CHAPTER 12

CONTROL AND MANAGEMENT OF EXPLOSIVES AND ASSOCIATED FACILITIES

CONTENTS

5 MANAGEMENT OF THE EXPLOSIVES FACILITY

1 **CONTROL AND MANAGEMENT**

1.1 **Introduction**

1.1.1 Explosives facilities by the nature of their use have special hazards that must govern the actions of all personnel responsible for their administration and for those who work within them. This chapter contains the general regulations for the control and management of explosives facilities, and, where appropriate, is to form part of the safety briefing for visitors required under the Health and Safety at Work etc Act 1974. However, the person who has ownership and is answerable for the level of risk generated will be the Head of Establishment (HoE). Only the HoE and their staff can control events and exercise supervision of duty of care on-site. Therefore and ultimately, it is the HoE's responsibility to review all operations carried out that generate risk and ensure that they are kept As Low As Reasonably Practical (ALARP).

1.2 **HoE Explosives Safety Representative**

1.2.1 HoEs with any responsibility for explosives may appoint a competent person(s) of an appropriate rank/grade as the Explosives Safety Representative(s) to be responsible to the HoE for all explosives matters, particularly safety. The duties and responsibilities of an Explosives Safety Representative are given in Chapter 3.

1.3 **Technical Explosives Authorities**

1.3.1 Technical Explosives Authorities, such as Ammunition technical staff (ATOs and ATs/(RN, RAF or Civilian Equivalents) are located within commands and establishments to give direction and guidance on the storage, maintenance, handling and movement of the ammunition. Advice on interpretation of these regulations is to be obtained, when required, from the appropriate Technical Explosives Authority, whose addresses are given at Annex A**.**

1.4 **Use of MOD Explosives Facilities to Generate Income**

1.4.1 Government departments are encouraged to generate additional income through the best use of available assets. Within the MOD this extends to facilities being made available to paying customers for private venture activities which might include storage, processing or use of weapons, munitions and explosives or the training of non-governmental organisations and individuals.

1.4.2 The important principle in any income generating initiative is that facilities and individuals must not be exposed to avoidable risks in the course of carrying out a non-core activity. Where a private venture activity is not related to the core business of the MOD and MOD personnel are not involved, the activity must not take place within IBD of any MoD explosive licensed facility. Equally no MOD manned facility or activity is to take place within IBD of the private venture activity. When MOD personnel are undertaking the private venture activity then the appropriate QDs should apply. Any proposed increase in activity over normal MOD use should be carefully controlled. If the intended facility is not, or could not be, licensed for the proposed activity then it cannot take place.

1.4.3 Where MOD Explosives Facilities are proposed to be used for income generation then there may be a question of whether such a facility remains “Under the Control of The Secretary of State” for the purposes of issuing an explosives licence. Certain principles relating to “Under the Control of The Secretary Of State” have been agreed between the HSE and CIE(MOD). The circumstances relating to the control of the explosives facilities must be such that they remain Under the Control of The Secretary of State and that the MOD explosives Licencing Scheme can remain in place. It is not possible to cover all variations of income generation within this TEB, therefore before entering into an agreement to use any MOD licensed explosives facility for income generation CIE(MOD) must be consulted, through the appropriate IE.

1.4.4 Approval for private venture use must be given in writing by the Duty of Care holder normally Head of Establishment (HOE). Before entering into any form of agreement with a customer a full written risk assessment of the proposed activity is to be made. This will require a sufficiently detailed proposal to be submitted by the potential customer so that the assessment can be conducted. Before approval is given the HOE must be satisfied that a safe system is in place and the details are written into the contract with the customer. As a minimum, for storage and handling, this must conform to the ASHE clearance process as detailed in Chapter 13. For processing the Approval to Process system as detailed in Chapter 19 must be followed. If the HOE is not satisfied that a safe system is in place the proposal should be rejected or, in exceptional circumstances, referred to CIE(MOD) through the appropriate IE.

2 PERSONNEL MATTERS

2.1 Knowledge of Regulations

2.1.1 Every person who is employed in an explosives facility is to be acquainted with the instructions in these regulations and it is the responsibility of the HoE to ensure that this is so. Where not achieved by inculcation of core competence, it is to be achieved through initial training and regular refresher training, with the content and implications of the regulations fully explained. Employees are to be actively encouraged to seek clarification from supervisors or line management immediately they perceive a training need.

2.1.2 Occasional visitors are to be fully briefed and/or accompanied by a competent person.

2.1.3 Disobedience of these regulations may result in disciplinary action.

2.2 Condition of Employment

2.2.1 No person is to be employed in an explosives area unless he or she, in addition to any other rules of employment, is:

(1) Responsible and of sound mind.

(2) Not addicted to excessive consumption of alcoholic liquors or to controlled substances.

2.3 Employment of Young Persons

2.3.1 Persons under the age of 18 years, or persons over 18 years when there is reason to suspect that they are immature or irresponsible, are not to be employed in or enter any facility where explosives are stored or handled, except under appropriate supervision. A person under the age of 16 years is not to be employed in any such facility.

2.4 Employment of Disabled Personnel

2.4.1 There is no ban on the employment of disabled personnel within an explosives facility; however each case is to be considered on its merits. HoEs must be satisfied that the nature of a disability will not give rise to any unacceptable risk. Within these parameters and where circumstances allow it, HoEs may provide useful employment for a reasonable number of disabled personnel.

2.5 Training and Supervision

2.5.1 Prior to employment in an explosives facility, personnel without core competence are to receive instruction, to an approved syllabus, on the basic principles governing explosives safety, fire prevention, fire fighting and security. Such training is to be continuous for all personnel at all levels, and records of this training are to be maintained. Furthermore, personnel employed in an explosives facility are to work under strict supervision until they have acquired a working knowledge of safety requirements.

2.5.2 A trainee is anyone training to be an explosives worker or an explosives area support worker. Training within the explosives area is to be limited to training that cannot reasonably take place elsewhere, and shall be the subject of a specific risk assessment. Types of training that may take place in an explosives area are: authorised training in the storage, handling, processing and inspection of explosives and explosives facilities. Before going into the explosives area a trainee is to have received appropriate instruction on explosives and explosives area safety. Trainees are to be under direct supervision. The number of trainees, and other workers, in the explosives area and their distribution within the area is to be controlled to take account of individual and societal risks.

2.5.3 Supervisors are not permitted to oversee any task involving the handling, processing or storage of explosives until such time as they are considered by the HoE to be thoroughly familiar with all the relevant regulations pertinent to the task.

2.5.4 The HoE is to ensure that licensed explosives facilities are placed under the charge of a suitably competent Officer, WO, NCO or civilian of a suitable grade who is to carry out a full inspection of the store and the area around it in accordance with Chapter 20.

2.5.5 A suitably competent NCO, or civilian equivalent may be made responsible for the day to day running of the store. Personnel responsible for or employed in the day to day running of the PES must have completed and passed an appropriate course of instruction.

2.5.6 ACF and CCF personnel responsible for the day to day storage, issue and accounting of SAA holdings only, are required to have passed the Cadet SAA Ammunition Storeman Course. ACF and CCF personnel responsible for the day to day storage of ammunition other than SAA whether in unit lines, on exercise or camp must have completed and passed the Unit Ammunition Storeman course delivered by the Army School of Ammunition.

2.6 **Checking of Personnel**

2.6.1 The person in charge of the explosives facilities is to know how many people are in his charge. This is necessary to facilitate rapid checking in the event of an emergency. He is to ensure that all persons employed are in a fit state, and competent to carry out their duties safely and efficiently.

