

RotoTec 800



COATING

Operating Instructions / Spare Parts List



Table of Contents	Page
1. Introduction.....	3
2. Contents of the RotoTec 800 case	4
3. Description of function.....	5
4. General safety instructions	6
5. Regulations.....	7
6. Safety information	8
7. Technical data.....	9
8. Operating the torch for the first time	10
9. Preparing the surface	17
10. The coating process.....	21
11. Spray table.....	26
12. Coating table	27
13. Further treatment of the coatings	28
14. Maintaining the torch and repairing malfunctions.....	29
15. Test run.....	30
16. Hygiene and safety	31
17. Spare parts list and accessories	32
18. Guarantee and imprint.....	36

Please read before operating the device for the first time

Congratulations on your purchase of the RotoTec 800 thermal spray coating unit, a Castolin product.

Please read these operating instructions carefully before using the unit for the first time. The operating instructions help you to use the thermal spray coating unit safely and in accordance with regulations and to achieve the best results.

1. Introduction

The modern technical design of the RotoTec 800 thermal spray coating unit represents state of the art technology in the development of safe and cost-effective units of this type. It was developed for the application of wear and corrosion-resistant protective coatings with thermal spray powder. It is easy to use and is designed to have a long service life. With RotoTec and ProXon alloys you can coat shafts, axles and bearing surfaces in a 'cold' process. The application of melted Eutalloy RW alloy powders results in particularly wear-resistant protective coatings on shaft protection sleeves, formed glass and fan blades, etc.

RotoTec 800

2. Contents of the RotoTec 800 800 case

RotoTec 800, complete, in case – Part N° / ESC Code: 307100

includes the following parts:

1 RotoTec 800 thermal spray gun, equipped with:

	Part N°/ ESC Code:
• 1 thermal spray nozzle (standard)	307118
• 1 reversible nozzle P/K	307115
• 1 powder connecting head for surface coating, Ø 1.5 mm (silver)	307108
• 1 heat shield	307112
• 1 powder connecting head for primer surface, Ø 1.0 mm (silver)	307107
• 1 open-end spanner, SW 24 mm with scale, L = 200 mm	307149
• 1 single head engineers wrench, SW 24	307148
• 1 gas lighter	84021
• 1 pair of safety glasses/goggles A1 with protective lenses, level 5	84005
• 1 nozzle cleaner in a metal case, No. 0 – 8	307150
• 1 operating manual RotoTec 800 (DIN A5, German, English, French, Italian, Spanish)	307147



3. Description of function

The RotoTec 800 thermal spray gun operates with acetylene and oxygen, coating workpieces with thermal spray powders, either as a reconstructive effort and/or as corrosion or wear protection.

The thermal spray powders are packed in special plastic powder containers, which can be placed directly onto the module adapter of the RotoTech 800 torch. The gas transports the powder particles into the torch, where it is discharge through the flame onto the base material. The high temperature of the flame transforms the powder particles into a melted, ductile state. When it comes into contact with the relatively cold base material, it coheres with the rough surface peaks, forming a point-shaped structure that interlocks with the surface. This forms a strong, stable bond.

Almost any machine part can be treated and repaired with the comprehensive selection of thermal spray powders.

The coating process generally includes three procedures: Preparation, applying the primer coat and then spraying on

the chosen anti-wear alloy. Due to the microporosity of the spray coatings, the applications have outstanding emergency running properties (depending on lubrication type), and are often used for workpieces exposed to wear caused by the friction of metal on metal.

The RotoTec 800 spray gun is a multi-purpose spray unit used to process the thermal spray powders in series 19000 (RotoTec), 21000 (ProXon), 29000 and 12000 (Eutalloy RW). An oxygen-acetylene flame supplies the heat. Part of the oxygen flow in the unit branches off in order to function as the transport gas for the powder.

The oxy-fuel gas for the flame is mixed by injection into a gas-mixing spray and heating nozzle.

This gas mixture design ensures the highest operational and functional safety in terms of avoiding flame backlash and its consequences.

4. General safety information

Attention: According to the occupational safety and health regulations of the Accident Prevention & Insurance Association (Berufsgenossenschaftliche Regeln [BGR] 500, section 2.33), operators of gas burning units are required to make operating instructions and user manuals available such that all employees have access to them.

Attention: According to the occupational safety and health regulations of the Accident Prevention & Insurance Association (Berufsgenossenschaftliche Regeln [BGR] 500, section 2.33), gas burning units may only be operated and maintained by experienced personnel that have been trained in the following:

- the particular hazards that occur when dealing with gases
- operating instructions
- safety regulations
- measures to be taken in case of accident or malfunction
- using safety equipment

The operating company must ensure that the content of the instruction and the time it was given are recorded in writing. Employees must sign a form to indicate that they received training.

5. Regulations

Observe the following regulations, norms, laws and directives.

98/ 37/ EG	Machinery Directive	73/ 23/ EWG	Low Voltage Directive
97/ 23/ EG	Pressure Device Directive	89/ 336/ EWG	Electromagnetic compatibility

Accident Prevention & Insurance Association Rules and Regulations (Berufsgenossenschaftliche Vorschriften und Regeln [BGVR])

Accident Prevention & Insurance Association (Berufsgenossenschaftliche Regeln [BGR]) 500, section 2.26 - Welding, cutting and related processes

Accident Prevention & Insurance Association 500, section 2.31 - Performing work on gas pipelines

Accident Prevention & Insurance Association 500, section 2.32 - Operating oxygen units

Accident Prevention & Insurance Association 500, section 2.33 - Gases

Norms

EN 559	Rubber hoses	DIN EN 1274	Thermal spraying -
EN 560	Hose connections		powders - composition
EN 561	Hose couplings	DIN EN 13214	Thermal spraying -
EN 562	Gauges		supervising thermal
EN 730-1	Safety equipment		spraying
EN 954 Part 1	Control safety functions	DIN EN 14616	Thermal spraying -
EN ISO 2503	Pressure regulator		recommendations
EN ISO 12100	Machine safety	DIN EN 1395	Approval testing for
EN ISO 14114	Acetylene manifold		thermal spray units
	systems	DIN ISO 9090	Gas tightness
DIN EN ISO 5172	Gas Welding Equipment	DIN ISO 9539	Materials
DIN EN 657	Thermal spraying -	VDE 0113/	Regulations regarding
	concepts, classification	EN 60204	the construction of
			electrical systems

Laws

GPSG	Equipment and Product Safety Act (Geräte- und Produktsicherheitsgesetz [GPSG])
BetrSichV	Occupational Health and Safety Regulations (Betriebssicherheitsverordnung [BetrSichV])
GefStoffV	Ordinance on Hazardous Substances (Gefahrstoffverordnung [GefStoffV])
BlmSchG	German Federal Emission Protection Law (Immissionsschutzgesetz [BlmSchG])

Technical Regulations

TRAC 204, 206, 207, 401, 402	Technical regulations for acetylene and calcium carbide devices
TRG	Technical regulations for pressurised gases
TRF	Technical regulations for liquefied gases (German: Flüssiggase)
Bulletin of the German Association for Welding and Related Processes (Deutscher Verband für Schweißen und verwandte Verfahren [DVS])	DVS 0221, DVS 2307, DVS 2314, DVS M 2304 etc

RotoTec 800

6. Safety information

The RotoTec 800 thermal spray coating unit meets the requirements of the currently accepted technical regulations and the existing norms and directives.

