



MetalJet C2

The MetalJet C2 offers an attractive, cost effective version of the MetalJet source technology with simplified electron optics producing a round electron beam focus. It is similar to a standard solid target x-ray tube, but features Excillum’s unique liquid metal jet anode technology. The MetalJet C2 delivers significantly higher brightness than a solid-target microfocus x-ray source, with an excellent spot quality. With the MetalJet C2 you will get a high-performance microfocus X-ray source, at a competitive price. If you in the future need even higher brightness than what is achievable with the round electron-beam focus, you have the possibility to upgrade to the MetalJet D2+, to get the world’s brightest microfocus x-ray tube.

Features and Benefits

- Very high microfocus source power
- Superior spot quality
- User variable spot size
- Very stable x-ray emission and spot position
- Adjustable take-off angle
- Integrated radiation shielding
- Optional dual port mode
- Optional shutter
- No external cooling water requirement
- Minimal and predictable maintenance
- LaB₆ long-life cathode
- Operated remotely from any computer
- Controlled with GUI or TCP/IP protocol
- User-friendly Graphical User Interface
- Upgradable to D2+

Technical Specification

Target material ¹	Ga or In rich metal alloy	Min. focal spot size	~ 5 µm
Target type	Liquid jet	Emission stability ³	< 1%
Voltage	21-70 kV	Position stability ³	< 1 µm
Power ²	0-200 W	Min. focus-object distance ⁴	18 mm
Max current	4.3 mA	Beam angle ⁵	13°

1) Room temperature liquid gallium alloys consist mainly of gallium, indium and tin. They have low reactivity and low toxicity but should be handled according to their safety data sheets and local regulations. The currently available anode alloys are ExAlloy G1 with 95% gallium and ExAlloy I1 with 21% indium (see typical emission spectra on next page).

2) The actual power used is dependent on spot-size and voltage. Maximum power allowed by the software is 200 W, however, maximum output power of the 70 kV high-voltage generators is 300 W.

3) Standard deviation.

4) Without a shutter (24.8 mm with shutter).

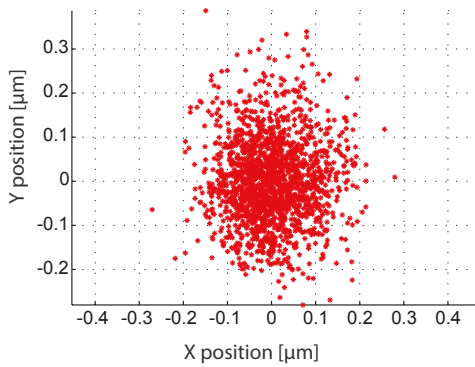
5) Without a shutter (10.5° with shutter).

Spot size ⁶ [μm, FWHM]	E-beam power [W]	Ga Kα (9.2 keV) peak brightness [photons / (s mm ² mrad ²)]	Ga Kα radiant flux [ph / (s mrad ²)]
20	50	1.4×10^{10}	2.6×10^6
80	200	6.8×10^9	8.7×10^6

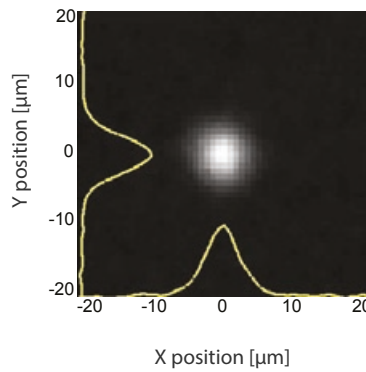
6) E-beam spot size, similar to the x-ray spot height. The x-ray spot width will be smaller.

Characteristics

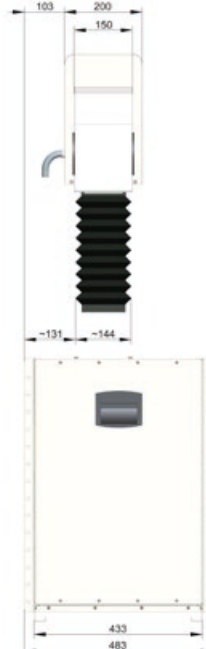
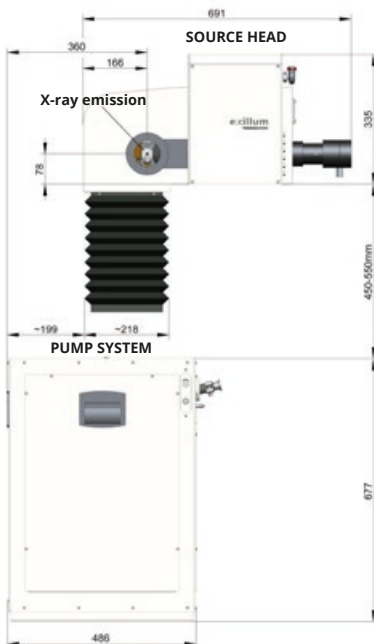
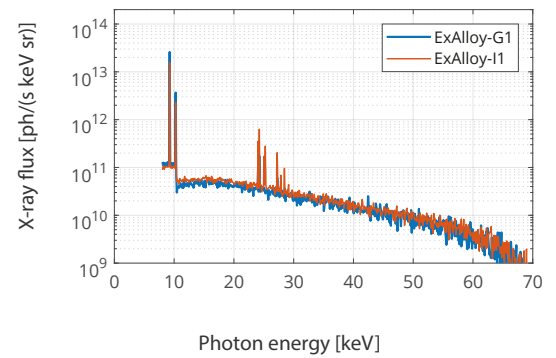
SPOT STABILITY OVER 24 h



SPOT SHAPE EXAMPLE



EMISSION SPECTRA AT 50 W, 70 kV, 20 μm (0.1 keV bin width)



Installation and operation

The source consists of the head and the pump system with dimensions shown in the drawing. The head has to be mounted essentially straight above the pump system. The coupling is semi-rigid, allowing some movement of the source head.

In addition, the MetalJet C2 consists of two 4U (176 mm height) 19" rack electronics boxes and a floor standing air/water chiller (69×36×62 cm), that can be mounted up to 4m from the head and pump system.

The source can be remotely operated through TCP/IP or directly through the GUI. The GUI can be operated on the source itself if it is equipped with monitor, keyboard and mouse, or on most computer platforms with a TCP/IP connection to the source.

The source cannot be operated as a standalone unit and must be integrated into a system providing the proper interlock connections.

Mains: AC, single phase, 200-240 V, 16 A, 50/60 Hz.

Ambient: 20-25°C (stable within ± 0.2°C for optimal source stability), max 85% relative humidity.

Safety & Compliance

Excillum's X-ray sources are compliant with the Machinery Directive 2006/42/EC, RoHS Directive 2011/65/EU and Low Voltage Directive 2014/35/EU. Excillum's X-ray sources are a sub-assembly and therefore excluded from the EMC Directive 2014/30/EU, hence also conform to the definition of partly completed machinery and so should not be CE marked. Our X-ray sources are intended for system integration into customer equipment. The system integrator is solely responsible for final certification and safety compliance. X-rays emitted from the source are harmful for the human body and it is the sole responsibility of the system integrator to comply with all regulations and to protect all personnel during operation. The X-ray source may be subject to local government radiation hazard regulations.