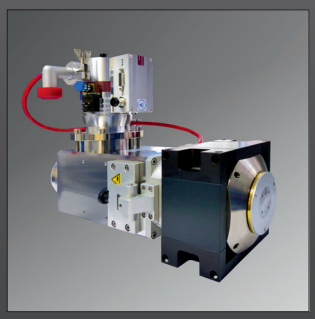
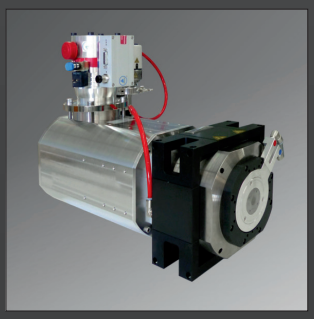
X-RAY WorX

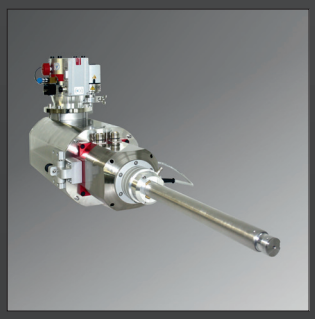
Superior Microfocus Technology

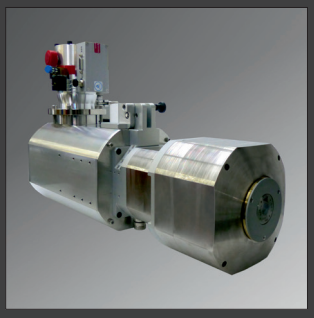
X-RAY WorX

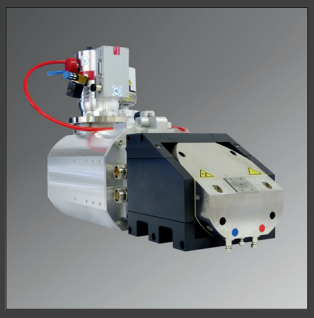
Options and accessories

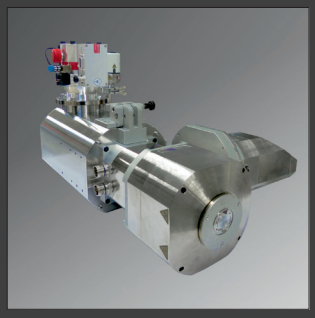












Version 1.3 / July 2023

Content

X-RAY WorX - your service partner

X-RAY WorX provides a comprehensive set of services relating to your X-ray systems. We ensure the availability of your X-ray system through regular maintenance, we repair systems quickly and reliably, and we take care of instant spare part shipments. In addition, we provide introductory as well as advanced service and application trainings for the service engineers of our partners.

Make or buy? Custom or standard?

Make or buy? Custom or standard? Being able to optimize a testing device for a particular application will improve results and usability. X-RAY WorX offers several helpful options and accessories for their X-ray tubes that support you in your daily work and help you to get the most out of your investment:

- Extend the applicability of your X-ray system by using different tube heads and targets
- Optimize your setup for particular applications by using our cooling options
- Check the conditions of your X-ray tube periodically using reference blocks or IQIs
- Ask your X-RAY WorX engineers for recommended options and installation advice.

Ordering options for microfocus X-ray tubes

If you are interested in any options for microfocus X-ray tubes or if you would like to place an order, please contact our service department:

service@x-ray-worx.com

Please note that for some options installation and commissioning have to be ordered separately.

If you have any question in advance, please call: +49 5131 48712-60.

Note:

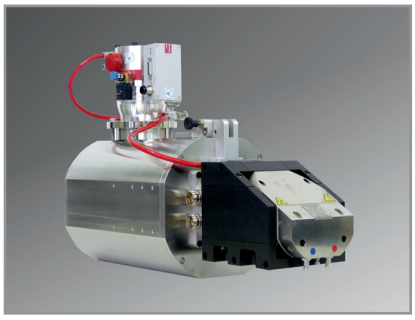
All images displayed in these catalogue show sample configurations. The real product may look slightly different. Therefore always specify our item number when you order a product.

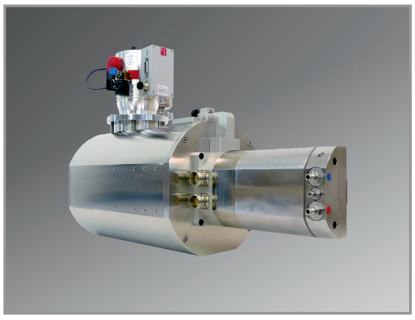
Options for reflection tubes

X-RAY WorX reflection tubes

X-RAY WorX offers different types of reflection tubes for versatile applications:

- Product line *SE*
- Product line *CT*



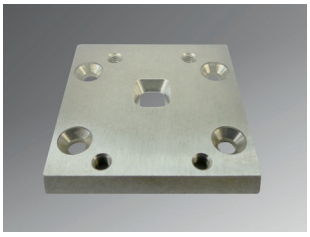


Beam collimators

The reduction of scattered radiation may improve your image quality and increase the accuracy of your measurements.