Do not operate the unit such that safety is compromised. The operating company must ensure that operation is restricted to units in proper condition.

The thermal spray coating unit may not be modified or rebuilt without the manufacturer's consent.

This unit consists of gas supply components that are **not electrical** and do not have their own ignition source, and the unit is **not subject to Directive 94/9/EG** (ATEX Directive) regarding the proper use of units in explosive areas and situations.

Proper Use

The RotoTec 800 thermal spray unit is operated with acetylene and oxygen and is designed for spray coating applications with a wide variety of powders, including RotoTec, RotoTec LT, Eutalloy RW and ProXon.

The unit may only be used for this purpose.

Proper use also includes observing all information included in these operating instructions, complying with periodic testing and observing the technical data specifications.

Improper use

Any use that does not comply with the stated purpose:

e.g. operation with other gases, gas sources, pressures, gas amounts or temperatures and ignoring minimum clearances.

Improper use is prohibited!

Operator experience and training

Thermal spray units may only be operated by persons who are at least 18 years old, physically fit and who have the required experience and knowledge to operate the unit or have been trained by a qualified person. Regular training, at least once a year, is recommended. This training should also be documented.

The RotoTec 800-System includes the following items and functions:

- Gas mixing spray nozzle, which can be easily exchanged
- Integrated powder supply system in spray nozzle adapter
- Removable powder connecting head with cut-off and metering system and connecting head locking mechanism when powder injection is open
- Powder connecting head can also be rotated 180° and then mounted on the spray gun base in the opposite direction. This makes it possible to process materials overhead.
- The spray gun has an integrated gas deflector. Turn the gas deflector stud screw (see page 14) to enable the transport gases to begin supplying the powder.

7. Technical data

Connections

Gas fuel and internal:	Gas fuel (acetylene) G 3/8 LH
Powder transport gas:	Oxygen G 1/4 RH
Additional gases:	Compressed air* or non-flammable gases M10 x 1
Powder supply system:	Injector intake - powder transport gas - Pressure nozzle »N« Ø 0.45 mm
Spray performance:	~3.0 – 6.0 kg/h depending on type of powder, unit setting, spray nozzle and integrated pressure nozzle in powder supply system

Working pressure and gas consumption values

	Oxygen, 3.0 bar - 1400 NL/h ± 50 NL/h
	Acetylene, 0.7 bar – 1130 NL/h ± 50 NL/h
Internal powder transport gas:	Oxygen 3.0 bar – 335 NL/h ± 30 NL/h (»N«-pressure nozzle)

Oxy-fuel gas mixture Injection (gas mixing spray and heating nozzle)

Spraying distance 150 - 200 mm, depending on additive materials for spraying (see Spray Table, p. 26)

Circumferential speed (with cylindrical or rotationally symmetrical workpieces): 15 – 50 m/min.
- depending on additive materials for spraying and coating thickness per pass!

*) Attention! Compressed air must be clean, dry and contain no oil.

RotoTec 800

8. Operating the torch for the first time

Gas connections and compressed air

The RotoTec 800 thermal spray coating unit can be connected to any gas supply unit (acetylene, oxygen).

Proper connections are shown in Fig. 1. Usually, short applications require a connection to one gas cylinder of each type of gas. For daily use or for longer, continuous applications, use a gas cylinder manifold for oxygen and acetylene.

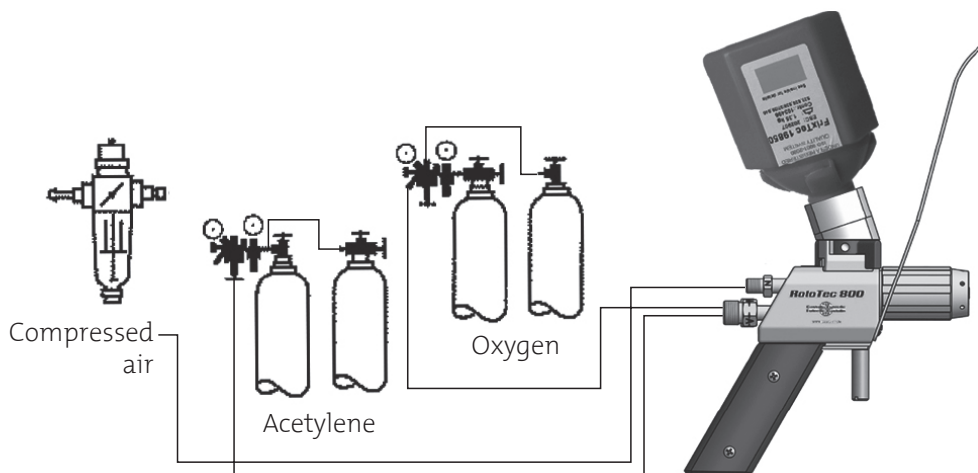


Fig. 1

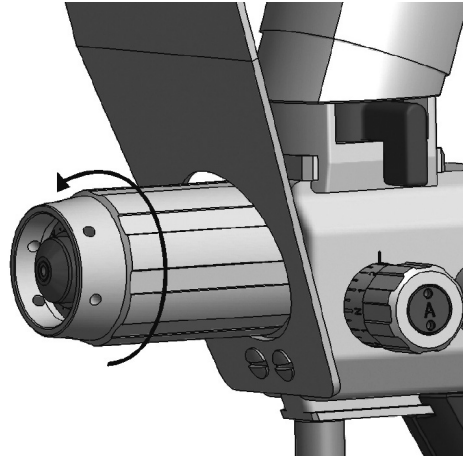
Pre-conditions for operation

- Thermal spray coating unit must be in proper working order.
- The gas supply unit must be in proper working order and meet technical safety regulations.

