## CytoViva Enhanced Darkfield Optical Illumination System Specifications



The patented CytoViva enhanced darkfield optical illumination system replaces the standard microscope condenser. The specialized illuminator focuses fixed-geometry, highly collimated light at oblique angles on the sample. This serves to improve signal-to-noise up to Seven (7) times over standard darkfield microscopy. This enables optimized dark field detection capability of non-fluorescing nano-scale samples.

## **Specifications**

Noble Metals & Metal Oxide NPs SoftNPs (liposomes, polymers, etc.)  ILLUMINATION SYSTEM Focal Distance Field of View -350 µm - 400 µm Numerical Aperture 1.2–1.4 N.A. LIGHT SOURCE Standard Light Sources Solarc, Halogen, Mercury Vapor Power Supply 100-240Vac,50/60 Hz, 1.6A max Power Variable Depending on Source Illumination Light Guide Type Liquid Outside Diameter of LLG 5 mm Inside Diameter of LLG S mm Inside Diameter of LLG S mm Minimum Mounting Clearance Dovetail Angle Dovetail Minimum Diameter Barrel Length Weight 0.43kg (15 oz.)  REQUIREMENT Immersion Oil Type A (nd> 1.515) Cargille Brand Sample Prep Soldes - 1 x 3 mm Glass Slide MICROSCOPE COMPATIBILITY  C-and O-shaped, 3-point Condenser Mounts (Diameter and Clearance Requirements of CytoViva Optical Illumination System) Inverted Research Microscopes OBJECTIVE COMPATIBILITY Mid Range Objective 10X Air Mid Range Objective 40X Long Working Distance High Range Objective	SYSTEM PERFORMANCE	
ILLUMINATION SYSTEM   Focal Distance	Noble Metals & Metal Oxide NPs	Detection ~ 10 nm
Focal Distance	SoftNPs (liposomes, polymers, etc.)	Detection ~ 75 nm
Field of View ~350 µm - 400 µm  Numerical Aperture 1.2–1.4 N.A.  LIGHT SOURCE  Standard Light Sources Solarc, Halogen, Mercury Vapor Power Supply 100-240Vac,50/60 Hz, 1.6A max Power Variable Depending on Source Illumination Light Guide Type Liquid Outside Diameter of LLG 5 mm Inside Diameter of LLG 3 mm  DIMENSIONS Height(Max) 98 mm Minimum Mounting Clearance 51 mm Dovetail Angle 30° Slope Dovetail Minimum Diameter 41 mm Barrel Length 110 mm Weight 0.43kg (15 oz.)  REQUIREMENT Immersion Oil Type A (nd> 1.515) Cargille Brand Sample Prep Cover slip - 0.17 mm Thickness Sample Prep Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY Upright Research Microscopes Requirements of CytoViva Optical Illumination System) Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY Mid Range Objective 10X Air Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional) Mid Range Objective 40X Coli with Iris (N.A.= ~1.4) High Range Objective 60X Oil with Iris (N.A.= ~1.4) High Range Objective 100X Oil with Iris (N.A.= ~1.4) High Range Objective 100X Oil with Iris (N.A.= ~1.4) WARRANTY	ILLUMINATION SYSTEM	
Numerical Aperture  LIGHT SOURCE  Standard Light Sources  Solarc, Halogen, Mercury Vapor  Power Supply  100-240Vac,50/60 Hz, 1.6A max  Power  Variable Depending on Source Illumination  Light Guide Type  Liquid  Outside Diameter of LLG  Inside Color of Col	Focal Distance	~1.5 mm
LIGHT SOURCE  Standard Light Sources  Solarc, Halogen, Mercury Vapor  Power Supply  100-240Vac,50/60 Hz, 1.6A max  Power  Variable Depending on Source Illumination  Light Guide Type  Liquid  Outside Diameter of LLG  5 mm  Inside Diameter of LLG  3 mm  DIMENSIONS  Height(Max)  98 mm  Minimum Mounting Clearance  51 mm  Dovetail Angle  30° Slope  Dovetail Minimum Diameter  41 mm  Barrel Length  110 mm  Weight  0.43kg (15 oz.)  REQUIREMENT  Immersion Oil  Type A (nd> 1.515) Cargille Brand  Sample Prep  Cover slip - 0.17 mm Thickness  Sample Prep  Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY  C-and O-shaped, 3-point Condenser Mounts (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes  OBJECTIVE COMPATIBILITY  Mid Range Objective  10X Air  Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  High Range Objective  40X Long Working Distance  High Range Objective  High Range Objective  10X Oil with Iris (N.A.= ~1.4)  High Range Objective  10X Oil with Iris (N.A.= ~1.4)  High Range Objective  10X Oil with Iris (N.A.= ~1.4)	Field of View	~350 µm - 400 µm
