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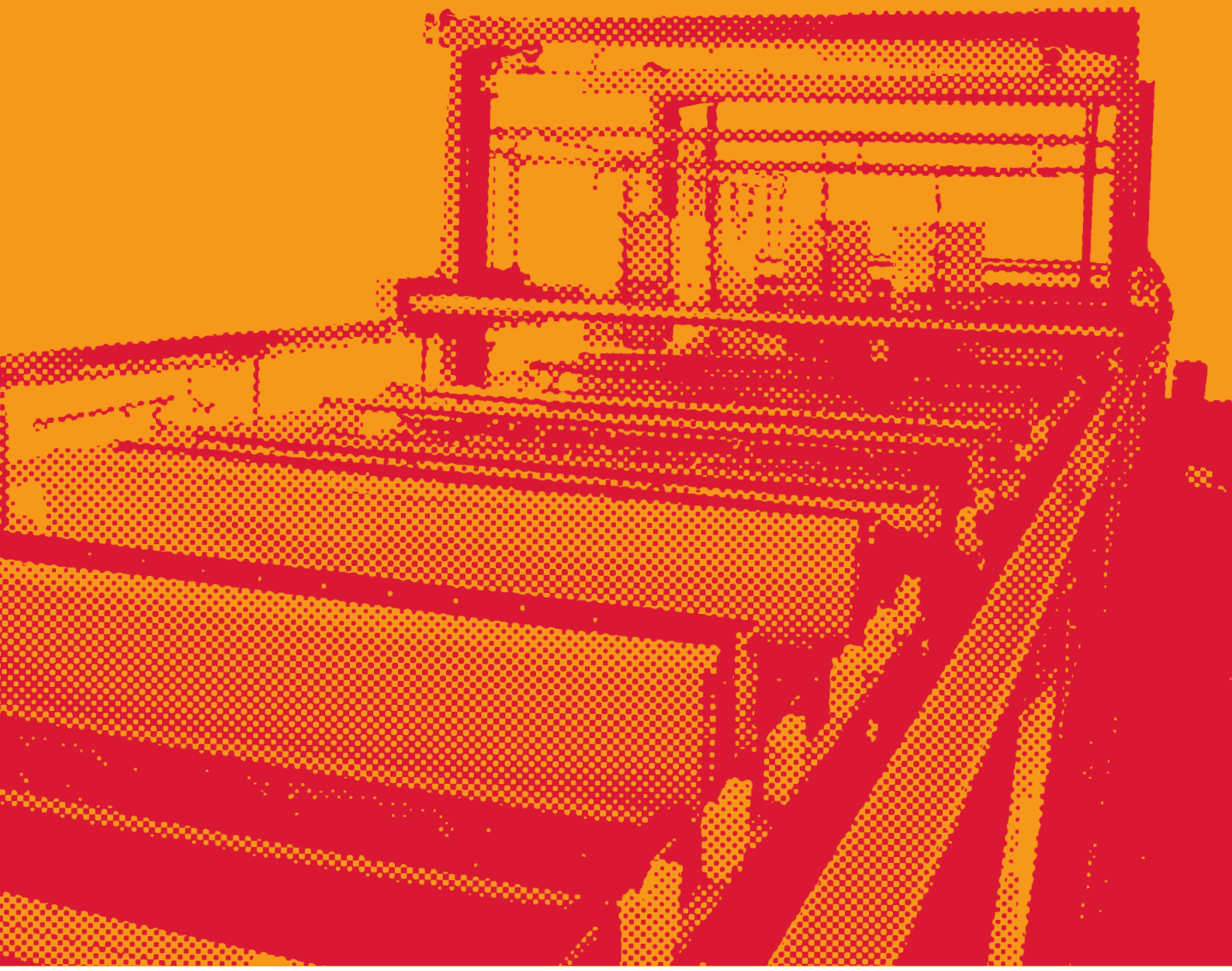
Risk Control

Fire safety in the electroplating industry



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CONTENTS

SCOPE

These recommendations outline the property protection measures appropriate to the electroplating industry either as independent operations or as part of combined industrial processes.

This document is specific to electroplating processes and excludes electrodeless plating such as hot-dipped galvanising.

