



EC 35 Hi-TE

EC 50 Hi-TE



EX 65 Hi-TE

User manual

Hi-TE Technologies used with air bearing turbine

All communication or reproduction of this document, in any form whatsoever and all use or communication of its contents are forbidden without express written authorisation from SAMES KREMLIN.

The descriptions and characteristics mentioned in this document are subject to change without prior notice.

© SAMES KREMLIN 2009



WARNING : SAMES KREMLIN SAS is registered with the Ministry of Labour as a training institution.

Throughout the year, our company offers training courses in the operation and maintenance of your equipment.

A catalogue is available on request. Choose from a wide range of courses to acquire the skills or knowledge that is required to match your production requirements and objectives.

Our training courses can be delivered at your site or in the training centre at our Meylan head office.

Training department:

Tel. 33 (0)4 76 41 60 04

E-mail: formation-client@sames-kremlin.com

SAMES KREMLIN SAS operating manuals are written in French and translated into English, German, Spanish, Italian and Portuguese.

The French version is deemed the official text and Sames will not be liable for the translations into other languages.

Hi-TE Technologies used with air bearing turbine

1. Description	4
1.1. Selection of the various systems	4
1.1.1. EC 35 Hi-TE Technology	4
1.1.2. EC 50 Hi-TE technology	4
1.1.3. EX 65 Hi-TE technology	4
1.2. Recommendations for the application on insulating parts	5
1.3. Performances	5
1.4. Spraying conditions	6
1.4.1. EC 35 Hi-TE Technology	6
1.4.2. EC 50 Hi-TE technology	6
1.4.3. EX 65 Hi-TE technology	7
2. Recommendations	8
3. Characteristics	8
4. Tools	9
5. Maintenance	10
5.1. Magnetic bell cup	10
5.1.1. Removal	10
5.1.2. Bell cup re-assembly	13
5.2. Shaping air assembly	14
5.2.1. Disassembly	14
5.2.2. Reassembly	14
6. Cleaning	16
6.1. Bell cup cleaning	16
6.2. Deflector cleaning	17
6.3. Outer cover cleaning	18
7. Spare parts	19
7.1. Replacement Frequency of bell cups and deflectors	19
7.2. EC 35 Hi-TE system	20
7.3. EC 50 Hi-TE system	21
7.4. EX 65 Hi-TE System	22

1. Description

Hi-TE technologies composed of a bell cup and a shaping air assembly are dedicated to sprayers equipped with air bearing turbines (PPH 607, PPH 607 R, Nanobell...).

EC 35 Hi-TE and EC 50 Hi-TE technologies are recommended for the application of all the products used in the field of the automotive finishing on metallic car-body parts or on plastic material, but for the "dust coat" called "base coat 2" for which EX 65 technology will be favoured.

- EC 35 Hi-TE technology: diameter of bell cup 35 mm.
- EC 50 Hi-TE technology: diameter of bell cup 50 mm.
- EX 65 Hi-TE technology: diameter of bell cup 65 mm.

1.1. Selection of the various systems

1.1.1. EC 35 Hi-TE Technology

Optimized for water-based or solvent-based paint application, EC 35 Hi-TE technology presents numerous advantages:

- High transfer efficiency, virtually stable whichever the speed of the robot or the paint flow may be.
- High flows
- High robot speeds
- Spray patterns that can be very narrow and that can vary linearly with respect to the shaping air flow.
- Very accurate trajectories thanks to a variable spray pattern.

EC 35 Hi-TE technology is thus particularly designed for trajectories requesting optimized spray patterns.

1.1.2. EC 50 Hi-TE technology

Optimized for water-based or solvent-based paint application, EC 50 Hi-TE technology presents numerous advantages:

- High transfer efficiency, virtually stable whichever the speed of the robot or the paint flow may be.
- High flows
- High robot speeds
- Spray patterns that can be very narrow and that can vary linearly with respect to the shaping air flow.

EC 50 Hi-TE technology is thus particularly designed for trajectories requesting optimized spray patterns.

1.1.3. EX 65 Hi-TE technology

EX 65 Hi-TE technology is used to apply the "dust coat", called "base coat 2", with a bell/bell process. It allows:

- a high shaping-air flow to favour a good orientation of the metallic flakes.
- a good colourmatching.

1.2. Recommendations for the application on insulating parts

EC 50 Hi-TE technology allows variable spray patterns and if necessary narrow ones. They are thus specially designed for the application on plastic parts such as bumpers.

To obtain the best results, it is highly recommended to use these technologies with trajectories of variable flows and spray patterns (125 mm < W50 < 250 mm for EC 50 Hi-TE technology), with high to very high motion speeds of the TCP (Tool Center Point) and with high paint flows.

It is also recommended:

- to systematically ground the part to be painted.
- to start the trajectory within the grounded area, in particular for water-based products. The paint film will then ensure the electrical continuity.
- to use a high electrostatic voltage (80 kV).
- to use a reduced spraying distance: from 180 to 210 mm.

1.3. Performances

	EC 35 Hi-TE System	EC 50 Hi-TE System	EX 65 Hi-TE System
Robot speed	up 1000 mm / s		
Paint flow	100 to 400 cc/mn	100 to 500 cc/mn	100 to 350 cc/mn
Rotation speed of bell cup	25 to 45 krpm		
Electrostatic charge	90 kV maxi, 80kV recommended		
Total shaping air	250 à 600 NI/mn	250 to 800 NI/mn	400 to 900 NI/mn
Impact diameter	variable 75 to 300 mm (according to the applied paints)	variable 100 to 450 mm (according to the applied paints)	approximately 300 mm
Spraying distance	180 mm to 300 mm		230 mm to 300 mm

1.4. Spraying conditions

1.4.1. EC 35 Hi-TE Technology

The values of parameters given below are indicative.