X-RAY WorX offers collimators of different sizes and shapes to adapt the dimension of the exposed surface to the size of your detector. Collimators are easy to install and may be used on demand.

Beam collimators



Beam collimators with square shaped cross section of X-ray cone with different opening angles

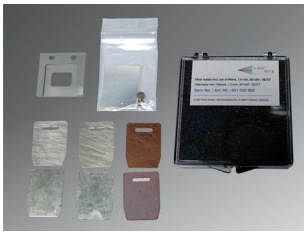
Description	Item No.
Opening angle of X-ray cone approx. 30° x 30°	401 000 870
Opening angle of X-ray cone approx. 40° x 40°	401 000 871
Opening angle of X-ray cone approx. 60° x 60°	401 000 872
Opening angle of X-ray cone approx. 60° x 80°	401 000 873

Filters

Filters allow the accurate filtering of the X-ray spectrum to reduce e.g. beam hardening artefacts. X-RAY WorX offers an easy way to mount filters in front of the tube's output window.

Filters made from copper, aluminium and tin in different thicknesses are included with every filter holder. Other materials may be easily clipped to fit into the holder.

Filter holders including set of filters



- For X-RAY WorX tubes of the product family *SE*
- Easy mounting of the holder on top of the tube window

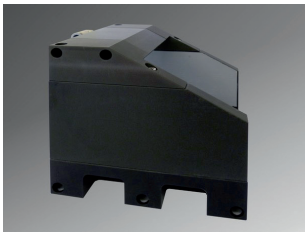
Description	Item No.
▶ Filter holder including set of filters (1 mm) ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ For use with filters of up to 1 mm thickness ▶ Frames for use with various materials	401 000 825
▶ Filter holder including set of filters (5 mm) ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 5 x 1.0 mm thickness, filters from tin (Sn) of 2 x 0.75 mm and 2 x 1.0 mm thickness ▶ For use with filters of up to 5 mm thickness ▶ Frames for use with various materials	401 000 826
▶ Filter holder incl. set of filters (5 mm, 80°x60°) ▶ Filters made from aluminum (Al) and copper (Cu), each of 2 x 1.0 mm, 1 x 1.5 mm, and 1 x 2.5 mm thickness, filters from tin (Sn) of 2 x 0.75 mm and 2 x 1.0 mm thickness ▶ For use with filters of up to 5 mm thickness	401 000 827
▶ Filter holder incl. set of filters (1.5 mm, 80°x60°) ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 1.0 mm and 1 x 1.5 mm thickness, filters from tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ For use with filters of up to 1.5 mm thickness	401 000 828

Cooling modules

During long-term exposure the focal spot position may change significantly due to the heat transferred to the X-ray tube and the holding structures of your X-ray system. The major sources of heat are the target and the electron optics in the tube head. The reflection target is always cooled to protect the sealings and keep the vacuum in good condition.

The tube head may be cooled by using an external cooling element. X-RAY WorX offers cooling elements for various types of X-ray sources with reflection or transmission targets and also for tubes of the former manufacturer Feinfocus®. Furthermore a cooling element replacing the fan of the turbo pump is available to reduce vibrations and to avoid air draft.

Cooling modules for tube head



- Water cooling of the tube head
- Reduction of thermal expansion of the tube to stabilize focal spot position and intensity
- Less heating of the measurement space
- Delivery with cooling element, cooling unit X-Cooler, hoses, couplings, and cooling agent

Description	Item No.
Cooling module for *XWT-160-SE* and *XWT-190-SE*	420 500 012
Cooling module for *XWT-225-SE, XWT-240-SE, XWT-300-SE*	420 500 022
Cooling module for Feinfocus® *FXE-225.20*	420 500 040
Cooling module for Feinfocus® *FXE-225.45* and *FXE-225.48*	420 500 050

Water cooling for turbo pump

- Cooling element with hoses and couplings for installation between X-Cooler and cooling element of tube head
- Cooling unit X-Cooler not included

Description	Item No.
Water cooling for turbo pump	420 500 110

Reflection targets

Certain low voltage or multiple energy applications may benefit from targets made of different materials, e.g. molybdenum or copper. X-RAY WorX offers various materials as target materials.

