

Recommendations



RC16a

for fish and chip
frying ranges

LOSS PREVENTION RECOMMENDATIONS

These recommendations are part of a series of insurer documents developed under the Insurers’ Fire Research Strategy Funding Scheme (InFiReS) and published by the FPA. InFiReS membership comprises a group of UK Insurers that actively support a number of expert working groups developing and promulgating best practice for the protection of property and business from loss due to fire and other risks. The technical expertise for the Recommendations is provided by the Technical Directorate of the FPA and experts from the Insurance Industry who together forms the InFiReS Process Steering Group.

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Technical contact:

Ian Jerome, Convenor of the Process Steering Group
 FPA Bastille Court, 2 Paris Garden, London SE1 8ND
 Direct line 020 7902 5310
 Fax 020 7902 5301
 e-mail ijerome@thefpa.co.uk

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First published by
 The Fire Protection Association
 Bastille Court,
 2 Paris Garden,
 London SE1 8ND

*Tel: 020 7902 5300, fax: 020 7902 5301,
 e-mail: fpa@thefpa.co.uk, website: www.thefpa.co.uk*

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SCOPE

These recommendations contain a set of fire safety measures for application to the installation, operation and maintenance of fish and chip frying ranges. Guidance regarding other forms of catering equipment, including general purpose deep fat fryers, is set out elsewhere¹.

These FPA Recommendations apply to ranges fuelled by both gas and electricity.

Throughout this guidance, the word 'fat' may freely be interchanged with 'cooking oil'.

INTRODUCTION

Fish and chips have been a popular British food since the middle of the nineteenth century. Frying normally takes place in small premises specialising in this task and it is to these traditional fish and chip shops that the recommendations in this document apply. The guidance does not relate to mobile fish frying outlets or to catering kitchens not specialising in the preparation of this product, where other codes of practice apply.

Fish and chip frying ranges represent a high fire hazard to both life and property. The main hazard arises from the use of large quantities of heated fats and the risk of over-heating the fat due to operator error or failure of a thermostat on the equipment. The risk is even greater if equipment is left unattended. (In practice, older ranges manufactured before 1975 are unlikely to be fitted with a thermostat.)

There are relatively small differences between the safe cooking temperature of fat (about 205°C), the temperature at which flammable vapours are given off (about 230°C) and that at which spontaneous ignition occurs (between 310°C and 360°C). The fire-related properties of fats change during use; one indication of this is the darkening of the colour resulting from oxidation. Monitoring the discoloration can be carried out using proprietary charts, available from the manufacturers or suppliers of the product. In practice, if the fat is heated to too hot a temperature or is not changed sufficiently often it can impair the quality and flavour of the cooking.

Other causes of fire include the spillage or overfilling of fat when changing or replenishing supplies, especially when the appliance is hot. In fume extraction systems the direct exposure of grease removal devices to flames or hot flue gases from the heat sources of the equipment are also common causes of fire.

If deposits of grease are allowed to accumulate in fume extract ducting, the introduction of an ignition source may cause the deposits to ignite and the resulting flames could spread rapidly throughout the complete ducting system. The fire could spread to other parts of the building and could cause anything from damage to the ductwork to the complete destruction of the building. Damage may be serious enough to necessitate lengthy and costly remedial work, resulting in considerable interruption to business operations.

Cooking oil and fat fires develop rapidly and produce considerable quantities of heat and smoke. In confined cooking areas this makes extinguishment by hand appliances difficult and dangerous, even if the operators have suitable types of extinguishers and have received appropriate training in their use.

New gas fired fish and chip ranges should meet the requirements of BS 6350². While this standard covers the safety aspects of gas frying ranges, it cannot be over emphasised that thorough cleaning and regular servicing of all equipment is essential.

BS 6350 also applies to LPG fuelled ranges, but there is no equivalent British Standard Specification for electrically powered frying ranges.

RECOMMENDATIONS

1 Siting and location

- 1.1 Fish and chip frying ranges should only be installed in compartments having a fire resistance of at least 30 minutes; the rooms should have non-combustible walls, floors and ceilings.
- 1.2 Where necessary, any combustible surfaces should be replaced, overlaid or lined with non-combustible material before installation of the equipment.
- 1.3 Any gaps around services entering or leaving the cooking area should be filled with suitable material so as to provide at least the same level of fire resistance as the element of construction in which it is located.
- 1.4 Doors leading from the cooking area to other rooms should have at least 30 minutes fire resistance and be fitted with self-closing mechanisms.
- 1.5 An adequate area should be provided in the immediate vicinity of the equipment to allow for the movement of staff and their escape in an emergency. This area should be kept clear of obstructions.
- 1.6 Suitable means of access and clearance should be maintained around the range for cleaning and maintenance purposes.
- 1.7 Adequate space should be provided to allow easy access to the connections to both the gas and electrical supplies.
- 1.8 Suitable measures should be taken to deny access to the oil pans and controls of the equipment by unauthorised staff and members of the public.
- 1.9 The range should not be sited immediately beneath water pipes. Sprinklers should not be installed where discharge may come into contact with the cooking oil.

