**POWERx**  
**High-Performance X-Ray**

Stringent food and beverage safety standards are placing escalating demands on producers for greater levels of contaminant detection and inspection capability. In the past, basic metal detectors met the need. Now, the POWERx X-ray systems far surpass the capability and sensitivity of metal detectors.

Thermo Scientific POWERx systems are designed to enable the highest level of quality assurance. They feature state-of-the-art X-ray design and image analysis software that optimizes sensitivity and probability of detection.

A wide range of models for upright and horizontal package orientations are available providing application flexibility from a single vendor with years of X-ray experience.

POWERx is rugged, reliable, and hygienic—designed to meet or exceed adverse environmental and cleaning requirements. Modular internal components and software have undergone rigorous testing to insure reliability. The system can be augmented with optional software modules for contaminant simulation, pharmaceutical regulation compliance and mass measurement.

POWERx products are backed by Thermo Fisher Scientific’s global service organization. Comprehensive service capabilities include a standard remote access feature allowing certified Thermo Fisher technicians to connect to your POWERx and optimize performance at any time.

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**Advanced Single-Beam Inspection for Upright Packages or Containers**

The Thermo Scientific POWERx S single beam systems offer industry-leading detection capability for metal cans, plastic bottles or other upright packages such as boxes or pouches. In these applications the package can be scanned easily by one X-ray beam enabling complete foreign body detection.

**POWERx S models view upright containers from one angle, reliably finding contaminants anywhere inside the package**

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**Model S140 Short Single Vertical-Beam System**

*Suitable for inspection of short, upright containers.*

Designed for high performance, yet economical inspection of small cans, boxes and pouches standing upright during production. Utilizes the same feature-rich image analysis software as all POWERx systems. Compact system size and integration with an existing conveyor makes installation fast and easy. Pharmaceutical version available.

**X-Ray Power**  
**S140**: 90 kV and 10 mA

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**Model S230 Tall Single Vertical-Beam System**

*Suitable for inspection of tall, upright containers.*

The same powerful features as the POWERx S140, featuring a larger inspection window and more power for heavy, dense packages (lower power LP version available).

**X-Ray Power**  
**S230**: 90 kV and 20 mA
Dual-Beam Inspection for 100% Detection Probability in Glass Containers

Detecting glass contaminants in glass containers with an X-ray system can be challenging. The Thermo Scientific POWERx D models utilize a patented approach with two X-ray beams that scan each container from a different angle eliminating blind spots found in other systems. The dual-beam architecture will also reliably detect hard to find glass slivers.

Model D165 Short Dual Vertical-Beam System
Suitable for inspection of short, upright glass containers. Patented dual-detection system design detects glass in glass bottles and jars. The probability of detection of contaminants in the bottom and side of containers is 100%. With the dual-beam system it’s also possible to detect thin, flat glass fragments or slivers. The D165 utilizes the same feature-rich image analysis software as all POWERx systems. Pharmaceutical version available.

X-Ray Power D165: 2 x 90 kV and 2 x 10 mA

Model D195 Tall Dual Vertical-Beam System
Suitable for inspection of tall, upright glass containers. The same powerful features as the POWERx D165, only with a larger inspection window and sufficient power for heavy, dense packages (lower power LP version available).

X-Ray Power D195: 2 x 90 kV and 2 x 20 mA
D195LP: 2 x 90 kV and 2 x 10 mA
The Power is in the Software

The Thermo Scientific POWERx software was designed with the user in mind. Its color-coded button interface makes it very intuitive and quick to learn. All POWERx models share many of the same system functions as well as a complete set of image processing and analysis tools. Operating and maintaining multiple systems across different production line types in a single factory is a snap.

**Model C200 Compact Conveyor System**

*Suitable for inspection of small, flat containers.* Designed for small footprint and cost effective inspection of small boxes, trays and bags handled on flatbed conveyors. Utilizes the same feature-rich image analysis software as all POWERx systems. Features a built-in rejecter. Pharmaceutical version available.

*X-Ray Power*  
C200: 95 kV and 1.5 mA

**Model C300 Mid-Size Conveyor System**

*Suitable for inspection of moderate-sized packages.* Similar to the C200 only for larger packages. Front access door provides quick entry to the X-ray inspection tunnel for cleaning and service. Pharmaceutical version available.