SYNOPSIS

These recommendations provide advice regarding property protection measures that should be observed when undertaking electroplating in heated tanks in any part of an industrial process. The potential fire hazards are outlined and advice is set out concerning the location of the operations, electrical installations, suitable fire protection measures and the management of the operation.

DEFINITIONS

Electrodeless plating

Electrodeless plating, which falls outside the scope of this document, is a chemical process whereby a metal coating is achieved by immersing a metal or non-metallic object in a suitable bath containing a chemical reducing agent without the use of an electrical current. Hot-dipped galvanising is an example.

INTRODUCTION

Electroplating is a process of coating a metal object with another metal using direct current passed through a suitable chemical solution. Coatings may include chromium, nickel, zinc, copper, brass and, in some specialist applications such as the aviation industry, cadmium.

Plating operations may be stand-alone businesses, which are usually small to medium in size or may be part of other industrial operations, such as in the aircraft, electronic and jewellery manufacturing industries.

Processes may involve the heavy coating of hard metals like chromium on machine parts while others may involve light coatings to domestic items, vehicle components, ornamental items, steel items (requiring corrosion protection) and during the manufacture of electronic circuit boards.

Plating processes often involve the coating of an article with one metal type as a base prior to a final coating with another. An example would be the nickel or copper plating of an article prior to being plated with chromium.

In addition to the plating process, a number of support processes and functions may form part of the business. These may include offices, effluent plants, electropolishing processes for stainless steel or similar and jig, maintenance and vehicle workshops.

The actual metal treatment process is likely to involve metal preparation in the form of stripping, degreasing and polishing; electroplating; metal finishing that may involve the polishing of plated items or the coating of ornamental items that have been copper or brass plated with a clear lacquer to inhibit tarnishing.

Although this document addresses property protection requirements, some of the recommendations are also applicable to life safety. The measures will therefore supplement the findings of the fire risk assessment conducted to meet the Regulatory Reform (Fire Safety) Order 2005 in England and Wales (ref. 1) and equivalent legislation in Scotland and Northern Ireland (refs. 2, 3 and 4). Premises where electroplating operations are carried out will also need to be assessed in compliance with the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 (ref. 5).

Process	Activity	Potential fire hazards
Metal preparation	• Stripping of components and degreasing	• Solvent-based degreasers • Electrical installations and equipment
	• Polishing and preparation of components for plating	• Electrical installations and equipment • Combustible materials, such as polishing mops and associated packaging • Combustible dusts from polishing mops in use on polishing machines. • Accumulations of combustible waste
Electroplating process	• Coating of metal objects with another metal, such as zinc, copper, brass, nickel, chromium and cadmium, using an electrical current passed through a chemical solution	• Electrical installations and equipment including cables, pumps, process heating units, transformers, rectifiers, exhaust fans and portable electrical equipment • Plastic tanks and plastic- or rubber-lined tanks. • Plastic extraction hoods and ducting • Possible evolution of hydrogen gas during the plating process • Accumulations of combustible waste and rubbish
Metal finishing	• Polishing of plated items where required	• Combustible dust from polishing mops on polishing machines • Electrical installations, machinery and equipment • Limited combustible packaging
	• Coating of ornamental items with clear lacquer either by dipping or spraying	• Flammable liquids in open containers when dipping • Flammable liquid in atomised form if application is by spraying • Electrical installations and equipment
Support processes and functions	• Jig, maintenance and vehicle workshops	• Electrical installations and equipment • Flammable liquids, such as lubricants and paraffin-based degreasing agents normally associated with workshops • Flammable gases, such as LPG • Limited combustible packaging • Accumulations of combustible waste and rubbish
	• Effluent plant	• Plastic tanks • Electrical installations and equipment, such as motors and cables

Table 1: Key fire hazards at electroplating premises

POTENTIAL FIRE HAZARDS

Electroplating processes usually involve damp environments using plating solutions that may be corrosive, reactive and perhaps toxic, rather than flammable.

Fire hazards encountered are likely to include electrical equipment and installations and the presence of limited quantities of flammable materials. Hazards may also include plastic extraction hoods and ducting, plastic tanks or plastic lined tanks fitted with electric immersion heaters and the use of flammable liquids for certain finishing processes or those located in the workshops. There is also a chance that flammable gases may be present on site.

As is the case with all industries, it is important that the key fire hazards are identified and are removed, reduced or managed accordingly (see Table 1).