Standard Light Sources Power Supply Power Supply 100-240Vac,50/60 Hz, 1.6A max Power Variable Depending on Source Illumination Light Guide Type Liquid Outside Diameter of LLG 5 mm Inside Diameter of LLG Jamm DIMENSIONS Height(Max) Height(Max) Minimum Mounting Clearance Dovetail Angle Sarrel Length 110 mm Weight 0.43kg (15 oz.)  REQUIREMENT Immersion Oil Type A (nd> 1.515) Cargille Brand Sample Prep Cover slip - 0.17 mm Thickness Sample Prep Sides - 1 x 3 mm Glass Slide MICROSCOPE COMPATIBILITY Mid Research Microscopes Upright Research Microscopes Cobjective Dox Air Mid Range Objective High Range Objective 100X Oil with Iris (N.A.= ~1.4) WARRANTY	Numerical Aperture	1.2–1.4 N.A.
Power Supply Power Variable Depending on Source Illumination Light Guide Type Liquid Outside Diameter of LLG Inside Color of Co	LIGHT SOURCE	
Power Variable Depending on Source Illumination Light Guide Type Liquid Outside Diameter of LLG 5 mm Inside Diameter of LLG 3 mm  DIMENSIONS Height(Max) 98 mm Minimum Mounting Clearance 51 mm Dovetail Angle 30° Slope Dovetail Minimum Diameter 41 mm Barrel Length 110 mm Weight 0.43kg (15 oz.)  REQUIREMENT Immersion Oil Type A (nd> 1.515) Cargille Brand Sample Prep Cover slip - 0.17 mm Thickness Sample Prep Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY Upright Research Microscopes (Diameter and Clearance Requirements of CytoViva Optical Illumination System) Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY Mid Range Objective 10X Air Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional) Mid Range Objective 40X Long Working Distance High Range Objective 60X Oil with Iris (N.A.= ~1.4) High Range Objective 100X Oil with Iris (N.A.= ~1.4) WARRANTY	Standard Light Sources	Solarc, Halogen, Mercury Vapor
Light Guide Type  Outside Diameter of LLG  Inside Diameter of LIC  Inside Diameter of Carolina Inside Diameter	Power Supply	100-240Vac,50/60 Hz, 1.6A max
Outside Diameter of LLG Inside Diameter of LlC Inside Diameter of LLG Inside Diameter of LLG Inside Diameter of LlC Inside Diameter of Calculation of State of Stat	Power	Variable Depending on Source Illumination
Inside Diameter of LLG  DIMENSIONS  Height(Max)  Minimum Mounting Clearance  Dovetail Angle  Dovetail Minimum Diameter  Barrel Length  Meight  Microscopes  Microscope  Microscope Compatibility  Microscopes  Mequires Optional Inverted Adapter  Mid Range Objective  Mid Range Objective  Moid	Light Guide Type	Liquid
DIMENSIONS   Height(Max)   98 mm	Outside Diameter of LLG	5 mm
Height(Max) 98 mm  Minimum Mounting Clearance 51 mm  Dovetail Angle 30° Slope  Dovetail Minimum Diameter 41 mm  Barrel Length 110 mm  Weight 0.43kg (15 oz.)  REQUIREMENT  Immersion Oil Type A (nd> 1.515) Cargille Brand  Sample Prep Cover slip - 0.17 mm Thickness  Sample Prep Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY  Upright Research Microscopes (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective 10X Air  Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective 40X Long Working Distance  High Range Objective 60X Oil with Iris (N.A.= ~1.4)  High Range Objective 100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Inside Diameter of LLG	3 mm
Minimum Mounting Clearance 51 mm  Dovetail Angle 30° Slope  Dovetail Minimum Diameter 41 mm  Barrel Length 110 mm  Weight 0.43kg (15 oz.)  REQUIREMENT  Immersion Oil Type A (nd> 1.515) Cargille Brand  Sample Prep Cover slip - 0.17 mm Thickness  Sample Prep Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY  Upright Research Microscopes (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective 10X Air  Mid Range Objective 20X Air  Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective 40X Long Working Distance  High Range Objective 60X Oil with Iris (N.A.= ~1.4)  High Range Objective 100X Oil with Iris (N.A.= ~1.4)  WARRANTY	DIMENSIONS	