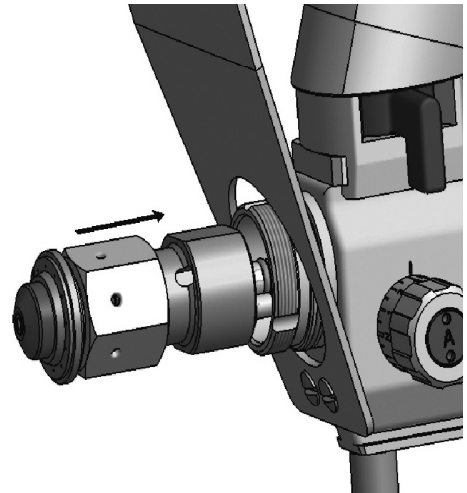
8. Operating the torch for the first time

Mounting the spray and heating nozzle

1. Unscrew the coupling sleeve fitting.



2. Insert the spray and heating nozzle.
3. Tighten the coupling sleeve fitting by hand.

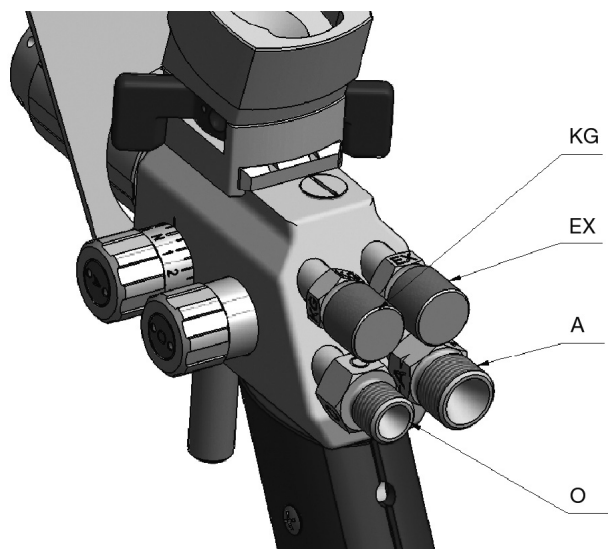


8. Operating the torch for the first time

Caution! The flexible connector pipes must be installed by a trained professional.

Do not allow torsion, flexing and compression along the longitudinal axis or a bending radius that is too small.

Connection Use the following ports to connect the acetylene and oxygen hoses and compressed air:



KG – Compressed air (M10 x 1)

EX – External gases (optional)

A – Acetylene G 3/8 LH

O – Oxygen G 1/4 RH

8. Operating the torch for the first time

Attaching the MegaPak container



Rotate the thermal spray coating unit 180° or remove the module retainer from unit (in this case, the sealing lever must be closed and the yellow dot visible). Use the bayonet fitting to mount the MegaPak container to the module retainer and tighten it by turning to the right (clockwise).



Attention!

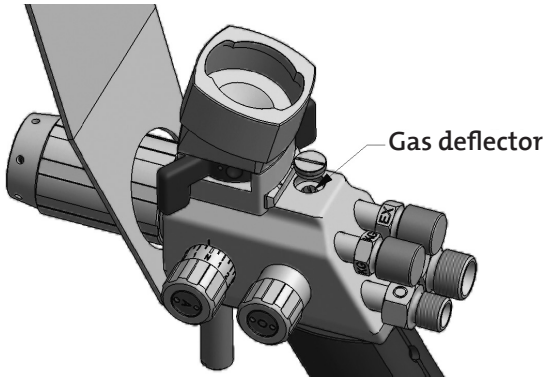
After the connection has been properly made, check the gas tightness before operating the thermal spray coating unit.

Operating pressure when the regulator/cut-off valve is closed:

- Acetylene 0.6 – 0.7 bar [10^5 Pa]
- Oxygen 3.0 bar [10^5 Pa]

8. Operating the torch for the first time

External powder transport gases



Attention! Before converting the thermal spray coating unit to use external powder transport gases, all other gases must be shut off and the pressure released.

To operate the thermal spray coating unit with external powder transport gas (port EX), the unit must be converted.

To convert the unit, adjust the gas deflector:

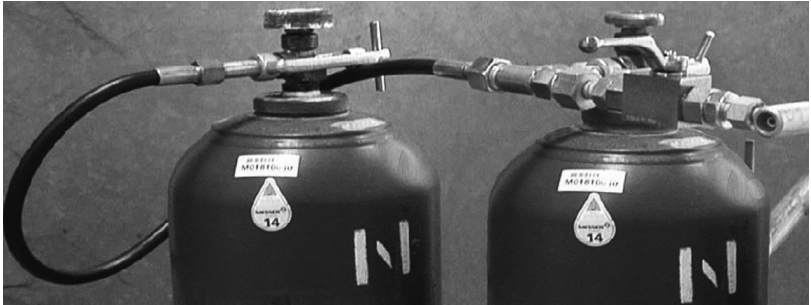
- Remove the lock screw.
- Screw the gas deflector stud screw to the right (clockwise) all the way in.
- Replace the lock screw.

Converting back to normal operation:

- Screw the gas deflector stud screw to the left (counter-clockwise) until it is flush with the upper edge of the tap hole.

8. Operating the torch for the first time

Attention! The following cylinder couplings are particularly well-suited for operating thermal spray units and torches with mid-level heat output capacity if a single cylinder is not adequate for acetylene withdrawal and no gas cylinder manifold is available.



- Cylinder coupling Ac for connecting 2 individual cylinders
Part N°/ ESC Code 840036
- Cylinder coupling Ac for connecting 3 individual cylinders
Part N°/ ESC Code 840038

Use the following approved, recommended values for withdrawing gas from acetylene cylinders:

Load type	Gas withdrawal at + 15 °C	Number of acetylene cylinders (contents, 40 l)		
		1	2	3
Burst mode (max. 20 min. withdrawal)	Withdrawal [l/h]	750	1.500	2.250
	RotoTec 800 Nozzle identification		FN-RF/N-A FN-L/T-A	
Continuous operation	Withdrawal [l/h]	500	1.000	1.500
	RotoTec 800 Nozzle identification		FN-RFN FN-LT	

8. Operating the torch for the first time

Setting the working

1. Open the oxygen regulator/cut-off valve 'O' (turn the small valve wheel approx. ½ turn to the left [counter-clockwise]).
2. Set the oxy-fuel gas regulator/cut-off valve 'A' to position »N« (turn the small valve wheel approx. 1/2 turn to the left [counter-clockwise]).
3. Open the oxygen gas supply and set the operating pressure at the oxygen pressure regulator to 3.0 bar [10^5 Pa] (see Spray Table on p. 26).

