Safety regulations

Translation of the original operating instructions
Documentation Safety regulations

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General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the powder spraying equipment. These safety regulations must be read and understood before the spraying paint equipment is used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

**DANGER!**
Danger due to electrically live or moving parts. Possible consequences: death or serious injury

**WARNING!**
Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

**INFORMATION!**
Useful tips and other information

These general safety regulations must be read and understood mandatory before start-up!
General information

The Gema powder spraying equipment is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.

Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. Gema Switzerland GmbH must be consulted prior to any use of the powder spraying equipment for any purposes or substances other than those indicated in our guidelines.

Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use.

The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.

Furthermore, the country-specific safety regulations also must be observed.

Additional safety and operation notices can be found on the accompanying CD or on the homepage www.gemapowdercoating.com.

General dangers

Start-up is forbidden until it has been established that the spraying equipment has been set up and wired according to the EU guidelines for machinery.

Unauthorized modifications to the powder spraying equipment exempt the manufacturer from any liability from resulting damage or accidents.

The operator must ensure that all users have received appropriate training for powder spraying equipment and are aware of the possible sources of danger.

Any operating method, which will negatively influence the technical safety of the powder spraying equipment, is to be avoided.
For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original Gema spare parts should be used!

Repairs must only be carried out by specialists or by authorized Gema service centers. Unauthorized conversions and modifications can lead to injuries and damage to the equipment and invalidate the Gema Switzerland GmbH guarantee.

### Electrical danger

The connecting cables between control unit and spray guns must be laid out in such a way that they cannot be damaged during operation. Please observe the local safety regulations!

The plug connections between the powder spraying equipment and the mains should only be removed when the power supply is switched off.

All maintenance activities must take place when the powder spraying equipment is switched off.

The powder coating equipment may not be switched on until the booth is in operation. If the booth stops, the powder coating equipment must switch off too.

### Explosion hazard

The control units for the spray guns must be installed and used in zone 22. Spray guns are allowed in zone 21.

Only original Gema OEM parts are guaranteed to maintain the explosion protection rating. If damages occur related to the use of spare parts from other manufacturers, all relevant warranty or compensation claims are void!

Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of greater than 50% of the lower explosion limit (UEG = max. permissible powder/air concentration). If the UEG is not known, then a value of 10 g/m³ should be considered (see EN 50177).

All unauthorized conversions and modifications to the electrostatic spraying equipment are forbidden for safety reasons.

No safety devices should be dismantled or put out of operation.

Mandatory operational and workplace notices from the operating company must be written in a comprehensible manner in the language of equipment operators and posted in a suitable place.

### Slip hazard

Powder lying on the floor around the powder spraying equipment is a potentially dangerous source of slipping. Booths may be entered only in the places designed for this purpose.
Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided by a proper grounding.

Grounding

All electrically conductive parts found within 5 meters around each booth opening, and in particularly the objects to be coated, must be grounded. The grounding resistance of each object must amount to maximally 1 MOhm. This resistance must be checked/tested regularly when starting work.

The condition of the work piece attachments, as well as the hangers, must guarantee that the work pieces remain grounded. The appropriate measuring devices must be kept ready in the workplace, in order to check the grounding.

The floor of the coating area must conduct electricity (normal concrete is generally conductive).

The supplied grounding cable (green/yellow) must be connected to the grounding screw of the electrostatic manual powder coating equipment. The grounding cable must have a good metallic connection with the coating booth, the recovery unit and the conveyor chain, respectively with the suspension arrangement of the objects.

Fire and smoke prohibition

Smoking and igniting fire are forbidden in the entire vicinity of the system! No work that could potentially produce sparks is allowed!

Electrical fields

As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations!

Photographing

Photographing with flashlight can lead to unnecessary releases and/or disconnections by safety devices.
Service and maintenance

Disconnect the plugs before the machines are opened for maintenance or repair.

The plug connections between the powder spraying equipment and the mains should only be removed when the power supply is switched off.

Clothing

As far as it is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).

A dust mask corresponding to filter class FFP2 at minimum must be worn during any cleaning work.

The operating personnel must wear electrically conductive footwear (e.g. leather soles).

The operating personnel should hold the gun with bare hands. If gloves are worn, these must also conduct electricity.

Conformity of use

1. The stationary powder spraying equipment is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.

2. Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. Gema Switzerland GmbH must be consulted prior to any use of the powder spray equipment for any purposes or substances other than those indicated in our guidelines.

3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The stationary powder spraying equipment should only be used, maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

4. Start-up (i.e. the execution of approved operational tasks) is forbidden until it has been established that the powder spray equipment has been set up and wired according to the guidelines for machinery (2006/42 EC). EN 60204-1 (machine safety) must also be observed.