3 **SECURITY**

3.1 **Patrolling**

3.1.1 Explosives areas/facilities are to be patrolled in accordance with the regulations given in JSP 440 – Defence Manual of Security, and local security advice/requirements.

3.2 **Guarding of Entrances**

3.2.1 Each entrance to an explosives area, except when closed and secured, is to be guarded by sentries, MGS, MOD or Service Police whose duty it is to:

(1) Prohibit entry by unauthorised personnel and personnel disqualified by these regulations.

(2) Scrutinise or search all personnel before admitting them.

(3) Challenge personnel as to their freedom from controlled articles/contraband (see para 5.7).

(4) Operate the control of entry system.

3.2.2 The above requirement is not usually applicable to single PES/small sites and specific guarding arrangements are to be agreed by the appropriate security authority.

3.3 **Control of Entry**

3.3.1 Only authorised personnel, including visitors, are to be given access to an explosives area/facility.

3.3.2 Entry into explosives areas/facilities is to be by means of the recognised entrances only.

3.3.3 No person who shows signs of intoxication is to be allowed to enter an explosives area/facility.

3.3.4 Each establishment will provide a system for the mustering of all staff in the event of an incident in the explosive area (e.g. swipe card, disc, etc.).

3.3.5 The custody, issue and return of discs, or the control of ‘swipe’ cards, is to be strictly controlled and the guardroom, police/piquet post or other building in which this is done is to be one that is unlikely to be destroyed or seriously damaged in the event of a fire or explosion.

3.3.6 Where implementation of this system is impracticable for small explosives areas/facilities, i.e. a single PES or small group of PES, a suitable similar system approved by the HoE is to be adopted.

3.4 **Illegal Entry**

3.4.1 All incidents of illegal entry into an ammunition store where there is the possibility that ammunition may have been tampered with are to be reported so that an inspection can be carried out to ensure stocks are safe.

3.5 **Custody of Keys**

3.5.1 The keys of all gates to explosives areas and PES are, when not in use, to be deposited in a safe place authorised for this purpose. All keys are to be clearly labelled or numbered in order that they can be readily identified. Arrangements for the custody of keys are to be in accordance with JSP 440.

3.6 **Explosives Attractive to Criminals and Terrorist Organisations**

3.6.1 Some explosives substances and articles are, by their very nature, considered as being attractive to criminals and terrorist organisations (ACTO)[1]. The explosives concerned are to be stored and stock checked under the requirements of JSP 440.

4 **ESTATE MAINTENANCE**

4.1 **General**

4.1.1 Good estate management is important in promoting the maintenance, safety and serviceability of PES and their contents. In order to promote this, HoEs are to liaise with the responsible authorities to ensure all appropriate measures are effected. Areas of responsibility are to be clearly defined, and where building maintenance functions devolve on explosives facilities estate, HoEs are to ensure that the proper actions are taken to prevent skilled explosives personnel being unduly employed on such tasks.

4.2 **Works Services / Repairs**

4.2.1 Works services in, on or in the vicinity of a PES are permitted under the conditions laid down in Chapter 18.

4.2.2 The Technical Explosives Authority is to advise on the conditions under which any repairs or modifications to the store may be carried out. Normally only explosives belonging to Compatibility Group (CG) S may remain in the store under repair or modification, but minor day to day tasks may be carried out with the explosives *in situ.*

4.3 **Surplus Facilities**

4.3.1 The regulations pertaining to explosives clearance and certification of surplus MOD explosives facilities are contained in JSP 362 (Defence Lands Handbook) and JSP 364 (JS EOD Manual). See also Chapter 17.

4.4 **Roads and Drainage**

4.4.1 Roads in, and leading to, explosive facilities are to be maintained in a good state of repair to lessen the risk of accident to vehicles. The integrity of drain covers positioned in road surfaces is also paramount. Where present, one-way traffic systems are to be clearly marked.

4.4.2 Good drainage of the land in explosives facilities is essential to the proper maintenance of roads, railways and buildings. All streams, ditches and culverts are to be kept clear and free of obstruction.

[1] Also known as 'Useful to the Ill Disposed (UID).

4.5 **Railway Lines**

4.5.1 Steps are to be taken to ensure that there is no obstruction to the view of road users or locomotive drivers at junctions of roads and railway lines. Warning notices are to be prominently displayed at the approaches to all such junctions, and the normal road traffic rules (e.g. give way to trains) are to be observed.

4.5.2 Where railway lines are provided between an explosives building and its associated traverse, their use is to be confined to traffic serving that building.

4.6 **Control of Vermin and Other Pests**

4.6.1 Vermin are a potential source of damage to buildings and services, and rabbits and other burrowing or boring animals such as termites can, if uncontrolled, cause severe damage to traverses, undermine buildings and roads, or damage packaging. Active measures are therefore to be taken to eliminate vermin and burrowing/boring animals[2] from explosives facilities.

4.7 **Vegetation, Crops And Livestock**

4.7.1 **Introduction -** The paragraphs below describe the minimum standard that is to be maintained for grass, trees and vegetation in and around explosives facilities. Grass, trees and vegetation are to be controlled to ensure that they do not present a hazard to explosives. There is a major fire risk with any uncontrolled growth, particularly during dry weather conditions. Close liaison is to be maintained with the unit and Local Authority Fire Focal Points, who may advise additional precautions dependent upon local prevailing conditions.

4.7.2 **Other hazards -** Other hazards will be dependent upon the topography and seasonal changes, but are likely to include the undermining of foundations, the blockage of underground services by tree and shrub roots, blocking of drains by leaves and grass, and the possibility of damage to buildings and facilities that could occur if trees fall upon them.

4.7.3 **Trees and Vegetation -** Trees and vegetation can also provide cover for intruders, particularly around perimeter fences. The regulations contained in JSP 440 are to be applied in this respect.

4.7.4 **Control of Vegetation -** Grass, heather, gorse, brushwood and undergrowth create a serious fire risk particularly during extended periods of dry weather, and when there is a preponderance of dead leaves and growth. To reduce the risk of fire, a Three-area Plan has been developed in which the following minimum conditions are to be applied:

(1) Area 1. No vegetation permitted within 1 m of PES (with the exception of earth-covered buildings) to provide a fire-break.

(2) Area 2. Whenever possible, no vegetation over 5 cm in height within a further 5 m of a PES (i.e. out to 6 m). No vegetation longer than 5 cm on, or within 5 m of, earth-covered buildings, or on traverses within 5 m of a PES. This is to allow for sighting of ejected unexploded articles by fire personnel thus permitting access if required, and to monitor damage caused by rabbits.

(3) Area 3. Beyond 6m, the length of vegetation to be in accordance with the site locally assessed risk.

NOTE These standards are not applicable to Authorised Quantity PES that IEs consider to be sufficiently protected by the installation or surrounding structures.

4.7.5 **Local Assessment of the Risk -** Local assessment of the risk is the responsibility of the HoE. The risk assessment team should consist of specialists from interested parties on the unit, and include:

(1) Explosives Safety Representative.

(2) Fire Focal Point (see Chapter 15).

[2] It should be noted that badgers and certain other creatures are protected by law and care is required in this respect.

(3) Senior Sy Officer.

(4) SATCO (if appropriate).

(5) Estates Management.

(6) Any other personnel considered necessary by the HoE.