Now oxygen is flowing from the burner gas hole in the thermal spray coating unit's gas mixing spray and heating nozzle.

4. Open the acetylene gas supply and set the operating pressure at the acetylene pressure regulator to 0.6 or 0.7 bar [10^5 Pa] (see Spray table on p. 26).

Attention!

Now a flammable gas mixture is flowing from the burner gas hole in the thermal spray coating unit's gas mixing spray and heating nozzle..

Igniting the flame

1. Igniting the flowing acetylene-oxygen mixture
2. When the regulator/cut-off valve 'A' is in position »N« a neutral flame can be set by adjusting the acetylene pressure regulator.

Now the basic setting for the flame is complete!

9. Preparing the surface

The bond between the spray material and the base metal is crucial to the thermal spraying process. In a 'cold' spray process, the bond is formed mechanically or by micro-welding.

If spraying is following by melting, surface impurities can negatively influence the metallurgic bond. For this reason, cleaning metal surfaces and surface roughness are very important. To achieve a sound, stable bond, carry out the following recommendations exactly.

Operation

Before the gas supply from the gas supply unit is activated, both regulator/cut-off valves for the thermal spray coating unit must be closed. These are marked: 'O' for oxygen and 'A' for acetylene.

9.1 Cleaning and degreasing

Remove impurities caused by corrosive effects, rust or paint residue mechanically by grinding or blasting. Pre-heating to slightly more than room temperature prevents condensation. Heat oil-saturated grey cast iron workpieces to approx. 200 °C to remove oil and grease residue. Surfaces that are to be sprayed must be free of oil, grease or lubricant residue. Use standard industrial solvents to clean these surfaces. Only trained personnel should use such products and only in well-ventilated work areas. Observe the normal precautions. Afterwards, blow clean, dry air over the prepared workpiece surfaces. Prevent the workpiece from subsequently coming into contact with any impurities.

9. Preparing the surface

9.2 Preparing for the process

Finish-turn the surface that is to be coated to remove all fatigued metal and all unevenness from abrasion. Shafts: Process as in Fig. 2a.

Prepare sharp edges and end zones as in Fig. 2b.

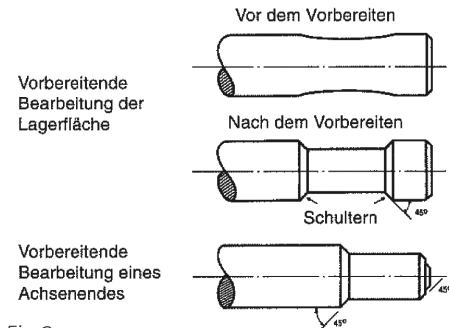


Fig 2a

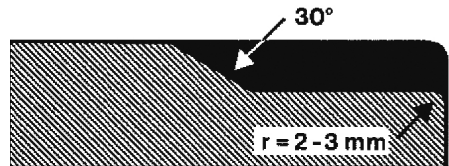


Fig 2b

Do not use liquid lubricants under any circumstances.

9.3 Surface roughness

There are various methods for achieving a surface roughness with the best qualities for a strong, stable bond with the base metal.

A) Thread cutting

This preparation is generally used with cylindrical workpieces that will be coating in a 'cold' process. A thread is cut in a quick pass: feed 0.7 mm/rev., depth of cut 0.35 mm (see Fig. 3). This preparation achieves an oxide-free surface for the cold process. Do not use lubricants here either. This technique is not recommended for thin coatings.

Attention! Use only carbon tool steel for 'rough turning'.

9. Preparing the surface

B) Grinding

This surface preparation can be used for both cold and melting (fusion) processes. Either **ceramic bonded** grinding discs or grinding tools can be used. Make sure that grinding dust or used and dirty grinding discs come into contact with the surface. The grinding tools should be self-sharpening.

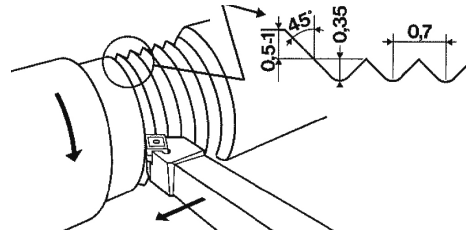


Fig.3

C) Blasting

This preparation method offers the best performance if clean shot is used (not contaminated by paint or other residue). The compressed air must also be clean, dry and free of oil.

The quality of surface preparation with blasting depends on the type and grain size of the shot and blast parameters, e.g. blasting time, distance, angle, speed of the shot and type of the blasting unit. In addition, the wear condition of the shot significantly influences the characteristics of a blasted surface.

Fused corundum (aluminium oxide) and sharp-edged steel shot or - depending on the application - other types of shot, e.g. silicon carbide (SiC), chilled cast iron shot, copper mill and melting chamber slag or quarry sand are also suitable blasting materials. The roughness of the blasted surface depends on the shot size and the air pressure. Coarse shot yields a higher surface roughness and consequently good adhesion

to the base material, but also yields a rough surface after finish-coating. The pressure used for blasting should not be too high so that the shot, particularly aluminium oxide, does not become embedded in the surface.

Thoroughly cleaning the blasted surface of shot residue and dust is very important in terms of the bond strength of the coating layer. The best way to clean the surface is with suction or by blowing dry, oil-free compressed air over the surface.

More detailed information regarding preparing the surfaces of metal workpieces for thermal spraying can be found in EN 13507.

9. Preparing the surface

9.4 Protecting the adjacent zones

The zones adjacent to the coating are masked and protected by brushing on the masking emulsion Solution R 103 (Part N°/ ESC Code 90103).

IMPORTANT

It is recommended that the coating process take place immediately after preparing the surface to avoid new problems with oxidation or contamination. Nevertheless, if the surface is damaged, repeat the preparation as described previously.

10. The coating process

10.1 The 'cold' coating processes with RotoTec and ProXon alloys

The coating process with RotoTec powder has three basic steps: first, prepare the surface; then, apply the primer layer ProXon 21021; finally, apply the RotoTec coating. A primer coating is not required when using ProXon as a one-step-alloy.

Use the following procedures:

Prepare the surface according to the recommendations in Chapter 9.

Clamp cylindrical workpieces into a lathe and set the circumferential and feed speeds based on the data in the Spray Table and the graphic (see Chapter 11 and 12).