2 Equipment

- 2.1 All ranges should be equipped with cooking thermostats set to prevent the temperature of the fat rising above 205°C, or the manufacturer's maximum recommended temperature if this is less than 205°C. The possibility, in some designs, of the temperature overshooting the set point should not be ignored.

Ranges should additionally be equipped with a separate high temperature limit control, of a non-self-resetting type, to shut off the energy source should the temperature of the fat exceed 230°C. This high temperature limit device shall not operate the same gas supply valve as any automatic temperature control.

While it is possible to retro-fit thermostats to existing frying ranges, the manufacturers of the equipment should be consulted if this is contemplated. This is because retro-fitting requires considerable expertise if the thermostats are to operate effectively.

- 2.2 Gas heated ranges should be equipped with a flame failure device to cut off the fuel supply in the event of flame failure.
- 2.3 Gas frying ranges should also be equipped with devices that prevent gas being supplied to the main burner when the extract system is not in operation. Similarly, the controls of electrically heated ranges should be interlocked so that it is only possible to switch the heating elements on when the extraction system is operating.
- 2.4 All ranges should be equipped with lids or shutters above the cooking pans capable of immediate and safe closure in the event of fire.
- 2.5 Where it may be difficult to approach the range if a fire were to occur, a long-handled hook or other device should be provided to enable the lid to be closed from a safe distance. All cooking staff should be instructed in the use of any hook or similar tool provided for this purpose.

3 Installation

- 3.1 Cooking equipment should be installed in accordance with the manufacturer's instructions.
- 3.2 The connection of the equipment to the power or gas supply should be carried out either by the manufacturer or by a contractor who, in the case of electrical equipment, is on the roll of the National Inspection Council for Electrical Installation Contracting (NICEIC) or a member of the Electrical Contractors' Association. In the case of gas equipment the installer should be suitably qualified and on the list of the Confederation for the Registration of Gas Installers (CORGI).

- 3.3 All electrical equipment should be installed in accordance with the current edition of British Standard BS 7671³ (formerly the IEE Wiring Regulations).
- 3.4 Where heating is by liquefied petroleum gas, the Recommendations relating to the use of liquefied petroleum gas⁴ should be complied with.
- 3.5 Fuel piping and electrical equipment should be sited so that they are not susceptible to the effects of heat, water vapour and grease.
- 3.6 Means should be provided for the remote emergency shutdown of power, fuel supply and the extraction system to all cooking equipment. This emergency shutdown device should be clearly labelled, easily accessible and safely located. The emergency shutdown device may be linked to the automatic fire detection and alarm installation so as to shut off the source of heat automatically in the event of the fire alarm actuating.
- 3.7 The installation, servicing and user's instructions should be kept safely for future reference.

4 Extraction System

- 4.1 All ranges should have mechanical ventilation for the extraction of heat and fumes and, in the case of fryers heated by gas, for the extraction of combustion products. It is important that the heat and fume extraction ducting leading from the range is separate from the ducting that extracts combustion products from the burners. Although combustion products should be extracted by a different system than the cooking fumes, both sets of ductwork should comply with items 4.2-4.8 inclusive.
- 4.2 Extract ducting should be as short as practicable and the design should comply with any local byelaws. The duct should preferably pass directly to the open and should not pass through, or be contained within, floor or ceiling voids, or roof spaces where exposed combustible materials are present.
- 4.3 Ducts should not pass through fire break walls.
- 4.4 Discharges to the open should be arranged in such a manner that grease will not be deposited on the building or adjoining premises and fumes are safely dissipated.
- 4.5 Ducts should be constructed of, and be supported by, galvanised or stainless steel of a substantial gauge, having all seams and joints liquid tight, with smooth surfaces to facilitate cleaning. Aluminium or plastic ducts should not be used.
- 4.6 Ducts should have a clearance of at least 150mm from combustible material, including combustible partitions and floors and, where necessary, should be protected with a non-combustible insulating