4.7.6 **Long Grass Policy at Flying Units -** On flying units which have, for flight safety reasons, a 'long grass policy' as a method of controlling birds, grass may be maintained at a height of 100 mm to 200 mm to discourage roosting and feeding. The areas where the long grass policy may be applied exclude the 6 m zone around a PES, traverses and earth mounded PES. Furthermore, the introduction of the long grass policy is only permitted where it is recognised that the birds in these areas pose a significant flight safety hazard. In these cases a long grass policy is only to be introduced as part of an overall airfield grass management policy controlled by the unit Senior Air Traffic Control Officer (SATCO).

A long grass policy is not to be introduced on non-flying units, or as a cost saving measure for grass cutting contracts. Introduction of the long grass policy must always be balanced against the perceived flight safety hazard and the increased fire and security risks.

4.7.7 **Control of Trees and Shrubs -** Trees and shrubs are permitted within explosives areas provided that they do not provide a means by which a fire can bridge a firebreak. Conifers and spruce are to be kept at least 30 m away from explosives facilities, other types of tree are to be kept at 15 m. If, for historical reasons, this is not possible then those trees affecting the fabric of the traverse or those in a condition that could lead to them falling over in a storm should be removed by cutting them down close to ground level, i.e. leaving as small a stump as possible. The proximity of trees to a PES should be controlled so that in the event of them being blown over, they cannot hazard a PES or the contents. Trees are to be regularly maintained by a competent person to ensure that they remain healthy and are less susceptible to storm damage and cannot hazard the PES or the contents.

4.7.8 **Cut Vegetation -** Cut vegetation, such as grass clippings, fallen branches, hay, etc, is to be removed from the short grass areas around PES defined above immediately after cutting. If the cuttings are removed to a distance of not less than 50 m, (e.g. stacks of hay and cereal crops), from a PES, they may be temporarily stacked to await removal. Removal must be completed within 3 days from the date of cutting. The HoE is responsible for ensuring that any grass cutting or vegetation control contract includes the requirement to remove all cuttings in accordance with this paragraph. Burning of cut vegetation is normally not permitted without the prior agreement of the appropriate IE.

4.7.9 **Agricultural Chemicals -** Only chemicals, fertilisers and poisons whose use and residue does not produce or cause a significant fire risk are to be used to control vegetation and vermin in explosives areas; generally, this will restrict the use of weed killers to those that are Herbicide and chlorate free. If doubt exists on the suitability or compatibility of agricultural chemicals and poisons, further advice may be obtained from the Area Fire Safety Manager of the Defence Fire Risk Management Organisation (DFRMO) through the appropriate IE.

4.7.10 **Agricultural Operations -** Agricultural operations, excluding the grazing of livestock, are permitted in explosives areas subject to the following conditions being written into a contract with the agricultural operator:

(1) Personnel involved in the agricultural operation are to be given the same protection as if they were contractors (see Chapter 18).

(2) Any agricultural operation which is within the area encompassed by the IBD must not involve more man-days than would normally be required to maintain the area, e.g. grass cutting.

(3) The crops grown must not create a significant fire risk. The unit Fire Focal Point (see Chapter 15) is to advise whether increased fire precautions are required (particularly increased fire breaks). These recommendations are to be implemented before agricultural operations commence.

(4) The contract with the operator must include the stipulation that when agricultural operations cease, the ground is returned to grass.

(5) Crops grown on flying units must not attract birds. The SATCO must assess their effect on/attraction to local bird life prior to permission for the crops being granted.

4.7.11 **Livestock -** The grazing of livestock within explosives facilities is not normally permitted due to the amount of access time to the area normally required by the farmer or his employees. However, where thought justified, the HoE is to submit a case to the IE for approval prior to any contract being signed. If the livestock is the property of the unit, the same procedure is to be carried out.

5 MANAGEMENT OF EXPLOSIVES FACILITY

5.1 Licensing

5.1.1 **Standard Licence –** There are two types of standard licence, both authorised by the respective IE, within whose functional area the establishment falls, or staff with delegated authority:

(1) MOD Form 1658; The explosives store is to be licensed according to the construction of the building, traverses and available quantity distances.

(2) MOD Form 1659; The explosives store is to be licensed for explosives belonging to Hazard Division (HD) 1.4, and pyrotechnic, smoke producing, illuminating, incendiary and lachrymatory natures of Compatibility Group G, within Hazard Divisions 1.2 and 1.3, with a total Net Explosives Quantity (NEQ) not exceeding 25kg.

5.1.2 **Non-Standard Licence -** In special circumstances it may be appropriate to issue a Non-Standard Licence on MOD Form 1658. Applications for this type of licence must be requested through the respective IE or staff with delegated authority, giving details of the explosives store and explosives to be stored. For unit storage this will normally be in the form of an operational requirement to store additional ammunition natures and or quantities, at possibly reduced minimum quantity distances.

5.1.3 After authorisation, one copy of the licence is to be retained by the appropriate IE, and a minimum of two by the establishment.

5.2 Explosives Limits

5.2.1 QD requirements are based on the Net Explosives Quantity (NEQ) of explosives and not its gross weight. The IE or staff with delegated authority is to calculate the maximum NEQ which can be held in the store based on the QDs available. The NEQ limits will be detailed on the licence which must be displayed where appropriate.

5.2.2 A board displaying the maximum Net Explosive Quantity (NEQ) in kilograms permitted in the store may be positioned inside the building. The displayed limits may, additionally, be stated by natures and quantities for administrative convenience.

5.3 Man Limits

5.3.1 Only the minimum number of personnel required to carry out the task in hand are to be in the explosives store or its precincts.

5.4 Approved Variations

5.4.1 Other non-compliance issues with a mandated requirement or standard within these regulations can be sanctioned by means of an Approved Variation, time limited to a maximum of 5 years. These are subsequently divided between those electrical and those non-electrical. All such requests must be submitted by the HoE, in writing, to the appropriate IE, through the local Technical Explosives Authority. See also Chapter 1.

5.4.2 The format for applying for a non-electrical Approved Variation is set out in MOD Form 1675.

5.4.3 A record of Approved Variations is to be kept by the HoE, the IE and CIE (MOD).

5.5 **Standing Orders**

5.5.1 Standing Orders or equivalent are to be published and carefully maintained. These orders are to be drafted in the first instance in consultation with the Technical Explosives Authority and are to include all material considerations in these regulations, in Queen's Regulations or in any other regulations relative to the maintenance of safety and security. Guidance to the preparation of Standing Orders is given at Annex B.

5.5.2 A copy of the Standing Orders is to be readily available to all personnel.

5.6 **Grounded DROPS Flatracks**

5.6.1 Grounded Dismountable Rack Offloading and Pick-up System (DROPS) Flatracks loaded with explosives are to be considered as open stacks.

5.7 **Safeguarding**

5.7.1 Safeguarding is a statutory based consultative system between Ministry of Defence (MOD) and the Department of Transport, Local Government and the Regions (DTLR) whereby directions are issued under Planning Law to Local Planning Authorities (LPAs) requiring the latter to notify MOD of any planning application within a defined area around an explosives facility. This area, known as the Safeguarded Area, is drawn on an Explosives Safeguarding Map (ESM) which is issued as a Safeguarding Direction Order (SDO) by Defence Estates (DE) Safeguarding to the LPA through MOD. The area reflects the NEQ that may be stored and the distances to be observed from the facility. These are not strictly safety distances but distances at which risks are acceptable to CIE (MOD) as the Licensing Authority for explosives.

5.7.2 Should a proposed development or change in use of an existing building affect explosives licensing, MOD then has the opportunity to object and prevent a loss or reduction in the use of licensed facilities

5.7.3 All PESs require the production of Safeguarding Maps, with the exception of those under an Authorised Quantity Licence, or any quantity of HD 1.4.