Pre-heat the workpiece to approx. 40 °C over ambient temperature.

10.1.1 Spraying on the ProXon 21021 primer layer (gold powder connecting head)

- Set spraying parameters according to the Spray Table. Apply the primer in a layer approx. 0.1 mm thick (Chapter 11).

10.1.2 Spraying on the RotoTec alloy (silver/aluminium powder connecting head)

- Set spraying parameters based on the selected alloy (Chapter 11) Spray on a coating layer of the desired thickness*) (if the surface will be processed further after this treatment, the layer application should yield a workpiece thickness approx. 0.5 mm greater than the final required dimension).

10.1.3 Spraying on the ProXon alloy (gold powder connecting head)

- Set spraying parameters based on the selected alloy (Chapter 11). Apply the coating in the desired thickness (if the surface will be processed further after this treatment, the coating application should yield a workpiece thickness approx. 0.5 mm greater than the final required dimension).

*) Note the recommended coating thicknesses listed in the product information of the powder used!

10. The coating process

Important information

Workpiece temperature:

During the spray operation, the workpiece temperature should not exceed 200 – 250 °C. If this temperature range is exceeded, allow the workpiece tool while still turning. However, avoid long interruptions of the spray operation.

Sealing the surface:

If the workpiece will be used in a corrosive medium, seal the

coating after it has cooled with the air-drying RotoGuard sealer, Part N°/ ESC Code 90111, or RotoSeal, Part N°/ ESC Code 90109. These sealers can be applied with a brush when the workpiece is still warm to the touch. Apply until the workpiece is saturated.

10.2 Coatings with Eutalloy RW alloys (silver/aluminium powder connecting head)

The coating process with Eutalloy RW has three basic steps:

surface preparation, spraying and subsequent melting and fusion

10.2.1 Spraying the alloy onto the surface

Use the following procedures:

Prepare the surface according to the recommendations in Chapter 9.

Clamp cylindrical workpieces into a lathe and set the circumferential and feed speeds based on the data in the Spray Table and the graphic (see Chapter 11 and 12).

Heat the workpiece evenly across its entire surface to a temperature of 200 – 300 °C.

Set the spraying parameters based on the selected alloy (Chapter 11) and apply it to the desired thickness*). The coating layer will shrink up to approx. 20%; take this into consideration in terms of coating thickness.

10.2.2 Alloy melting and fusion

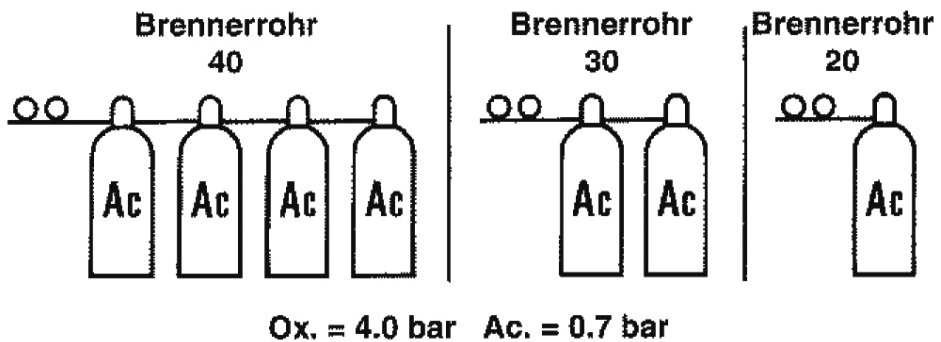
The alloy is melted with the specially designed CastoFuse Autogenous Torch for Eutalloy RW alloys (complete CastoFuse kit: Part N°/ ESC Code 800922).

*) Note the recommended coating thicknesses listed in the product information of the powder used!

10. The coating process

CastoFuse fusion lance	Workpiece diameter	Acetylene consumption
20	< 30 mm	> 700 NI/h
30	30 – 50 mm	> 1100 NI/h
40	50 – 100 mm	> 2100 NI/h

Select the lance according to workpiece dimensions. The table above offers a guideline. When using an acetylene gas cylinder manifold, observe the following safety rules. In general, for continuous acetylene withdrawal, 1 gas cylinder is sufficient for lance 20; lances 30 and 40 require 2 and 3–4 connected gas cylinders, respectively.



For the fusing process with large workpieces (100 mm and greater), more torch units or special burners must be used.

- Connect the fusion lances with the CastoFuse torch and set the pressure(s) with the flame slightly cut back.

10. The coating process

Fusion includes the following procedures (Fig. 4):

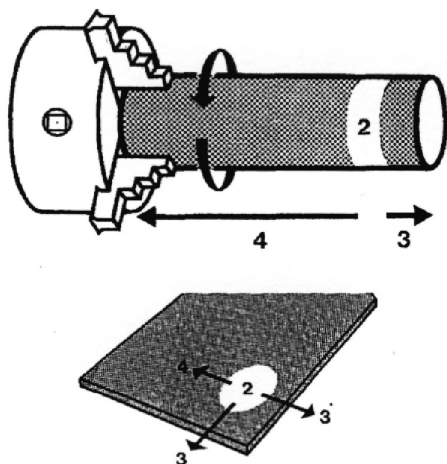


Fig.4

- Pre-heat the workpiece evenly and across its entire surface to a temperature of 400 – 500 °C (1).
- Then continue to heat it in a localised area about 2 – 3 cm from the edge. When the surface is shiny and lustrous, the fusion procedure is complete (2).
- Gradually and systematically melt and fuse the edge zone. This prevents overheating, oxidising and flaking or blistering at the edges (3).
- Finally, melt and fuse the rest of the surface (4).

NOTE

- When working with long pieces that are clamped, elongation or expansion must be taken into consideration. To prevent longer workpieces from warping, provide support for them during the fusing procedure.
- For series production, fusing can be completed in a furnace or in a high frequency process.
- Cool the workpiece slowly in a position where no strain can occur, preferably in vermiculite.

10. The coating process

10.4 Coating with metals and alloys that have low melting points, RotoTec LT (for ex. zinc, aluminium, etc)

10.4.1 *Spraying instructions and parameters for RotoTec LT*

Use the following procedures:

Prepare the surface according to the recommendations in Chapter 9.

Clamp cylindrical workpieces into a lathe and set the circumferential and feed speeds based on the data in the Spray Table and the graphic (Chapter 11 and 12).

Pre-heat the workpiece to approx. 40 °C over ambient temperature.

Set spraying parameters based on the selected alloy (Chapter 11). Spray on the coating in the desired thickness. If the surface will be processed further after this treatment, the coating application should yield a workpiece thickness approx. 0.5 mm greater than the final required dimension.

