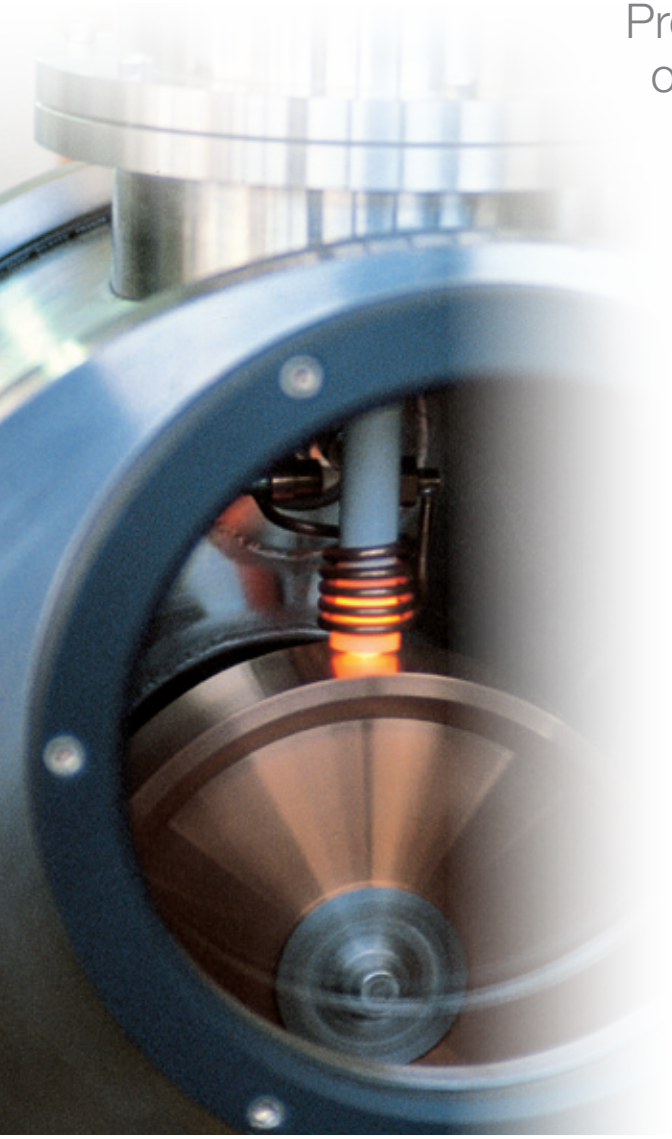
Edmund Bühler GmbH
Since 1880

Rapid Quenching Systems
Melt Spinners and Splat Quencher

Production of rapidly solidified amorphous or nano-crystalline ribbons or splats on a laboratory scale, either in high vacuum or inert gas atmosphere

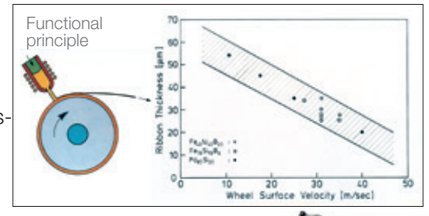


SINCE 1880

MADE IN GERMANY

Melt Spinning Systems – Melt Spinners MSP 10 and MSP 60

The alloys are heated by induction in a suitable crucible with slit or round nozzle and ejected on a copper wheel with overpressure. The melt rapidly solidifies and leaves the wheel as a ribbon.



Melt Spinner MSP 10

Laboratory-scale system designed for quantities of 5-10 g per run

Chamber with water-cooled wheel

System designed for quantities up to 60 g per run

Melt Spinner MSP 60

Melt Spinner MSP 10

- Solid copper spinning wheel ø 200 mm
- Complete system consisting of high vacuum chamber, movable rack system, adequate high vacuum pumping system (with turbomolecular or diffusion pump) and RF generator (different models available, 5-6 kW)

Melt Spinner MSP 60

- Solid copper spinning wheel ø 250 mm (water-cooled wheel available as option)
- Variable angle of inclination (ejection angle) by means of an adjustable wheel drive
- Ribbon deflector
- Complete system consisting of high vacuum chamber, movable rack system, adequate high vacuum pumping system (with turbomolecular or diffusion pump) and RF generator (different models available, 12 or 25 kW)

MSP 10 / MSP 60

- Automatic crucible positioning system TPS
  – 2 adjustable positions for melting and ejection
  – Reproducible parameter settings
  – Required: compressed air 4-6 bar

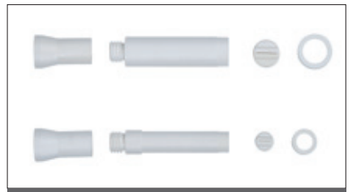
- Control panel (touch screen) for control of: generator, spinning wheel, crucible positioning system, pyrometer, pumping system, wheel polishing function. Simultaneous dislpay of melting time, wheel speed and generator power.