5.7.4 The HoE is responsible for ensuring that Safeguarded Areas are inspected quarterly by physical inspection and the Technical Explosives Authority and local Defence Land Agent must be notified of any new developments or obvious signs of activity which regularly bring significant numbers of people onto the land (in excess of 200 persons in any 24 hour period). The establishment of new caravan sites must also be notified.

5.7.5 Further details are given in Chapter 11.

5.8 **Controlled/Prohibited Articles and Contraband**

5.8.1 **Introduction -** The entry of certain items into explosives facilities is strictly controlled. These are known as controlled or prohibited articles or ‘contraband’ (see definitions). Cases of doubt regarding the status of a particular item, or where it is perceived any of the items listed at Annex C might need to be introduced into the Explosives Facility, the matter is to be referred to the relevant Technical Explosives Authority.

5.8.2 **Contraband Notices -** These are to be prominently displayed at the entrance(s) to all explosives facilities. This notice is to be produced locally to the required size deemed necessary, an example is shown at Annex C.

5.8.3 **Smoking Materials and Designated Smoking Areas -** Smoking is strictly prohibited in an explosives area or PES except in places designated as smoking areas (known as Designated Smoking Areas or DSAs) under conditions specified by the relevant IE. Where no physical explosives area boundary exists smoking is not permitted within 15m of the PES. All smoking and smoking related materials are to be declared at the piquet post

but means of ignition, including the removable portions of car lighters, are to be surrendered. The owner may then convey cigarettes or tobacco direct to the DSA. In order to avoid taking means of ignition into the area, a non-removable electric cigarette lighter may be fixed to the wall in the DSA. Where such lighters are not provided, then means of ignition are only to be conveyed to and from the DSA in a locked red box observing the appropriate requirements detailed in para 5.10.2. A separate red box is to be used to transport the smoking materials.

5.8.4 **Firearms -** With the following exceptions, firearms are prohibited within an explosives area/facility:

(1) Signal pistols/small arms required in proof/trials facilities.

(2) Weapons in packs or pods, or for inclusion in packs or pods for approved aircraft weapons systems, but only in authorised buildings.

(3) Firearms carried by authorised personnel on guard/defence and operational duties, or for authorised tactical exercises (see para 5.21).

(4) Firearms held in authorised locations for rapid deployment of defence force personnel; the keys for which are to be held under secure arrangements separate from the explosives area keys (JSP 440 refers).

(5) Firearms used for shooting game or vermin, in organised events that have been subjected to a formal Risk Assessment in accordance with JSP 375 and authorised by HoE.

5.8.5 **Food and Drink -** Intoxicating liquors are not to be taken into an explosives facility. Food and non-intoxicating drinks may be admitted subject to the prior approval of the HoE. For reasons of hygiene and health, the consumption of food or drink is only permitted inside designated areas.

5.8.6 **Battery Powered Devices -** Battery powered devices of any description are not to be taken into an explosives facility unless specific authority has been obtained from CIE (MOD) (see also Chapter 8).

5.8.7 **Spark, Flame or Heat Producing Items -** Spark, flame or other heat producing items are not permitted inside an explosives facility unless required for a specific reason, such as a works service and must be authorised through the Permit to Work system (see Chapter 18). Metal shod footwear is prohibited in a PES.

5.8.8 **Magnetic Therapy Products -** No magnetic therapy products (bracelets, “spot” magnets, joint bandages, etc) are to be worn or carried within an explosives facility or within non-explosives areas handling weapon inert components.

5.8.9 **Tracker Devices Fitted to Vehicles -** To ensure that the risk of the presence of tracker devices to unscreened/unshielded EEDs/GMs is ALARP, HoEs are to establish a control mechanism that routes any vehicle fitted with a tracker device in accordance with Chapter 24 para 4.2.

5.8.10 **Other Controlled Items -** In normal circumstances, many other items are not permitted to enter explosives facilities. However, there are occasions when the following normally prohibited items may be authorised to enter by the HoE. These include:

(1) Cameras (under the conditions laid down in JSP 440 and Chapter 8).

(2) POL not in sealed approved containers.

(3) Lanterns, oil lamps, stoves etc.

(4) Unauthorised tools.

(5) Vehicle Radio Key Fobs are battery powered devices and are therefore not permitted inside explosives buildings unless authorised by CIE(MOD) as required by para 5.8.6 above. If approved to EN 300 220-1 (and most are) they generate only a low level of Radio Frequency energy. Therefore, if authorised by the HOE, they are permitted inside explosives areas where protected Electro Explosives Devices (EEDs) are present. Where exposed EEDs are present they may still constitute a hazard and are not permitted.

5.8.11 **Searching of Personnel -** All persons, before entering an explosives facility, are to search their pockets and are to deposit outside the entrance any controlled articles which they have with them. A suitable container or pigeon-hole is to be provided for the reception of such articles. All persons employed in or visiting an explosives facility may, if they consent, be subjected to a thorough search at the entrance before entering and when leaving, or at any time whilst they are in the explosives area. The search is to be made by a MOD Policeman, Security Guard, Service NCO, Chargehand or equivalent, in the presence of a person of senior rank or grade to those being searched. Personnel are only to be searched by personnel of the same gender, body searches are not permitted. Searches are to be carried out at random intervals, and a record maintained. Personnel unwilling to consent to search are not to be admitted to an explosives facility.

5.8.12 Visitors are liable to be searched if this is considered desirable by the MOD Police, NCO, Chargehand or equivalent, who is on duty at the entrance to an explosives facility. Visitors who do not submit to this liability are to be refused admittance. Before any visitor is searched, reference is to be made to the HoE.

5.9 First Aid Equipment

5.9.1 A local risk assessment is to be undertaken to define the requirements for the positioning of First Aid kits at all PES in accordance with the guidance given in the Health and Safety (First Aid) Regulations 1981 and associated ACoP. First Aid equipment must always be provided in Process Facilities, when explosive processing tasks are being carried out. Details of first aid treatment for white phosphorous (WP) and other hazardous substances and the precautions to be taken when handling these substances are given in Chapter 17.

5.10 Fire Precautions

5.10.1 All personnel have a responsibility to do all in their power to prevent fires, report any occurrence of fire, take appropriate first aid measures, and co-operate in any larger fire fighting effort. HoE is responsible for producing fire orders and a pre-fire plan, with advice from the local fire safety advisor. Detailed instructions for fire pre-planning and fire fighting are given in Chapter 15.

5.11 Lighting Of Fires[3]

5.11.1 **General -** The unauthorised lighting of fires in explosives facilities is prohibited. Authority for the lighting of fires may be given by the HoE in special circumstances subject to a formal risk assessment being carried out, but the number of authorised fires is to be kept as low as possible.

5.11.2 **Carrying of Means of Ignition for Authorised Fires -** When authority has been given for a fire to be lit, only a means of ignition approved by HoE is to be used for the purpose. The means of ignition are to be taken into the facility in a lockable red box by the person authorised to use them. The user is to keep the key in his possession and is to allow no other person to have access to the means of ignition, and is to use them only for the purpose for which they have been authorised. Means of ignition are not to be left in the facility when unoccupied but are to be brought out by the authorised person.

5.11.3 The authorisation referred to above is given in writing, by the HoE, and is to state the purpose for which the means are required.

5.12 Control Of Overflight By Aircraft

5.12.1 **General –** On military flying Units, the Explosive Safety Representative should contact the Senior Air Traffic Control Officer to request a suitable entry in the Unit Flying Order Book which highlights the danger of potential disaster at large co-located explosives

[3] Fires in this context excludes burning on authorised demolition areas for which separate regulations apply.

storage sites. In this way, consideration can be given by aircrew to avoidance of explosives facilities.