RECOMMENDATIONS

1. Construction/location

1.1 Where possible, electroplating operations should be located in a separate building, away from other processes.

1.2 Where this is not practical, the electroplating process should be separated from other important or business critical areas by 60-minutes' fire resistant construction.

1.3 Any openings around service penetrations in the fire-rated construction should be fire-stopped with a suitable proprietary material affording a minimum of 60-minutes' fire resistance.

1.4 Containment and drainage provisions should be provided for areas containing tanks.

1.5 Drainage systems should be designed to avoid the mixing of incompatible materials.

1.6 Toxic solutions should not be released into groundwater drains, but should be retained on site for safe disposal by a licensed contractor.

1.7 Fume and/or smoke extraction facilities should be provided. These should be independent of the services from other plant areas.

2. Process heating and electrical installations

2.1 All electrical installations and equipment should be installed by competent electricians in accordance with BS 7671: **Requirements for electrical installations** (ref. 6). Installations should be both moisture and chemical resistant.

2.2 All electrical installations and equipment should be regularly inspected by a competent electrician in accordance with BS 7671. The Periodic Inspection Report from Appendix 6 of the document should be used and accompanied by a Schedule of Inspection and Schedule of Test Results. Because of the corrosive nature of the atmosphere in the vicinity of electroplating processes, more frequent inspections of electrical installation than those indicated in the standard may be appropriate. The frequency of inspections should be determined by risk assessment.

2.3 All switchgear and control equipment must be installed in a manner that will provide adequate protection from physical damage as well as from harsh environmental conditions.

2.4 Infrared scanning (thermography) of electrical installations and equipment at regular intervals is recommended.

2.5 Areas in which flammable vapours or gases may be present should be assessed in accordance with BS EN 60079-10-1: 2009: **Explosive atmospheres. Classification of areas. Explosive gas atmospheres** (ref. 7) to ensure that electrical equipment provided is suitable for use in the zone.

Heating units

2.6 Where possible, electric immersion heaters should be replaced with other forms of heating, such as steam using heat exchangers.

2.7 Where heating units are installed in plastic tanks or plastic-lined tanks, the following safeguards should be considered:

2.7.1 The heater should have adequate strength to withstand normal handling, installation and use during service.

2.7.2 The construction should include means by which the heater can be securely and safely attached to the tank or other structure.

2.8 The outer sheathing material of the heater should be compatible with the liquid in which it is to be immersed; the advice of the process chemical supplier and the heater manufacturer should be obtained.

2.9 Heating units should be installed in accordance with the manufacturer's recommendations to ensure sufficient clearance from the sides and base of the tank.

2.10 It should be ensured that heating units to be installed have been designed for electroplating process use, are fit for purpose and, where necessary, carry a recognised standards mark.

2.11 High liquid level sensors should be fitted to isolate the flow of product and prevent overfilling where tanks are filled from bulk supplies.

2.12 It should be ensured that each heating unit is fitted with an over-temperature sensor and cut out. If not an integral part of the heating unit, the location of the sensor should be determined in conjunction with the manufacturer.

2.13 All high liquid level and high temperature safety devices should be capable of operating independently of the process controls.

2.14 Cut-out devices should be provided to isolate heating units if process pumps are deactivated or fail, or when the flow of liquid is interrupted.

2.15 High level temperature sensors should be provided to isolate the power supply and sound an alarm if the temperature of the liquid reaches 14°C above the normal process temperature of the liquid. These should be on a manual reset.

2.16 Heating units should be protected from mechanical damage.

2.17 When tanks are to be drained, it should be ensured that heaters are turned off before draining commences and only reinstated once the liquid level has been restored.

2.18 LPG and other industrial gases in cylinders should be stored, used and handled in accordance with the

recommendations set out in RC8: **Recommendations for the storage, use and handling of common industrial gases in cylinders including LPG** (ref. 8).

Immersion heaters

2.19 Where practical considerations require that electric immersion heaters be retained, the following should apply:

2.19.1 Metal sheathed heating elements should be connected to a terminal or earth wire of sufficient size to carry any fault current (see 2.1).

2.19.2 A residual current device with a tripping current of 30mA and manufactured to BS EN 61557: **Electrical safety in low voltage distribution systems up to 1000V ac and 1500V dc. Equipment for testing, measuring or monitoring of protective measures** (ref. 9) should be incorporated into the power supply to the heater.

