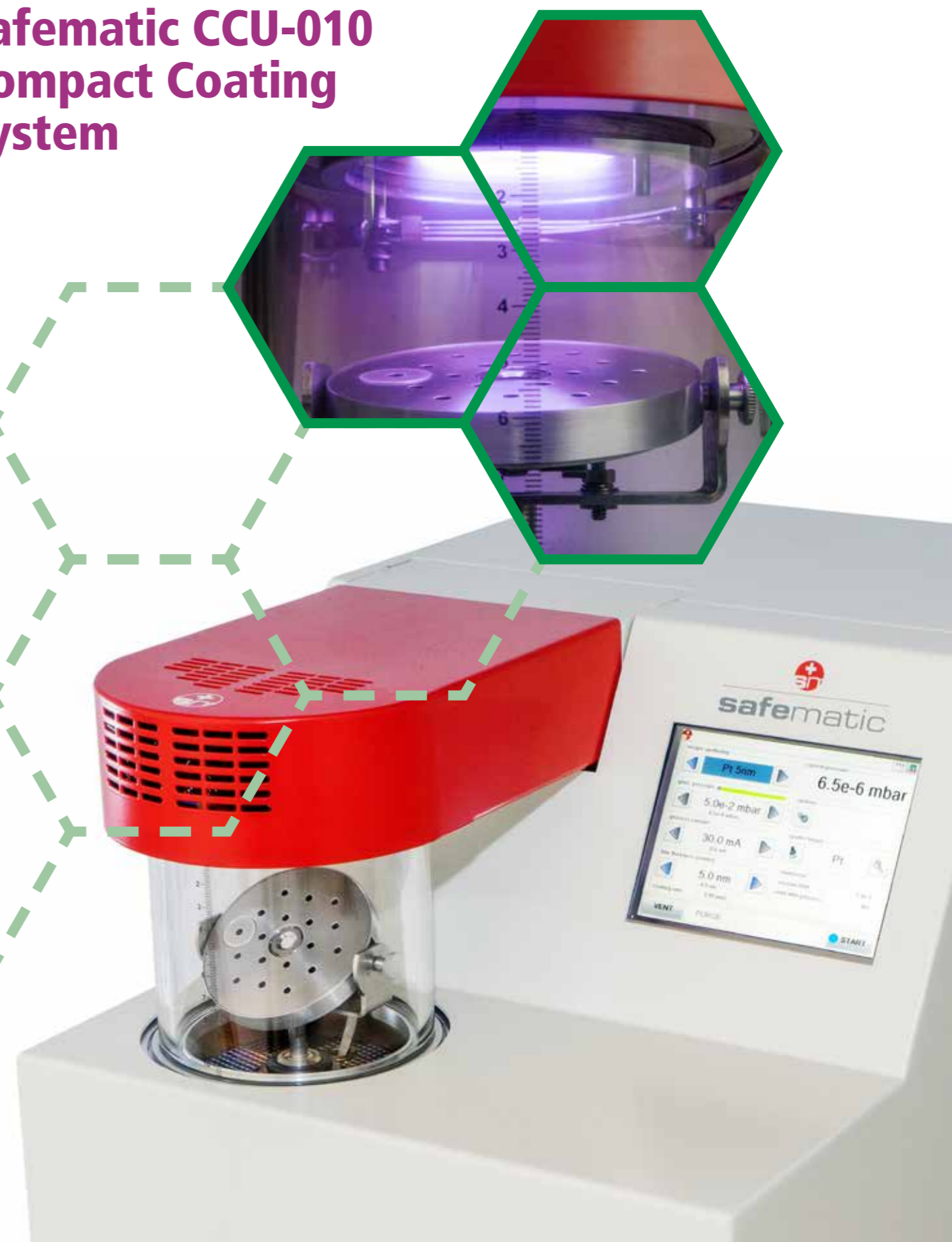


Ordering information

Code	Product description
100000	CCU-010 LV. Compact coating system base unit. Standard vacuum External rotary pump or scroll pump required (<i>see below</i>)
100001	CCU-010 HV. Compact coating system base unit. High vacuum including integrated turbomolecular pump and diaphragm pump (<i>external rotary pump not required</i>)
Pumping (CCU-010 LV only)	
A65201903	Edwards RV3 rotary vacuum pump
A73501983	Edwards nXDS6i dry scroll pump
Options for coating and glow discharge	
100002	SP-010. Sputter head module for SEM applications
100012	SP-011. Sputter head module for very high sputtering rates. Recommended for non-EM applications requiring thick coatings
100003	CT-010. Carbon fibre cord evaporation head module, featuring a carbon spooling system for up to 50 depositions
100004	GD-010 glow discharge for hydrophobic/hydrophilic treatment of carbon films and other surfaces
Specimen stage options	
<i>The CCU-010 is supplied with a static specimen stage (40020), with adjustment for height and tilt but no rotation</i>	
100005	RS-010 rotation stage (variable rotation speed)
100006	PS-010 rotary planetary stage (variable rotation speed)
400020	Additional 80mm Ø standard specimen stage
Coating LAB and vacuum upgrade options for CCU-010 LV	
100008	Coating LAB software
200000	HV Upgrade Kit I. Includes Pfeiffer turbopump (Hi Pace 80), conversion kit and cable
200001	HV upgrade Kit II. Includes Pfeiffer turbopump (Hi Pace 80), Vacuubrand MD 1 VARIO-SP membrane pump, conversion kit and cable
Sputtering targets	
<i>For full list, visit our website</i>	
70-AU5404	Gold (Au) 54 Ø x 1.0mm. Purity 99.99%
70-AU5408	Gold (Au) 54 Ø x 0.2mm. Purity 99.99%
70-AP5405	Gold/palladium (Au/Pd), 80/20, 54mm Ø x 1.0mm. Purity 99.99%
70-PT5408	Platinum (Pt), 54mm Ø x 0.1mm. Purity 99.99%
300004	Platinum (Pt), 54mm Ø x 0.2mm. Purity 99.95%
70-IR5412	Iridium (Ir), 54mm Ø x 0.3mm. Purity 99.99%
300020	Iridium (Ir), 54mm Ø x 1.0mm. Purity 99.95%