5.12.2 **Helicopters -** Military helicopter operations which over-fly explosives facilities may be permitted for training/exercise purposes[4] provided that:

(1) A local formal Risk Assessment has been conducted by the unit Explosives Safety Representative that demonstrate that the risks are tolerable and ALARP.

(2) They are authorised beforehand by the HoE.

(3) Only passenger or non-explosive transfers are involved.

(4) No over-flight of PES is permitted.

(5) Use is made of the safest ingress/egress routes, which are to be included in local Flying and Unit Orders.

(6) No movement of explosives is undertaken during over-flight.

5.13 Site Plans and Identification Of PES

5.13.1 Site plans of the establishment, to an appropriate scale, showing all PES are to be maintained in the control office or other appropriate location and with the appropriate Fire Focal Point.

5.14 Display Of Warning Flags

5.14.1 At Proof, Trials and Demolition facilities, a red warning flag(s) is to be displayed outside each facility where proofing, trials or demolition activities of any kind are being carried out.

5.15 Vacating A PES

5.15.1 **Closure of Packages -** When vacating a PES, all packages are to be closed, and sealed if appropriate.

5.15.2 **Doors, Windows and Shutters -** All PES doors, windows and shutters are to be kept closed and secured except when open for work or ventilation. When the doors are open, a responsible person is to be left in charge of the building.

5.15.3 **Electricity Supplies -** When a PES is vacated, the electrical supply is normally to be switched off at the building master switch. However, in buildings where a constant temperature or humidity is required, the power may be left on provided that the heaters, etc, are thermostatically controlled. Other than those provided for security features, all other power supplies are to be switched off (see also Chapter 8).

5.15.4 **Process Buildings and Major Proof Centres -** If the next day is a working day, explosives may remain in the working or transit areas of Process Buildings (PBs) or the approved store of a Major Proof Centre (MPC) provided that they are:

(1) Removed from gravity rollers.

(2) Repackaged.

(3) Placed on the floor.

(4) The PB/MPC must comply with the security requirements of JSP 440.

5.15.5 If the next day is not a working day, the above procedure is to be followed except that explosives may only be left in the PB transit area or MPC approved store. For some complex weapons e.g. Spearfish, the above procedures are not practicable prior to the completion of the process task.

5.15.6 **Temporary Breaks -** During temporary breaks during the working day, the following actions must be taken prior to vacating a PES:

(1) All entrances are to be left clear of obstruction.

[4] For explosives aspects, see Chapter 10 Section 5, and for helicopter landing pads, see Chapter 10 Section 7.

(2) Explosives on gravity rollers must be secured against accidental movement.

(3) Explosives may be left in Process Buildings and Proof Facilities provided that:

(4) They are safely stowed.

(5) Unless stipulated as permissible on the Explosives Licence, no explosive filling is exposed.

5.16 **Thunderstorms**

5.16.1 All PES are to be vacated and secured during periods of Thunderstorm, and remain so until the storm has passed. Other specific requirements for thunderstorms are given in Chapter 17.

5.16.2 All ammunition containers are to be closed within the store and any transport sent away.

5.17 **Use Of Emergency Exits**

5.17.1 Personnel employed in explosives facilities are to be aware of the location of both the normal and emergency exits of the PES in which they work. Whenever a fire fighting practice takes place, evacuation drills are also to be carried out, during which the emergency exits as well as the normal exits are to be used. Emergency doors are to be clearly marked as such, both internally and externally.

5.17.2 The person in charge of the building is to record in the PES Log Book (see Chapter 20) the date of the practice and the time taken to clear the building. He is also to comment on the adequacy or otherwise of the number of exits and the use made of them, and make recommendations for additional means of exit when considered necessary.

5.17.3 At such drills, workers in process facilities are to be encouraged to make use of all available exits and to ignore the normal rules for entering and leaving such buildings. However, care is to be taken that protective clothing and shoes are free from extraneous matter before personnel are permitted to re-enter the facility.

5.17.4 Packaging, MHE, gravity rollers and other equipment are not to be permitted to block fire lanes or flow lines, or impede emergency egress from the PES.

5.18 **Tools, Other Materiel and Unauthorised Explosives**

5.18.1 **General -** No stores are to be admitted to an explosives facility other than the explosives or non-explosives authorised for storage therein, and any such tools, appliances, building materials, etc, as may be authorised from time to time in accordance with these regulations. Explosives other than those authorised on the Explosives Licence are not to be taken into a PES. Captured enemy and foreign explosives are subject to special regulations (see Chapter 13).

5.18.2 **Articles in Use List -** An Articles in Use List (MOD Form 1660) or equivalent list of tools authorised for use by the authorised processing documentation is to be available in the process room or PES for each approved task.

5.18.3 **Tools and Equipment -** Tools and other equipment of local manufacture are not permitted unless their use is called for in an approved work instruction and their design is authorised. In cases where it is necessary to ‘prove’ a locally manufactured tool or other piece of equipment in an explosives facility, prior authority is to be obtained from the relevant IE, to whom full details should be submitted by the applicant.

Tools and equipment required for works services/repairs to PES are to be authorised as detailed in Chapter 18.

5.19 **Permitted Operations**

5.19.1 **Introduction -** Some operations are of negligible hazard and may be permitted in explosives storehouses. Operations which involve the rectification of explosive articles and/or the exposure of explosives substances are strictly prohibited in explosives

storehouses. Apart from cleaning operations such as sweeping or dusting, the operations that may be permitted in explosives storehouses are as described in the following paragraphs. Other operations may be permitted where movement of the store to a process area creates a greater risk. In such instances the HOE may authorise such work. Each case is to be judged on its merits and will require full risk assessment in support of the task. All other instances must be referred to the relevant IE for authorisation.

5.19.2 **Explosives Storehouses and Open Bays -** The only operations permitted within a storehouse or open storage bay are:

(1) Re-stencilling and re-labelling of packages and unboxed stores as required.

(2) Build up and break down of ULS/ACA/Overpacks/Crates/Pallet configurations where the packages within are sealed or are unboxed stores.

(3) Opening gates of ULCs to check Humidity Indicators.

(4) Aircraft HE bombs may be maintained or inspected provided such operations are carried out in accordance with instructions issued by the appropriate IPT and agreed by the responsible IE.

(5) Visual inspection of prepared for use aircraft weapons.

(6) Checking of temperature/humidity indicators/approved data loggers where such does not involve breaching containers/packages.

(7) Certain low risk, short duration, tasks such as the repacking or visual inspection and/or issue/receipt of small quantites of explosives of HD 1.3 and 1.4 may be permitted in the immediate vicinity or if necessary within the parent licensed storage building at the discretion of the HoE, subject to local risk assessment. Only one package (or two if fractioning is the required task) may be open at any one time. This task may be conducted under the veranda or other shelter (where fitted) or in the open air (subject to weather) or in a Mobile Ammunition Inspection Facility (MAIF). Where none of the aforementioned exists it may be conducted in an area or gangway at the greatest possible distance from all stacks of explosives. The doors to the parent building must be closed but unlocked. The MAIF and its rail equivalent, the Mobile Ammunition Inspection Trailer (MAIT), may alternatively be located at a licensed transit facility or stabling area for similar purposes providing no other explosives other than those to be visually examined and/or repackaged are present. Where it is intended to use the MAIF/ MAIT for processing of explosives, see Chapter 19 regarding licensing requirement.