2.19.3 Each heating installation should have a warning light, clearly visible from the operating position at the tank, to indicate when the heaters are energised.

2.19.4 Each installation should also have a manually resettable isolating switch, which is clearly identified and readily accessible from the operating position at the tank.

2.19.5 In the case of quartz- or PTFE-sheathed heaters, guards should be available to provide adequate protection from physical damage.

2.19.6 In the case of quartz- or PTFE-sheathed heaters, some method of providing an earth connection should be provided and this must be connected to an efficient electrical earth.

2.19.7 A thermostatic device for controlling the temperature of the process liquid should be incorporated into the power supply system. If the heater sheath has a maximum temperature rating, a control should be fitted to ensure that this temperature is not exceeded.

2.19.8 It is important that the level of the process liquid does not fall and expose the hot zone of the heater. Low liquid level sensors should be provided to isolate the electrical supply to the heaters and provide a visual and audible alarm if the level drops to a defined extent. Such sensors should be provided even if devices are installed that are designed to automatically maintain the level of the liquid in the event of uncontrolled evaporation or tank leakage.

2.19.9 Adequate means should be provided for making and protecting electric cable connections to the element and earth terminals.

2.19.10 The power rating (kW) and surface power density (W/cm^2) should be appropriate for the volume of the liquid being heated. The chemical supplier and the heater manufacturer should be consulted for advice.

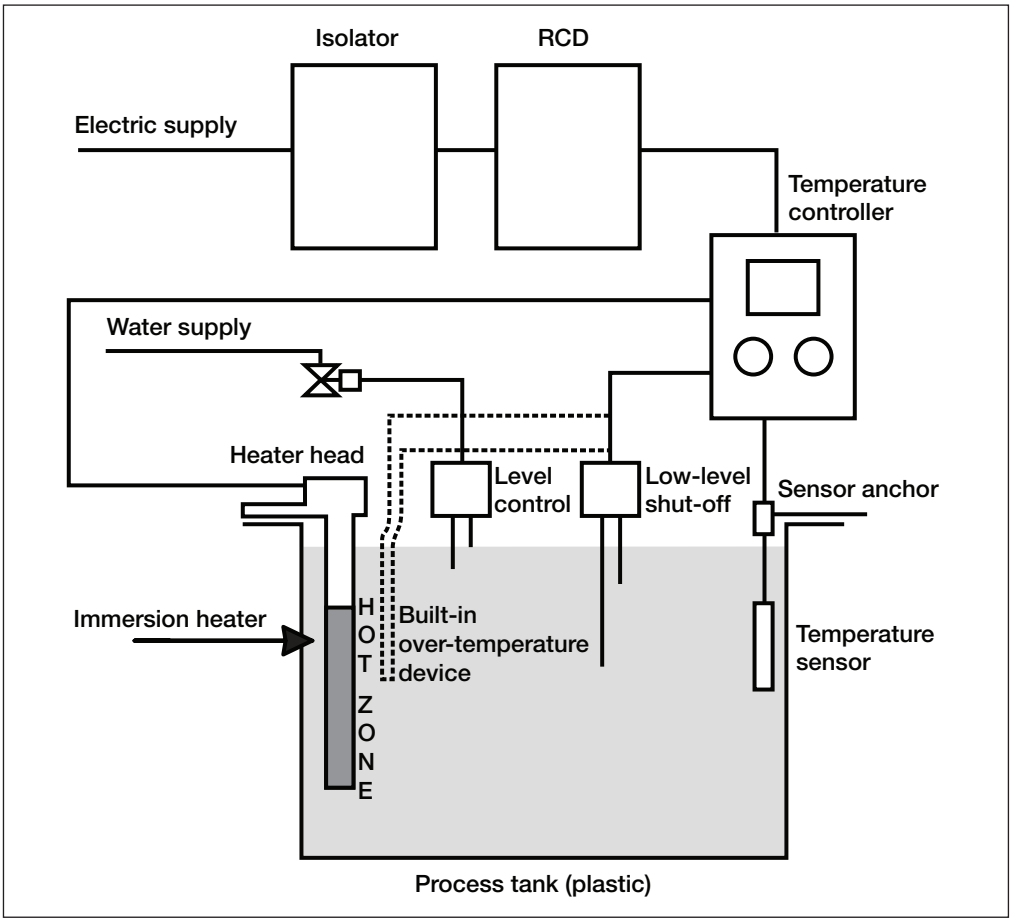
2.19.11 Immersion heaters should be installed so as to be clear of any sludge build up in a tank.