*X-Ray Power*  
C300: 70 kV and 3.0 mA
Advanced Capabilities for Pharmaceutical Applications

FDA 21 CFR Part 11 Capability
The Thermo Scientific POWERx Rx models enable the user to comply with the requirements of 21 CFR 11 regarding security, storage and retrieval of electronic records for tracking and traceability. User access to the system is strictly controlled at multiple levels and meets the requirements for electronic signatures. Lot and Action databases are maintained for audit trail records and events tracking.

IQ/OQ/PQQ Validation Packages
Installation, Operations and Production Qualification documentation and support detailing the POWERx system specifications and text methods to support validation and cGMP compliance.

Consulting Services
Consulting by Thermo Fisher Scientific for guidance as to the safe and effective implementation of X-ray inspection systems for pharmaceutical production applications.

Models C400 and C600 Full-Size Standard Conveyor Systems
Suitable for inspection of most typical sized packages. Available in two aperture sizes with a high power X-ray source for large, dense products (lower power C400 LP version available). Unique roll-out conveyor design for easy cleaning and maintenance. Capable of bulk product inspection in up to eight lanes.

X-Ray Power
C600: 90 kV and 10 mA
C400: 90 kV and 10 mA
C400 LP: 90 kV and 5 mA

Model C800 Large Conveyor System
Suitable for inspection of large packages or cases. Similar to the POWERx C400/C600 models, only designed with the largest possible aperture.

X-Ray Power
C800: 90 kV and 10 mA
POWERx S and D Models

Application Specifications

- Inspectable Products: Packaged products including glass jars, bottles, cans, brick packs
- Product Height and Width:
  - S 140: 140 mm x 185 mm (5.5 in x 6.5 in)
  - S 230: 230 mm x 185 mm (11.0 in x 7.28 in)
  - D 165: 165 mm x 185 mm (6.49 in x 7.28 in)
  - D 195: 195 mm x 185 mm (7.67 in x 7.28 in)
  (refer to beam diagrams for inspection area details)
- Conveyable Product Weight: Determined by external conveyor design
- Detection Sensitivity for Metal: Typical sensitivities range from 1 mm to 2 mm (0.04 in to 0.08 in) diameter metal and 2 mm to 4 mm (0.08 in to 0.16 in) diameter glass depending on product density, texture and packaging. In some products 0.5 mm (0.02 in) diameter metal and 1.0 mm (0.04 in) glass can be detected.
- Detection Sensitivity for Other Contaminants (stone, bone, plastic, etc.): Application testing is required; Results typically range from 2 mm to 5 mm (0.08 in to 0.20 in)

Technical Specifications

- X-Ray Beams:
  - S 140 and S 230: Single
  - D 165 and D 195: Dual (positioned at 90 degrees, patented design)
- X-Ray Power:
  - S 140: <90 kV and <10 mA
  - S 230: <90 kV and <20 mA
  - S 230 LP option: <90 kV and <10 mA
  - D 165: 2 x <90 kV and 2 x <10 mA
  - D 195: 2 x <90 kV and 2 x <20 mA
  - D 195 LP option: 2 x <90 kV and 2 x <10 mA
- Conveyor Height (measured from the floor to the bottom of the package being inspected):
  - S 140: 771 to 965 mm (30.4 to 38.0 in)
  - S 230: 775 to 900 mm (30.4 to 35.4 in)
  - D 165: 916 to 1110 mm (36.0 to 43.7 in)
  - D 195: 835 to 905 mm (32.9 to 35.6 in)
- Software Algorithms:
- Colorimetric thresholds, shape analysis, photometric inspection; Application specific inspection routines possible at additional cost
- Human-Machine Interface:
- High contrast 15-in color LCD with touch screen
- Available Languages:
- English, French, Italian, German, Portuguese, Spanish, Polish
- Data Export and Interfaces:
- File formats: .mdb, .txt, .tif, .jpg, .bmp; USB and network interfaces
- Remote Access:
- Standard, includes software and hardware (modem or network interface)
- Machine Weight:
  - S 140: 600 kg (1323 lb)
  - S 230: 1100 kg (2425 lb)
  - D 165: 1200 kg (2646 lb)
  - D 195: 1400 kg (3086 lb)
- Construction:
  - AISI 304 stainless steel, scotch bright finish
- Electrical Requirements:
  - 230 VAC ±10%, 50/60 Hz, single phase (not including optional air conditioners)
  - S 140: 18 A
  - S 230: 28 A, LP option: 18 A
  - D 165: 30 A
  - D 195: 41 A, LP option: 39 A
- Cooling:
  - External water chiller (X-ray tube) and heat exchanger (cabinet)
- Environmental Specifications:
  - Operating Temperature/Humidity: +5°C to +35°C (+41°F to +95°F); 20-80% non-condensing
  - Air Supply Requirement: 6 bar (87 psi), required for X-ray shutters on some models
- Conformance and Certifications:
  - Radiation Safety: Certified to emission <0.5 µSv/h excluding input/output tunnels; FDA CFR21 part 1020.40
  - Pharmaceutical (Rx models): CFR 21 part 11 compliant; IQ/OQ/PQ validation available
- Available Options:
  - Hardware: Water chiller, shielding, rejecters, radiation safety meter
  - Software: Auto Set-Up, Virtual Contaminant Simulation
  - Service: Installation, 24/7 technical support, service contracts, extended warranties