300019	Platinum/Iridium (Pt/Ir), 54mm Ø x 1.0. Purity 99.95%
70-PP5404	Platinum/palladium (Pt/Pd), 80/20%, 54mm Ø x 0.5mm. Purity 99.99%
300006	Chromium (Cr), 54mm Ø x 0.5mm. Purity 99.95%
70-AG5404	Silver (Ag), 54mm Ø x 0.25mm. Purity 99.97%
70-NI5403	Nickel (Ni), 54mm Ø x 0.075mm. Purity 99.98%
300008	Tungsten (W), 54mm Ø x 1.0mm. Purity 99.95%
300010	Aluminium (Al), 54mm Ø x 1.0mm. Purity 99.99%
300011	Iron (Fe), 54mm Ø x 3.5mm. Purity 99.99%
300012	Indium Cn oxide (ITO), 54mm Ø x 2.0mm. Purity 99.99%
70-PD5404	Palladium (Pd), 54mm Ø x 0.1mm. Purity 99.99%
70-CU5410	Copper (Cu), 54mm Ø x 0.25mm. Purity 99.99%
70-TI5410	Titanium (Ti), 54mm Ø x 0.25mm. Purity 99.6+%
300022	Cobalt (Co), 54mm Ø x 0.35mm. Purity 99.95%
300009	Carbon (C), 54mm Ø x 1.0mm. Purity 99.99%
Carbon fibre cord	
300014	Carbon fibre cord on spool (holder), 1m
300015	Carbon fibre cord on spool (holder), 2m

Introducing the Safematic CCU-010 Compact Coating System



Safematic coaters – compact, modular and intelligent

- High performance sputtering and carbon coating
- Patented carbon spooling – 50 carbon coatings without user intervention
- Unique plug-and-go sputter and carbon coating modules
- Actively cooled sputter head ensures coating quality and allows long run-times
- Class-leading vacuum performance and fast pump down times
- Compact, reliable and easy to service
- Full UK and Ireland technical and field service support from Labtech

A technology-leading vacuum coater from the experts



Safematic GmbH manufactures technology-leading carbon and sputter coaters in Switzerland's St. Gallen Rhine Valley, a region renowned for expertise in vacuum and coating technology. Key members of the Safematic R&D team have years of experience in EM and thin film coating. Building on this expertise and knowledge Safematic engineers have designed key components into each coating head, thus optimising instrument performance whilst minimising downtime and improving ease of servicing.