Ask your local representative or your X-RAY WorX sales department if you are interested in a material that is not on the list.

Reflection targets

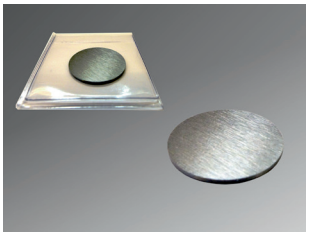
Description	Item No.
Reflection target copper (Cu), including O-ring sealings	401 000 650
Reflection target silver (Ag), including O-ring sealings	401 000 660
Reflection target molybdenum (Mo), including O-ring sealings	401 000 655

Tube window

In low energy applications with materials having low absorption coefficients it is difficult to get enough image contrast.

The low inherent filtration of the optional beryllium window may increase the image contrast and improve the results of your CT scan compared to the standard aluminium window.

Tube window beryllium



- For tubes with reflection target (*SE, CT, RAC Superfocus*)
- Diameter: 26 mm, thickness: 1 mm
- Including O-ring sealing 20.00 x 2.00 (high temperature)

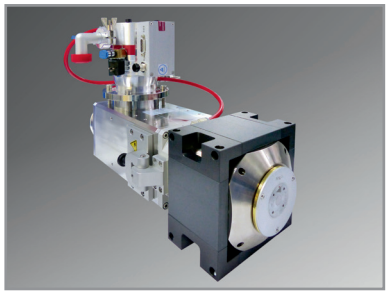
Description	Item No.
Tube window beryllium	401 000 155

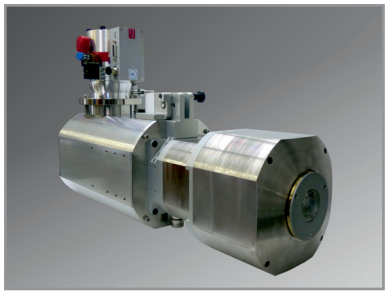
Options for transmission tubes

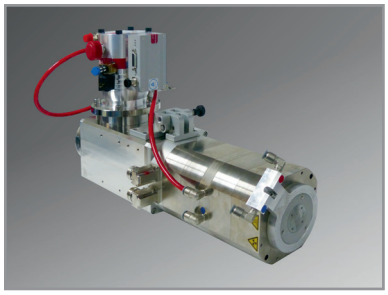
X-RAY WorX transmission tubes

X-RAY WorX offers different types of transmission tubes for versatile applications:

- Product line *T*
- Product line *THE*
- Product line *THE Plus*
- Product line *TC*
- Product line *TCHE*
- Product line *TCHE Plus*
- Product line *TCNF*
- Product line *TCNF Plus*







Filters

Filters allow the accurate filtering of the X-ray spectrum to reduce e.g. beam hardening artefacts. X-RAY WorX offers an easy way to mount filters in front of the tube's output window. Filters made from copper, aluminium and tin in different thicknesses are included with every filter holder. Other materials may be easily clipped to fit into the holder.

Filter holders including set of filters

- Min. focus-to-object distance (FOD) 3.25 mm
- Frames for use with various materials, easy mounting
- Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness

Description	Item No.
Filter holder (160 kV or 190 kV) and bolted target holder ▶ Tube mounting point required (optional accessory, item number 700 000 408 resp. 700 200 053)	401 000 862
Filter holder (225 kV, 240 kV, or 300 kV) and bolted target holder ▶ Tube mounting point required (optional accessory, item number 700 000 409 resp. 700 200 090)	401 000 867

Beam collimators

The reduction of scattered radiation may improve your image quality and increase the accuracy of your measurements. X-RAY WorX offers collimators of different sizes and shapes to adapt the dimension of the exposed surface to the size of your detector. Collimators are easy to install and may be used on demand.

