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AIR RAID PRECAUTIONS

THE PROTECTION OF FOODSTUFFS AGAINST POISON GAS



LONDON
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THE PROTECTION OF FOODSTUFFS AGAINST POISON GAS

*Issued by the Home Office
(Air Raid Precautions Department)*

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1938

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THE PROTECTION OF FOODSTUFFS AGAINST POISON GAS

The purpose of this pamphlet is to bring to the notice of producers, manufacturers and distributors in the food industry the importance of protecting their stocks against contamination by gas in time of war. Foodstuffs, for the most part, absorb gas very readily and if badly contaminated would have to be destroyed.

Later publications will give information on the inspection and treatment of suspected and contaminated foodstuffs.

The protection of stocks of food in private houses will be dealt with in the general handbook for householders which is in course of preparation.

I. NATURE OF CONTAMINATION.

Poison gases, which may be discharged from aircraft in gas bombs or in the form of spray, are usually classified as persistent and non-persistent. Either type is liable to affect foodstuffs exposed to it.*

" Persistent " gases are usually liquids which evaporate slowly, giving off dangerous vapour. Any object on which the liquid has fallen will continue to give off vapour until the liquid has all evaporated or until steps have been taken to render it ineffective. In the case of mustard gas or other blister gases contact with a contaminated object will cause skin burns. Even walking over contaminated ground is dangerous.

Mustard gas and many of the tear gases are examples of this persistent class.

" Non-persistent " gases, when liberated into the air, form clouds of gas or smoke which drift along with the wind, gradually mixing with larger quantities of air and so becoming less dangerous. Examples are chlorine, phosgene, and the irritant smokes produced from certain compounds of arsenic.

* Full information on the different types of war gases, and on the protective measures which should be taken against them, are given in A.R.P. Handbook No. 1, *Personal Protection against Gas*.

2. SUMMARY OF PROTECTIVE MEASURES.

The following is a summary of the precautions which should be taken to protect food supplies against gas, and which are described in the sections indicated—

(a) In selecting methods of packing, choose the material which gives the best gas protection (see Section 3).

(b) See that, where necessary, foodstuffs are kept covered with suitable protective material (see Sections 3 and 8).

(c) Render all storehouses as gas-proof as is practicable (see Section 4).

(d) In the distributive trade, retain wrappings on commodities as far as possible to give the maximum practicable protection (see Section 6).

(e) See that all foodstuffs are adequately protected during transport (see Section 8).

3. THE PACKING OF FOODSTUFFS.

Modern methods of distribution, by which foodstuffs are issued to retailers in some standard form of packing instead of in bulk, are of great advantage as a protection against gas. Every layer of material which may help to prevent gas coming into contact with the foodstuff is of value, and the issue of unwrapped products should be reduced to a minimum.

The protection afforded by different types of packing varies greatly, from completely impervious containers such as hermetically sealed glass bottles or tins, which (as long as they remain undamaged) give complete protection against gas, to ordinary sacks (such as are used for flour, grain, etc.), which give practically no protection.

If there is a choice of forms of packing for a particular foodstuff, preference should be given to the material which affords the better protection against gas. For instance, waxed or grease-proof papers are better than ordinary pervious papers. It should be remembered that there is often a considerable lapse of time between the packing of an article and its sale to the consumer, and it is therefore desirable that, if necessary, a more suitable packing material should be adopted as soon as is practicable.

The following table shows the protective value of different types of packing materials:—

Type of Packing.	Protective value.
Airtight bottles or sealed tins.	Complete protection against all forms of gas.
Airtight glass or earthenware jars.	Complete protection if cover is of glass, metal, bakelite or similar materials. If covered with grease-proof paper will protect completely against vapour and give fair protection against moderate liquid contamination.
Sealed wooden barrels (for storage of liquids, e.g. wines, beer, etc.).	Complete protection against vapour and moderate amounts of liquid.
Wooden boxes ... } Thick cardboard ... }	If joints are tight, good protection against vapour. Will absorb liquid gas.
Oilskin ... } Waxed cartons ... } Transparent moisture-proof wrapping material with a cellulose acetate base. }	Good protection against vapour and liquid.
Greaseproof paper ...	Good protection against vapour. Some protection against slight liquid contamination.
Thin cardboard ... } Ordinary papers ... }	Limited protection against vapour. No protection against liquid.
Ordinary sacks ... } Textiles ... }	No protection against either vapour or liquid.

4. THE STORAGE OF FOODSTUFFS.

When foodstuffs in loose bulk, or in other respects poorly protected against gas contamination, are kept in a store place, measures should be taken to render the store place itself as gas-proof as may be practicable. The degree of gas-proofing necessary will depend on the type of foodstuff stored, and care must be taken to store the most vulnerable foods where they are least likely to be contaminated. As war gases are heavy, there will be less danger from vapour on upper floors, but it must be remembered that incendiary bombs are likely to penetrate the roof and possibly the top floor of a building.

Buildings which, owing to their design or construction, cannot be made to give good protection against gas, should only be used for the storage of better packed foodstuffs or those which are unabsorbent and can be washed or cooked.