- material. Where ducts pass through any combustible material, that material should be cut away for a distance of at least 150mm from the duct and the space filled with non-combustible insulation.
- 4.7 Ductwork should be routed so that it cannot be touched by staff or customers. Where concealed, ducts should be encased in non-combustible material having at least 30 minutes fire resistance.
 - 4.8 The whole of the ducting (including lined chimneys or flues) should be accessible for cleaning. Bends or dips, which might collect residues, should be eliminated as far as possible. At each major change in direction an opening with a grease-tight cover should be provided to allow for inspection and cleaning.
 - 4.9 Filters, traps or other forms of grease removal devices should be provided. These should include a residue trap at the base of any vertical riser or incorporated into the extract unit. They should not be sited where they may be liable to direct flame impingement or hot flue gases.
 - 4.10 Traps, sumps or other grease-removal devices should be provided as close to the range as possible and should also be installed in a readily accessible position to facilitate cleaning. They should not, however, be nearer than 500mm to the heat source for the range unless suitably protected, for example by a steel baffle plate.
 - 4.11 Brick chimneys or flues should not be used to conduct grease fumes away from the ranges unless they are lined with an impervious, non-combustible material.
 - 4.12 Sufficient air circulation should be provided around air-cooled motors powering fans used for extraction.
- ## 5 Operating instructions
- 5.1 Cooking appliances should be operated and serviced in accordance with the manufacturer's instructions.
 - 5.2 Operators should be thoroughly instructed in the correct use of the equipment.
 - 5.3 Before use, a check should be made to ensure that the surface of the cooking oil in the pans to be used is between the minimum and maximum levels marked for safe operation.
 - 5.4 In the case of gas-heated ranges the extractor fan should be switched on and be allowed to run at least 2 minutes before lighting up.
 - 5.5 Extractor fans should be run at all times during frying and for 20 minutes after frying is finished, to cool down the range.
 - 5.6 Cooking equipment should not be left unattended whilst the heat source is operating.
 - 5.7 It is very important that, in addition to turning the burner or heater controls off, the main gas cock or electricity supply should be isolated at the mains after each frying session. In the case of LPG-heated ranges the gas should be turned off at the gas cylinder(s), which should be located outside the building⁴.
 - 5.8 'Cracklings' should be placed in closed metal containers and removed from the premises at the close of business each day. Operators should be aware that spontaneous combustion of cracklings can occur.
- ## 6 Maintenance
- 6.1 Appliances should be serviced at least annually by suitably qualified personnel in accordance with the manufacturer's instructions. This service should include testing the normal method of temperature control, checking ducts and burners, and cleaning if necessary. All fuel and power connections and controls should be checked.
 - 6.2 Grease traps should be emptied and filters cleaned at frequent intervals, which should not exceed 7 days. The internal surfaces of the ducting and the extraction motor should be cleaned at intervals not exceeding 12 months, preferably by a specialist contractor.
 - 6.3 Grease filters should be cleaned and maintained in accordance with the current best practice.
- ## 7 Fire protection
- 7.1 Operators should be thoroughly instructed about the hazards associated with fighting cooking oil and fat fires.
 - 7.2 A notice showing the action to be taken in the event of fire should be prominently displayed in the cooking area. In particular, the notice should require the prompt shut-down of the heat supply and extraction system.
 - 7.3 It is recommended that a suitable fixed extinguishing system, installed by an approved company⁵, should be provided, with both manual and automatic operation, covering the frying ranges, overhead canopy and ducting system. The operation of the fixed system should automatically shut down the heat supply and extraction system.
 - 7.4 Portable fire extinguishing appliances should be provided throughout the premises in accordance with British Standard 5306, Part 8⁶. A minimum of two portable fire extinguishers, of a type carrying British Approvals of Fire Equipment (BAFE) marking, should be provided in the cooking area. These should be of Type F as defined in BS 7937⁷, each with a fire rating of numerical value equal to the volume of the oil in the largest pan (for example, a pan containing 25 litres of oil

should be protected by two extinguishers each having a rating of not less than 25F).

- 7.5 An outbreak of fire involving burning gas should only be controlled and not extinguished until such time as the gas supply has been shut off.
- 7.6 Operators should be made familiar with the operation and correct method of use of portable fire extinguishing appliances and any fixed fire extinguishing system. They should also be instructed in the actions to take in the event of a fire or an escape of burning gas.