Paint flow	100 to 400 cc/min
Shaping air ratio	1/3 vortex 2/3 droit
Speed of robot	up to 1000 mm/s (700 mm/s recommended)
Spraying distance	180 to 260 mm (230 mm recommended)
Electrostatic charge	60 to 90 kV (85 kV recommended)

	Bell speed	Overlap	Width of variable pattern
Waterborne base coats	from 25 to 45 krpm	de 75 à 50%	From 75 mm to 300 mm

1.4.2. EC 50 Hi-Te technology

The values of parameters given below are indicative.

These values are valid for the different types of paint: water borne primers and base coats, solvent borne primers, base and clear coats.

Paint flow	100 to 500 cc/min
Shaping air ratio	1/3 vortex 2/3 straight 250 NI/min < Total air < 900 NI/min
Total air	300 NI/min < Air total < 800 NI/min (Water borne primers) 250 NI/min < Air total < 800 NI/min (Waterborne base coats) 250 NI/min < Air total < 800 NI/min (Solvent borne primers) 300 NI/min < Air total < 800 NI/min (Solvent borne base coats) 300 NI/min < Air total < 500 NI/min (Solvent borne clearcoat)
Speed of robot	up to 1000 mm/s (700 mm/s recommended)
Spraying distance	200 to 260 mm (230 mm recommended)
Electrostatic charge	60 to 90kV (80 kV recommended)
Width of variable pattern	150 to 450 mm, 150 to 400 for Solvent borne primers

	Bell speed	Overlap	Spraying distance
Water borne primers	from 30 to 45 krpm	from 66 to 50% (50% recommended)	200 to 260 mm
Waterborne base coats	from 30 to 45 krpm	from 75 to 50% (50% recommended)	180 to 260 mm
Solvent borne primers	from 25 to 45 krpm (40 krpm recommended)	from 66 to 50% (50% recommended)	200 to 260 mm
Solvent borne base coats	from 25 to 45 krpm	from 75 to 50% (50% recommended)	190 to 260 mm
Solvent borne clearcoat	45 krpm	from 75 to 50% (50% recommended)	180 to 260 mm

1.4.3. EX 65 Hi-TE technology

The values of parameters given below are indicative.

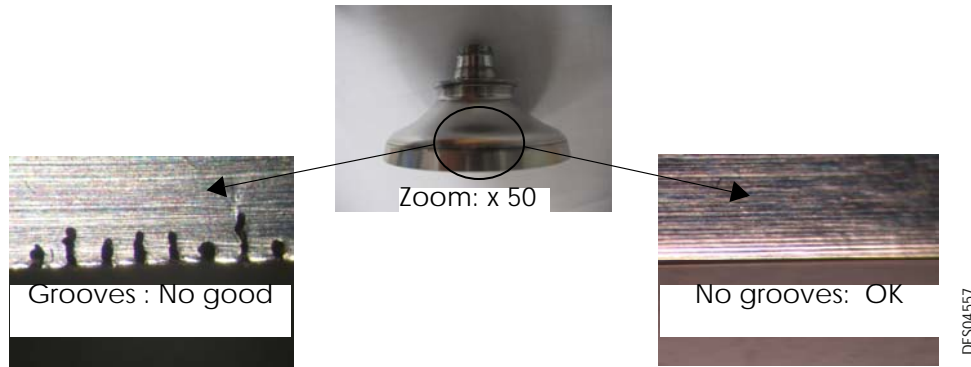
Paint flow	100 to 350 cc/min
Shaping air ratio	2/3 vortex, 1/3 droit 400 NI/min < Total air < 900 NI/min (Solvent borne base coats)
Speed of robot	up to 1000 mm/s (700 mm/s recommended)
Electrostatic charge	60 to 90 kV (80 kV recommended)
Width of pattern	around 300 mm (according to paints used)
Bell speed	From 20 to 45 krpm
Spraying distance	From 230 mm to 300 mm
Overlap	From 66 to 75 %

2. Recommendations

For perfect results, the atomizing bell cup must be cleaned frequently. It is recommended to clean the bell cup external every 8 hours and completely every 120 hours. The bell cup must not be subjected to impacts on its atomizing edge or distorted because it is balanced.

Necessary checks:

It is imperative to check the wear of the bell cup (all diameters) at the level of the spraying edge every 120 hours using a binocular 50-times magnifying glass.



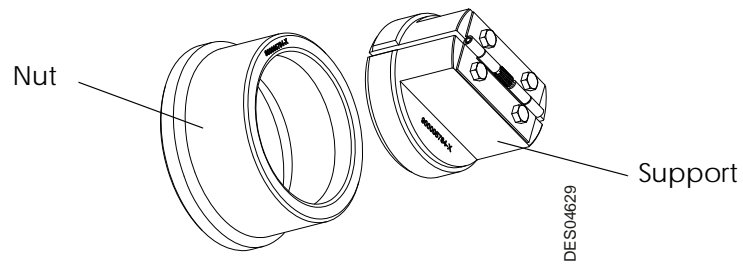
WARNING : If these recommendations are not respected, the operator exposes himself to the mechanical risk characterized by a tearing of the material due to the excessive wear of the bell cup.

For the replacement frequencies of the various bell cups ([see § 7 page 19](#)).

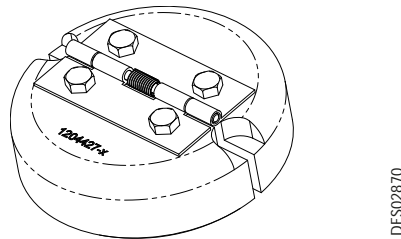
3. Characteristics

	Magnetic aluminium Bell cups		
Diameter	35 mm	50 mm	65 mm
Length	45.5 mm	45.5 mm	45.5 mm
Weight	38 g	44 g	67 g