Options MSP 10 / MSP 60

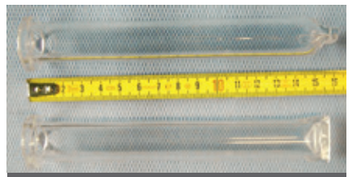
- Infrared quotient pyrometer to measure the temperature of the melt. Temperature range: 500 - 1700°C (different temperature ranges on request)
- Casting Option
  When the spinning wheel is dismounted, a water-cooled, 2-piece casting form made of copper can be installed in the chamber. The sample is blown out into the casting form with argon after melting

- Recirculating water chiller

Typical amorphous ribbon



3-piece boron nitride crucible with adapter



Quartz-crucible

Further Options Melt Spinner MSP 60

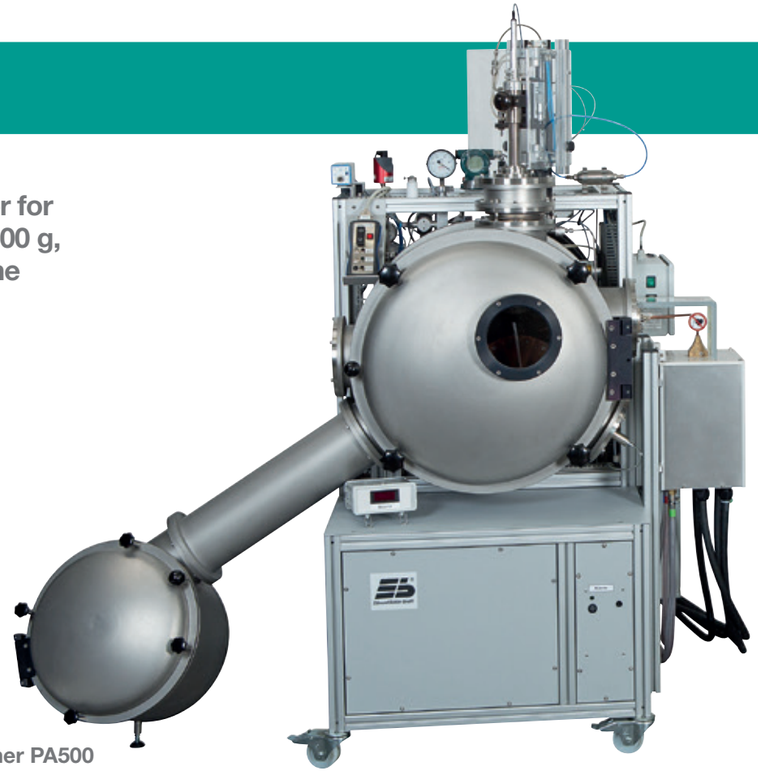
- Water-cooled spinning wheel, max. surface velocity: 35 m/sec.
- Multi-track option: Up to 3 runs can be done successively before the wheel has to be polished or machined again (number of runs depending on the width of the ribbons)
- Detachable machining tool
  The wheel can be machined directly in the chamber without having to dismount and re-install the wheel

Technical Data Melt Spinner MSP 10 / MSP 60

	MSP 10	MSP 60
Sample quantity	5 –10 g (depending on generator)	max. 60 g
Generator power	5 kW / 6 kW	12 kW / 25 kW
Spinning wheel	Solid copper, ø 200 x 40 mm	Solid copper, ø 250 x 40 mm
Surface velocity of wheel	max. 60 m/sec.	max. 60 m/sec. (solid wheel) max. 35 m/sec. (water-cooled wheel)
Ribbons	Width: 1 – 10 mm Thickness: 20 – 60 µm	Width: 1 – 17 mm Thickness: 20 – 60 µm
Cooling rate	10^5 K/sec.	10^5 K/sec.
Vacuum	< 10^{-2} – 10^{-5} mbar	< 10^{-2} – 10^{-5} mbar
Connection	400 V, 3-ph, 50/60 Hz (Generator) 230 V, 50/60 Hz (Melt Spinner)	400 V, 3-ph, 50/60 Hz (Generator) 230 V, 50/60 Hz (Melt Spinner)
Crucibles	Boron nitride or quartz, with slit nozzle or round nozzle Alternative: graphite	Boron nitride or quartz, with slit nozzle or round nozzle Alternative: graphite
Max. temperature	Boron nitride approx. 1700°C Quartz approx. 1200°C	Boron nitride approx. 1700°C Quartz approx. 1200°C
Dimensions	(W x H x D) 1820 x 1800 x 750 mm	(W x H x D) 1800 x 1800 x 1000 mm