Beam collimators

- Min. focus-to-object distance (FOD) 2.25 mm
- Easy mounting

Description	Item No.
Beam collimator 21° (160 kV or 190 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 21° ▶ Tube mounting point required (optional accessory, item number 700 000 408 resp. 700 200 053)	401 000 860
Beam collimator 21° (225 kV, 240 kV, or 300 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 21° ▶ Tube mounting point required (optional accessory, item number 700 000 409 resp. 700 200 090)	401 000 865
Beam collimator 33° (160 kV or 190 kV) with bolted target holder ▶ Limitation of the opening angle of the X-ray cone to approx. 33° ▶ Tube mounting point required (optional accessory, material number 401 000 950 resp. 401 000 952)	401 000 882
Beam collimator 33° (225 kV, 240 kV, or 300 kV) with bolted target fixture ▶ Limitation of the opening angle of the X-ray cone to approx. 33° ▶ Tube mounting point required (optional accessory, material number 401 000 951 resp. 401 000 953)	401 000 880
Beam collimator 40° (160 kV or 190 kV) with bolted target holder ▶ Limitation of the opening angle of the X-ray cone to approx. 40° ▶ Tube mounting point required (optional accessory, material number 401 000 950 resp. 401 000 952)	401 000 885
Beam collimator 40° (225 kV, 240 kV, or 300 kV) with bolted target fixture ▶ Limitation of the opening angle of the X-ray cone to approx. 40° ▶ Tube mounting point required (optional accessory, material number 401 000 951 resp. 401 000 953)	401 000 887

Beam collimators with filter holder and sets of filters

Beam collimator with filter holders including set of filters

- Beam collimators with filter holder and bolted target holder
- Min. focus-to-object distance (FOD) 5.2 mm
- Frames for use with various materials
- Easy mounting

Description	Item No.
Beam collimator 21° (160 kV or 190 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 21° ▶ Filter holder for use with filters up to 1 mm thickness ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from Tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ Tube mounting point required (optional accessory, material number 401 000 950 resp. 401 000 952)	401 000 861
Beam collimator 21° (225 kV, 240 kV, or 300 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 21° ▶ Filter holder for use with filters up to 1 mm thickness ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from Tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ Tube mounting point required (optional accessory, material number 401 000 951 resp. 401 000 953)	401 000 866
Beam collimator 33° (160 kV or 190 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 33° ▶ Filter holder for use with filters up to 1 mm thickness ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from Tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ Tube mounting point required (optional accessory, material number 401 000 950 resp. 401 000 952)	401 000 883

Beam collimator with filter holders including set of filters

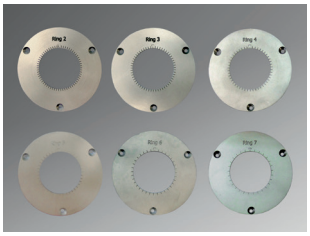
Description	Item No.
Beam collimator 33° (225 kV, 240 kV, or 300 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 33° ▶ Filter holder for use with filters up to 1 mm thickness ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from Tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ Tube mounting point required (optional accessory, material number 401 000 951 resp. 401 000 953)	401 000 881
Beam collimator 33° (225 kV, 240 kV, or 300 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 33° ▶ Filter holder for use with filters up to 5 mm thickness ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 5 x 1.0 mm thickness, filters from Tin (Sn) of 2 x 0.75 mm and 2 x 1.0 mm thickness ▶ Tube mounting point required (optional accessory, material number 401 000 951 resp. 401 000 953)	401 000 884
Beam collimator 40° (160 kV or 190 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 40° ▶ Filter holder for use with filters up to 1 mm thickness ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from Tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ Tube mounting point required (optional accessory, material number 401 000 950 resp. 401 000 952)	401 000 886
Beam collimator 40° (225 kV, 240 kV, or 300 kV) ▶ Limitation of the opening angle of the X-ray cone to approx. 40° ▶ Filter holder for use with filters up to 1 mm thickness ▶ Filters made from aluminum (Al) and copper (Cu), each of 1 x 0.5 mm and 1 x 1.0 mm thickness, filters from Tin (Sn) of 1 x 0.75 mm and 1 x 1.0 mm thickness ▶ Tube mounting point required (optional accessory, material number 401 000 951 resp. 401 000 953)	401 000 888

Target fixing rings

To extend the lifetime of your transmission targets X-RAY WorX designed a set of special off-centre target holder rings.

By changing the target holder ring on your transmission tube, a different track on the target surface will be exposed to the electron beam offering a new unused tungsten surface.

Sets of target fixing rings



- 6 target fixing rings with different non-centric slots
- Extension of the target life time by improved utilization of the target surface
- Intuitive identification and graduated angle scale, easy change

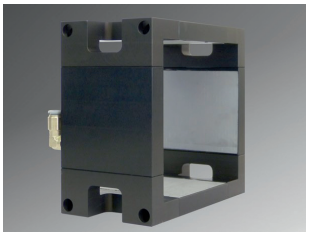
Description	Item No.
Set of target fixing rings for transmission tubes	401 000 910
Set of target fixing rings for tubes with target cooling	401 000 900

Cooling modules

During long-term exposure the focal spot position may change significantly due to the heat transferred to the X-ray tube and the holding structures of your X-ray system. The major sources of heat are the target and the electron optics in the tube head. The tube head may be cooled by using an external cooling element.