(8) This excludes the direct handling of any Electro Explosive Device (EED), such as electric detonators, which can be susceptible to Electro Static Discharge (ESD). For accounting purposes it is permissible to open unsealed inner packaging, providing the risk from any nearby Radio Frequency (RF) source has been negated, see Para 5.27.1. If a unit believes it has a necessity to handle such items, authority to do so must first be obtained by the establishments relevant Inspector Explosive (IE). If this is granted the precautions detailed in Chapter 8 Para 10 should be applied.

5.19.3 **Airfield Forward Weapon Storage (see Chapter 10 Section 5) -** In addition to the permitted operations in the above paragraph, the following operations are permitted in FWS subject to a Risk Assessment being carried out by the unit Explosives Safety Representative and agreed by the relevant IE:

(1) Unboxing/boxing of belted ammunition and making up/breaking down of belts into aircraft loads for loading into aircraft or aircraft ammunition tanks/dispensers. This activity is to be carried out in a conductive regime (see Chapter 8) if the ammunition is electrically initiated.

(2) Final fuzing operations and setting of fuzes on aircraft weapons in accordance with relevant technical instructions. However, rectification of any description is not permitted.

(3) Loading into magazines of Countermeasures stores (such as IR Flares and Chaff cartridges with integral squibs), but only in a conductive regime (see Chapter 8).

5.19.4 **Ready Use Storehouse/Unit Ammunition Store -** In addition to the activities in para 5.19.2, above, and where the use of a Process Building is not reasonably practical, issues, receipts and visual inspection may be permitted in a suitable area set aside for the purpose subject to a written Risk Assessment having been carried out by the Explosives Safety Representative and authorised by the IE licensing authority. This is to be limited to HDs 1.3 and 1.4 stores only.

5.20 Cleanliness And Husbandry

5.20.1 All PES are to be kept thoroughly clean at all times. Spare dunnage, pallets and other foreign materials and rubbish are not to be kept in the store. Non-static producing doormats may be provided at the entrance(s) to PES, and the floor, workbenches, and all platforms and fittings, are to be kept free from dust and grit.

5.20.2 Items used for maintenance such as paint, white spirit, oily rags, waste and other articles liable to spontaneous combustion are to be placed, immediately after use into suitable containers at least 10 metres away from the PES or in any area approved by DFRMO. Alternatively into containers housed in a suitably fireproof compartment which can be closer to the PES. These bins are to be cleared at regular intervals and on no account are they to remain filled overnight. Any waste material which is, or is suspected of being, contaminated with explosives substances is to be treated as explosive and stored and disposed of accordingly.

5.20.3 Minor quantities of rags, and no more than 1 pint or ¾ litre of paint, white spirit etc, for day to day use may be stored in a metal locker adjacent to the outside rear or side walls of the store.

5.21 Entrances

5.21.1 The doorways of the explosives store are to be kept clear at all times.

5.21.2 Doors are to remain unlocked whenever personnel are inside the store.

5.22 Tactical Exercises

5.22.1 Tactical exercises in explosives facilities are to be subject to stringent controls approved by the HoE and the prior authorisation of the appropriate IE.

5.23 Trials In Explosives Facilities

5.23.1 It may be necessary from time to time to conduct trials in explosives facilities to investigate new packaging, handling or movement techniques, and surveillance or destruction methods. Where possible space and weight representative, electrically active but explosively inert items should be used. In all such instances, the regulations and safety principles outlined in this publication are to be observed unless Approved Variation has been authorised in advance by CIE (MOD).

5.24 Demolition Areas

5.24.1 Where a demolition area is sited within an explosives facility, the authorisation and use is to be governed by the responsible IE (see also Chapter 10, Section 9).

5.25 Firework and Other Displays Utilizing Explosives

5.25.1 The regulations pertaining to MOD firework, etc, displays are contained in Chapter 17.

5.26 Receipt and Issue Bays / Rooms

5.26.1 Receipt and Issue Bays are part of compartmented buildings where one compartment is authorised for receipts, issues and creating fraction or part filled packages,

and visual inspection of stocks. Only the compartment authorised on the explosives licence is to be used for these activities. Receipt and issue bays can also be found situated in storage sites.

5.26.2 For Unit ammunition stores/R&I rooms, the activities of fractioning/repack for issue, and inspection/repack on receipt are considered to be part of the issue/receipt procedure, rather than ammunition processes in their own right. This excludes the direct handling of any Electro Explosive Device (EED), such as electric detonators, which can be susceptible to Electro Static Discharge (ESD). For accounting purposes it is permissible to open unsealed inner packaging, providing the risk from any nearby Radio Frequency (RF) sources has been negated. If a unit believes it has a necessity to handle such items within the R&I room it must first gain authority from their functional Inspector Explosive (IE).

NOTE All fraction packs must be packed in accordance with the ESTC classified method of pack, and correctly marked and sealed, if they are to be transported on the public road.

5.26.3 When issues, packaging or unpackaging are in progress, only one nature at a time is to be dealt with. If more than one nature is necessarily in the R and I room, all containers, except those containing the particular nature in hand, are to be held segregated with the lids closed.

5.27 **Handling or Testing of EEDs**

5.27.1 Where EEDs, or stores containing EEDs, are handled, maintained, assembled, tested or prepared for use, the RADHAZ Category 1 Safe Distances detailed in Chapter 24 are to be observed. Additionally, the earthing, conductive/anti-static and processing requirements given in Chapter 8, Chapter 17 and Chapter 19 are to be applied.

5.28 **Aircraft Weapon Generation/Preparation Buildings-Concurrent Operations**

5.28.1 The IE may authorise concurrent operations within an aircraft weapon generation/preparation building after due consideration of the nature and compatibility of the operations involved. The authority and any special requirements (e.g. separation of working areas) are to be reflected on the Explosives Licence.

5.29 **Integrated Weapon Complex**

5.29.1 The Integrated Weapon Complex is a processing facility specially designed for the assembly, test and repair of sophisticated weapons, meeting the requirements for remote testing of All-Up-Round (AUR) weapons in accordance with Chapter 17, Chapter 19 and Chapter 21.

5.29.2 Whilst the primary use of an IWC is for the assembly and test of AUR, other AUR may be held for very limited periods prior to and after processing subject to the NEQ limit applicable and provided that ALARP principles are demonstrated.

5.30 **Amnesty Boxes for Ammunition and Explosives**

5.30.1 Within the MOD there is an ongoing problem of small quantities of ammunition being found within domestic waste. This is being found either on the MOD establishment or in some instances off the establishment by the waste operator. In the latter case this leaves the MOD open to criticism that we are not controlling our ammunition correctly, has the potential to cause harm to members of the public, and may result in an investigation by the civil authorities with ensuing legal action.

5.30.2 There are explicit instructions for the management of ammunition and explosives, within MOD Explosives Regulations, Range Instructions and Orders and relevant user manuals. However, it still remains a fact that there are instances of personnel finding themselves in possession of ammunition when they should not and subsequently dispose of it inappropriately.

5.30.3 In order to assist with preventing unauthorised disposal of ammunition the use of Amnesty Boxes is authorised. It is not compulsory to have Amnesty Boxes, this will be a decision taken by the TLBH and Head of Establishment. There may be various reasons why

an individual may not feel able to declare ammunition inadvertently retained following range or exercise activity, however, amnesty boxes are not to be considered the default position for the control of ammunition following range and exercise activity; rather adherence to proper procedures and good discipline are to be the primary methods.

