

# RHODUNA® 275 Black

## Operating Instructions

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### Electrolyte for selective decorative pencil rhodium-plating (brush rhodium-plating)

- Abrasion-resistant, dark and bright coatings
- Operating temperature 20 °C to 40 °C
- Deposition speed up to 0.1 µm/min
- Ready for use with 2 g Rh/100 ml
- High covering power

### Electrolyte Characteristics

Pencil plating is a special type of brush plating. With pencil rhodium-plating, small area elements of parts are selectively rhodium-plated by means of direct current through a wiping touch with a tampon tip soaked with the respective rhodium electrolyte.

The process mainly serves for applying decorative patterns on e. g. jewellery, spectacles, tableware, and things like that.

RHODUNA® 275 Black deposits bright coatings of an anthracite to black colour. Usually layer thicknesses of 0.1 µm are applied. RHODUNA® 275 Black is distinguished by its high covering power and high plating speed.

Electrolyte type:	Pencil rhodium-plating electrolyte
Rhodium content:	2 g Rh/100 ml
pH-value:	< 1, strongly acidic
Temperature:	Room temperature (20 - 40 °C)
Voltage:	8 - 10 volts (max. 12 volts)
Deposition speed:	Up to 0.1 µm/min

### Coating Characteristics

Coating:	Rhodium
Colour:	Anthracite - black

### Basic Equipment

The basic equipment required for pencil rhodium-plating consists of:

- A tampon pencil including a supply of tampon tips.  
This pencil is normally a plastic holder with a connection to the rectifier. The absorbent and exchangeable tampon tips are inserted into a suitable contact socket at the front end of the holder.
- Pencil rhodium-plating electrolyte RHODUNA® 275 Black.
- Rectifier with adjustable voltage up to at least 10 volts.

We recommend our rectifiers

TG 511	(10 V/10 A)
TG 2011	(10 V/20 A) or
TG 5050	(20 V/50 A).

### Form of Supply

- RHODUNA® 275 Black, ready for use (2 g Rh/100 ml).  
Delivered in 100 ml units.

Special replenishments and corrections are not necessary because the solution is used up during application.

### Operating Conditions

Rhodium content:	2 g Rh/100 ml
Operating temperature:	Room temperature (20 - 40 °C)
pH-value:	< 1, strongly acidic
Voltage:	8 - 10 volts (maximally 12 volts)
Deposition speed:	Approx. 0.1 µm can be reached if 1 cm <sup>2</sup> is treated for about 1 minute while the movement is constant.

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In addition, the voltage can be increased to maximally 12 volts and the electrolyte temperature to 40 °C. Higher voltages must not be applied because then the tampon tips will be rendered unusable due to melting.

In any case take care that the tampon tip is always well soaked with the electrolyte. Usually it is sufficient to dip the pencil into the electrolyte approx. 2 - 3 times per minute.

The specified speed may only serve as a rough approximate value because the deposition speed is influenced by the individual carrying out of the work (movement, pressure, dipping frequency).

## Special Process Hints

**Procedure:** The cable fixed to the tampon pencil is connected to the positive pole of the rectifier. The negative pole is connected to the workpiece to be treated by means of a second cable and e. g. a crocodile clip. Suitable are rectifiers supplying at least 8 - 10 volts. The voltage should be adjustable and measurable, as e. g. with rectifier TG 511 (up to 10 V).

The tampon tip should always be well soaked with the electrolyte. If the tip is dry, remove it from the holder and dip both ends into the electrolyte, one after the other, until it is completely saturated. Then the tip is again deeply inserted into the contact socket of the holder.

**Caution:** The electrolyte is strongly acidic! Handle the tips with tweezers and rubber gloves! For different types of electrolytes, different tips must be used by all means!

**Pretreatment:** As with any other plating treatment, the parts first have to be cleaned thoroughly. This is done in the usual way by soak cleaning or ultrasonic pre-degreasing and electrolytic degreasing. After intermediate rinsing, briefly dip in 5 % sulphuric acid and rinse again. Afterwards, rinse in deionized water.

If fine structures with borders as exact as possible are to be applied, the surface of the part should be dried rapidly or the adhering water film should at least be spun off. If the surface of the part is wet, the electrolyte film will easily run during the treatment and thus lead to blurred borders.

**Pencil rhodium-plating:** The connections to the part (cathode, negative pole) and to the pencil (anode, positive pole) have been made. Turn on the current and adjust the voltage. After dipping the tampon tip again into the electrolyte, the tampon tip is moved back and forth or in small circles on the area to be rhodium-plated, applying very slight pressure. The article is rhodium-plated as long as the sufficiently soaked tampon tip is in contact with the article.

Metal depletion in the contact area is avoided by:

- the special composition of the electrolyte
- good movement of the tip on the part
- occasional renewed dipping of the tip into the electrolyte supply (approx. 2 - 3 times per minute)

Deformed and blunt tampon tips can be resharpened. Occasionally change the tip. A high consumption of tips results from a too high operating voltage because then the tips melt together due to overheating and the current passage is impeded.

Seal the tip with the cap prior to idle periods.

**Posttreatment:** Rinse off any electrolyte rests in a recovery rinse (still rinse). Rinse the parts in deionized water and dry.

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## Use as Rack Electrolyte

In exceptional cases, RHODUNA® 275 Black can also be used for rack operation. For this purpose, dilute 100 ml of RHODUNA® 275 Black ready for use (2 g Rh/100 ml) with 900 ml of deionized water.

Without replenishing the amount of rhodium deposited, approx. 1000 mg of rhodium (approx. 50 %) can be plated out of the diluted RHODUNA® 275 Black. Afterwards the deposition speed will become slower and the deposits will lose their dark, anthracite-black colour.

If the electrolyte is to be replenished, add per 100 mg of rhodium deposited 5 ml of RHODUNA® 275 Black, ready for use.

## Operating Conditions (Rack Operation)

Rhodium content:	2 g/l Rh
Operating temperature:	Room temperature (20 - 30 °C); At higher temperatures (> 30 °C), the organic component (blackening agent) in the electrolyte will decompose and the deposits will lose their dark, anthracite-black colour.
pH-value:	< 1, strongly acidic
Current density:	1.5 A/dm <sup>2</sup> (0.5 – 3.0 A/dm <sup>2</sup> )
Deposition speed:	Approx. 0.05 µm at 2.0 A/dm <sup>2</sup>
Anodes:	Platinized titanium, e.g. PLATINODE® coated with 2.5 µm of platinum
Electrolyte tank:	Acid-proof plastic (polypropylene), or glass
Heating equipment:	Only required if the room temperature is below 20 °C. The heating equipment should have a reliable temperature control which safely prevents overheating of the electrolyte (max. 30 °C).
Agitation equipment:	Parts and/or electrolyte agitation required. Air agitation not permitted.
Exhaust system:	Efficient exhaust system required for removing strongly acidic, corrosive spray mists! Strong gas evolution!

## Note

Our information relating to the storage stability refers to storage in closed original storage containers under the conditions stated on the label.

## Precautionary Measures/Safety Hints

For information on safety, please see the corresponding Material Safety Data Sheets! The valid accident prevention regulations and safety instructions must be observed.

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