2.19.12 Enclosures of non-combustible construction should be provided for embedded or bonded heaters.

3. Fire protection

The level of fire protection is likely to vary depending on the level of the risk, whether the electroplating tank is free standing or attached to other structures and the type and extent of the processes involved.

Figure 1: Elements of a typical process tank utilising an immersion heater



3.1 A suitable number of appropriate portable fire extinguishers, approved and certificated by an independent, UKAS accredited third party certification body, should be provided for use by trained staff in accordance with BS 5306-8: **Fire extinguishing installations and equipment on premises. Selection and installation of portable fire extinguishers. Code of practice** (ref. 10).

3.2 The extinguishers should be maintained by a competent engineer in accordance with BS 5306-3: **Fire extinguishing installations and equipment on premises. Commissioning and maintenance of portable fire extinguishers. Code of practice** (ref. 11).

3.3 A suitable manual fire alarm system should be provided in accordance with BS 5839-1: **Fire detection and fire alarm systems for buildings. Code of practice for system design, installation, commissioning and maintenance** (ref. 12). The level of provision of automatic fire detection should be determined by the fire risk assessment. The installation should be designed, installed, commissioned and maintained by an engineer with accreditation by an independent, UKAS-accredited third party certification body.

3.4 Where plastic tanks, plastic-lined tanks or plastic ducts are in use, a fire risk assessment should be conducted to determine if the provision of automatic sprinklers would be beneficial. The assessment should take into consideration the types of chemicals and solutions in use and their potential for reaction with water. The use of corrosion-resistant sprinkler heads and piping may be necessary.

3.5 Any sprinkler systems installed, system extensions or the separation of sprinkler protected and non-sprinkler protected areas should be in accordance with the standard to which the system was designed and installed, while new systems should be in accordance with the requirements of the **LPC Rules for Automatic Sprinkler Installations 2009 incorporating BS EN 12845** (ref. 13).

3.6 As well as assessing the need for sprinklers, the assessment should also consider other forms of automatic fire suppression system and their application to specific processes or items of plant. Where appropriate, such installations should be designed, installed, commissioned and maintained by a competent engineer.

3.7 Automatic fire suppression systems must be maintained in accordance with published standards or where no relevant standards apply, to the manufacturer's requirements. Insurers recommend that companies completing maintenance (and installations) of these systems be members of recognised third party certification schemes.

4. Fire safety management

Fire safety management must address emergency procedures, staff training, regular fire safety inspections and the periodic testing and maintenance of electrical equipment and heating units, all of which will be necessary to help ensure that an adequate level of fire safety is maintained.

Emergency procedures

4.1 It should be ensured that fire procedures are suited to the hazards, are in place and are rehearsed. Procedures should cover the action to be taken on discovering a fire and the action to be taken on hearing the alarm.

4.2 When drafting the procedures, the presence of flammable liquids, exposure to chemicals and plating liquids and the possibility of reactivity of solutions with water should be taken into consideration.

Staff training

4.3 Staff should receive fire safety training on induction and follow-up training at regular intervals as indicated in the fire risk assessment for the premises.

4.4 Designated staff will also require training to ensure that they are competent to conduct and record any fire safety inspections as indicated in the fire risk assessment.

4.5 All training should be formally recorded.

Inspection and maintenance

4.6 A routine inspection and maintenance programme for all heating equipment and tanks should be implemented and recorded.

4.7 On a weekly basis, visual inspections should be undertaken of all electrical components and safety devices.

4.8 On a monthly basis, it is important that safety devices for electric immersion heaters are tested; safety devices for other types of heater should be tested on a quarterly basis.

Liaison with the fire and rescue service

4.9 The fire and rescue service should be informed about the location, nature and quantities of hazardous materials stored and used on site. It is helpful to provide a secure box near the entrance containing plans of the site, showing the layout, location and quantities of hazardous substances (such as highly flammable liquids, compressed gas cylinders, tanks, and refrigerants) together with the location of hydrants and other water supplies.