5.30.4 Where Amnesty Boxes are to be used the following conditions must be adhered to:

(1) The siting of amnesty boxes must be done so in consultation with the relevant Explosives Licensing authority.

(2) The relevant Fire and Security Authorities must give their approval for the siting and any recommendations made complied with.

(3) Amnesty Boxes are to be included on the Site Hazard Register and subject to Risk Assessment. (This will assist with defining where they are to be sited).

(4) The locations of Amnesty Boxes are to be recorded by the relevant Inspector Explosives (IE) on a register and inspected as part of the routine inspection of explosives safety management of the establishment.

(5) The design must be approved by the relevant IE.

(6) The establishment must produce suitable orders for the management of the Amnesty Box(s).

(7) Amnesty Boxes must be kept in a good state of repair.

(8) Establishment Fire Plan must show the location of any Amnesty Boxes.

(9) Ammunition recovered must be accounted for.

5.30.5 The following points must be considered when designing Amnesty Boxes:

(1) Internal size should not be such so as to give a large drop.

(2) Must be secure.

(3) Aperture must not allow the unauthorised removal of contents.

(4) Clearly marked and readily identifiable.

5.30.6 Orders for the management of Amnesty Boxes must cover:

(1) Authorised location

(2) Key control.

(3) Authorise who is to be responsible for the inspection and emptying of the Amnesty Boxes.

(4) Instructions for the daily inspection and emptying of Amnesty Boxes.

(5) Actions to be taken in the event of finding unsafe or unrecognisable articles in the Amnesty Boxes.

(6) How ammunition recovered from amnesty boxes is to be accounted for and who by.

5.31 **New Builds and Refurbishment of Explosive Storage**

5.31.1. All planned new buildings of explosive storage or any refurbishment work other than minor maintenance must be notified to the Appropriate Explosive Authority before a contract is granted or work commences and no work is allowed to commence without their authority (also see Chapter 5).

6 **MANAGEMENT OF EXPLOSIVES**

6.1 **Homogeneity**

6.1.1 Ammunition components, bulk HE and propellants are given a filled lot number. Most guided missile components have a lot number and some are given a serial number for each component within a lot. The aim is to provide homogeneity within each lot.

6.1.2 The batching system is an extension of the lotting system. It is applied to ammunition that is a complete assembly including its own means of ignition e.g. Mortar Bomb 81 mm, Rocket System 94mm, etc and indicates that rounds within a batch have a similar combination of lot numbers of components.

6.1.3 With Small Arms Ammunition (SAA) date of manufacture, known as work dates, are used in lieu of lotting or batching although some mixed belt ammunition is batched.

6.1.4 The objects of providing a system of homogeneity are to:

(1) Achieve consistent performance of ammunition on firing with minimum variations.

(2) Facilitate identification, segregation and withdrawal from service ammunition which is unsatisfactory, potentially dangerous, or has become life expired.

(3) Identify a specific quantity in which the results of inspection, proof and test can be representative.

6.1.5 Ammunition is therefore to be stored, recorded and issued not only by nature but separately by Ammunition Management Code, lot, batch, Batch Key Identity (BKI) or work dates within each nature.

6.2 **Unauthorised Modification of Ammunition**

6.2.1 Any modification or interference with ammunition not provided for in the relevant User or Drill Handbooks or authorised by the IE is forbidden. This includes tampering and the breaking down or sectioning of any round or component of ammunition for any purpose.

6.2.2 Instructional ammunition is made up from empty components by authorised manufacturers and is not to be constructed by breaking down and emptying filled ammunition already in service.

6.3 **Unauthorised Use of Ammunition**

6.3.1 Establishments or individuals are not to:

(1) Carry out experiments involving the alteration of charges of Service propellants or of bursting charges.

(2) Use non-Service ammunition of any type for official service activities, unless the ammunition has been obtained through official channels for a specific use.

(3) Use ammunition in a manner or for purposes other than those for which it is authorised.

(4) Make use of an explosive device that is only authorised for other specialised units.

(5) Manufacture or use Home Made Explosives (HME) unless specifically authorised by the IEs.

(6) Manufacture or use simulated IEDs without the authority of the relevant IE. IED Training Aids are only to be manufactured, or held, by those units that have a specific role for IEDD training, such as the ASofA, DEODS & OPTAG. Units involved in IEDD, such as 11 EOD Regt RLC, RN, RE and RAF IEDD teams are also permitted to manufacture and possess IED Training Aids. The explosive components of simulated IEDS are restricted to recognised and authorised electric EOD simulators and Igniters Safety Fuze Electric (ISFE).

6.4 **Maintenance of Explosives**

6.4.1 Maintenance required to be carried out on explosives is only to be undertaken when specifically authorised.

6.5 **Opening of Ammunition Containers**

6.5.1 Sealing wires, metal seals or labels are not to be interfered with and containers are only to be opened when the contents are required for immediate use. There may be occasions where unsealed containers need to be stored. The number of these unsealed containers is to be kept to a minimum. Such unsealed containers are to be properly closed and the correct internal furniture used.

6.6 **Part Filled Packages**

6.6.1 Any containers made into a part filled package because of detailed issues, are to be closed before they are returned to storage and the amended quantities marked on the outside of the container. The issue part filled package is also to be packaged in its appropriate authorised Service container and this is to be marked to denote its contents. This does not apply if the explosives are issued directly to the user, or it is to be stowed in an Armoured Fighting Vehicle (AFV) or specially authorised racked vehicles.

6.6.2 Where practicable each Batch Key Identity (BKI) lot, batch or work date is to have only one part filled package.

6.6.3 Where the package fully complies with the requirements of Chapter 14 para 7.7 this is deemed a Fraction Pack, not a Part Filled Package.

6.7 **Assembly of Components to Explosives**

6.7.1 When components of explosives have to be assembled for use e.g. grenades, fuzing of shell or anti-tank mines and the explosives are not expended, unless authorised by the appropriate IE to leave them assembled, the components are to be removed and repackaged into their correctly marked FSSP before being returned to store. Charges of demolition explosives are not to be returned to store with detonators or other ancillaries in the charges.

6.8 **Protection from Moisture**

6.8.1 Explosive substances are generally hygroscopic, i.e. they tend to absorb moisture. This phenomenon has the potential to reduce sensitivity and lead to reduced reliability and unserviceability. However, should certain explosive substances be subjected to total submergence this can lead to the development of highly dangerous conditions and expert advice should be sought in these cases. Care is therefore required to maintain the weather-proof qualities of explosives packaging and the fabric of all licensed buildings. Any sign of dampness and/or ingress of moisture to a licensed building are to be reported immediately in accordance with local instructions so that remedial action can be taken.

6.8.2 The effects of moisture on various types of ammunition and associated materials are as follows:

(1) Unboxed ammunition. The most harmful effect is corrosion. In the early stages basic cover and stencil markings (essential for identification) are obliterated. Later, pitting of the ammunition may occur to such an extent as to make it unserviceable.

(2) Steel containers and their contents. Steel containers not only lose their basic colour and markings, but eventually become perforated with rapid deterioration of the contents following. Substances particularly subject to decay under damp conditions in steel containers are components made from certain alloys and paper cylinders.

(3) Explosive compositions. Some substances used in explosive compositions attract and hold moisture with the consequent falling off or even total loss of the explosive properties. They can also become unserviceable and sometimes dangerous after short periods in damp conditions.

6.8.3 Non-explosive materials. The decay of soft woods through moisture is not a common source of trouble with ammunition containers. However, fabrics, felt and paper materials, by absorbing moisture, create conditions favourable to corrosion and decay in other materials in the same container.