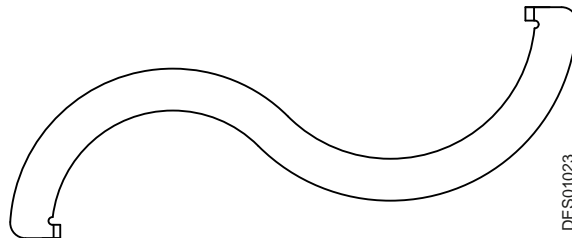
4. Tools



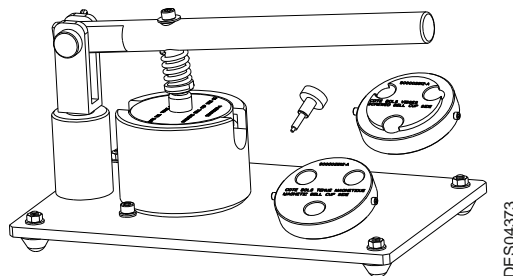
Part Number	Description	Qty	Unit of sale
900005784	Removal tool for EC 35 magnetic bell cup	1	1



Part Number	Description	Qty	Unit of sale
900000803	Removal tool for EC 50 magnetic bell cup	1	1
1204427	Removal tool for EX 65 magnetic bell cup	1	1



Part Number	Description	Qty	Unit of sale
1308689	Installation/ Removal tool for outer cover	1	1



Part Number	Description	Qty	Unit of sale
910002897	Installation / Removal tool for bell cup distributor	1	1

5. Maintenance



WARNING : Before any operation, stop shaping air and high voltage and wait for a complete stop of the turbine. Never stop the bearing air.

5.1. Magnetic bell cup



WARNING : All maintenance and handling operations operated on the bellcup must be carried out with utmost care as it is balanced.



WARNING : Any use of an unbalanced bellcup involves an inevitable destruction of the high speed turbine. Possible causes for unbalanced rotating parts are: paint deposits, physical damage and dry paint located on the bellcup or on the securing cylinder.

5.1.1. Removal



WARNING : The magnetic bellcup removal is carried out only the shaping air assembly in place.

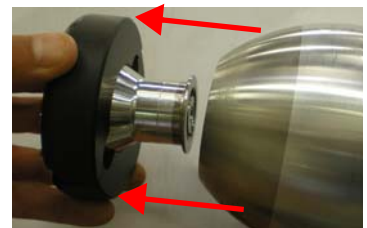
EC 50 and EX 65 bell cup removal

- **Step 1:** Position the suitable tool ([see § 4 page 9](#)) on the bell cup.



WARNING : Take care to the edge of the bell cup.

- **Step 2:** Close the tool on the bell cup and pull the bell cup in the axis.



- **Step 3:** Place the bell with care on a flat surface. It is imperative not to prop the bell against the fixation cylinder.

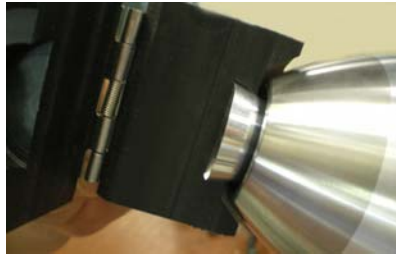


EC 35 bell cup removal

- **Step 1:** Position the tool (support) ([see § 4 page 9](#)) on the bell cup.



WARNING : Take care to the edge of the bell cup.



- **Step 2:** Close the tool on the bell cup.



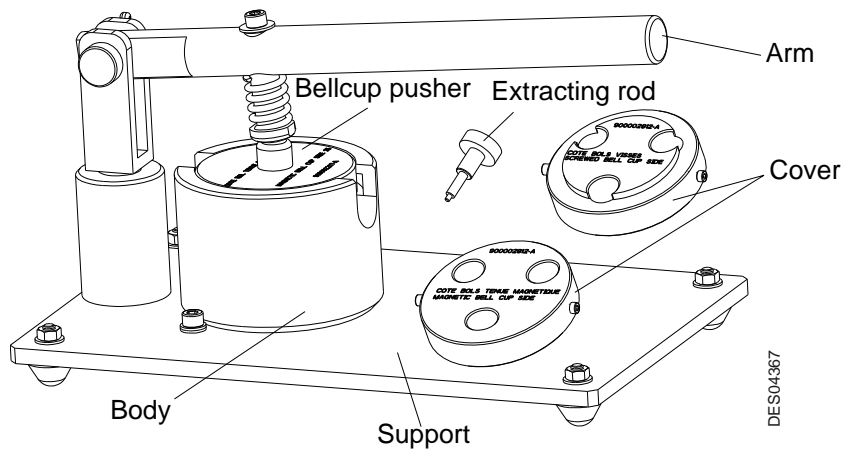
- **Step 3:** Hold the tool and screw the nut of the tool clockwise; it must come right against the outer cover (mechanical stop).



- **Step 4:** Hold the nut, then screw it anti-clockwise in order to remove the bell cup.



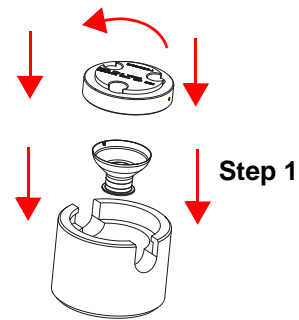
5.1.1.1. Deflector removal



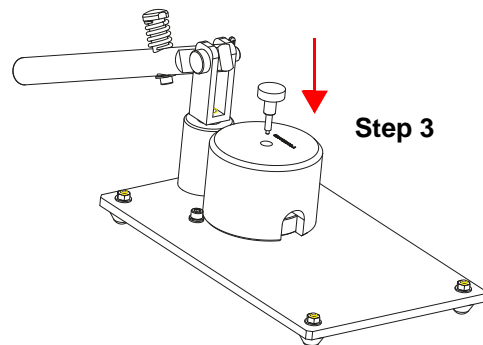
- **Step 1:** Put in place the bellcup in the body. Choose the cover according to the type of the bellcup (screwed or with magnetic fixing).

Remark: the position of the cover is given by the marking which must be side bellcup.

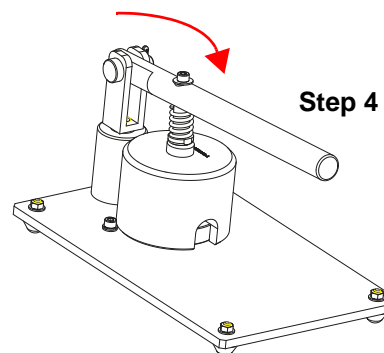
- **Step 2:** Place the cover on the body and turn it to secure the bellcup.