4.10 In the event of a fire, a designated member of staff should be available to meet the fire and rescue service and inform the officer in charge of:

- the location of the fire;
- the situation regarding personnel;
- the location of water supplies for firefighting; and
- the nature, location and approximate quantities of hazardous materials on the site, including fuel tanks and gas cylinders.

5. General requirements

5.1 The use, storage and control of flammable liquids should be in accordance with the Parts 1 and 2 of RC20: **Recommendations for fire safety in the storage and use of flammable liquids** (refs. 14, 15) and RC57: **Storage and use of highly flammable and flammable liquids in external fixed tanks** (ref. 16).

5.2 Flammable degreasing solvents should be replaced by non-flammable types where possible.

5.3 Where indicated by the fire risk assessment, consideration should be given to providing local extraction at grinding and buffing machines to remove combustible dust that is generated.

5.4 A high standard of housekeeping should be maintained with particular attention to areas where combustible waste can accumulate, such as under tanks and duck-boards.

5.5 Where parts of the premises have been assessed in accordance with BS EN 60079-10-1 (ref. 7), suitable hazard zone plans should be available and displayed.

5.6 Where plastic tanks and ducting are to be used, consideration should be given, where practicable, to the following:

5.6.1 Constructing tanks from fire-retardant polypropylene.

5.6.2 Using fire-retardant fibreglass resin for fume extraction ducting where metal is not suitable.

5.6.3 Fitting fire-break dampers in the main fume extraction ducting.

5.7 Tanks should be clearly labelled for identification purposes by the fire brigade when attending an incident.

5.8 In areas where hydrogen may be produced during the plating process ventilation should be provided in accordance with the findings of the risk assessment. Inlets should be provided at a low level with exhausts at the highest point of the room in the same elevation of the exterior wall or roof.