Dovetail Angle 30° Slope  Dovetail Minimum Diameter 41 mm  Barrel Length 110 mm  Weight 0.43kg (15 oz.)  REQUIREMENT  Immersion Oil Type A (nd> 1.515) Cargille Brand  Sample Prep Cover slip - 0.17 mm Thickness  Sample Prep Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY  Upright Research Microscopes (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective 10X Air  Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective 40X Long Working Distance  High Range Objective 60X Oil with Iris (N.A.= ~1.4)  High Range Objective 100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Height(Max)	98 mm
Dovetail Minimum Diameter  Barrel Length  110 mm  Weight  0.43kg (15 oz.)  REQUIREMENT  Immersion Oil  Type A (nd> 1.515) Cargille Brand  Sample Prep  Cover slip - 0.17 mm Thickness  Sample Prep  Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY  Upright Research Microscopes  Upright Research Microscopes  Inverted Research Microscopes  Pequires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  10X Air  Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  High Range Objective  60X Oil with Iris (N.A.= ~1.4)  High Range Objective  100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Minimum Mounting Clearance	51 mm
Barrel Length Weight 0.43kg (15 oz.)  REQUIREMENT Immersion Oil Type A (nd> 1.515) Cargille Brand Sample Prep Cover slip - 0.17 mm Thickness Sample Prep Slides - 1 x 3 mm Glass Slide MICROSCOPE COMPATIBILITY Upright Research Microscopes Upright Research Microscopes Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY Mid Range Objective 10X Air Mid Range Objective 10X Air Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional) Mid Range Objective High Range Objective 60X Oil with Iris (N.A.= ~1.4) High Range Objective 100X Oil with Iris (N.A.= ~1.4) WARRANTY	Dovetail Angle	30° Slope
Neight   N	Dovetail Minimum Diameter	41 mm
Type A (nd> 1.515) Cargille Brand	Barrel Length	110 mm
Immersion Oil Sample Prep Cover slip - 0.17 mm Thickness Sample Prep Slides - 1 x 3 mm Glass Slide MICROSCOPE COMPATIBILITY Upright Research Microscopes (Diameter and Clearance Requirements of CytoViva Optical Illumination System) Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY Mid Range Objective 10X Air Mid Range Objective 20X Air Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional) Mid Range Objective 40X Long Working Distance High Range Objective 60X Oil with Iris (N.A.= ~1.4) High Range Objective 100X Oil with Iris (N.A.= ~1.4) WARRANTY	Weight	0.43kg (15 oz.)
Sample Prep Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY  Upright Research Microscopes Unique Research Microscopes Inverted Research Microscopes  Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective Inverted Research Microscopes Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective Inverted Research Microscopes  Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective Inverted Research Microscopes  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective Inverted Research Microscopes  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective Inverted Research Microscopes  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective Inverted Research Microscopes  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avairable Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  Avair	REQUIREMENT	
Sample Prep  Slides - 1 x 3 mm Glass Slide  MICROSCOPE COMPATIBILITY  C-and O-shaped, 3-point Condenser Mounts (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective 10X Air  Mid Range Objective 20X Air  Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective 40X Long Working Distance  High Range Objective 60X Oil with Iris (N.A.= ~1.4)  High Range Objective 100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Immersion Oil	Type A (nd> 1.515) Cargille Brand