The CCU-010 is a compact, fully automatic sputter coater and/or carbon coater that is very simple to set up and use. The exceptionally compact plug-in coating modules are truly self-contained and include the coating head (sputtering or carbon), power supply, automatic shutter and gas control system. There is a simple plug-in electrical and pneumatic

interface with feed through to the coater base unit. Swapping between coating modules takes seconds and this user-friendly modular design gives unsurpassed ease of access for servicing.

CCU-010: a modular but simple approach to sputtering and carbon coating

The CCU-010 is available with high vacuum (CCU-010 HV) or standard vacuum (CCU-010 LV). The vacuum chamber is 120mm in diameter and has a useful scale for setting the

specimen stage height. With safety in mind the implosion guard has a sensor so the coater cannot be activated without the guard in place.

The CCU-010 has a static specimen stage but can be fitted with an optional variable speed rotation stage or a rotary planetary stage, each with options for holding different specimen and stub types.



CCU-010 HV high vacuum sputter/carbon coater

- base for high-quality sputtering and carbon coating for SEM, TEM and thin film applications
- built-in turbomolecular and diaphragm pumps – small footprint and no external pump needed
- oil-free pumping – clean vacuum environment, elimination of specimen contamination
- class-leading high vacuum performance – rapid coating process cycles
- choice of plug-in sputtering modules (SP-010 or SP-011) and/or carbon coating module (CT-010)
- dual position film thickness measurement system as standard

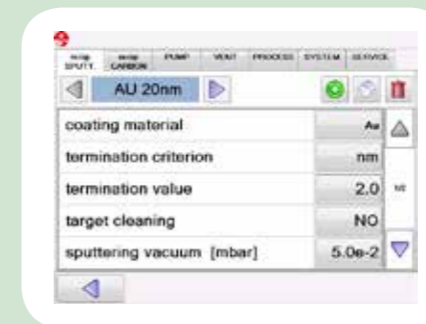


CCU-010 LV standard vacuum sputter/carbon coater

- base for routine high-quality sputtering and carbon coating for SEM
- rotary pumped with easy upgrade path option to high vacuum (CCU-010 HV) specification – future proofing for changing user needs
- choice of plug-in modules: sputter coating (SP-010) and carbon coating (CT-010)
- dual position film thickness measurement system as standard

Intuitive operation and access to process data

The CCU-010 is controlled by a modern, touch screen display and intuitive software which allows the user to easily create and store their own coating recipes. *The Coating Lab option provides full run data for audit trail (see page 6).*



Dual-position film thickness monitor – as standard

The CCU-010 includes a dual-position film thickness monitor (FTM), which measures coating thickness and terminates sputter coating and carbon coating processes at user-defined thicknesses. The FTM can be located in the centre or outer positions to accommodate different specimen sizes.



CT-010 carbon evaporation module – redefining carbon coating

Safematic sets new standards in carbon coating with this compact plug-in carbon fibre module. The SP-010 head plugs into the CCU-010 LV and CCU-010 HV base units and is immediately ready to go. Applications include SEM, TEM and any other process requiring high quality carbon films.

Patented carbon spooling system

The CT-010 uses a unique, technology-leading carbon fibre spooling system. This allows up to 50 coatings to be carried out without the need to change the carbon source – a very significant advantage over very labour intensive ‘single shot’ carbon coaters. Once a section of carbon fibre has been evaporated a new section is automatically advanced and the spent fibre drops into a convenient catchment tray. In addition to ease of use the automatic spooling system allows practically any thickness of carbon film to be controllably deposited in one process cycle.

Regular or gentle evaporation modes and glow discharge option

If ‘gentle’ mode is selected there are longer pauses between evaporation pulses than in ‘regular’ mode. As a result, specimens are

subjected to minimal thermal radiation.

The GD-010 glow discharge system (optional) can quickly be installed for surface treatment of carbon coated grids. This is greatly simplified because the carbon coating and glow discharge treatment can be done sequentially – without the inconvenience of having to “break” vacuum and exchange process heads.