Software Options

- Virtual Contaminant Simulation: Assists in optimizing the probability of detection by simulating contaminant detection in stored images
- Auto Set-Up: Automatically determines the ideal parametric set-up based on statistics captured during production set-up
- Checkweighing Feature (C models only): Mass measurement by correlation of X-ray density to weight*

Hardware Options

- Customized radiation shielding and conveyors (S and D models)
- Product alignment rails (C models)
- Reject devices and bins, audible alarms and beacons
- Metal and glass test spheres
- UL or CSA safety certification
- Radiation survey meter
- Spare parts kit

*not compliant with the international R51 standard
The Advantages of X-Ray Inspection

- **Compliance To Requirements:** Easily comply with your customer inspection mandates and/or government regulations
- **Surpasses Metal Detector Capability:** Detect more than just metal—find other dense foreign objects such as glass, stone, and some plastics
- **Surpasses Metal Detector Sensitivity:** Improve your detection sensitivity in applications where metallic packaging impacts the performance of metal detectors
- **Verification:** Verify assembly of your product (e.g., presence/absence, counting, breakage, placement) guaranteeing the highest quality level and a superior brand
- **Conformance:** Mass measurement software (optional) to maintain ideal product weight
- **Traceability:** Create and save detailed records for traceability and process improvement including information-rich images of rejected product

**POWERx C Models**

### Application Specifications

<table>
<thead>
<tr>
<th>Inspectable Products</th>
<th>Packaged products including bag-in-box, metallized pouches, tray and carton products, vacuum packed products; bulk flow products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Height and Width</strong></td>
<td>Refer to beam diagrams for inspection area details</td>
</tr>
<tr>
<td><strong>Conveyable Product Weight</strong></td>
<td>≤ 100 kg (≤ 220 lb)</td>
</tr>
<tr>
<td><strong>Detection Sensitivity for Metal</strong></td>
<td>Typical sensitivities range from 1 mm to 2 mm (0.04 in to 0.08 in) diameter metal and 2 mm to 4 mm (0.08 in to 0.16 in) diameter glass depending on product density, texture and packaging. In some products 0.5 mm (0.02 in) diameter metal and 1.0 mm (0.04 in) glass can be detected.</td>
</tr>
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<td><strong>Detection Sensitivity for Other Contaminants (stone, bone, plastic, etc.)</strong></td>
<td>Application testing is required; Results typically range from 2 mm to 5 mm (0.08 in to 0.20 in)</td>
</tr>
</tbody>
</table>
| **Inspection Speed** | C 200: ≤ 40 m/minute (≤ 131 ft/minute)  
C 300: ≤ 60 m/minute (≤ 195 ft/minute)  
C 400/C 600/C 800: ≤ 70 m/minute (≤ 230 ft/minute) |
| **Inspection and Reject Lanes** | Up to 8 |