MICROSCOPE COMPATIBILITY  Upright Research Microscopes  C-and O-shaped, 3-point Condenser Mounts (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes  Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  10X Air  Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  40X Long Working Distance  High Range Objective  60X Oil with Iris (N.A.= ~1.4)  High Range Objective  100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Sample Prep	Cover slip - 0.17 mm Thickness
Upright Research Microscopes  C-and O-shaped, 3-point Condenser Mounts (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes  Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  10X Air  Mid Range Objective  20X Air  Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  40X Long Working Distance  High Range Objective  60X Oil with Iris (N.A.= ~1.4)  High Range Objective  100X Oil with Iris (N.A.= ~1.4)	Sample Prep	Slides - 1 x 3 mm Glass Slide
Upright Research Microscopes  (Diameter and Clearance Requirements of CytoViva Optical Illumination System)  Inverted Research Microscopes  Requires Optional Inverted Adapter  OBJECTIVE COMPATIBILITY  Mid Range Objective  10X Air  Mid Range Objective  20X Air  Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  40X Long Working Distance  High Range Objective  60X Oil with Iris (N.A.= ~1.4)  High Range Objective  100X Oil with Iris (N.A.= ~1.4)	MICROSCOPE COMPATIBILITY	
OBJECTIVE COMPATIBILITY  Mid Range Objective 10X Air  Mid Range Objective 20X Air  Mid Range Objective 40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective 40X Long Working Distance  High Range Objective 60X Oil with Iris (N.A.= ~1.4)  High Range Objective 100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Upright Research Microscopes	(Diameter and Clearance Requirements of CytoViva
Mid Range Objective  Mid Range Objective  20X Air  Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  40X Long Working Distance  High Range Objective  60X Oil with Iris (N.A.= ~1.4)  High Range Objective  100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Inverted Research Microscopes	Requires Optional Inverted Adapter
Mid Range Objective  Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  40X Long Working Distance  High Range Objective  60X Oil with Iris (N.A.= ~1.4)  High Range Objective  100X Oil with Iris (N.A.= ~1.4)  WARRANTY	OBJECTIVE COMPATIBILITY	
Mid Range Objective  40X Air or Water (N.A.= 0.7 Iris Optional)  Mid Range Objective  40X Long Working Distance  High Range Objective  60X Oil with Iris (N.A.= ~1.4)  High Range Objective  100X Oil with Iris (N.A.= ~1.4)  WARRANTY	Mid Range Objective	10X Air
Mid Range Objective  High Range Objective  High Range Objective  Output  100X Oil with Iris (N.A.= ~1.4)  WARRANTY  40X Long Working Distance  60X Oil with Iris (N.A.= ~1.4)  100X Oil with Iris (N.A.= ~1.4)	Mid Range Objective	20X Air
High Range Objective 60X Oil with Iris (N.A.= ~1.4) High Range Objective 100X Oil with Iris (N.A.= ~1.4) WARRANTY	Mid Range Objective	40X Air or Water (N.A.= 0.7 Iris Optional)
High Range Objective 100X Oil with Iris (N.A.= ~1.4) WARRANTY	Mid Range Objective	40X Long Working Distance
WARRANTY	High Range Objective	60X Oil with Iris (N.A.= ~1.4)
	High Range Objective	100X Oil with Iris (N.A.= ~1.4)
Marranti	WARRANTY	
warranty One (1) year from date of purchase	Warranty	One (1) year from date of purchase

## Application Examples

- Nano-Bio Interactions
- Nano-materials
  Characterization
- Nano-Drug Delivery
- Pathogen and Cell Characterization

## CytoViva Optical Illumination System



20nm AgNPs in Solution



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