Key advantages:

- automatic, 50-run carbon fibre spooling system – saves operator time and enhances carbon coating quality and productivity
- automatic, controlled deposition using film thickness monitor
- for both SEM and TEM carbon coating
- sequential carbon coating and glow discharge treatment
- carbon fibre capture – maintains system cleanliness by collecting spent carbon fragments
- built-in automatic source shutter
- compact, plug-and-go design – ease of use and servicing
- carbon fibre now offers superior results with less outgassing and without the overheating associated with carbon rods



SP-010 and SP-011 sputter coating modules

Both sputtering modules plug into the CCU-010 LV and CCU-010 HV base units and are ready to go. Each head module contains all the key components for high quality sputter coating including magnetron, target, shutter, process pressure regulator, power electronics and cooling system. In addition an innovative interface connects the electrical power, gas supply and signal transmission to the CCU-010 basic unit in seconds (push fit).

Active cooling and wide choice of sputter targets

SP-010 and SP-011 sputtering modules have efficient active cooling, which allow continuous coating times up to 50 minutes - ideal for applications requiring thicker films.

A wide range of sputter targets is available for SEM, FIB and thin film applications (see page 8).

For SEM applications the SP-010 will deposit fine grain coatings for high resolution imaging. For the smallest grain size coating Cr, Ir and W are widely used (turbo pumped CCU-010 HV base unit required).

SP-011 has a different design of sputtering magnetron and is recommended for thin film applications requiring high sputtering rates and thicker films than standard EM applications.

Key advantages:

- advanced magnetron sputtering for high-resolution SEM
- sputtering of non-oxidising and oxidising metals (HV needed)
- advanced process vacuum control – stable chamber pressure
- cooled sputtering head – consistent quality, rapid deposition
- built-in automatic source shutter
- compact plug-and-go design

Options and accessories

Specimen stage options

The CCU-010 is supplied with a standard 80mm diameter specimen stage. The stage is static but has height and tilt adjustment. There are two optional stages – rotation and rotary planetary. Both stages plug into the CCU-010 substage and are automatically recognised by the base unit.

RS-010 variable speed rotary stage



This 80mm diameter stage allows simultaneous placement of up to six large stubs (25.4mm diameter) or 20 small stubs (12.7mm diameter). Other types and sizes of SEM stubs or specimens can be accommodated.

The plug-in film thickness monitoring crystal and holder is pre-installed in a central location on both CCU-010 and CCU-010 stages and has variable rotation speed (6-120 rpm).

PS-010 variable speed rotary planetary stage



The PS-010 rotary planetary stage plugs into the coating base unit and is automatically recognised. The 80mm diameter stage allows simultaneous placement of up to six large stubs with a diameter of 25.4 mm or 12 small stubs with a diameter of 12.7 mm. Other types of stub or specimens can be accommodated.

Rotation speed is variable between 6 and 120rpm (main table, clockwise) and 24 to 480rpm (individual holders, anticlockwise).

Coating LAB

Process data, including graphical information, can be viewed using the PC-based Coating LAB software. Data includes pressure, current, voltage, coating rate, coating thickness and specimen temperature as real-time curves.

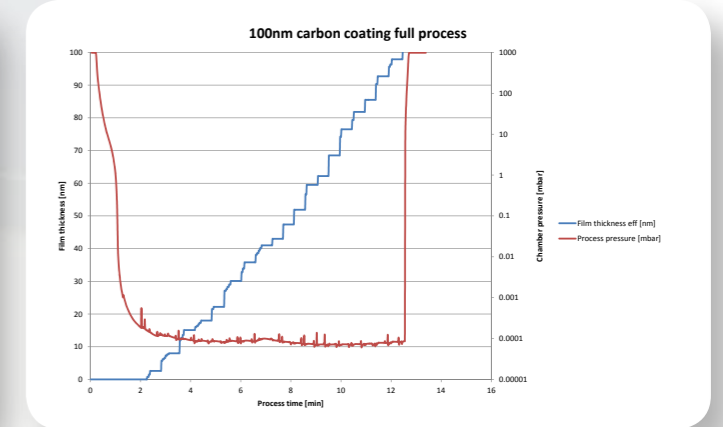
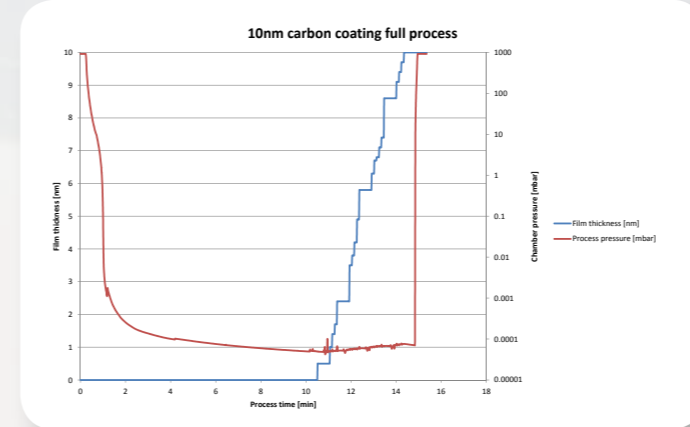