- **Step 3:** Place the body on the support in stop against the screws, (cover side support). Put in place the extracting rod.



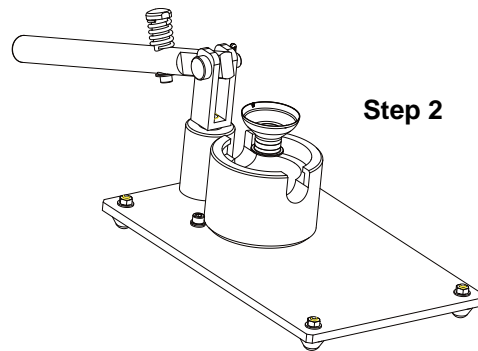
- **Step 4:** Bring the arm on the extracting rod and press until it stops. A "Clac" must be heard, deflector is separated from bellcup.



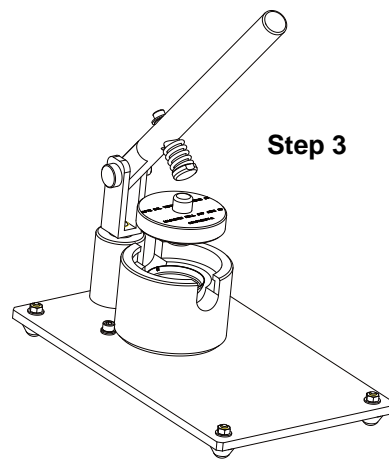
DES04369

5.1.1.2. Deflector re-assembly

- **Step 1:** Manually position the deflector in bellcup.
- **Step 2:** Place bellcup in the tool body.

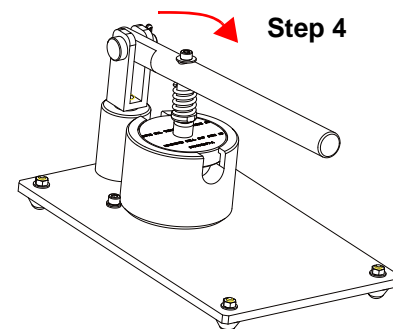


- **Step 3:** Select according to the bellcup diameter, the side of the bellcup pusher. Install the bellcup pusher in the body.
Remark: the position of the cover is given by the marking which must be side bellcup.



WARNING : For the EX 65 bell cup, use the EC 35 bell cup pusher.

- **Step 4:** Bring the arm on the bellcup pusher and press until complete crushing of the spring. Deflector is then assembled.



DES04370

5.1.2. Bell cup re-assembly



WARNING : Imperatively, put in place the shaping air shroud before installing the magnetic bell cup.

Check the absence of foreign matters (residues of dry painting, filings...) on the complete face of support of the bell cup and the rotor (cylinder, flange and magnet).

- Do not use the tool to re-install the bell cup.
- Position the bell cup on the rotor, a snap must be heard.

5.2. Shaping air assembly

The procedure is identical whatever the diameter of the bell cup

5.2.1. Disassembly

- **Step 1:** With the fingers, push the shaping air shroud against the atomizer and remove the outer cover using the tool (P/N # 1308689) by placing the wrench notches into the outer cover slots, turn clockwise and continue removing by hand.
- **Step 2:** Remove the shaping air shroud.

5.2.2. Reassembly

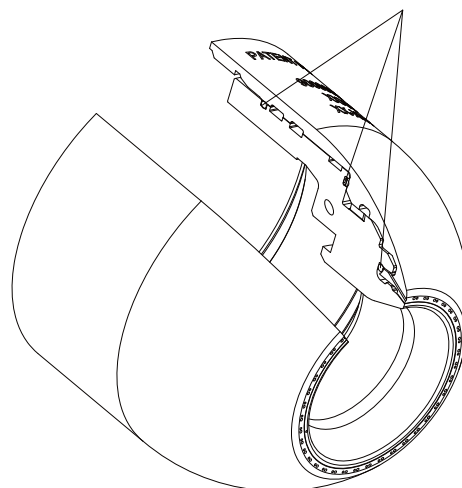


WARNING : Clean all components and inspect for damage, replace if necessary [see § 7 page 19](#).

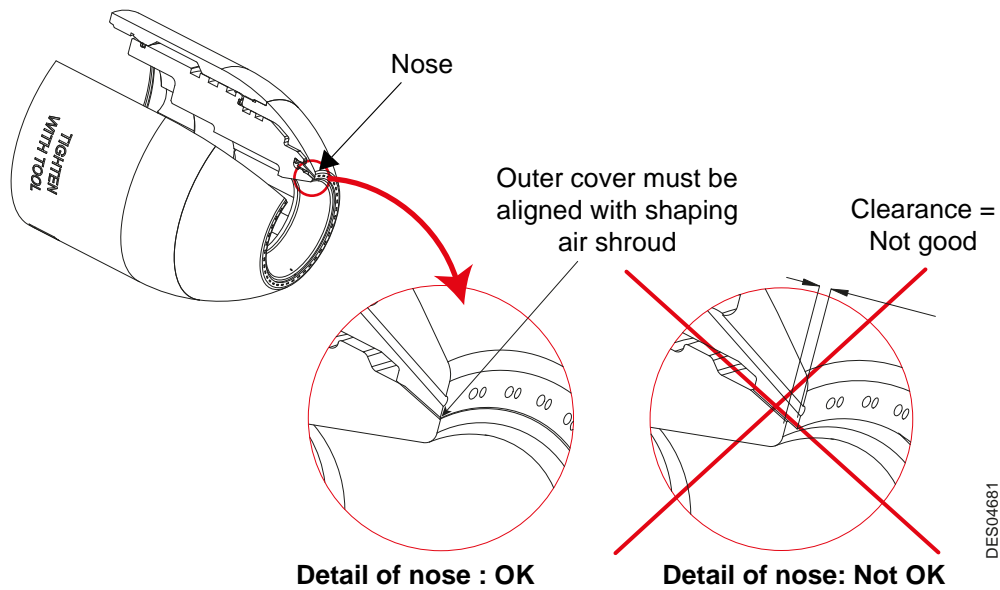


WARNING : Before re-installing the shaping air assembly, check the three o-rings and the restrictor are in place.

