length [㎜]	1624	0.04x
	726	0.1x
	320	0.33x
Distortion	< 0.5%	
Interface	V38 Mount	
Iris	Changeable	
Storage temperature [° C]	−25 ... +70	
Filter thread [㎜]	M37 * 0.75 pitch	
Weight [g]	114	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	53
Effective focal length	f'eff [㎜]	60.07
Front focal length	SF [㎜]	−47.23
Back focal length	S'F' [㎜]	40.93
Principal plane distance	HH' [㎜]	−1.89
Pupil magnification	β 'P	0.97
Entrance pupil position	SEP [㎜]	14.64
Exit pupil position	S'AP [㎜]	−17.39
Vertex width	Σd [㎜]	30.09

VEO_HJ COMPONON-S 4.0 / 80

VEO_HJ COMPONON-S 4.0 / 80 is a high performance industrial lens optimized for large format area scan and line scan cameras with image circle diameters of 80 ㎜.

- V38 mount
- 80 ㎜ image circle
- Low distortion
- 400 ㎚ – 1000 ㎚ broadband AR (Anti-Reflective) coating
- Application: Flat panel display (FPD), printed circuit board (PCB), web inspection, package sorting, logistics

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	0 ... 0.5	
F/# range	F/4.0 ... F/45	
Numerical aperture	0.12	Image Plane
Max. sensor size [㎜]	80	
Focal length [㎜]	80	
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	214 ... ∞	
Total length [㎜]	2172	0.04x
	971	0.1x
	429	0.33x
Distortion	< 0.2%	
Interface	V38 Mount	
Iris	Changeable	
Storage temperature [° C]	−25 ... +70	
Filter thread [㎜]	M37 * 0.75 pitch	
Weight [g]	109	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	53
Effective focal length	f'eff [㎜]	80.34
Front focal length	SF [㎜]	−57.92
Back focal length	S'F' [㎜]	64.67
Principal plane distance	HH' [㎜]	−1.81
Pupil magnification	β 'P	1.03
Entrance pupil position	SEP [㎜]	20.29
Exit pupil position	S'AP [㎜]	−17.86
Vertex width	Σd [㎜]	36.28

VEO_HJ APO 4.5 / 90

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 ㎜.

- V38 mount
- 90 ㎜ image circle
- Low distortion
- Apochromatic correction
- 400 ㎚ – 1000 ㎚ broadband AR (Anti-Reflective) coating
- Application: Flat panel display (FPD), printed circuit board (PCB), web inspection, package sorting, logistics

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	0 ... 0.5	
F/# range	F/4.5 ... F/64	
Numerical aperture	0.11	Image Plane
Max. sensor size [㎜]	90	
Focal length [㎜]	90	
Wavelength [㎚]	400 ... 1000	Visible ... NIR
Working distance [㎜]	246 ... ∞	
Total length [㎜]	2466	0.04x
	1102	0.1x
	486	0.33x
Distortion	< 0.2%	
Interface	V38 Mount	
Iris	Changeable	
Storage temperature [° C]	−25 ... +70	
Filter thread [㎜]	M37 * 0.75 pitch	
Weight [g]	134	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	52
Effective focal length	f'eff [㎜]	91.19
Front focal length	SF [㎜]	−67.47
Back focal length	S'F' [㎜]	67.77
Principal plane distance	HH' [㎜]	−3.62
Pupil magnification	β 'P	1.01
Entrance pupil position	SEP [㎜]	22.44
Exit pupil position	S'AP [㎜]	−24.72
Vertex width	Σd [㎜]	43.52

VEO_YK EMERALD 2.2 / 50

VEO_YK EMERALD 2.2 / 50 is a high performance industrial lens optimized for area scan and line scan cameras with image circle diameters of 43.2 mm.

- V48 mount
- 43.2 mm image circle
- Optimized for short working distances
- 400 nm – 1000 nm broadband AR (Anti-Reflective) coating
- Application: Flat panel display (FPD), printed circuit board (PCB), web inspection, factory automation

Specifications

Performance		
Parameter	Specification	Remarks
Magnification range	0 ... 0.167	
F/# range	F/2.2 ... F/16	
Numerical aperture	0.22	Image Plane
Max. sensor size [mm]	43.2	
Focal length [mm]	50	
Wavelength [nm]	400 ... 1000	Visible ... IR
Working distance [mm]	327 ... ∞	
Total length [mm]	1121	0.05x
	610	0.1x
	402	0.17x
Distortion	< 0.6%	
Interface	V48 Mount	
Iris	Changeable	
Storage temperature [° C]	−25 ... +70	
Filter thread [mm]	M43 * 0.75 pitch	
Weight [g]	202	
Optical Parameters		
Contents	Parameter	Value
Chief Ray Angle (Max.) in object plane	CRA[°]	45
Effective focal length	f'eff [mm]	51.21
Front focal length	SF [mm]	−23.75
Back focal length	S'F' [mm]	32.17
Principal plane distance	HH' [mm]	−10.9
Pupil magnification	β 'P	1.07
Entrance pupil position	SEP [mm]	23.94
Exit pupil position	S'AP [mm]	−22.81
Vertex width	Σd [mm]	35.59