11. Spray table

Spray material	Spray nozzle	Concentric nozzle	Acetylene bar]	Oxygen [bar]	Compressed air [bar]	Spray distance [mm]	Flame regulator/ acetylene valve	Module adapter
RotoTec								
19300	FN-RF/N- A	K/P	0,6	3,0	0,5 – 1,0	180 – 200	N	Silver
19400	FN-RF/N- A	K/P	0,6	3,0	0,5 – 1,0	180 – 200	N	Silver
19800	FN-RF/N- A	K/P	0,7	3,0	1,0 – 2,0	180 – 200	N	Silver
19850	FN-RF/N- A	K/P	0,7	3,0	1,0 – 2,0	180 – 200	N	Silver
19910	FN-RF/N- A	K/P	0,6	3,0	0,5 – 1,0	180 – 200	N	Silver
19985	FN-RF/N- A	K/P	0,6	3,0	0,5 – 1,0	180 – 200	N	Silver
19999	FN-RF/N- A	K/P	0,6	3,0	0,5 – 1,0	180 – 200	N	Silver
RotoTec LT								
29220 LT	FN-RF/N- A	P/K	0,7	3,0	2,0	150 – 180	N	Silver
29230 LT	FN-L/T- A	B/R	0,7	3,0	3,0 – 5,0	200 – 300	N	Silver
29240 LT	FN-RF/N- A	P/K	0,6	3,0	2,0 – 3,0	180 – 200	N	Silver
Proxon								
21021	FN-RF/N- A	P/K	0,6	3,0	–	150	N	Proxon (gold)
21031	FN-RF/N- A	P/K	0,6	3,0	–	150	N	Proxon (gold)
21071	FN-RF/N- A	P/K	0,6	3,0	0,5 – 1,0	150	N	Proxon (gold)
Eutalloy RW								
12112	FN-RF/N- A	P/K	0,7	3,0	–	200	N	Silver
12494	FN-RF/N- A	P/K	0,7	3,0	–	200	N	Silver
12495	FN-RF/N- A	P/K	0,7	3,0	–	200	N	Silver
12496	FN-RF/N- A	P/K	0,7	3,0	–	200	N	Silver
12497	FN-RF/N- A	P/K	0,7	3,0	–	200	N	Silver
12499	FN-RF/N- A	P/K	0,7	3,0	–	200	N	Silver

P – Pinch: K – Cool (Kühlen): B – Spacing adaptor (Blindring)

Note Depending on the application, the spray parameters may differ from those listed among the following standard parameters. Our application specialists are always on hand to provide you will comprehensive technical information.

Attention! The pressures for acetylene and oxygen, respectively, must be adjusted after the values given in the table are set using the A-valve (the oxygen valve must be completely open/on) to achieve a neutral flame.

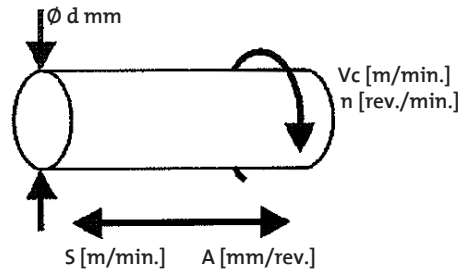
Spraying distance: 150 - 300 mm (depending on additive spraying materials); circumferential speed: 20 – 50 m/min.; Feed: 4 – 8 mm/rev.

Coating thickness per pass: RotoTec: 0.2 mm; ProXon: 0.15 – 0.2 mm; Eutalloy RW: 0.2 – 0.3 mm

12. Coating table

Selecting the setting values for coating when using a lathe

The following table demonstrates the relationship between workpiece diameter, circumferential speed and feed.



	Vc = 20 m/min., A = 3 mm/rev.		Vc = 40 m/min., A = 53 mm/rev.	
d [mm]	n [rev./min.]	S [m/min]	n [rev./min.]	S [m/min]
30	212	0,64	424	2,12
40	159	0,48	318	1,59
50	127	0,38	255	1,27
60	106	0,32	212	1,06
70	90	0,27	181	0,90
80	79	0,23	159	0,79
90	70	0,21	141	0,70
100	63	0,19	127	0,63
110	57	0,17	115	0,57
120	53	0,15	106	0,53
130	48	0,14	97	0,48
140	45	0,13	90	0,45
150	42	0,12	84	0,42
160	39	0,11	79	0,39
170	37	0,11	74	0,37
180	35	0,10	70	0,35
190	33	0,10	67	0,33
200	31	0,09	63	0,31
210	30	0,09	60	0,30
220	28	0,08	57	0,28
230	27	0,08	55	0,27
240	26	0,07	53	0,26
250	25	0,07	50	0,25
260	24	0,07	48	0,24
270	23	0,07	47	0,23
280	22	0,06	45	0,22
290	21	0,06	43	0,21
300	21	0,06	42	0,21

13. Further treatment of the coatings

Further treatment of RotoTec 800 coatings depends on their hardness and structure. Carbide cutting tools (ISO K 01/ ISO K 10) work best for most applications. A high-quality finish can be obtained with boron nitride turning tools, which are preferred for finish work with alloys that include a percentage of Diamax-hard material. **Attention! When processing RotoTec coatings on a lathe, never use a lubricant. When processing Eutalloy RW coatings on a lathe, always use a lubricant.**

14. Maintaining the torch and repairing malfunctions

14.1 Maintenance

The RotoTec 800 thermal spray coating unit was developed with simple, yet safe, maintenance in mind. Every spray gun undergoes demanding tests in our factory to ensure precise and proper function.

It is essential that the spray gun be protected from impact and contamination. To ensure proper function, the nozzles and regulating elements must be in good condition.

The following inspection list is not directly related to spray gun maintenance, but it is important in terms of operational safety and for achieving reliable results.

1. Inspect the hose connections for oxygen / acetylene to ensure that they are in proper working condition (cracks, damage, etc.). Make sure that **no oil is present** at any of the connections.
2. Use only original Castolin powder containers to ensure that the spray material is clean.
2. Inspect the gas cylinders and the pressure regulating valves to ensure that they are in proper working condition.

We recommend that you contact a Castolin sales representative regarding any other maintenance problems.

Attention! Do not work with a defective unit!

14.2 Trouble-shooting / cleaning the unit

To ensure trouble-free operation and to keep track of application conditions properly, please read the operating instructions carefully. In this way, you can avoid using the wrong settings and prevent mistakes.