3 o-rings on the shaping air shroud



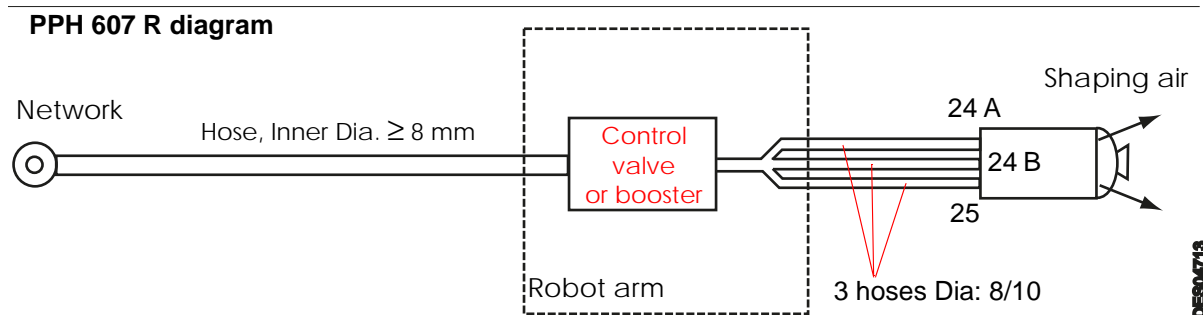
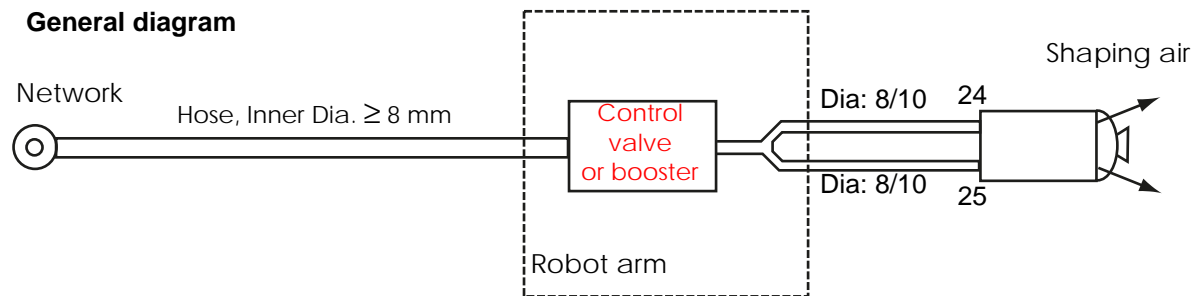
- **Step 1:** Install the shaping air shroud on the atomizer while making corresponding the alignment pin and put it in stop.
- **Step 2:** Put in place the outer cover over the assembly, secure it by hand then tighten it with the tool P/N # 1308689. When tightening is correct the front face of the shaping air shroud and the front face of the outer cover are aligned.



Hi-TE technologies are supplied by two independent air circuits marked 24 and 25 on the quick disconnect plate

- circuit 24 is called vortex air circuit.
- circuit 25 is called straight air circuit.

After the reassembly, make sure that each of both circuits is correctly supplied by supplying successively with vortex air, the air must only flow out through the holes of the outer cover of which angle deflects the air from the bell cup axis, then in straight air, the air then flows out through the holes directed towards the bell cup rotation axis.



The 8/10 supply hoses may be replaced by 7/10 ones, but must always be of same diameter and same length up to the quick disconnect plate.

6. Cleaning

6.1. Bell cup cleaning

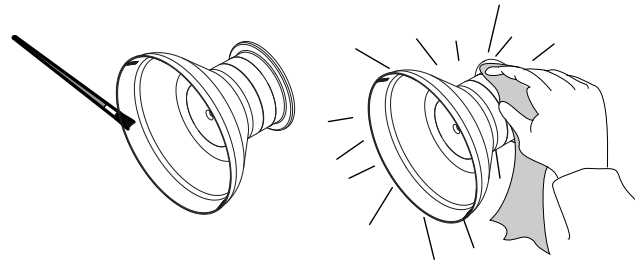
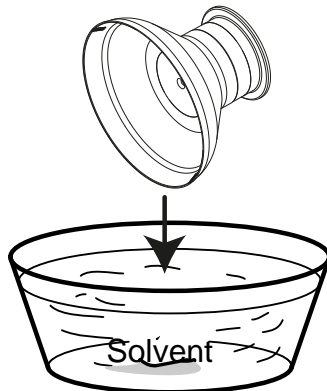


WARNING : All maintenance and handling operations operated on the bell cup must be carried out with utmost care as it is balanced.

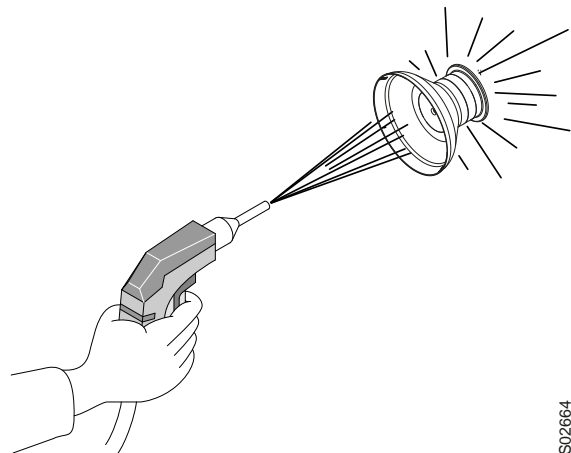
- **Step 1:** Remove the bell cup ([see § 5.1.1 page 10](#)).
- **Step 2:** Let the bell cup soak for one hour in a suitable solvent, then clean with a clean cloth and soft brush.