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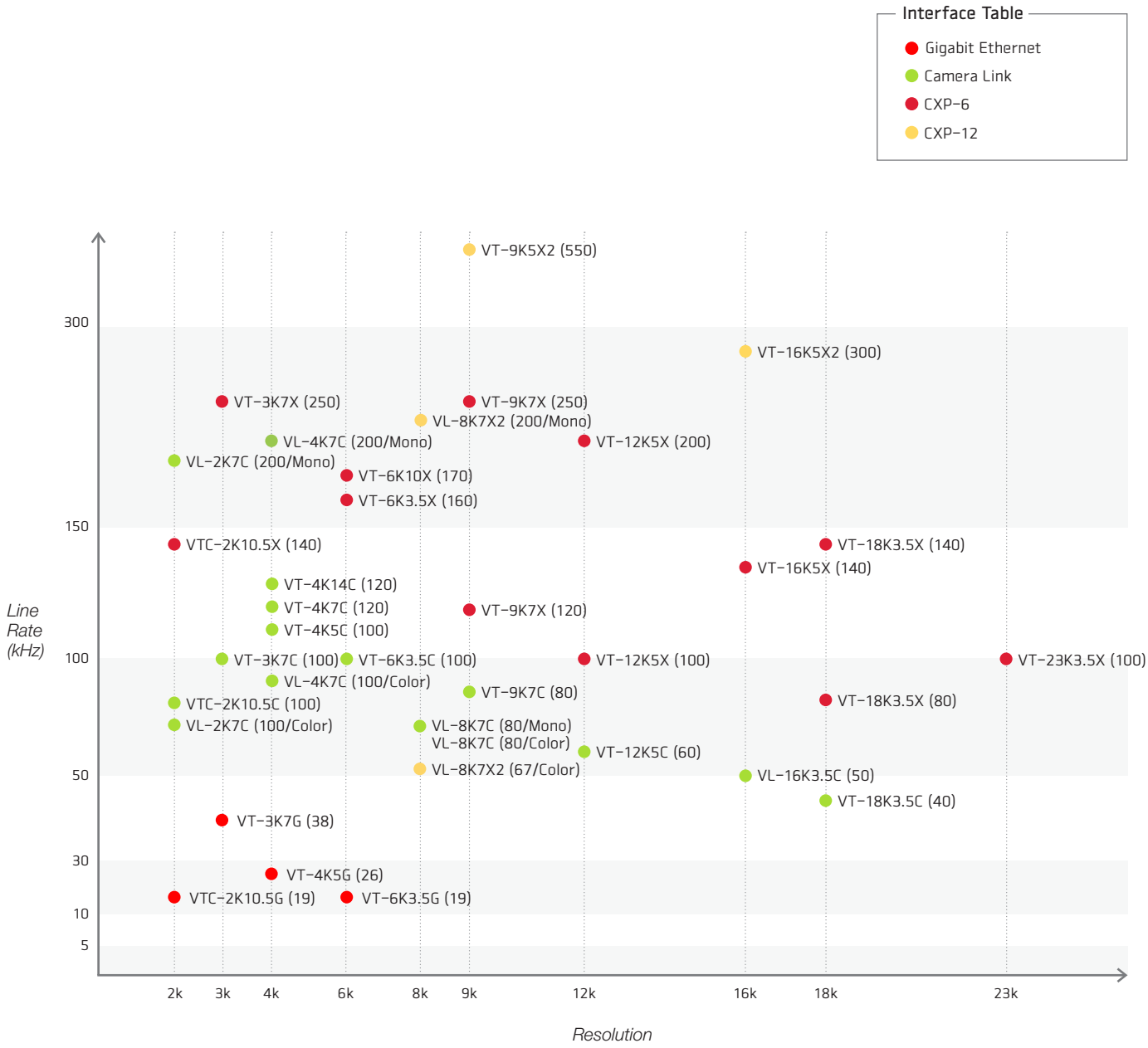
TDI Line Scan & Line Scan Cameras



Area Scan Cameras