Melt Spinner PA500

Semi-automated Melt Spinner for quantities between 100 and 500 g, depending on the alloy and the melting temperature



Melt Spinner PA500

Chamber with water-cooled wheel

Melt Spinner PA500

- High vacuum or inert gas atmosphere
- Water-cooled copper spinning wheel, water-cooled crucible holder with boron nitride crucible
- Ribbon deflector
- Crucible positioning system for precise, reproducible distance between nozzle and wheel and automatic ejection of the melt
- Pressure control via software
- Individual programming of the pressure parameters
- Compact system with movable rack, built-in turbomolecular pump and high vacuum gauge. Complete with generator, ribbon collecting vessel, valves, and all safety features

Ribbon collecting vessel

Options PA500

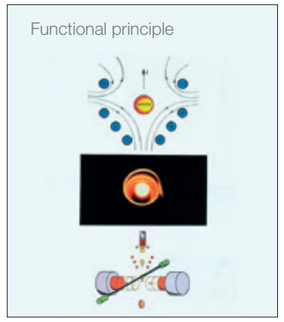
- Automated evacuation and flushing of the chamber via software
- Casting Option
  When the spinning wheel is dismounted, a water-cooled, 2-piece casting form made of copper can be installed in the chamber. The sample is blown out into the casting form with argon after melting
- Recirculating water chiller
- Polishing fixture
  (allows polishing during the casting process)
- Multi-track option: Up to 3 runs can be done successively before the wheel has to be polished or machined again (number of runs depending on the width of the ribbons)
- Detachable machining tool
  The wheel can be machined directly in the chamber without having to dismount and re-install the wheel

Technical Data PA500

Sample quantity	100 – 500 g
Temperature range	up to 1700°C
Generator power	25 kW
Vacuum	< 10^{-2} – 10^{-5} mbar
Spinning wheel	Copper, water-cooled, ø 250 x 60 mm
Surface velocity of the wheel	max. 35 m/sec.
Ribbons	Width: 10 – 30 mm (different widths on request) Thickness: 20 – 60 µm
Cooling rate	10^5 K/sec.
Connection	400 V, 3-ph, 50/60 Hz (Generator) 230 V, 50/60 Hz (Melt Spinner)
Crucibles	Boron nitride or quartz, with slit nozzle or round nozzle
Dimensions	
Melt Spinner with ribbon collecting vessel	(W x H x D) 2000 x 1800 x 1200 mm
Control cabinet	(W x H x D) 600 x 1200 x 600 mm
Generator	(W x H x D) 600 x 1300 x 600mm

Splat Quencher URQ

The alloy is melted by induction (levitation melting). A laser light barrier detects the falling droplet and releases two high-velocity pistons which squeeze it into an amorphous or nano-crystalline splat.



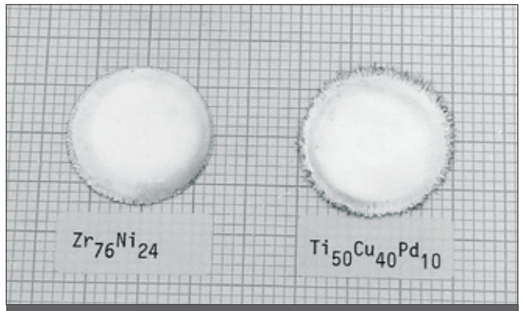
Levitation Melting with Rapid Quenching

Splat Quencher URQ

Splat Quencher URQ

- Designed for crucible-free melting of reactive alloys with high melting points (max. 2500°C)
- Compact RF generator, optimized for levitation melting
- Very high cooling rates

Copper pistons with coil housings



Typical splats

Levitated molten sample

Options URQ

- Infrared quotient pyrometer to measure the temperature of the melt. Temperature range: 900 - 3000°C (different temperature ranges on request)

- Recirculating water chiller

Technical Data Splat Quencher URQ

Sample quantity	80 – 200 mg (higher quantities on request)
Splat size	Thickness: 20 – 100 µm, ø 10 – 30 mm, depending on sample quantity
Temperature range	up to 2500°C
Generator power	5 kW
Generator frequency	500 kHz – 1 MHz
Vacuum	$< 10^{-2}$ – 10^{-5} mbar
Cooling rate	10^{6} K/sec.
Copper pistons	Solid copper ø 30 mm (options: ø 25 or 35 mm)
Connection	400 V, 3-ph, 50/60 Hz (Generator) 230 V, 50/60 Hz (Splat Quencher)
Dimensions	(W x H x D) 850 x 1500 x 750 mm

Product Overview

Edmund Bühler GmbH
Since 1880

www.edmund-buehler.de

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Technical modifications and errors reserved.

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