### Technical Specifications

| **Maximum X-Ray Power** | C 200: ≤ 95 kV, 1.5 mA  
C 300: 70 kV, 3 mA  
C 400 (LP): 90 kV, 10 mA; LP option: 5 mA |
| **Conveyor Height** | C 200: 800 mm to 950 mm (31.5 in to 37.4 in)  
C 300: 860 mm to 1020 mm (33.8 in to 40.2 in)  
C 400: 405 mm (16.0 in) |
| **Conveyor Belt Width** | C 200: 160 mm (6.3 in)  
C 300: 270 mm (10.6 in)  
C 400: 405 mm (16.0 in) |
| **Conveyor Length** | C 200: 1100 mm (43.3 in); includes reject system |
| **Software Algorithms** | Colorimetric thresholds, shape analysis, photometric inspection; Application specific inspection routines possible at additional cost |
| **Human-Machine Interface** | High contrast 15-in color LCD with touch screen |
| **Data Import and Export** | File formats: .mdb, .txt, .tif, .jpg, .bmp; USB and network interfaces |
| **Remote Access** | Standard, includes software and hardware (modem or network interface) |
| **Machine Weight** | C 200: 400 kg (882 lb)  
C 300: 600 kg (1323 lb)  
C 400: 800 kg (1764 lb) |
| **Construction** | AISI 304 stainless steel, bead blast finish |
| **Electrical Requirements** | 230 VAC ±10%, 50/60 Hz, single phase  
C 200: 10 A  
C 400/C 600/C 800: 18 A |
| **Cooling** | External water chiller (X-ray tube) and heat exchanger (cabinet) |

### Environmental Specifications

| **Operating Temperature/Humidity** | +5°C to +35°C (+41°F to +95°F); 0-80% non-condensing |
| **Water and Dust Protection Level** | IP 65, NEMA 4X |
| **Air Supply** | 6 bar (87 psi) for rejector only |

### Conformance and Certifications

- **Radiation Safety:** Certified to emission ≤ 0.5 µSv/h excluding input/output tunnels; FDA CFR21 part 1020.40
- **Pharmaceutical (Rx models):** CFR 21 part 11 compliant; IQ/OQ/PQ validation available.

### Available Options

- **Hardware:** Water chiller, shielding, rejecters, radiation safety meter
- **Software:** Mass Measurement, Auto Set-Up, Virtual Contaminant Simulation
- **Service:** Installation, 24/7 technical support, service contracts, extended warranties
Services and Benefits

**Thermo Scientific Priority One™ Service**
We provide a complete service and support offering to insure that our products perform according to your requirements. From our comprehensive warranty, to customer service, to spare parts and service contracts we are committed to providing you the highest level of service for your investment. Whenever you need service or support, factory trained and certified technicians are ready to keep your production up and running. For further information on our service and support offerings, visit our website or give us a call toll-free at +1 (800) 227-8891.

**A Comprehensive Product Offering for Product Inspection**
We offer a complete line of Thermo Scientific packaging inspection equipment including checkweighers, metal detectors and X-ray systems. Our products protect your brand and insure safety and quality for your customers. Visit our website or give us a call—we are the experts in Product Inspection.

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  - PROx, visit www.thermo.com/prox
  - POWERx, visit www.thermo.com/powerx
  - InScan, visit www.thermo.com/inscan
- APEX Metal Detectors, visit www.thermo.com/apex
- Moisture and Constituent Analysis
  - Spectra-Quad, visit www.thermo.com/spectraquad
  - GMS, visit www.thermo.com/gms

**Financial Services**
Thermo Fisher is able to offer attractive leasing terms on its products. Leasing can be a good way to expand or upgrade your production line without straining your cash flow. Any Thermo Scientific product can be quoted as a purchase or lease.

**Product Inspection Facilities**
Thermo Fisher has several facilities located around the world which will inspect products for metal or solid contaminants using our Thermo Scientific X-ray systems. If you have a quantity of material or products which you suspect may be contaminated, simply give us a call to discuss the situation. Once you ship the product to one of our facilities we will inspect and segregate it, saving you time, money and rework. Call us toll-free at +1 (800) 227-8891

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