6. Checklist

		Yes	No	N/A	Action required	Due date	Sign on completion
6.1	**Construction/location (section 1)**						
6.1.1	Are electroplating operations located in a separate building, away from other processes? (1.1)						
6.1.2	If the answer to 6.1.1 is 'no', are the electroplating process separated from other important or business critical areas by 60-minute, fire-resistant construction? (1.2)						
6.1.3	Are any openings around service penetrations in the fire-rated construction fire-stopped with a suitable proprietary material affording a minimum of 60-minutes' fire resistance? (1.3)						
6.1.4	Are containment and drainage provisions provided for areas containing tanks? (1.4)						
6.1.5	Are drainage systems designed to avoid the mixing of incompatible materials? (1.5)						
6.1.6	Are toxic solutions retained on site for safe disposal by a licensed contractor rather than being released into groundwater drains? (1.6)						
6.1.7	Are fume and/or smoke extraction facilities provided independently of services from other plant areas? (1.7)						
6.2	**Process heating and electrical installations (section 2)**						
6.2.1	Are all electrical installations and equipment installed by competent electricians in accordance with BS 7671, with installations being both moisture and chemical resistant? (2.1)						
6.2.2	Are all electrical installations and equipment regularly inspected and tested in accordance with BS 7671, or more frequently than required by this standard when determined by a risk assessment? (2.2)						
6.2.3	Is all switchgear and control equipment installed in a manner that will provide adequate protection from physical damage as well as from harsh environmental conditions? (2.3)						
6.2.4	Is infrared scanning (thermography) of electrical installations and equipment undertaken at regular intervals? (2.4)						
6.2.5	Have areas in which flammable vapours or gases may be present been assessed in accordance with BS EN 60079-10 to ensure that electrical equipment provided is suitable for use in the zone? (2.5)						
6.2.6	Have electric immersion heaters been replaced wherever possible with other forms of heating, such as steam using heat exchangers? (2.6)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.2.7	Where heating units are installed in plastic tanks or plastic-lined tanks, has the heater adequate strength to withstand normal handling, installation and use during service? (2.7.1)						
6.2.8	Where heating units are installed in plastic tanks or plastic-lined tanks, does the construction include means by which the heater can be securely and safely attached to the tank or other structure? (2.7.2)						
6.2.9	Is the outer sheathing material of the heater compatible with the liquid in which it is to be immersed? (2.8)						
6.2.10	Have the heating units been installed in accordance with the manufacturer's recommendations to ensure sufficient clearance from the sides and base of the tank? (2.9)						
6.2.11	Have heating units in plastic tanks been designed for electroplating process use, are they fit for purpose and do they carry a recognised standards mark? (2.10)						
6.2.12	Have high liquid level sensors been fitted to isolate the flow of product and prevent overfilling where tanks are filled from bulk supplies? (2.11)						
6.2.13	Is each heating unit fitted with an over-temperature sensor and cut out? (If not an integral part of the heating unit, is the location of the sensor determined in conjunction with the manufacturer?) (2.12)						
6.2.14	Are all high liquid level and high temperature safety devices capable of operating independently of the process controls? (2.13)						
6.2.15	Are cut-out devices provided to isolate heating units if process pumps are deactivated or fail, or when the flow of liquid is interrupted? (2.14)						
6.2.16	Are high level temperature sensors provided to isolate the power supply and sound an alarm if the temperature of the liquid reaches 14°C above the normal process temperature of the liquid? Are these on a manual reset? (2.15)						
6.2.17	Are heating units protected from mechanical damage? (2.16)						
6.2.18	When tanks are to be drained, are heaters turned off before draining commences and only reinstated once the liquid level has been restored? (2.17)						
6.2.19	Are LPG and other industrial gases in cylinders stored, used and handled in accordance with the recommendations set out in RC8? (2.18)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.2.20	Where practical considerations require that electric immersion heaters are retained, are metal sheathed heating elements connected to a terminal or earth wire of sufficient size to carry any fault current? (2.19.1)						
6.2.21	Where practical considerations require that electric immersion heaters are retained, is a residual current device with a tripping current of 30mA and manufactured to BS EN 61557 incorporated into the power supply to the heater? (2.19.2)						
6.2.22	Where practical considerations require that electric immersion heaters are retained, does each heating installation have a warning light, clearly visible from the operating position at the tank, to indicate when the heaters are energised? (2.19.3)						
6.2.23	Where practical considerations require that electric immersion heaters are retained, does each installation have a manually resettable isolating switch that is clearly identified and readily accessible from the operating position at the tank? (2.19.4)						
6.2.24	Where practical considerations require that electric immersion heaters are retained, are guards for quartz- or PTFE-sheathed heaters available to provide adequate protection from physical damage? (2.19.5)						
6.2.25	Where practical considerations require that electric immersion heaters are retained, is some method of providing an earth connection for quartz- or PTFE-sheathed heaters provided and connected to an efficient electrical earth? (2.19.6)						
6.2.26	Where practical considerations require that electric immersion heaters are retained, is a thermostatic device for controlling the temperature of the process liquid incorporated into the power supply system? If the heater sheath has a maximum temperature rating, has a control been fitted to ensure that this temperature is not exceeded? (2.19.7)						
6.2.27	Where practical considerations require that electric immersion heaters are retained, are low liquid level sensors provided to isolate the electrical supply to the heaters and provide a visual and audible alarm if the level drops to a defined extent? (Are such sensors provided even if devices are installed that are designed to automatically maintain the level of the liquid in the event of uncontrolled evaporation or tank leakage?) (2.19.8)						