X-RAY WorX offers cooling elements for various types of X-ray sources with reflection or transmission targets and also for tubes of the former manufacturer Feinfocus®. Furthermore a cooling element replacing the fan of the turbo pump is available to reduce vibrations and avoiding air draft.

Cooling modules for tube head



- Water cooling of the tube head
- Reduction of thermal expansion of the tube to stabilize focal spot position and intensity
- Less heating of the measurement space
- Delivery with cooling element, cooling unit X-Cooler, hoses, couplings, cooling agent, and water cooling of the tube head

Description	Item No.
Cooling module for *T, THE*, and *THE Plus* up to 190 kV	420 500 010
Cooling module for *T, THE*, and *THE Plus* with 225, 240, and 300 kV	420 500 020
Cooling module for *TC, TCHE*, and *TCHE Plus* up to 190 kV	420 500 011
Cooling module for *TC, TCHE,* and *TCHE Plus* with 225 and 240 kV	420 500 021
Cooling module for Feinfocus® *FXE-225.50* and *FXE-225.51*	420 500 030
Cooling module for Feinfocus® *FXE-160.51*	420 500 060

Water cooling for turbo pump

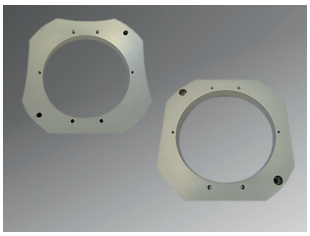
- Cooling element with hoses and couplings for installation between X-Cooler and cooling element of tube head
- Cooling unit X-Cooler not included

Description	Item No.
Water cooling for turbo pump	420 500 110

Tube mounting points

The performance of your X-ray system may be improved by using custom devices like automatic filters, flexible collimators, or additional shielding. X-RAY WorX offers a mechanical base for this type of equipment that can be easily mounted on the tube head of each transmission tube. Furthermore the tube head can be fixed close to the target which may reduce shifting of the tube in the direction of the sample.

Tube mounting points



- Mounting of custom accessories or holders at the tube head
- Fixture at the tube head to stabilize focal spot in Z-direction (magnification axis)
- Further support at the cathode chamber required
- Material: brass (nickel-plated)

Description	Item No.
Tube mounting point (160 kV / 190 kV)	401 000 950
Tube mounting point (160 kV / 190 kV) for tubes with target cooling	401 000 952
Tube mounting point (225 kV, 240 kV, and 300 kV)	401 000 951
Tube mounting point (225 kV, 240 kV, and 300 kV) for tubes with target cooling	401 000 953

Transmission targets

Certain low voltage or multiple energy applications may benefit from targets made of different materials, e.g. molybdenum or copper. X-RAY WorX offers various materials as target materials. Ask your local representative or your X-RAY WorX sales department if you are interested in a material that is not on the list.

The thickness of the tungsten layer of a transmission target has influence on the focal spot size and on the flux. At higher voltages (>180 kV) and energies (>10 watt) we recommend a target with a 10 microns tungsten layer, whereas for high resolution applications at low energies (<1 watt) a 2 microns layer will be the best choice.

Maximum flexibility for scientific applications may be achieved using the **FlexFocus** target made of four quarters with different thicknesses of tungsten layers. Before starting the scan just rotate the target to the appropriate position without venting the tube.

Standard transmission targets

Description	Item No.
High Energy target for all transmission tubes ▶ 6 microns tungsten layer on 300 microns diamond substrate ▶ 25 watt max. target power ▶ 50 watt max. target power with cooled transmission target	401 000 590

High resolution transmission targets

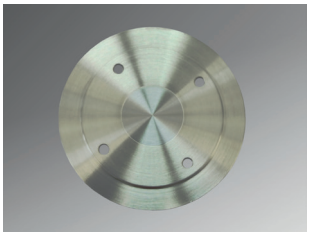
Description	Item No.
High Resolution target for product lines *TC, TCHE, TCHE Plus, TCNF,* and *TCNF Plus* ▶ 2 micron tungsten layer on 250 microns beryllium substrate ▶ JIMA resolution: 0.5 microns (< 1 watt target power) ▶ 10 watt max. target power	401 000 585
High Resolution Diamond target for product lines *TC, TCHE, TCHE Plus, TCNF,* and *TCNF Plus* ▶ 2 micron tungsten layer on 300 microns diamond substrate ▶ Optimized for high resolution computed tomography (CT) ▶ JIMA resolution: 0.5 microns (< 1 watt target power) ▶ 25 watt max. target power ▶ 50 watt max. target power with cooled transmission target	401 000 595

