



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

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**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

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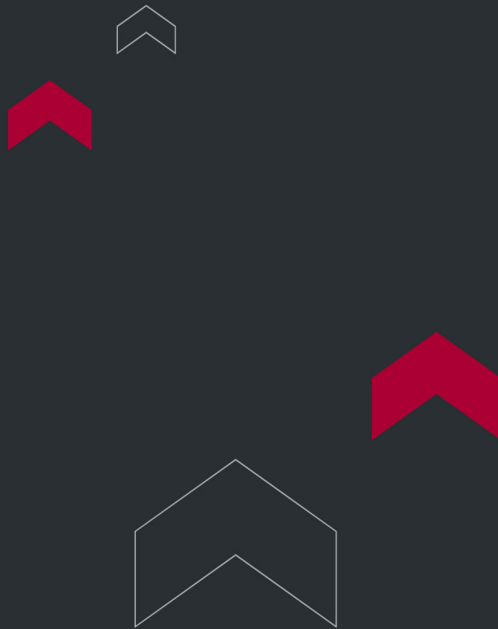
### Metallurgical Microscope With Dark Field - ToronMM™-41 Features

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

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



**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](mailto: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](mailto: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](mailto:me@torontech.com)

