



Electrostatic Spraying Equipment

EN 50050 (EN 50014, EN 50176 & EN 50177 also apply)

This protection concept is applicable to hand-held and automatic electrostatic spraying equipment and associated apparatus, which can be used to spray flammable liquid coating materials, flammable coating powders or flammable flock.

There are three types of systems considered under EN 50050 and the automatic installation guides, EN 50176 and EN 50177. These are:

Type A: Systems complying with EN 50050 with a discharge energy limit of 0.24 mJ (flammable liquid) or 2mJ (flammable powder or flock). In these systems there is no danger of either electric shock or discharges of incendive energy.

Type B: Systems with a discharge energy limit in excess of 2mJ but less than 350mJ and a current limit of less than 0.7mA. In these systems there is no danger of electric shock but there are dangers from discharges of incendive energy.

Type C: Systems with a discharge energy limit in excess of 350mJ and a current limit in excess of 0.7mA. In these systems there are dangers of electric shock and discharges of incendive energy.

Requirements Applicable to all Handheld Spray Guns

The principles for handheld spray guns are:

- T6 temperature classification.
- Tool secured covers.
- Compliance with EN 292, Safety of machinery and EN 1953, Atomising and spraying equipment for coating materials safety requirements.
- Handle surface resistance not exceeding 1 MΩ.
- Conductive contact surface area of the handle of at least 20cm².
- All conductive parts assembled to remain in electrical contact and connected to earth.

- Earthed metallic screened cable protected by an insulated outer sheath.
- Trigger biased to the off position and able to switch the high voltage supply and spraying material off within 2 seconds of release.
- Multi-outlet high voltage supplies are permitted when isolation for each circuit is present.
- Current limiting resistors mounted and protected so that they are immune from short circuits.
- Zener diodes used to limit the high voltage, to be duplicated and not operated at more than 2/3 their rating under a one-fault condition.
- Adjusting devices used to adjust the high voltage above the maximum limits must be durably and permanently locked.



Requirements Applicable to Handheld Spray Guns for Flammable Liquid Coating Materials

- Any electrical apparatus or part of electrical apparatus of a paint spray gun including the outer enclosure (with exception of the components in the high voltage circuit), shall comply with the requirements of one or more types of protection concept listed in EN 50014.
- Associated apparatus used in the hazardous area shall comply with one or more types of protection concept listed in EN 50014 and meet the minimum ingress protection of IP 54.



Requirements Applicable to Handheld Spray Guns for Flammable Powder Coating Materials

- Any electrical apparatus or part of electrical apparatus of a powder spray gun including the outer enclosure (with exception of the components in the high voltage circuit), shall comply with the requirements of one or more types of protection concept listed in EN 50014 and meet the minimum ingress protection of IP 54.
- Associated apparatus used in the hazardous area shall comply with EN 50281-1-1 and the maximum surface temperature of the enclosure shall not exceed 200°C.

Requirements Applicable to Handheld Spray Guns for Flammable Flock

- Any electrical apparatus or part of electrical apparatus of a flock spray gun including the outer enclosure (with exception of the components in the high voltage circuit), shall comply with the requirements of one or more types of protection concept listed in EN 50014 and meet the minimum ingress protection of IP 54.
- Associated apparatus used in the hazardous area shall comply with EN 50281-1-1 and the maximum surface temperature of the enclosure shall not exceed 200°C.

General Test Requirements for all Handheld Spray Guns

- **Voltage Tests:**
The high voltage parts of the spray gun and its connecting cable shall be raised to a voltage of 1.2 times its rated voltage for a period of 1 minute. There shall be no breakdown.

A 2.5 metre minimum sample of the high voltage cable shall be raised to a voltage of 1.2 times its rated voltage for a period of 20 minutes. There shall be no breakdown.

- **Temperature Tests:**

Testing is conducted in accordance with EN 50014 on the spray gun and associated apparatus if used in the hazardous area.

- **Impact Test:**

The spray gun and associated apparatus intended to be located in the hazardous area are submitted to 7-Joule impacts, corresponding to high-risk mechanical danger defined in EN 50014. The equipment shall comply after test with the ignition test requirements (see below).

- **Drop Test:**

The spray gun is to be dropped 4 times from a height of 1.25 metres onto a concrete floor. The equipment shall comply after test with the ignition test requirements (see below).

- **Cable Pull Test:**

Any cable to the spray gun, except where connected to intrinsically safe circuits, is to be subjected to a pull test of 150 N for a period of 50 seconds.

- **Ignition Tests for Spray Guns for Liquid Paints and Flammable Flock:**

A test gas mixture with a minimum ignition energy of 0.24 mJ, mixture of propane 99% purity and air with a concentration by volume of $5.25 \pm 0.25\%$ propane is used.

Earthed metal spheres of 10 mm and 25 mm are repeatedly moved towards those parts of the spray gun and its connecting cable from which its possible to obtain the most incendive discharges for a period of 20 minutes. The explosive mixture shall not be ignited.

- **Ignition Tests for Spray Guns for Coating Powders:**

A test gas mixture with a minimum ignition energy of 2 mJ, mixture of methane 99% purity and air with a concentration by volume of $12.0 \pm 0.1\%$ methane is used. Earthed metal spheres of 10 mm and 25 mm are repeatedly moved towards those parts of the spray gun and its connecting cable from which its possible



to obtain the most incendive discharges for a period of 20 minutes. The explosive mixture shall not be ignited.

- **Ignition Tests for Triboelectrical Spray Guns:**

Tests to determine that the maximum possible charging current does not exceed 15 μ A and that propagating brush discharges are avoided.

- **Ignition Tests for Flock:**

Spray guns for flock designed to be used only for non-flammable adhesives vapours need not pass an ignition test; it only has to be declared by the manufacturer that the maximum possible discharge energy is less than 350 mJ.

Requirements Applicable to Automatic Spray Guns

Automatic guns of Type A systems are assessed and tested in compliance with EN 50050, as per the requirements to handheld guns.

Automatic guns of Type B or Type C systems are a risk from incendive energy and electric shock (Type C) and therefore would not pass the ignition tests defined in EN 50050.

However, these types of spray guns are assessed and tested against the relevant requirements of EN 50050 and against the installation requirements defined in either EN 50176 or EN 50177.

In addition to these standards, incendive types of spray guns are also assessed to any available standards deemed necessary in accordance with the ATEX Directive 94/9/EC to ensure safety.

Additional testing is usually based on determining a safe distance that the spray gun can operate at without causing an incendive spark, this is then marked on the gun and is incorporated as a special condition of safe use.

Other types of equipment

In addition to electrostatic spray guns, we have used our experience and knowledge to provide certification for anti-static guns that are used to discharge surfaces prior to coating or painting.

How Can Sira Help?

Sira is a world-leader in the conformity assessment solutions field, specialising in product certification to a wide range of protection concepts.

ATEX Certification and FM Approval

Sira is able to issue ATEX Certification (for access to European markets) and produce FM test reports leading to North American Approval for a range of spray gun products.

Our scope of expertise covers:

- Electrostatic spray guns
- Powder spray guns
- Ionising spray guns
- Automatic & Handheld spray guns
- Types A, B & C spray gun systems

Sira has carried out spray gun certification for a number of leading manufacturers across the globe, and our experience and expertise makes us the number one choice for spray gun product compliance.

Our compliance services also include:

A free meeting at Sira to discuss your product certification project, identifying any pitfalls and calculating a schedule of work.

Fixed price quotations explaining the cost and timescales involved in carrying out the project.

Training courses detailing current European and International safety legislation.

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