Trouble sources and prevention

Clean the torch with clean, dry compressed air. Keep the oxygen and acetylene intakes closed when cleaning the torch. For safety reasons, we recommend loosening the acetylene hose connection.

After work is completed, store the spray gun and all accessories in a dry room.

In addition, ensure that:

- all of the O-rings on the flame nozzle, powder injector and spray gun are in proper working condition and the coupling sleeve is in the proper position and is tight,
- the threads of the coupling sleeve and injector are clean,
- and there is no residue on the powder connecting head and connecting plate.

15. Test run

1. Inspect all gas/air connections.
2. Select the correct spray nozzle and reversible nozzle.
3. Attach the correct connecting head (silver or gold) for the spray powder container. See spraying table paragraph 11.
4. Use the desired spray material.
5. Set the correct pressure(s) for gases/compressed air.
6. Attach the powder container to the connecting head.
7. Make sure that the workpiece has been cleaned and prepared according to the recommendations.
8. When coating cylindrical parts, check the circumferential speed and feed.
9. Set the correct gas mixture for trouble-free ignition.
10. Set the correct spraying distance.
11. Carry out the spraying procedure for the respective spraying material.
12. Use the powder shut-off lever to stop the powder flow, then wait until the rest of the powder has been discharged before extinguishing the flame.

16. Hygiene and safety

Health hazards

Open the oxygen flow first, then the acetylene (do not allow acetylene to flow into the spray gun without oxygen).

Observe the usual precautions when dealing with gas cylinders. Place gas cylinders where they are protected from impact, from tipping over, and from direct heat. Never lubricate or grease the threads of gas cylinders or gauges.

Skin contact with or inhalation of the fumes and dust particles emitted during the spraying operation can pose health hazards. Do not allow nitrous gases to concentrate. Adhere to the rules for maximum work area concentrations and values! Follow the instructions and information in the safety data sheets regarding the welding filler material used.

Areas of influence

Work areas must be well ventilated. Electrical devices, including lighting, within the work area must be protected from dust (see DIN 40050 / IP 54). Required equipment for extinguishing fires includes at least one fire blanket stored such that it is protected from dust and one hand-held fire extinguisher (powder extinguisher P6 according to DIN 14406) at every access door.

Ventilation

Suction all fumes and dust particles right at the point of origin. Intake speed should be 0.5 to 1.5 m/s; in the pipes it

should be at least 1.5 m/s (according to the Association of German Engineers [VDI] regulation 2262). The fumes may only be ventilated outdoors with a suitable precipitator. The requirements of German air quality standards (TA-Luft) must be followed.

Personal safety equipment

Protective clothing must be worn when gas welding. If the related gases, smoke and dust are not adequately removed to the permissible work area concentrations, you must wear breathing protection equipment. The protection class depends on the additive spraying materials. Adhere to the information provided in the breathing protection bulletin ZH 1/134.

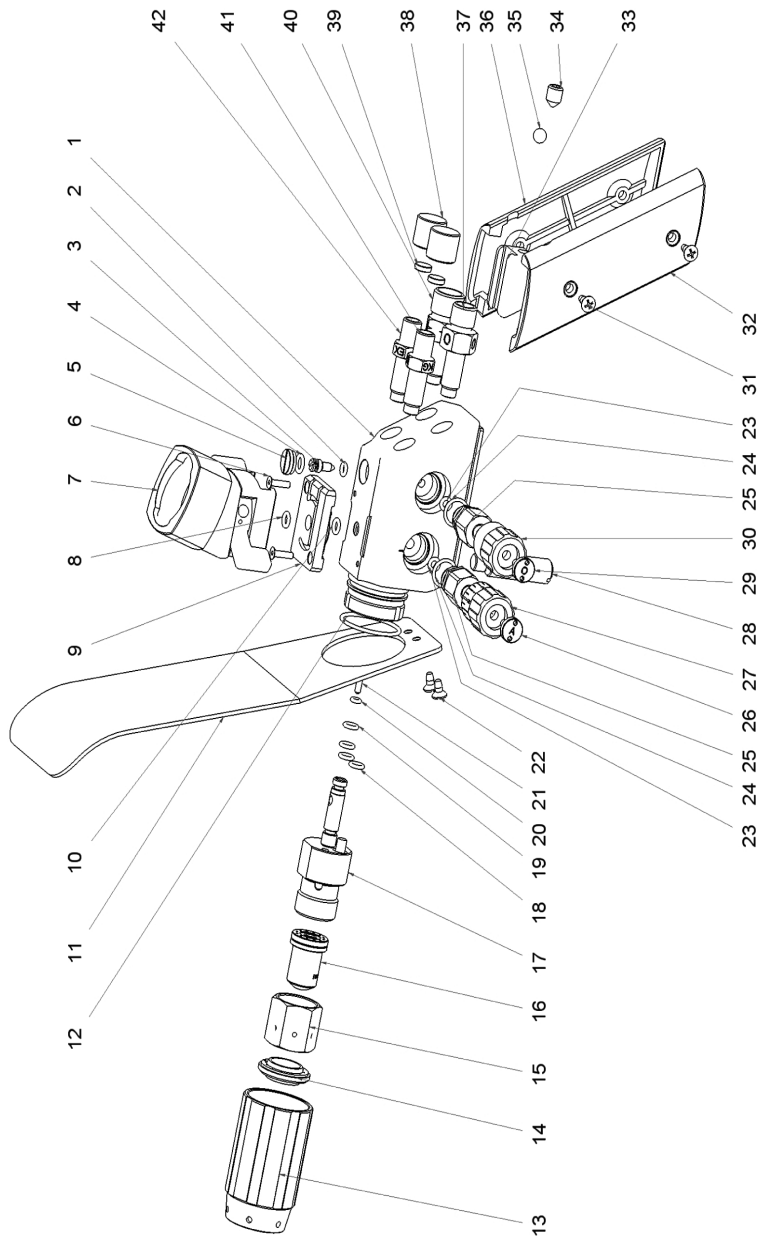
Personal behaviour

Wear safety glasses/goggles, class A1, with protective lenses, level 5! (Included in the standard equipment in the RotoTec 800 unit case.) Do not inhale welding fumes. Prevent the formation of dust. Do not eat, drink, smoke or store food in the work area. Keep the work area clean (suction the area - do not sweep or blow!); remove powder residue. Store work clothing separately from street clothes. Wash thoroughly when taking a break or at the end of the work shift.

Maintenance

It is recommended that our service station inspect the unit once a year.