Some store places are already designed specially to exclude air—for instance the type of store in which CO_2 gas is used as a preservative. Others, such as the cold store of up-to-date construction, are provided with tightly fitting doors and other means of air exclusion. These should not need further gas-proofing. If, during an aerial attack they are kept closed, the foodstuffs in them may be expected to remain uncontaminated.

Store places of ordinary construction, in the design of which no special attention has been given to draught exclusion, need to be examined carefully from a gas-proofing standpoint. In an emergency the number of exits and entrances should be reduced to a minimum, those kept in use being provided with airlocks, and the rest being sealed. It may be necessary to make doors and windows fit more closely and to provide shutters for hatches, chimney vents and other openings. In a large store comprising several rooms or sections each sub-division should be made to shut off from the other. This will lessen the chance of the gas gaining access to all the rooms.

Open sheds offer poor protection against gas. Foodstuffs kept in them should be covered by tarpaulins.* Tarpaulin curtains to cover the open side will give some additional protection.

It must be remembered that such measures, though considered sufficient for food, provided it is protected by its packing against vapour, would not give sufficient protection

* See Section 9.

for human beings, and suitable gas-proof shelters should be provided for employees, as described in Air Raid Precautions Handbook No. 6.

Note: Instructions as to the construction of airlocks and the strengthening and sealing of doors and windows are given in A.R.P. Handbooks Nos. 1 and 6, "Personal Protection against Gas", and "Air Raid Precautions in Factories and Business Premises".

Handbook No. 5, "Structural Precautions against Bombs and Gas", now in preparation, will give advice as to the protective measures which may be taken in new buildings.

5. STORAGE IN THE OPEN.

If it is necessary in an emergency to stack foodstuffs in open dumps or depôts they should be covered by large tarpaulins. Open stores of grain and fodder should be similarly protected. If tarpaulins are available on farms they should be used to give additional safety to straw-thatched stacks of grain.

6. STORAGE AT RETAIL STORES.

When an air raid warning has been received, the shop should be completely closed up to keep out poison gas. Close fitting doors, windows or shutters will be required for premises not already possessing them.

In addition, the stocks held in the shop should be stored in such a way as to prevent any gas which may enter the shop from penetrating to the food. All foodstuffs should be kept as long as possible in their original packing, and further protection given by keeping them in cupboards, drawers and boxes instead of stacking them on open shelves.

No uncovered foodstuffs should be displayed in windows or on counters or shelves.

It would be necessary to observe these conditions throughout a war, as the period of warning before an air raid is likely to be short and would not give sufficient time to pack away a large quantity of food which was displayed without protection.

7. VENTILATION SYSTEMS.

If simple extractor fans are used for ventilation, gas will tend to be drawn in with the cool air, particularly in the lower parts of the building. In such circumstances, the ventilation must be closed down when an air raid warning is received. Means must also be provided for closing the exhaust vents to prevent contaminated air entering when the fans are stopped.

If, however, a plenum system of ventilation exists, and if the position of the air intake is sufficiently high, it may be used with advantage during air raids and will help to prevent the entrance of poisonous gases.

The air intake should be at least 30 ft. above the level of the ground or adjacent flat roofs. If this is not the case, the danger from gas would be increased by the possibility that it would be drawn in from outside, and the ventilation system must be closed down.

If special filtration units for the neutralization of gas are provided, the ventilation system can continue to be used.

In a cool store which is ventilated by air from outside, it would be necessary to close all ventilator openings when an air raid warning was received, and steps should be taken now to make it possible to do this quickly.

Before re-starting or reopening a ventilation system after a raid, it will be necessary to make sure that there is no gas in the vicinity.