Special High Energy transmission targets

▶ 25 watt max. target power
▶ 50 watt max. target power with cooled transmission target

Description	Item No.
Special High Energy Mo transmission target ▶ 6 microns molybdenum layer on 300 microns diamond substrate	401 000 540
Special High Energy Cu transmission target ▶ 6 microns copper layer on 300 microns diamond substrate	401 000 550
Special High Energy Ag transmission target ▶ 6 microns silver layer on 300 microns diamond substrate	401 000 560
Special High Energy Cr transmission target ▶ 6 microns chromium layer on 300 microns diamond substrate	401 000 570
High Energy 300 transmission target ▶ For transmission tube *XWT-300-THE Plus* ▶ 6 microns tungsten layer on 450 microns diamond substrate	401 000 592
High Energy 300 Plus transmission target ▶ For transmission tube *XWT-300-THE Plus* ▶ 9 microns tungsten layer on 450 microns diamond substrate	401 000 593

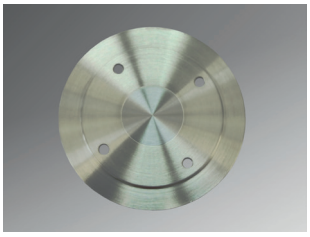
Special Analytics transmission targets



- 10 watt max. target power
- 6 microns layer on 250 microns beryllium substrate

Description	Item No.
Special Analytics Mo transmission target ▶ 6 microns molybdenum layer	401 000 500
Special Analytics Cu transmission target ▶ 6 microns copper layer	401 000 510
Special Analytics Ag transmission target ▶ 6 microns silver layer	401 000 520
Special Analytics Cr transmission target ▶ 6 microns chromium layer	401 000 530

Special High Resolution transmission targets



- 25 watt max. target power
- 50 watt max. target power with cooled transmission target
- 2 microns layer on 300 microns diamond substrate
- For product lines *TC, TCHE, TCHE Plus, TCNF,* and *TCNF Plus*

Description	Item No.
Special High Resolution Mo transmission target ▶ 2 microns molybdenum layer	401 000 545
Special High Resolution Cu transmission target ▶ 2 microns copper layer	401 000 555

High Energy FlexFocus transmission target

Description	Item No.
High Energy FlexFocus transmission target ▶ For tubes of product lines *TC, TCHE, TCHE Plus, TCNF,* and *TCNF Plus* ▶ 2 / 3 / 6 / 9 microns tungsten layer in 90° segments on 300 microns diamond substrate ▶ Target power: max. 25 Watt ▶ Target power: max. 50 Watt (with cooled transmission target)	401 000 597

General options

General options

X-RAY WorX is always anxious to support users in integrating X-ray tubes into their inspection systems.

A selection of helpful materials like safety switches, warning lamps, emergency buttons, 19” racks for the X-ray controller, and control transformers for different mains, just to name a few, is supplied to make integration as easy as possible.

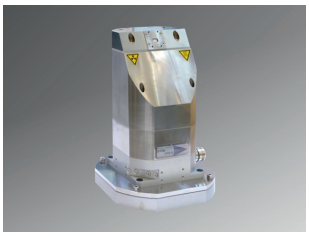
Tube heads

Requirements for your X-ray system will change. Just think of many products that are made of composite materials today and require lower energy and higher resolution for inspection than comparable aluminium parts.

An existing reflection target tube may be extended with a transmission tube head to allow for higher magnification and higher resolution. Various types of tube heads are offered by X-RAY WorX.

Contact your X-RAY WorX service or sales department to discuss your needs and check which additional tube heads fit on your X-ray source.

Tube heads with reflection target



- Tube head with electron optics and **High Power** reflection target
- Performance data: 50 - 3000 µA, max. 350 watt
- Target power: max. 300 watt
- JIMA resolution: min. 2 microns (in one direction)
- Including target cooling, cooler unit, and hoses

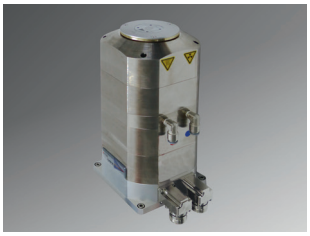
Description	Item No.
Tube head *SE* for X-ray tubes with 160 kV and 190 kV	420 500 200
Tube head *SE* for X-ray tubes with 225 kV and 240 kV	420 500 202
Tube head *SE* for X-ray tubes with 300 kV	420 500 204

Tube heads with transmission target (single-stage electron optics)