17. Spare parts list and accessories









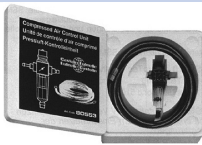











Spare parts list **RotoTec 800**

Pos.	Part N°/ ESC Code	Description	Qty.
1	307101	Base	1
2	850537	O-ring 3.5 x 0.9 NBR 70 Shore	1
3	307103	Gas deflector stud screw	1
4	850898	O-ring 7 x 1.5 NBR 70 Shore	1
5	307105	Lock screw M12 x 0.5	1
6	307106	Countersunk screw M3 x 12 DIN 7991-A4	2
7	307107	Powder connecting head, complete, for primer surface (gold)	1
–	307108	Powder connecting head, complete, for surface coating (silver)	1
8	307109	O-ring 4 x 2.5 NBR 70	1
9	307110	Connecting plate, complete	1
10	850897	O-ring 3 x 1.5 NBR 70	1
11	307112	Heat shield	1
12	882015	O-ring 29.87 x 1.78 NBR 70 Shore	1
13	307114	Air hood M32 x 1	1
14	307115	Reversible nozzle P/K	1
–	307116	Spacing adaptor (B/R) for LT powder	1
15	307117	Coupling nut M22 x 1	1
16	307118	Thermal spray nozzle FN-RF/N-A	1
–	307119	Thermal spray nozzle (FN-L/T-A) for LT powder	1
17	307120	Pre-mounted nozzle retainer	1
18 & 19	850553	O-ring 5 x 1.5 FPM 75	2
20	307123	O-ring 2.5 x 1.5 Material 36624	1
21	307124	Transport gas nozzle -N- 0.45	1
22	307125	Countersunk screw M4 x 10 ISO 7047-4.8	2
23	850542	O-ring 6 x 1 NBR 70 Shore	1
24	850541	O-ring 11 x 1.5 NBR 90 Shore	1
25	307128	Gas regulating valve without pos. 80, 90	1
26	307129	Spanner head screw M4 x 8 -A-	1
27	307130	Hand wheel, anodised and engraved	1
28	307131	Retaining pin	1
29	307132	Spanner head screw M4 x 8 -O-	1
30	307133	Hand wheel, anodised	1
31	307125	Countersunk screw M4 x 10 ISO 7047-4.8	4
32	307134	Grip plate, left	1
33	307135	Grip retainer	1
34	307136	Set screw M8 x 10 DIN 914	1
35	307137	Ball Ø 7, class 3	1
36	850557	Grip plate, right	1
37	307139	Port G 1/4 RH – M10 x 1 M/M	1
38	307140	Cap nut M10 x 1	2
39	307141	Sealing shim	2
40	307142	Port G 3/8 RH – M10 x 1 M/M	1
41	307143	Port KG M10 x 1 – M10 x 1 M/M	1
42	307144	Port EX M10 x 1 – M10 x 1 M/M	1

RotoTec 800

List of accessories **RotoTec 800**

Pos.	Part N°/ ESC Code	Description	Illustration
1	800001	SecureGas – oxygen, pressure regulator, single-stage, primary pressure up to 200 bar, working pressure up to max. 10 bar, connections G 3/4 RH (f) / G 1/4 RH (m)	
2	800004	SecureGas – acetylene, pressure regulator, primary pressure up to 40 bar, working pressure up to max. 1.5 bar, bracket DIN, connection G 3/8 LH (m)	
3	840036	Cylinder coupling for acetylene, for connecting two cylinders	
4	840038	Cylinder coupling for acetylene, for connecting three cylinders	
5	840001	StopFlam1 - oxy-fuel gas, gas backflow prevention with flame inhibitor and gas backflow valve for connecting to the pressure regulator, connections: G 3/8 LH / G 3/8 LH	
6	840002	StopFlam1 - oxygen, gas backflow prevention with flame inhibitor and gas backflow valve for connecting to the pressure regulator, connections: G 1/4 RH / G 1/4 RH	
7	204933	Hose unit Ox/Ac DN 6.0 x 3.5 mm with threaded sleeve 1/4 RH / 3/8 LH, length: 5 m, with explosion prevention Ox/Ac	
8	840014	FastFlam, oxy-fuel gas, 8.0 mm, G 3/8 LH, quick coupling including coupling pin for direct connection to spray gun	
9	840015	FastFlam, oxy-fuel gas, 6.3 mm, G 3/8 LH, quick coupling including coupling pin for direct connection to spray gun	
10	840017	FastFlam, oxygen, 6.3 mm, G 1/4 RH, quick coupling including coupling pin for direct connection to spray gun	

Pos.	Part Nº/ ESC Code	Description	Illustration
11	203742	Compressed air control system consisting of compressed air pressure regulator with oil and water separator, 6 m, with connections 3/8" and M 10 x 1 (both with tapered seals)	
12	209173	Sliding cut-off valve with ball seal for connecting to compressed air	
13	84169	Support bracket for mounting the gun on a lathe.	
14	290020	CastoFuse kit, complete Acetylene-oxygen fusion torch for pre-heating and for melting (fusing) Eutalloy RW coatings	
15	390137	Mounted grinding point (with ceramic bond), Ø 50 x 25 mm, retainer (mounting) pin Ø 6.0 mm (10 pc./pkg.) For preparing metal surfaces prior to the thermal spray coating process.	
16	205165	RotoTool I cutting tool, with reversible cutter for Tool I made of carbide ISO K10	
17	204619	Reversible cutter for Tool I, with chip breaker, made of carbide ISO K10	
18	204620	Reversible cutter for Tool II, with chip breaker, made of carbide ISO K10	
19	204109	RotoTool III, cutting tool, straight, with cutting stylus 3/8" made of carbide ISO K01	
20	204110	RotoTool III, cutting tool, right, with cutting stylus 3/8" made of carbide ISO K01	
21	204111	RotoTool III, cutting tool, right, with cutting stylus 1/2" made of carbide ISO K01	
22	205163	Stylus 1/2", length: 38 mm, made of carbide ISO K01	
23	205164	Stylus 3/8", length: 38 mm, made of carbide ISO K01	

RotoTec 800

Guarantee

The unit is guaranteed for 12 months and generally applies to operation during one shift. The guarantee includes the cost of replacing defective parts and component groups, including the time required for assembly. All guarantee claims regarding wear parts, improper use in damp conditions or heat, or damage caused by external forces are excluded.

Imprint

Operating instructions for RotoTec 800, Part N° / ESC Code 307147

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Notes

RotoTec 800

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Your resource for protection, repair and joining solutions

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