Tundra Cryo-TEM
Unravel complex proteins with simplified cryo-EM
What will you discover?

The Thermo Scientific™ Tundra™ Cryo-Transmission Electron Microscope (Cryo-TEM), in combination with the Thermo Scientific™ Falcon™ C Direct Electron Detector, allows you to perform structural analyses on challenging proteins (<100 kD) and macromolecules with unprecedented ease of use. With the Tundra Cryo-TEM, cryo-electron microscopy (cryo-EM) is more accessible, enabling discoveries in infectious and neurodegenerative diseases, cancer, and more. Using the Tundra Cryo-TEM, you can reveal high-resolution structures to discover tomorrow’s breakthroughs, easily load and unload cryo-EM grids in a contamination free state, and screen room temperature negative stain grids and plastic sections.

“The Tundra [Cryo-TEM] will help with accessibility because the training required to use this instrument was very minimal. It lowered the barrier to entry into cryo-EM.”

−Dr. Andrew Borst,
Protein Design Institute, University of Washington

Figure 1. CDK-activating kinase (CAK) complex determined at 4.3 Å using the Falcon C Detector. Sample courtesy of Basil Greber, Institute of Cancer Research, London.*

*Images generated using the Tundra Cryo-TEM.
Achieve biologically relevant resolution

The Tundra Cryo-TEM can efficiently validate ligand and protein binding when in fast mode, taking over 10,000 images in as little as a few days' acquisition time. With cryo-EM, you can take a closer look at enzymes that play a pivotal role in glycolysis or modulate cellular function by degrading protein substrates that are no longer needed. In combination with the new Falcon C Detector, the Tundra Cryo-TEM can help expand your scientific discovery by visually resolving structures for proteins <100 kD and producing 3D reconstructions down to 2.1 Å resolution.
Improve productivity

With the simplified workflow of the Tundra Cryo-TEM, both new and existing cryo-EM facilities can readily train scientists on single particle analysis, providing users with relevant job skills for career advancement in the biological sciences. In addition, the Tundra Cryo-TEM can help improve productivity in established cryo-EM laboratories by identifying the best samples grids to analyze on higher resolution platforms.

Expand your capabilities

The Tundra Cryo-TEM can also be utilized for negative-stain electron microscopy, an easy and cost-effective method for the quality assessment of purified biological specimens at room temperature (Figure 7). In addition, the Tundra Cryo-TEM can visualize sections of resin-embedded cells and tissues, or isolated particles of protein complexes and viral assemblies (Figure 8).
Validate high-resolution structures

The Tundra Cryo-TEM can help expand your scientific discovery, revealing a variety of details, such as how small molecules interact with drug targets, the mechanisms underlying protein transport, or the molecular conformation of ligand-target binding. With the new Falcon C Detector, you can boost your performance and approach resolutions that are on par with higher kV platforms.

Increase confidence in your results

Streamlined workflows with automation and AI

The Tundra Cryo-TEM features an innovative cryo-loading station that uses automation to load the sample grid into the transfer device and then into the microscope, reducing possible user error and manual steps. Additionally, Thermo Scientific Smart EPU Software provides faster experimental setup through:

- An intuitive user interface that helps you easily set up the microscope and data collection runs
- Traffic light indicators that let you know the microscope's status and help resolve common issues
- Predefined templates that allow you to jumpstart standard experiments

Smart EPU Software includes the EPU Quality Monitor and Smart Plugins which monitor data as it is acquired and adjust data collection settings on the fly, improving experimental outcomes.

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"The availability of the Falcon C [Detector] for the Tundra Cryo-TEM will be game changing in the sense that low-resource institutions will be able to get high-resolution reconstructions. So not only using the Tundra [Cryo-TEM] as a screening microscope, but a data collection tool. And that versatility is great for institutions that may only have one TEM."

—Dr. Edward Eng
Senior Scientist, New York Structural Biology Center, NY
Increase accessibility to cryo-EM

The Tundra Cryo-TEM is especially designed for new users who are not experts in electron microscopy, and is easier to use than typical cryo-TEM instruments. With pricing that is set to meet a range of grant programs globally, more institutions can create cutting-edge training facilities to help meet the growing demand for scientists with hands-on cryo-EM expertise.

"With their experience in cryo-EM techniques, not only will they get a job, but they will get the job that they want."

– Dr. Montserrat Samso
Department of Biochemistry and Biophysics, Virginia Commonwealth University

<table>
<thead>
<tr>
<th>MW (kDa)</th>
<th>330 kDa</th>
<th>2.5 MDa</th>
<th>3.7 MDa</th>
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<tbody>
<tr>
<td>Acq. Time (hrs)</td>
<td>30</td>
<td>37</td>
<td>17</td>
</tr>
<tr>
<td>Resolution (Å)</td>
<td>4.2</td>
<td>3.5</td>
<td>3.0</td>
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Designed for ease of use and speed

Discover cryo-EM that is truly accessible and cost effective, with on-board solutions for users who are new to cryo-EM.
Technical Highlights

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<tr>
<th>Source</th>
<th>X-FEG (extreme high-brightness field emission gun)</th>
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<tbody>
<tr>
<td>Accelerating voltage</td>
<td>Fixed accelerating voltage of 100 kV</td>
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| Semi-automated sample loading| • Cryo-preparation station for contamination-free sample exchange  
|                               | • Sample transfer device for transfer of single AutoGrids to the microscope, with fixed cryo-box |
| Lenses                        | High-resolution objective lens optimized for single particle analysis |
| Stage                         | Computerized specimen cryo-stage                 |
| Detector options              | • High-performance Falcon C Direct Electron Detector for improved resolution capabilities  
|                               | • Standard Ceta-F CMOS Camera with dose fractionation, optimized for low-dose imaging |
| Room size requirements (L x W x H) | • All in one room dimensions: 4.20 x 4.00 x 2.74 m (13.8 x 13.1 x 8.99 ft)  
|                               | • Dimensions with cryo-loading station in neighboring room: 4.00 x 3.80 x 2.74 m (13.1 x 12.5 x 8.99 ft) |
| Smart EPU Software            | AI-enabled and automated software solution that provides feedback during data collection and has an open application programming interface |

Additional resources for Tundra Cryo-TEM

The **Accelerate and Advance Service Portfolio** for the Tundra Cryo-TEM provides easy maintenance, reduced cost of ownership, training, and support, as well as convenient access to system health and performance.

The **Electron Microscopy Funding Support Center** offers technical content, resources, and proposal writing tools to help you acquire the research instrument you need.

**Getting Started with Cryo-EM eBook**

Cryo-EM is easier to adopt and more affordable than ever before. Explore how cryo-EM can overcome the current limitations of traditional techniques such as X-ray crystallography (XRD). Learn about key methods, including single particle analysis, microcrystal electron diffraction (MicroED), and cryo-tomography, and how these techniques are used to answer important scientific questions.

Learn more at [thermofisher.com/Tundra](http://thermofisher.com/Tundra)