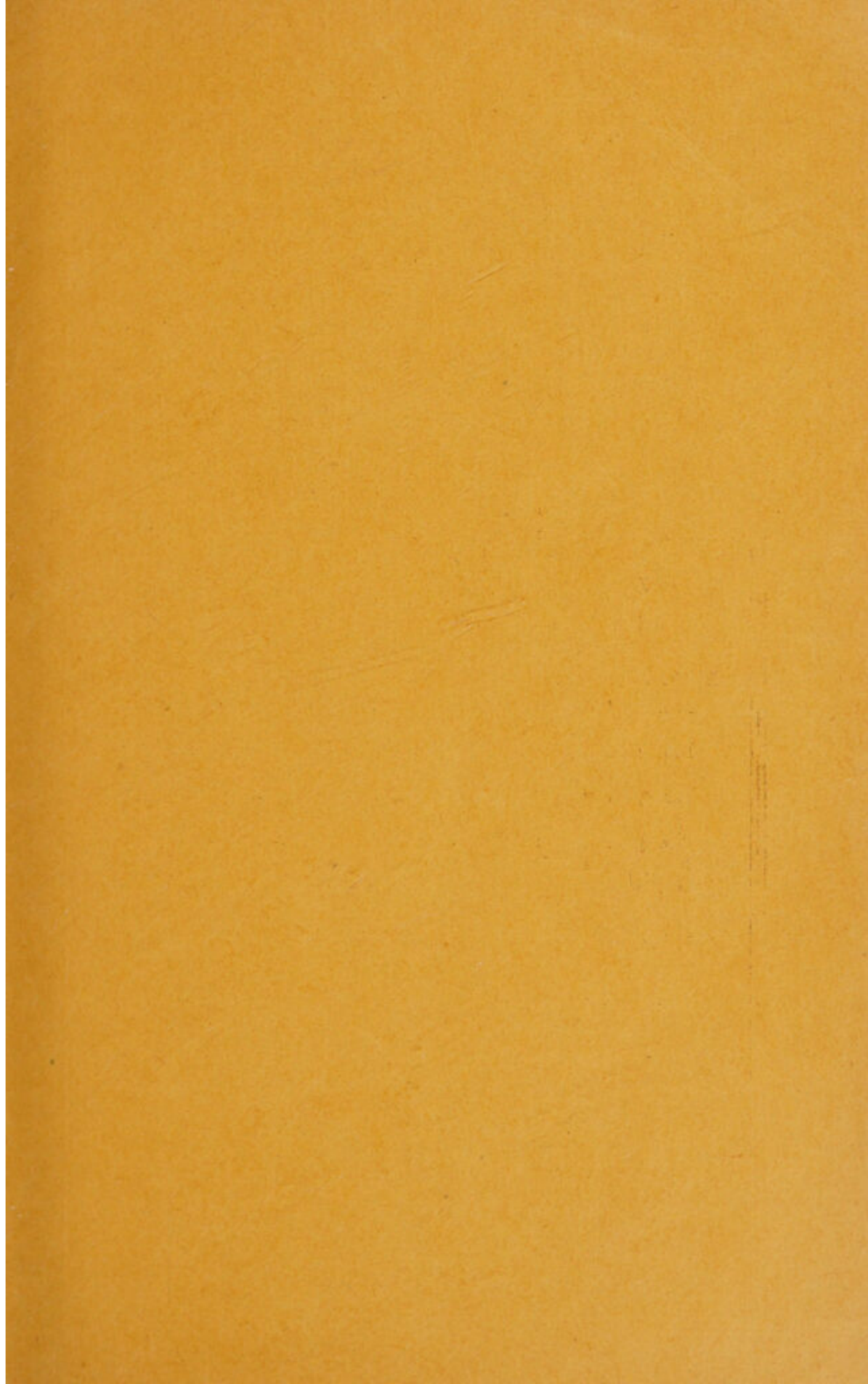
8. THE TRANSPORT OF FOODSTUFFS.

When foodstuffs, in bulk or poorly protected in box or wrapping, are in transport on road or railway, the closed type of vehicle should be used whenever possible. When open lorries, trucks or barges have to be used the load should be covered with tarpaulins, the outside edges of which should be fastened down *outside* the vehicle.

9. TARPAULINS.

Although tarpaulins are recommended as a suitable covering for exposed foodstuffs, it is important to realise that different types of tarpaulins vary considerably in their resistance to penetration by gas. The most satisfactory protection is given by the impervious oil-dressed type. The cuprammonium-bitumen type is considerably less resistant, but affords some measure of protection. Ordinary waterproof covers of the Willesden canvas type are comparatively readily penetrated by both liquid and vapour, but if nothing else is available they will afford some protection.

Where it is practicable, better protection will be afforded if the tarpaulin can be supported on a framework so that it is not in actual contact with the foodstuff which it is desired to protect.



Official Publications on Air Raid Precautions

HANDBOOKS

- No. 1 Personal Protection against Gas (*2nd edition*)
6d. (8d.)
- No. 2 First Aid and Nursing for Gas Casualties
(*3rd edition*) 4d. (5d.)
- No. 3 Medical Treatment of Gas Casualties (*1st edition*)
6d. (8d.)
- No. 4 Decontamination of Materials (*1st edition*) 6d. (7d.)
- No. 5 Structural Precautions against Bombs and Gas
(*in preparation*)
- No. 6 Air Raid Precautions in Factories and Business
Premises (*1st edition*) 6d. (7d.)
- No. 7 Anti-Gas Precautions for Merchant Shipping
(*2nd edition*) 3d. (3½d.)
- No. 8 The Duties of Air Raid Wardens (*1st edition*)
2d. (2½d.)

MEMORANDA

- No. 1 Organisation of Air Raid Casualties Services
(*2nd edition*) 6d. (7d.)
- No. 2 Rescue Parties and Clearance of Débris (*2nd edition*) 2d. (2½d.)
- No. 3 Organisation of Decontamination Services
(*2nd edition*) 2d. (2½d.)
- No. 4 Air Raid Wardens (*1st edition*) 2d. (2½d.)
- No. 5 Anti-Gas Training (*1st edition*) 4d. (5d.)
- No. 6 Local Communications and Reporting of Air
Raid Damage (*1st edition*) (*in preparation*)
- No. 7 Personal Requirements for Air Raid General and
Fire Precautions Services and the Police
Service (*1st edition*) 2d. (2½d.)
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