WARNING : Make sure that all surfaces are clean and completely free of impurities, particularly the inner and outer surfaces of the bell cup fastening cylinder.



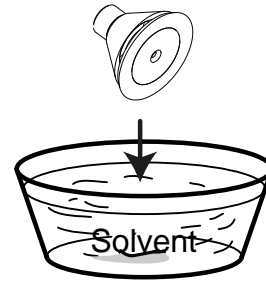
- **Step 3:** Dry carefully the two faces of the bell cup with compressed air.



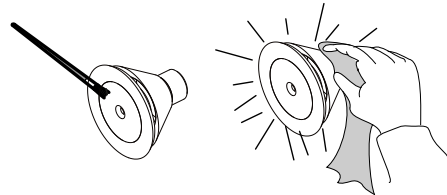
6.2. Deflector cleaning

- **Step 1:** Remove the deflector, ([see § 5.1.1.1 page 12](#)).

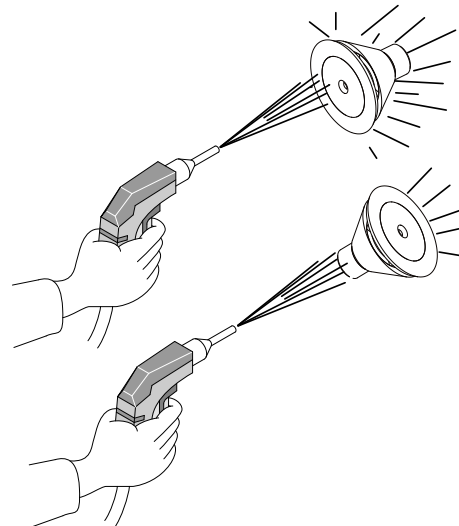
- **Step 2:** Let the deflector soak in solvent for one hour.



- **Step 3:** Then clean with a clean cloth and soft brush.



- **Step 4:** Dry carefully the two faces of the deflector with compressed air.



DES04690

6.3. Outer cover cleaning

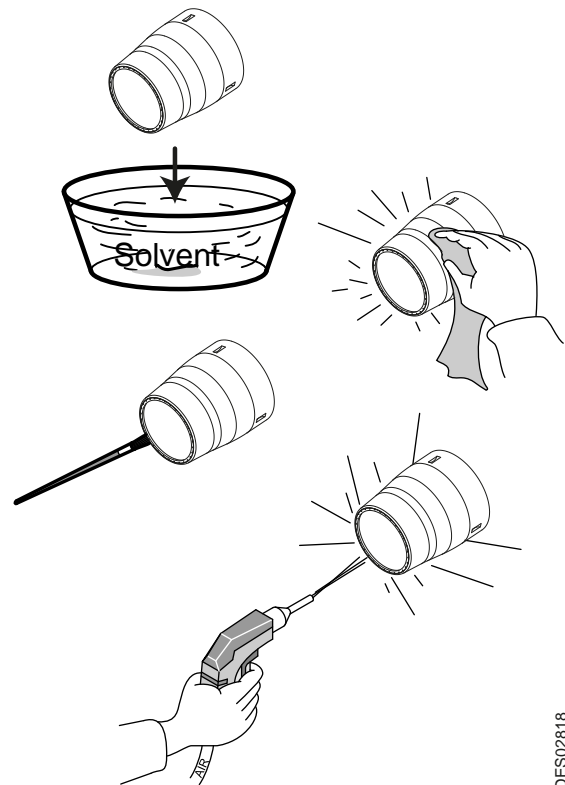
- **Step 1:** Remove the outer cover [see § 5.2.1 page 14](#).

- **Step 2:** Let the outer cover soak in solvent for one hour, then clean the outer and inner surfaces using a rag soaked in solvent.

- **Step 3:** Using a nylon brush, clean all the holes located on the front face of the outer cover.

- **Step 4:** Dry carefully with compressed air insisting on the holes to eliminate the paint residues, then wipe with a clean dry rag.

- **Step 5:** Check the shaping air shroud, clean it if necessary using a rag soaked in solvent.