6.2.28	Where practical considerations require that electric immersion heaters are retained, are adequate means provided for making and protecting electric cable connections to the element and earth terminals? (2.19.9)						
6.2.29	Where practical considerations require that electric immersion heaters are retained, are the power rating (kW) and surface power density (W/cm^2) appropriate for the volume of the liquid being heated? (2.19.10)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.2.30	Where practical considerations require that electric immersion heaters are retained, are immersion heaters installed so as to be clear of any sludge build up in a tank? (2.19.11)						
6.2.31	Where practical considerations require that electric immersion heaters are retained, are enclosures of non-combustible construction provided for embedded or bonded heaters? (2.19.12)						
6.3	**Fire protection (section 3)**						
6.3.1	Are a suitable number of appropriate portable fire extinguishers, approved and certificated by an independent, UKAS-accredited third party certification body, provided for use by trained staff in accordance with BS 5306-8? (3.1)						
6.3.2	Are the extinguishers maintained by a competent engineer in accordance with BS 5306-3? (3.2)						
6.3.3	Is a suitable manual fire alarm system provided in accordance with BS 5839-1 with the level of provision of automatic fire detection determined by the fire risk assessment? And has the installation been designed, installed, commissioned and maintained by an engineer with accreditation by an independent, UKAS-accredited third party certification body? (3.3)						
6.3.4	Where plastic tanks, plastic-lined tanks or plastic ducts are in use, has a fire risk assessment been conducted to determine if the provision of automatic sprinklers would be beneficial? (3.4)						
6.3.5	Have any sprinkler systems installed, system extensions or the separation of sprinkler protected and non-sprinkler protected areas been carried out in accordance with the standard to which the system was designed and installed? Are new systems in accordance with the requirements of the **LPC Rules for Automatic Sprinkler Installations incorporating BS EN 12845**? (3.5)						
6.3.6	Has the assessment also considered other forms of automatic fire suppression system and their application to specific processes or items of plant? (3.6)						
6.3.7	Are automatic fire suppression systems maintained in accordance with published standards and at least to the manufacturer's requirements? (Insurers normally recommend that companies completing maintenance – and installations – of these systems be members of recognised third party certification schemes.) (3.7)						
6.4	**Fire safety management (section 4)**						
6.4.1	Are fire procedures suited to the hazards, are they in place and rehearsed? Do they cover the action to be taken on discovering a fire and the action to be taken on hearing the alarm? (4.1)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.4.2	When drafting the procedures, are the presence of flammable liquids, exposure to chemicals and plating liquids, and the possibility of reactivity of solutions with water taken into consideration? (4.2)						
6.4.3	Do staff receive fire safety training on induction and follow-up training at regular intervals as indicated in the fire risk assessment for the premises? (4.3)						
6.4.4	Do designated staff receive training to ensure that they are competent to conduct and record any fire safety inspections as indicated in the fire risk assessment? (4.4)						
6.4.5	Is all training formally recorded? (4.5)						
6.4.6	Is there a routine inspection and maintenance programme for all heating equipment and tanks with the results being implemented and recorded? (4.6)						
6.4.7	Are visual inspections of all electrical components and safety devices undertaken on a weekly basis? (4.7)						
6.4.8	Are safety devices for electric immersion heaters tested on a monthly basis, and safety devices for other types of heater tested on a quarterly basis? (4.8)						
6.4.9	Have the fire and rescue service been informed about the location, nature and quantities of hazardous materials stored and used on site? (4.9)						
6.4.10	Has a secure box been provided near the entrance containing plans of the site, showing the layout, location and quantities of hazardous substances together with the location of hydrants and other water supplies? (4.9)						
6.4.11	Has a designated member of staff been nominated to meet the fire and rescue service upon their arrival in the event of fire? (4.10)						
6.5	**General recommendations (section 5)**						
6.5.1	Is the use, storage and control of flammable liquids in accordance with the Parts 1 and 2 of RC20 and RC57? (5.1)						
6.5.2	Have flammable degreasing solvents been replaced by non-flammable types where possible? (5.2)						
6.5.3	Where indicated by the fire risk assessment, has consideration been given to providing local extraction at grinding and buffing machines to remove combustible dust? (5.3)						
6.5.4	Is a high standard of housekeeping maintained with particular attention to areas where combustible waste can accumulate such as under tanks and duck-boards? (5.4)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.5.5	Where parts of the premises have been assessed in accordance with BS EN 60079-10, are suitable hazard zone plans available and displayed? (5.5)						
6.5.6	Where plastic tanks and ducting are to be used, are tanks constructed from fire retardant polypropylene? (5.6.1)						
6.5.7	Where plastic tanks and ducting are to be employed, is fire-retardant fibreglass resin used for fume extraction ducting where metal is not suitable? (5.6.2)						
6.5.8	Where plastic tanks and ducting are to be used, are fire-break dampers installed in the main fume extraction ducting? (5.6.3)						
6.5.9	Are tanks clearly labelled for identification purposes by the fire brigade when attending an incident? (5.7)						
6.5.10	In areas where hydrogen may be produced during the plating process, has ventilation been provided in accordance with the findings of the risk assessment? (5.8)						

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Fire Protection Association
London Road, Moreton in Marsh
Gloucestershire GL56 0RH, UK
Tel: +44 (0)1608 812500 Fax: +44 (0)1608 812501
Email: administrator@riscauthority.co.uk
Website: www.riscauthority.co.uk

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