5. Unauthorized modifications to the powder spraying equipment exempt the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.

7. Furthermore, the country-specific safety regulations also must be observed.

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**Technical safety regulations for stationary electrostatic powder spraying equipment**

**General information**

Stationary Gema Switzerland GmbH electrostatic spraying equipment is built to the “state of the art” and is operationally safe. This equipment can be dangerous if it is not used for its specified purpose. Consequently it should be noted that there exists a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery belonging to the user and a hazard to the efficient operation of the equipment.

1. The powder spraying equipment should only be started up and used once the operating instructions have been carefully studied. Incorrect operation of the control unit can lead to accidents, malfunctions or damage to the control itself or to the plant.

2. Before every start-up check the equipment for operational safety (regular servicing is essential)!

3. The local safety guidelines are to be followed for safe operation.

4. Please observe the local safety regulations!

5. Disconnect the plugs before the machines are opened for repair.

6. The plug connections between the powder spraying equipment and the mains should only be removed when the power supply is switched off.

7. The connecting cables between the control unit and the spray gun must be installed so as to eliminate the possibility of damage during the operation. Please observe the local safety regulations!

8. Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. Any warranty claim for damage caused by the use of foreign parts is void.

9. If Gema Switzerland GmbH powder spraying equipment is used in conjunction with machinery from other manufacturers, then their safety regulations must also be taken into account.

10. Before starting work, familiarize yourself with all installations and operating elements, as well as with their functions! Familiarization during operation is too late!

11. Take care when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable! Smoking is forbidden in the entire plant area!

12. As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations!
WARNING!
We point out that the customer himself is responsible for the safe operation of the equipment. Gema Switzerland GmbH is in no way responsible for any resulting damage.

Safety conscious working

Each person responsible for the assembly, start-up, operation, service and repair of powder spraying equipment must have read and understood the operating instructions and the "Safety regulations" chapter. The operator must ensure that the user has had the appropriate training for powder spraying equipment and is aware of the possible sources of danger.

The powder spraying equipment should only be used by trained and authorized personnel. This applies to modifications to the electrical equipment, which should only be carried out by a specialist.

The operating instructions and the necessary closing down procedures must be followed before any work is carried out concerning the set-up, start-up, operation, modification, operating conditions, mode of operation, servicing, inspection or repairs.

The powder spray equipment can be turned off by using the main switch or failing that, the emergency shut-down. Individual components can be turned off during operation by using the appropriate switches.

Individual safety regulations for the operating firm and/or operating personnel

1. Any operating method, which will negatively influence the technical safety of the powder spraying equipment, is to be avoided.

2. The operator should care about no non-authorized personnel works on the powder spraying equipment (e.g. this also includes using the equipment for non-conform work).

3. For dangerous materials, the employer has to provide an operating instructions manual for specifying the dangers arising for humans and environment by handling dangerous materials, as well as the necessary preventive measures and behavior rules. The operating instructions manual has to be written in an understandable form and in the language of the persons employed, and has to be announced in a suitable place in the working area.

4. The operator is under obligation to check the powder spraying equipment at least once every shift for signs of external damage, defects or changes (including the operating characteristics) which could influence safety and to report them immediately.

5. The operator is obliged to check that the powder spraying equipment is only operated when in satisfactory condition.

6. As far as it is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).

7. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder spraying equipment.

8. The safety devices may not be dismantled or put out of operation. If the dismantling of a safety device for set-up, repair or servicing is necessary, reassembly of the safety devices must take
place immediately after the maintenance or repair work is finished. All maintenance activities must take place when the powder spraying equipment is switched off. The operator must train and commit the responsible personnel to this.

9. Activities, such as checking powder fluidization or checking the high voltage spray gun etc., must be carried out with the powder spraying equipment switched on.

Notes on special types of hazard

Power/tension

It is necessary to refer once more to the danger of life from high voltage current if the shutdown procedures are not observed. High voltage equipment must not be opened - the plug must first be taken out - otherwise there is danger of electric shock.

Powder

Powder/air mixtures can be ignited by sparks. There must be sufficient ventilation in the powder coating booth. Powder lying on the floor around the powder spraying equipment is a potentially dangerous source of slipping.

Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided - please refer to chapter "Grounding".

Grounding

All electricity conducting parts found in the workplace (1 meter around each booth opening, according to EN 12981), and particularly the objects to be coated, have to be grounded. The grounding resistance of each object must amount to maximally 1 MOhm. The resistance must be tested regularly. The condition of the work piece attachments, as well as the hangers, must guarantee that the work pieces remain grounded. If the grounding of the machinery includes the suspension arrangements, then these must constantly be kept clean in order to guarantee the necessary conductivity. The appropriate measuring devices must be kept ready in the workplace, in order to check the grounding.