DES02818

7. Spare parts

7.1. Replacement Frequency of bell cups and deflectors

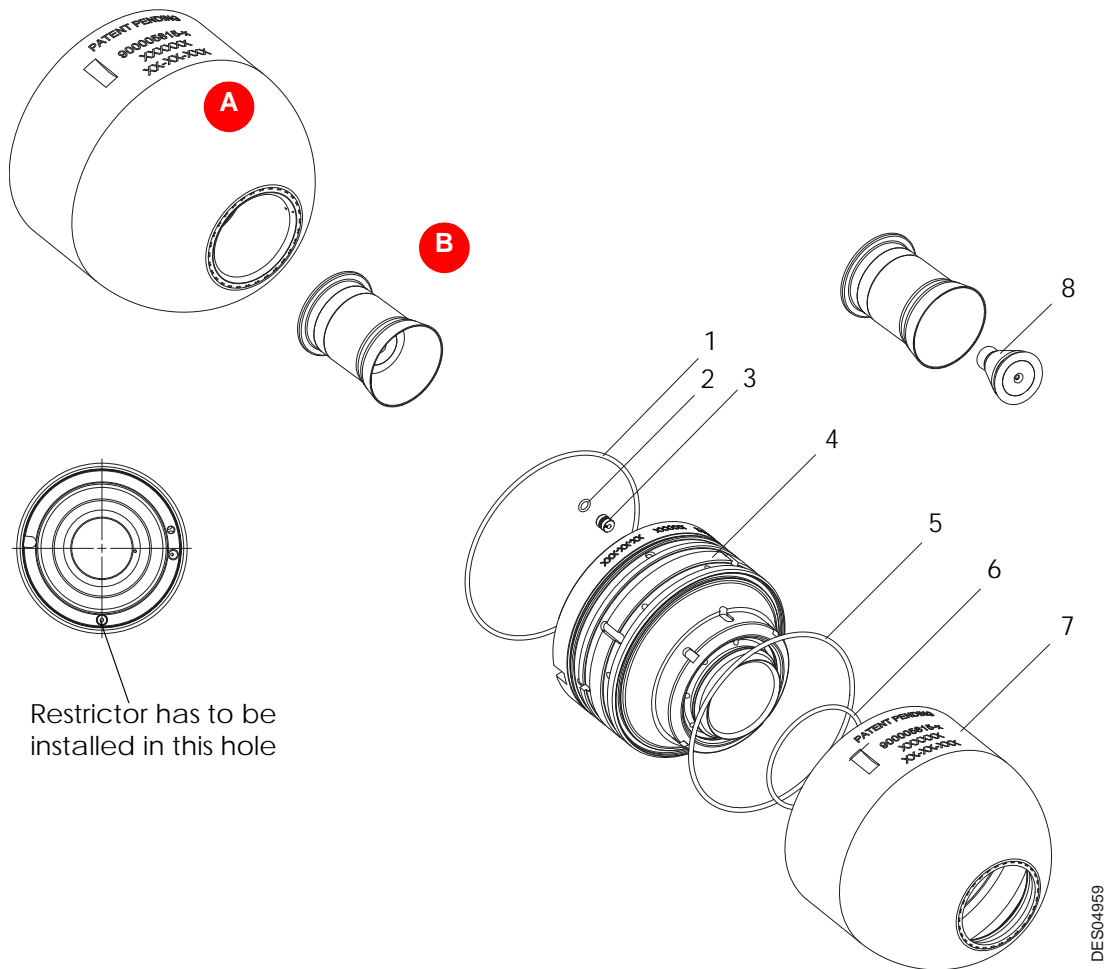
Types of bell cups	Replacement frequency
Bol 35 EC	5000 hours
Bol 50 EC	5000 hours
Bol 65 EX	5000 hours
Deflector	1500 hours

These average values depend of the paint type, the paint flow and the bell cup rotation speed.



WARNING : SAMES KREMLIN recommends to integrate these periodicities in preventive maintenance schemes and to systematically apply them, so that the equipment is not affected by an excessive wear of the bell cup.

7.2. EC 35 Hi-TE system



Item	Part Number	Description	Qty	Unit of sale	Maintenance level for spare parts (*)
	910008515	EC 35 Hi-TE system	1	1	2
A	910008975	EC 35 Hi-TE shaping air assembly	1	1	2
1	J2FENV622	O-ring - FEP viton	1	1	1
2	J3STKL038	O-ring - chemically inert	1	1	1
3	900006781	Restrictor Dia: 2.0	1	1	2
4	900005814	Shaping air shroud	1	1	2
5	J2FENV386	O-ring - FEP viton	1	1	1
6	J2FENV420	O-ring - FEP viton	1	1	1
7	900005815	Outer cover	1	1	2
B	910000877	Aluminium EC 35 Hi-TE bell cup	1	1	2
8	1312181	Deflector (included in item B)	1	1	1

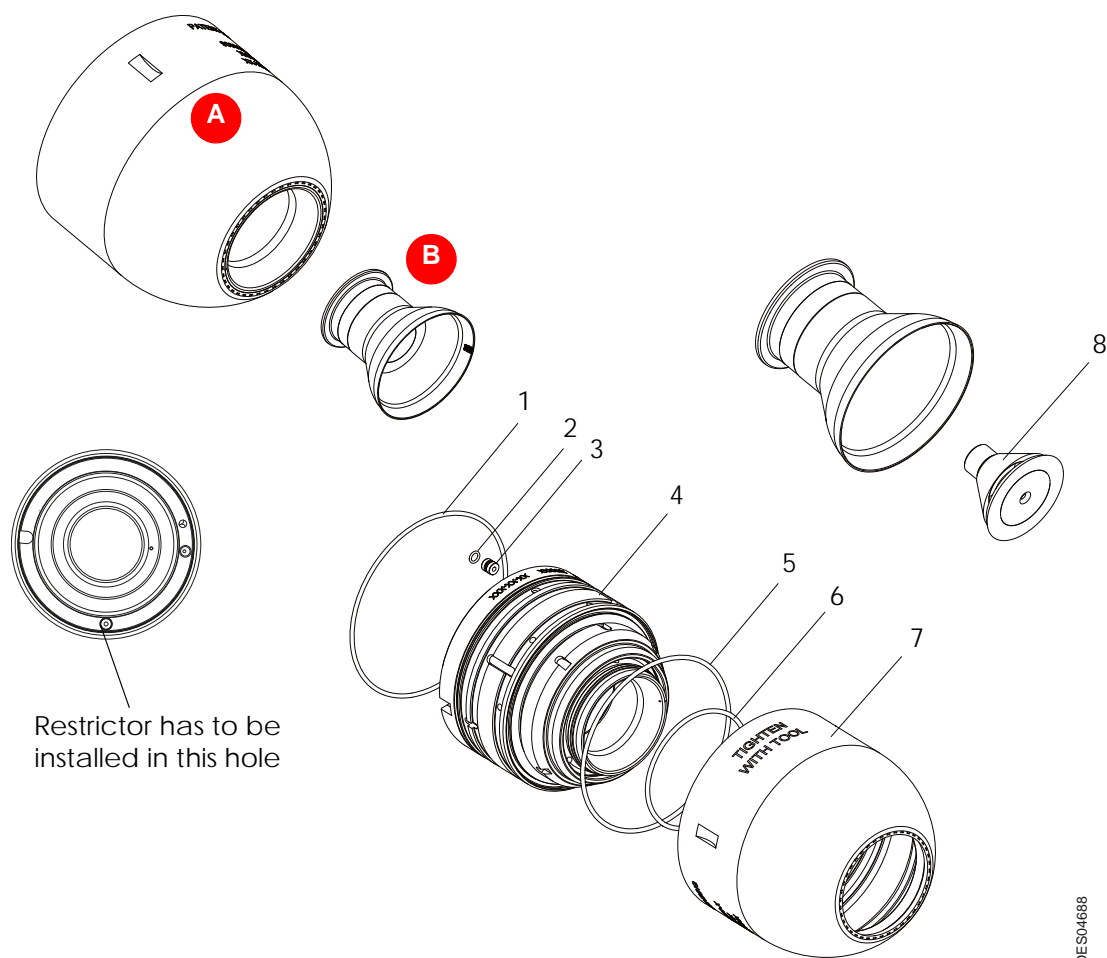
(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance

7.3. EC 50 Hi-TE system



Item	Part Number	Description	Qty	Unit of sale	Maintenance level for spare part (*)
	910008514	EC 50 Hi-TE system	1	1	2
A	910007433	EC 50 Hi-TE shaping air assembly	1	1	2
1	J2FENV622	O-ring - FEP viton	1	1	1
2	J3STKL038	O-ring - chemically inert	1	1	1
3	900005993	Restrictor Dia: 2.1	1	1	2
4	900005529	Shaping air shroud	1	1	2
5	J2FENV386	O-ring - FEP viton	1	1	1
6	J2FENV358	O-ring - FEP viton	1	1	1
7	900005530	Outer cover	1	1	2
B	910000876	Aluminium EC 50 Hi-TE bell cup	1	1	2
8	1312135	Deflector (included in item B)	1	1	1

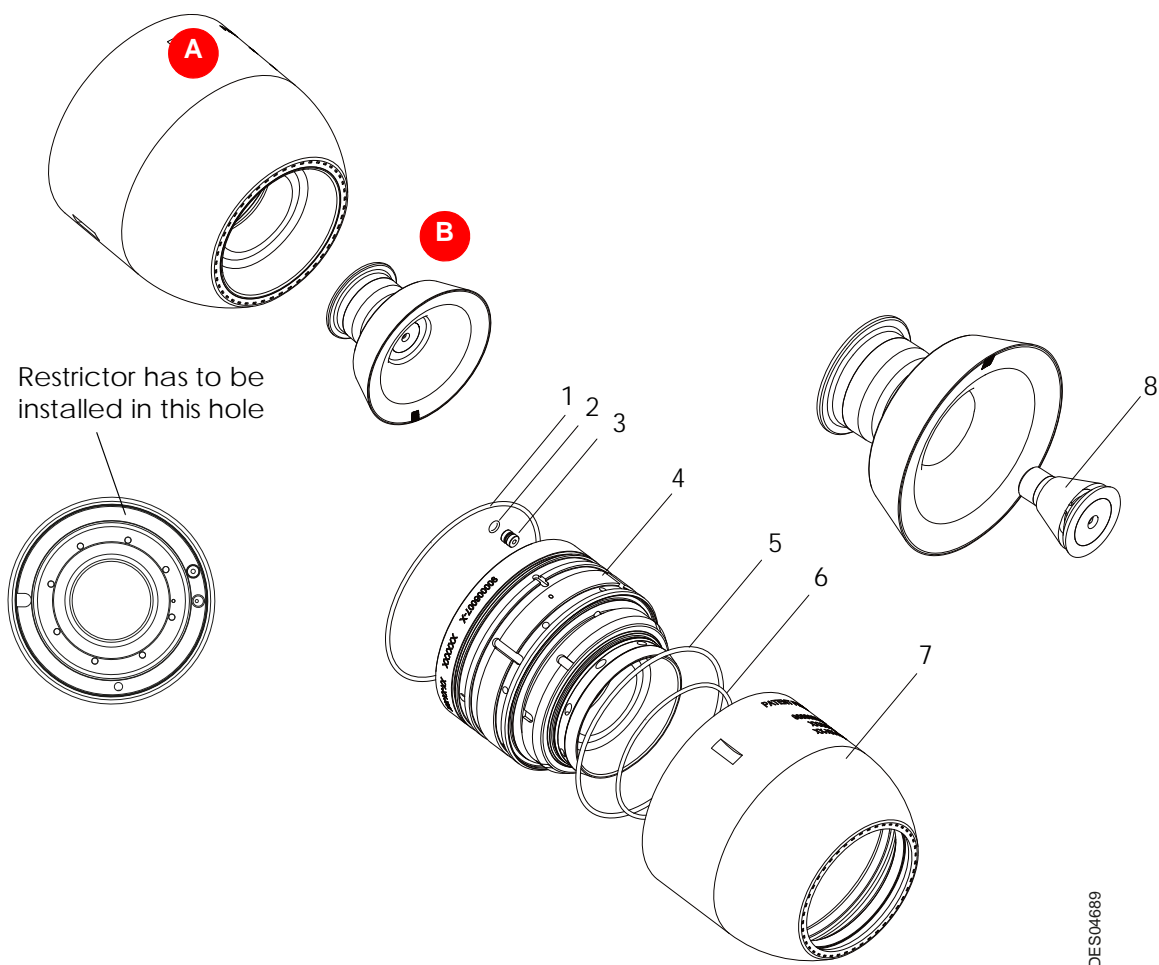
(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance

7.4. EX 65 Hi-TE System



Item	Part Number	Description	Qty	Unit of sale	Maintenance level for spare part (*)
	910008513	EX 65 Hi-TE System - PPH 607	1	1	2
A	910008211	EX 65 Hi-TE shaping air assembly	1	1	2
1	J2FENV622	O-ring - FEP viton	1	1	1
2	J3STKL038	O-ring - chemically inert	1	1	1
3	900005993	Restrictor Dia: 2.1	1	1	2
4	900006007	Shaping air shroud	1	1	2
5	J2FENV386	O-ring - FEP viton	1	1	1
6	J2FENV549	O-ring - FEP viton	1	1	1
7	900006008	Outer cover	1	1	2
B	910008179	Aluminium EX 65 Hi-TE Bell cup	1	1	2
8	1312181	Deflector (included in item B)	1	1	2

(*)

Level 1: Standard preventive maintenance

Level 2: Corrective maintenance

Level 3: Exceptional maintenance