Sputter target options

An extensive range of sputter targets is available. The standard vacuum CCU-010 LV can sputter non-oxidising (noble) metals such as gold, gold/palladium, platinum and silver. The high vacuum CCU-010 HV will sputter both non-oxidising and oxidising metals, such as chromium and iridium.

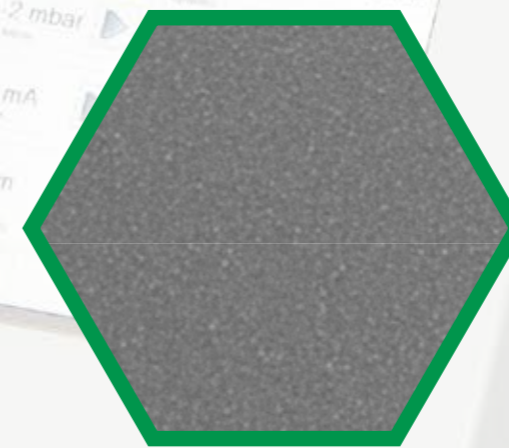


Applications and processes



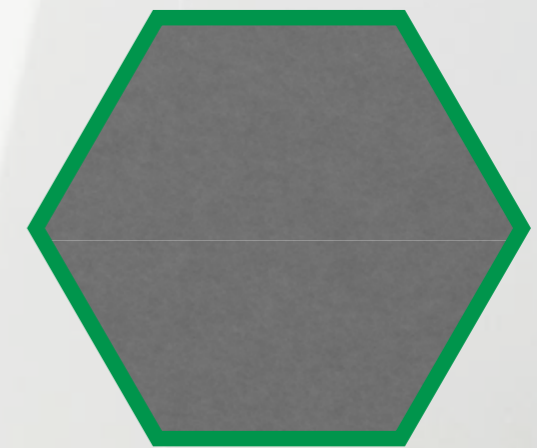
Typical carbon coating process data for 10nm and 100nm thick films

FE-SEM images of sputtered oxidising metals



Chromium

2nm on glass, SEM image (2M x magnification)



Tungsten

Specifications

	CCU-010 HV	CCU-010 LV
Dimensions (unpacked)	L 570 x W 360 x H 350mm. 25kg	L 570 x W 360 x H 350mm. 24kg
Glass cylinder	Ø 120mm	Same
Implosion guard	Plastic splinter shield around the glass cylinder	Same
Sputtering targets	Ø 54mm, thickness up to 3mm	Same
Coating time	0.5 to 990s	Same
Coating current	10-100mA	Same
Pumping	Integrated, oil-free turbomolecular and membrane pumps	Rotary or scroll pump
Ultimate vacuum	<2 x 10 ⁻⁶ mbar	< 5 x 10 ⁻³ mbar (with Edward RV3)
Vacuum measurement	Pirani and cold cathode gauges	Same
Rotary pump connection	Not required	Flange connection DN 25 ISO-KF
Display	115 x 86mm, TFT graphical display	Same
Specimen stage	Ø 80mm, height adjustment 0-50mm, tilt 0-45°. Optional rotation and rotary planetary stages available	Same
Film thickness measurement	Dual-position film thickness monitor	Same
Electrical	90-260VAC, 47-63 Hz, 500W	Same
Process gas connections	Ø 6mm	Same