Compressed air

When there are longer pauses or stand-still times between working, the powder spraying equipment should be drained of compressed air. There is a danger of injury when pneumatic hoses are damaged and from the uncontrolled release and improper use of compressed air.

Crushing and cutting

During operation, moving parts may automatically start to move in the operating area. It must be ensured that only instructed and trained personnel go near these parts. The operator should ensure that barriers comply with the local security regulations.

Access under exceptional circumstances

The operating firm must ensure that local conditions are met when repairs are made to the electronic parts or when the equipment is restarted.
so that there are additional measures such as barriers to prevent unauthorized access.

**Prohibition of unauthorized conversions and modifications to machines**

All unauthorized conversions and modifications to the electrostatic spraying equipment are forbidden for safety reasons.

The powder spraying equipment should not be used if damaged, the faulty part must be immediately replaced or repaired. Only original Gema spare parts should be used! Any warranty claim for damage caused by the use of foreign parts is void.

Repairs must only be carried out by specialists or by authorized Gema service centers. Unauthorized conversions and modifications can lead to injuries and damage to the equipment. The Gema Switzerland GmbH guarantee would no longer be valid.

**Safety requirements for electrostatic powder coating**

1. This equipment is dangerous if the instructions in this operating manual are not followed.
2. All electrically conductive parts located in the zone 22 and especially the work pieces must be grounded.
3. The floor of the coating area must conduct electricity (normal concrete is generally conductive).
4. The operating personnel must wear electrically conductive footwear (e.g. leather soles).
5. The operating personnel should hold the gun with bare hands. If gloves are worn, these must also conduct electricity.
6. The supplied grounding cable (green/yellow) must be connected to the grounding screw of the electrostatic manual powder coating equipment. The grounding cable must have a good metallic connection with the coating booth, the recovery unit and the conveyor chain, respectively with the suspension arrangement of the objects.
7. The electricity and powder supply to the hand guns must be set up so that they are fully protected against heat and chemical damage.
8. The powder coating equipment may not be switched on until the booth is in operation. If the booth stops, the powder coating device must switch off too.
9. The grounding of all electrically conductive devices (e.g. hooks, chain conveyor etc.) must be checked on a weekly basis. The grounding resistance must amount to maximally 1 MOhm.
10. The control device must be switched off if the hand gun is cleaned or the nozzle is changed.
11. When working with cleaning agents there may be a risk of hazardous fumes. The manufacturers instructions must be observed when using such cleaning agents.
12. The manufacturers instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.
13. If any part of the spray gun is damaged (broken parts, fractures) or missing, then it should not be used.

14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original Gema spare parts should be used!

15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The former protection must not be reduced.

16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of greater than 50% of the lower explosion limit (UEG = max. permissible powder/air concentration). If the UEG is not known, then a value of 10 g/m³ should be considered.

A summary of the directives and standards

**European directives RL**

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<td>Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres</td>
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<td>2004/108/EG</td>
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**EN European standards**

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<td>Safety of Machinery – Electrical Equipment of Machines – Part 1: General requirements</td>
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<td>EN 13980:2002</td>
<td>Potentially Explosive Atmospheres – Application of Quality Systems</td>
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<td>EN 12981+A1: 2009</td>
<td>Coating plants - spray booths for application of organic powder coating material/safety requirements</td>
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<td>EN 50177:2006</td>
<td>Stationary electrostatic spraying equipment for flammable coating powder</td>
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<td>EN 61241-0:2006</td>
<td>Electrical Apparatus for Use in the Presence of Combustible Dust. General requirements</td>
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<tr>
<td>EN 61241-2-2:</td>
<td>Electrical Apparatus for Use in the Presence of Combustible Dust. Part 2: Methods</td>
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<td>EN 61241-10:</td>
<td>Electrical Apparatus for Use in the Presence of Combustible Dust. Part 10: Classification of Areas Where Combustible Dusts Are or May Be Present</td>
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<td>2004</td>
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<tr>
<td>EN 1127-1:2008</td>
<td>Explosive Atmospheres. Basic Concepts and Methodology</td>
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**Special security measures**

- Installation work performed by the customer must be carried out according to local regulations.
- Before starting up the plant a check must be made that no foreign objects are in the booth or in the ducting (input and exhaust air).
- All components must be grounded according to the local regulations before start-up.
- The booth grounding is to be checked at every start-up. The grounding connections are customer specific, and are made on the booth. The grounding of the workpieces and other plant units must also be checked.