- Performance data: 50 - 1000 µA
- JIMA resolution: min. 2 microns
- Target power: max. 25 watt (*THE*)
- Target power: max. 50 watt (*THE Plus*)
- Internal water cooling of transmission target (*THE Plus*)

Description	Item No.
Tube head *THE* for X-ray tubes with 160 kV and 190 kV ▶ Including **High Energy** transmission target	420 500 215
Tube head *THE* for X-ray tubes with 225 kV and 240 kV ▶ Including **High Energy** transmission target	420 500 225
Tube head *THE Plus* for X-ray tubes with 160 kV and 190 kV ▶ Including **High Energy** transmission target	420 500 270
Tube head *THE Plus* for X-ray tubes with 225 kV and 240 kV ▶ Including **High Energy** transmission target	420 500 274
Tube head *THE Plus* for X-ray tubes with 300 kV ▶ Including **High Energy 300 Plus** transmission target ▶ Min. focus-object-distance (FOD): 0.45 mm	420 500 272

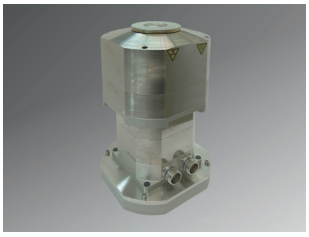
Tube heads with transmission target (dual-stage electron optics)



- Including **High Resolution Diamond** transmission target
- Performance data: 50 - 1000 µA, max. 80 watt
- JIMA resolution: min. 0.5 microns
- Internal water cooling of tube head reduces focal spot movement during long CT scans
- Water cooling of turbo pump

Description	Item No.
Tube head *TCNF* for X-ray tubes with 160 kV and 190 kV ▶ Target power: max. 25 watt	420 500 260
Tube head *TCNF* for X-ray tubes with 225 kV and 240 kV ▶ Target power: max. 25 watt	420 500 262
Tube head *TCNF Plus* for X-ray tubes with 160 kV and 190 kV ▶ Target power: max. 50 watt ▶ Internal water cooling of transmission target	420 500 280

Tube heads with transmission target (dual-stage electron optics)



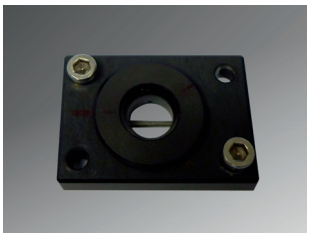
- Performance data: 50 - 1000 µA, max. 80 watt
- JIMA resolution: min. 0.9 microns

Description	Item No.
Tube head *TC* for X-ray tubes with 160 kV and 190 kV ▶ Including **High Brightness** transmission target ▶ Target power: max. 10 watt	420 500 230
Tube head *TCHE* for X-ray tubes with 160 kV and 190 kV ▶ Including **High Energy** transmission target ▶ Target power: max. 25 watt	420 500 232
Tube head *TCHE Plus* for X-ray tubes with 160 kV and 190 kV ▶ Including **High Energy** transmission target with cooling ▶ Target power: max. 50 watt	420 500 235
Tube head *TC* for X-ray tubes with 225 kV and 240 kV ▶ Including **High Brightness** transmission target ▶ Target power: max. 10 watt	420 500 240
Tube head *TCHE* for X-ray tubes with 225 kV and 240 kV ▶ Including **High Energy** transmission target ▶ Target power: max. 25 watt	420 500 242
Tube head *TCHE Plus* for X-ray tubes with 225 kV and 240 kV ▶ Including **High Energy** transmission target with cooling ▶ Target power: max. 50 watt	420 500 245

Reference blocks and test charts

Checking the condition of your X-ray system may be required when reporting results or as a part of your periodic system monitoring or external audit. X-RAY WorX offers various reference blocks to measure focal spot sizes or resolution in different dimensions as well as spatial detector resolution and focal spot position.

Reference blocks



Measurement of focal spot size according to EN 12543-5 or ASTM E2903-18

Description	Item No.
Reference block tungsten ball (measurement of focal spot position) ▶ Tungsten ball with 0.6 mm diameter in ceramics holder	409 000 107
Reference block tungsten wire (for product lines *SE* and *CT*) ▶ Tungsten wire, 1.0 mm diameter in holder, including screws	409 000 111
Reference block tungsten wire (panoramic target) ▶ Tungsten wire with 1.0 mm diameter in holder ▶ Mounting on rod anode *RAC Superfocus* with panoramic target	409 000 108
Reference block tungsten wire (reflection target) ▶ Tungsten wire with 1.0 mm diameter in holder ▶ Mounting on rod anode *RAC Superfocus* with reflection target	409 000 109
Reference block tungsten wire ▶ Tungsten wire with 1.0 mm diameter in holder ▶ Mounting on rod anode of product line *RAC* with 25 mm diameter	409 000 118
Reference block tungsten wire ▶ Tungsten wire with 1.0 mm diameter in holder ▶ Mounting on rod anode of product line *RAC* with 45 mm diameter	409 000 119

