TORONTECH

METALLURGICAL MICROSCOPE WITH DARK FIELD - TORONMM™-41

The ToronMM™-41 Dark Field Metallurgical Microscope is engineered for precision imaging in advanced materials research, failure analysis, and industrial quality control.

It features a 45° inclined, 360° rotatable trinocular head for ergonomic viewing and a rugged three-layer mechanical stage for smooth, accurate sample positioning. Designed to support both bright field and dark field observations, it also offers optional Differential Interference Contrast (DIC) for enhanced structural visibility.

Equipped with a quintuple nosepiece for seamless switching between objectives, this metallurgical analysis microscope delivers high-contrast imaging for grain structure evaluation, surface defect detection, and coating inspection. The integrated auto shut-off function promotes energy efficiency without sacrificing performance—making the ToronMM™-41 a dependable choice for labs that demand accuracy, durability, and optical clarity in their daily workflows.

APPLICATIONS

Metallurgical & Materials Science Industry - Grain structure evaluation, phase identification, and defect detection using both bright field and dark field imaging techniques.

Automotive & Transportation - Inspection of coatings, welds, and metallic surfaces to ensure durability, performance, and quality in vehicle components.

Aerospace & Defense - Advanced microstructural analysis of high-performance alloys, composites, and protective coatings for critical aerospace and defense applications.

Electronics & Semiconductor Industry - High-contrast surface imaging and thin-film inspection to detect defects, inclusions, and micro-cracks in electronic materials.

Industrial Manufacturing & Coating Industry - Quality control of machined parts, castings, and applied coatings through dark field and optional DIC analysis for enhanced defect visibility.

Petrochemical & Energy Industry - Examination of corrosion effects, material degradation, and structural changes in pipelines, reactors, and energy infrastructure.

Research & Academic Institutions - Metallographic studies, failure analysis, and advanced training programs leveraging bright field, dark field, and DIC observation methods.

Quality Assurance & Certification Labs - Standardized metallographic inspections and documentation in compliance with ASTM, ISO, and other global testing standards.

FEATURES

Metallurgical Microscope With Dark Field - ToronMM™-41 Features

1. Trinocular Head: Features a 45° inclined, 360° rotatable design with a beam-splitting ratio of 100:0 or 80:20, and an adjustable interpupillary distance from 50mm to 75mm for ergonomic viewing.
2. Mechanical Stage: High-precision three-layer XY-axis stage measuring 240mm (W) x 250mm (L), offering a smooth 50mm x 50mm movement range for accurate sample positioning.
3. Observation Methods: Supports advanced observation techniques, including dark field and optional DIC (Differential Interference Contrast) for enhanced surface and structural analysis.
4. Nosepiece: Equipped with a movable quintuple bright & dark field nosepiece, including a dedicated DIC slot to support flexible imaging needs.
5. Eco-Friendly Functionality: Integrated auto shut-off system activates after 30 minutes of inactivity, combined with a light intensity indicator to promote energy efficiency and user convenience.

TECHNICAL SPECIFICATIONS

Optical system	Infinity color corrected optical system
Viewing head	Trinocular(binocular), 45° inclined, 360° rotatable trinocular head Interpupillary distance adjustable between:50-75mm, (beam splitting ratio can be 100:0 or 80:20)
Eyepiece	High eyepoint wide field plan eyepiece PL10X/22mm, diopter adjustable High eyepoint wide field eyepiece WF15X/13 High eyepoint wide field eyepiece WF20X/10mm
Metallurgical objective	LWD bright field & dark field & DIC plan achromatic metallurgical objective 5X, 10X, 20X, 50X, 100X
Nosepiece	Reversed quintuple nosepiece with DIC slot
Focusing adjustment	Low position coaxial coarse and fine adjustment. with tightness adjustment. Coarse adjustment range 38 mm; precision of fine adjustment:2um
Stage	Three-layer mechanical stage, area 240Wx250L mm, moving range 50x50mm; Metal stage plate,center hole dia.φ12mm
Illumination system	Reflection Koehler illumination with iris diaphragm and centerable field diaphragm , wide-range voltage 90-240V ,12V/100W halogen bulb (single 3W LED option), with continuous intensity
Polarizing kit	Polarizer and the analyzer can be removed from the optical path, the analyzer can be rotated 360°
Photo accessories	Photo tube (with PK mount), photo eyepiece 3.2X
Video accessories	CTV0.35X/CTV0.5X/CTV0.65X/1.0X
Software	Specialized metallographic analysis software

TORONTECH.com

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Torontech Inc.
251 Consumers Road, Suite 1200
Toronto, Ontario, M2J 4R3, Canada

Phone: +1 416 368 2721 | Fax: +1 416 981 7652
Email: info@torontech.com

Torontech, LLC
601 Brickell Key Drive, Suite 700
Miami, FL 33131, USA

Toll-Free: 1-866-383-7919
Email: sales@torontech.com

Torontech ME FZE
Meydan Grandstand, 6th Floor,
Meydan Road, Nad Al Sheba,
Dubai-261440, UAE

Phone: +971 488 19252
Email: me@torontech.com

USA | Canada | EU | UAE | GCC | KSA | India | Africa | Latin America | Asia