REFERENCES

- 1 Recommendations for cooking equipment (other than fish and chip frying ranges) RC16B, FPA, 2003.
- 2 BS 6350: 1983: Specification for gas heated fish and chip frying ranges.
- 3 BS 7671: 2001: Requirements for Electrical Installations. IEE Wiring Regulations, 16th edition. The Institution of Electrical Engineers.
- 4 Requirements for firms engaged in the design, installation and commissioning of fire fighting systems, LPS 1204, Issue 2, Loss Prevention Certification Board, 1994.
- 5 BS 5306: Fire extinguishing installations and equipment on premises: Part 8: 2000: Selection and installation of portable fire extinguishers - Code of practice.
- 6 BS 7937: 2000: Specification for portable fire extinguishers for use on cooking oil fires (class F).

ADDITIONAL REFERENCE MATERIAL

LPGA CoP 3 Recommendations for prevention or control of fire involving LPG.

LPGA CoP 7 Storage of full and empty LPG cylinders and cartridges.

LPGA CoP 15 Valves and fittings for LPG service.

LPGA CoP 22 LPG piping system design and installation.

The above guides are published by the LP Gas Association.

Gas Safety Regulations 1972 (SI 1972 No 1178), HMSO.

List of approved fire and security products and services, published annually by the Loss Prevention Certification Board.

ADDRESSES OF ORGANISATIONS

British Standards Institution (BSI)

389 Chiswick High Road
London W4 4AL
Tel: 020 8996 9000
Fax: 020 8996 7400
Web: www.bsi-global.com

Council for Registered Gas Installers (CORGI)

1 Elmwood
Chineham Business Park
Crockford Lane
Basingstoke
Hampshire RG24 6WG
Tel: 01256 372200
Fax: 01256 708144

Electrical Contractors' Association (ECA)

ESCA House
34, Palace Court
London W2 4HY
Tel: 020 7313 4800
Web: www.eca.co.uk

Loss Prevention Certification Board (LPCB)

BRE
Garston
Watford
Hertfordshire WD25 9XX
Tel: 01923 664100
Fax: 01923 664994
Web: www.brecertification.co.uk

LP Gas Association (LPGA)

Pavilion 16
Headlands Business Park
Salisbury Road
Ringwood
Hampshire BH24 3BP
Tel: 01425 461612
Fax: 01425 471131
Web: www.lpga.co.uk

National Inspection Council for Electrical Installation Contracting (NICEIC)

Vintage House
37 Albert Embankment
London SE1 7UJ
Tel: 020 7564 2323
Fax: 020 7564 2370
Web: www.niceic.org.uk

**In the case of a leak of mains gas call Transco for assistance on their
24 hour emergency line: 0800 111999**

Good practice when handling hot oil or fat

Where there is hot oil or fat there is a major fire hazard but the main hazard to staff is burns associated with hot liquids. These can be caused by splashes when food or a basket is dropped carelessly, or if the cooking oil spits or boils over due to excess water or moisture in the food. If the oil is spilled or splashed onto the floor it can also cause slips.

The following safety measures should be observed:

- Check that the oil is between the minimum and maximum oil level marks, do not overfill the pans
- Break up dripping or fat into small lumps
- Do not top up pans with oil from large containers
- Do not leave the fryer unattended while in use
- Do not introduce water or ice into the hot oil with the food
- Do not overload the cooking basket
- Do not let the basket drop into the oil
- Clean up spills from the floor immediately
- Take care when shaking food in the basket

- Allow the oil to cool before draining; the removal of oil should always be undertaken when it has cooled sufficiently so as to minimise the risk of burns and scalds
- Turn off the fryer and allow the oil to cool before cleaning; clean the equipment in accordance with the manufacturer's instructions.
- Suitable protective equipment, including eye protection, heat resistant apron and heat resistant gauntlets, should be worn if filtering of oil is to be undertaken.

When discarding hot oil, the container in which used oil is to be stored should be:

- Made of metal or heat resistant plastic (normal plastic will melt)
- Clean and dry, to prevent the risk of explosion and injury
- Fitted with a lid when filled or partially filled, to prevent entry of moisture or leakage if knocked over
- In good condition, with no holes or leaking joints

Gas Safety

If there is a smell of gas on the premises:

- Shut down frying and other gas fuelled appliances promptly and safely
- Turn the gas supply off at the main stopcock
- Put out all naked flames
- Open doors and windows to ventilate the building
- In the case of a leak of mains gas call Transco for assistance on their 24 hour emergency line: 0800 111999
- Keep people away from the area(s) concerned
- Do not search for gas leaks with naked flames
- Do not smoke where there is a smell of gas
- Do not operate electric switches

If the leak is from the supply pipes Transco will advise regarding its repair; if it is from the appliance the service agent or a CORGI registered engineer may have to be called.

In the case of a gas cylinder that continues to leak after the valve has been shut the supplier should be contacted for advice.