JIMA resolution test charts

Description	Item No.
JIMA resolution test chart RT RC-02C (0.4 - 15 microns)	409 000 100
JIMA resolution test chart RT RC-05B (3 - 50 microns)	409 000 101
JIMA resolution test chart RT RC-04 (0.1 - 10 microns)	409 000 105
JIMA resolution test chart RT CT-01 (3 - 7 microns)	409 000 106

Wire IQIs

According to ISO 19232-1 (EN 462-1), including declaration of conformity

Description	Item No.
Wire IQI EN-W 6 FE-50	409 000 112
Wire IQI EN-W13 FE-50	409 000 113
Wire IQI EN-W 6 AL-50	409 000 114
Wire IQI EN-W13 AL-50	409 000 115
Wire IQI EN-W 6 TI-50	409 000 116
Wire IQI EN-W13 TI-50	409 000 117
Duplex-Wire-IQI, acc. to EN 462-5, ISO 19232-5, ASTM E2002	409 000 104

Racks and control

Description	Item No.
19” rack for X-ray controller, safety relays, and power supplies ▶ Emergency stop push button ▶ Key switch ▶ Start button green ▶ Warning lamp yellow	420 500 100
Control-PC ▶ Windows PC (Win 7 or higher) with 24”-monitor or laptop with pre-installed X-COM software ▶ Keyboard & mouse ▶ Connection to tube controller via LAN cable (Cat-5) ▶ 2 ethernet ports	420 500 102
Remote control XWHC-1 ▶ Hand-held remote control for the main functions of X-RAY WorX tubes. incl.: X-Ray On, X-Ray Off, calibration (startup, centering, filament adjust), interlock (key switch) and emergency-off ▶ Connection at X-ray controller (XPU, XCU) ▶ Cable length 15m ▶ Specification of X-ray parameters with X-COM software on control PC (not included)	420 500 105

Transformers

Transformer in housing

- Ingress protection marking: IP23

Description	Item No.
Control transformer in housing, 115V/230V ▶ To operate X-RAY WorX tubes in the USA or Taiwan ▶ Rated input voltage: 115V +/- 5%, 50-60Hz ▶ Rated output voltage: 230V ▶ Rated power: 2000VA	300 000 437
Control transformer in housing, 115V/230V ▶ To operate X-RAY WorX product lines *CT Plus, TCNF*, and *TCNF Plus* in the USA or Taiwan ▶ Rated input voltage: 115V +/- 5%, 50-60Hz ▶ Rated output voltage: 230V ▶ Rated power: 2500VA	300 000 435
Control transformer in housing, 200V/230V ▶ To operate X-RAY WorX tubes in Japan ▶ Rated input voltage: 200V +/- 5%, 50-60Hz ▶ Rated output voltage: 230V ▶ Rated power: 2000VA	300 000 447
Control transformer in housing, 115V/230V ▶ To operate X-RAY WorX product lines *CT Plus, TCNF*, and *TCNF Plus* in Japan ▶ Rated input voltage: 115V +/- 5%, 50-60Hz ▶ Rated output voltage: 230V ▶ Rated power: 2500VA	300 000 448
Isolating transformer in housing, 230V/230V ▶ Rated input voltage: 230V +/- 5%, 50-60Hz ▶ Rated output voltage: 230V ▶ Rated power: 2000VA	300 000 451
Isolating transformer in housing, 230V/230V ▶ For operation of X-RAY WorX product lines *CT Plus*, *TCNF*, and *TCNF Plus* ▶ Rated input voltage: 230V +/- 5%, 50-60Hz ▶ Rated output voltage: 230V ▶ Rated power: 2500VA	300 000 452

Warning lamps

Description	Item No.
Warning lamp (yellow)	409 000 351
Warning lamp (red)	409 000 352
Warning lamp (yellow) with LED	409 000 353
Warning lamp (red) with LED	409 000 354

Buttons and key switches

Description	Item No.
Interlock AZ16	409 000 070
Acutator for interlock AZ16	409 000 071
Emergency stop push button ▶ Mushroom head push button (red) with key, mounting adapter, and two contact elements, assembled ▶ Turn key to release ▶ Cutout diameter 22.3 mm	409 000 345
Key switch	409 000 920
Start button green	409 000 925

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