6.8.4 It is imperative that explosives are protected from dampness or the ingress of moisture. The following stores are particularly susceptible:

(1) Explosive substances or articles containing hygroscopic fillings, e.g. pyrotechnics (including WP and lachrymatory), trade explosives, combustion time fuzes, cordtex, gunpowder, etc.

(2) Packages containing non-explosive items likely to corrode.

(3) Articles containing components manufactured from zinc, aluminium alloys or cadmium plating.

(4) Rocket motors.

6.8.5 Water that is entering a licensed building through a structural defect is to be distinguished from that resulting from condensation and urgent action taken to repair the defect. If repairs cannot be speedily effected, the licensed building contents are to be moved to another licensed building.

6.8.6 Providing an ammunition store is given adequate protection against the access of moisture, good ventilation of the ammunition will not only keep it cool but prevent condensation in and around the containers and the ammunition therein.

6.9 **Protection From Heat**

6.9.1 Explosives are to be kept as cool as possible and are to be protected from the direct rays of the sun.

6.9.2 Explosives are not to be stored within 0.5 m of any heating device.

6.10 **Ventilation**

6.10.1 Despite the importance of proper ventilation, the indiscriminate admission of air into PES may do more harm than good, but, in general, the sealing and protective coating of the explosive stores or their packaging does much to offset the effect of moisture laden air.

6.10.2 The higher the temperature of the air, the more moisture it requires to become saturated, and therefore it must not be concluded that on a warm day, the air is necessarily drier and better for ventilation than on a cold day. Indeed, the reverse may be the case. Therefore, in climates where the Relative Humidity (RH) is generally high, PES are not to be opened for ventilation without first ascertaining that the conditions are suitable.

6.10.3 The ventilation of a previously closed PES in which the internal temperature is lower than that of the incoming air may result in condensation forming on the internal walls and the explosives/packages. With a free flow of air, this condensation normally evaporates during the period of ventilation, but when the air-flow is restricted, as may occur where the PES is surrounded by traverses or situated in a deep hollow, the rate of evaporation may be slow. Thus several ventilation periods may be necessary before the condensation finally disappears.

6.10.4 In humid climates, where normal ventilation cannot keep condensation in check, air-drying/conditioning apparatus to an approved standard may be installed.

6.10.5 In the UK, unless ordered otherwise by the relevant IE, PES ventilators are to remain open, being temporarily closed only as an immediate precaution against the entry of precipitation or fog.

6.10.6 Ventilation by opening the doors and windows is not to be carried out unless condensation or excessive heat is a perceived problem, in which case advice is to be obtained from the IE (see Annex D).

6.10.7 The temperatures and times of opening of a unit explosives store are to be recorded on the locally produced Daily Record of the Readings of the Thermometer and Hydrometer (Explosives Store) when any of the following appertain:

(1) Explosives held carry a storage temperature limitation.

(2) The internal temperature is liable to rise above 30°C.

(3) It is advised by the Technical Explosives Authority.

6.10.8 The Technical Explosives Authority will advise on the correct positioning of the thermometer in the store.

6.11 **Chemical Stability And Temperature Limitations For Explosives**

6.11.1 **Introduction -** The chemical stability of explosives in storage is discussed in detail at JSP 762.

6.11.2 Whilst in general explosives become less sensitive as the temperature drops, very low temperatures can have an adverse affect upon their safety or function when they are subsequently used. For example, cracking and fragmentation of the explosives can occur which can affect their operation. In propellants, cracking can lead to increased burning rates and, in the extreme, detonation. Nitro-glycerine freezes below 13^{o}C and may crystallize out such that, upon increase in temperature, the explosive in which it is contained may leach nitro-glycerine.

6.11.3 To prevent degradation or outright unserviceability of explosives, temperature limitations are applied to the storage and transportation of certain types of explosives substances and articles. Ammunition containers housing such ammunition are marked with a red rectangle enclosing the critical temperature figures. These limitations are detailed by the IPT in the item Maintenance/Support Policy Statement, A&ERs Vol 3, or other relevant publication. The purpose of the following paragraphs is not to substitute for the appropriate policy documents, but instead to give a general guide to temperature limitations for explosives, and the mechanisms for measuring and controlling storage temperature. From the guidance given, the most suitable storage accommodation available is to be used in order that temperature susceptible explosives are maintained in a serviceable condition for the longest possible period.

6.11.4 Although isolated periods of exposure to extremes of temperature may not cause any immediate deterioration, the effects can be cumulative. Where necessary, the extent of such periods of exposure is to be recorded and notified to the relevant IPT.

6.11.5 **Storehouse Construction and Heating Equipment -** All explosives storehouses should be so designed and equipped that the inside temperature rarely falls below 5^{o}C, and rarely rises above 25^{o}C. In the UK, it would obviously be unusual for these limits to be exceeded, though the situation may well occur overseas. In practice, there are many explosives that can safely be kept in storehouses with no space heating, insulation or air conditioning installed. However, the presence of an adequate and serviceable means of ventilation in storehouses is a major requirement regardless of temperature limitations, if only to prevent deterioration of the building structure. Proposals to install space heating or air conditioning are to be referred to the IE before being implemented. See also Chapter 6.

6.11.6 **Application of Temperature Restrictions -** The restrictions given below are to be considered when making major alterations to existing storehouses, and when constructing new storehouses:

6.11.7 Limits of Temperature. When any explosive is mentioned with more than one class of temperature restriction, it is to be regarded as being in the class with the maximum restriction.

6.11.8 Minimum Temperature. To prevent exudation of nitro-glycerine, nitrate ester based propellants (e.g. cordite), and articles containing such propellants, should not be kept in storehouses for a continuous period of more than one month if the temperature in any part of the building is liable to remain below 5 C. If the stipulated minimum temperature conditions cannot be sustained, artificial heating to an approved standard is to be installed.

6.11.9 Maximum Temperatures. The efficiency, storage life and safety of some explosives, particularly propellants, are adversely affected by storage at abnormally high temperatures. They are not to be kept in storehouses where the temperature can be expected to rise above the limits shown in the item Support Policy Statement or other relevant publication without the prior authority of the IPT for the explosive/store. The use of adequate ventilation, approved air conditioning, or insulation, is to be considered in order to keep temperatures in storehouses within approved limits. In hot climates, the explosives listed below are to be stored in the coolest accommodation possible:

(1) Stores containing Amatol or TNT.

(2) Incendiary stores.

(3) Propelling charges or stores containing propellants.

(4) Stores containing WP or Lachrymatory compositions.

6.11.10 Temperature limitations are equally important during transportation, especially where explosives are to be moved by sea. The accompanying documentation must therefore be annotated with any temperature limitations for the store being moved.

6.11.11 **Temperature Recording -** Where stipulated in the technical publication for the explosive or weapon, max/min thermometers or approved temperature data loggers are to be installed in the buildings where temperature susceptible explosives and articles are stored, handled or processed and the readings recorded. Approved temperature data loggers may also be placed inside individual explosives packages. When further called for, this information is to be passed to the relevant IPT to assist in lifing policy and replacement planning.

6.12 Identification Of Explosives Returned To UK From Overseas - RAF Provisioned Natures

6.12.1 **Introduction -** Explosives which have been subjected to excesses of heat, cold or humidity for periods of 6 months or more, must be identified to enable the IPT to control its stocks, especially when they are subject to proof and surveillance programmes. This information is also useful for identifying un-lifed stocks that remain in storage for long periods, and where the change in storage conditions resulting from deployment to different climatic regions in the world in support of Out-of-Area operations could affect their stability, but only after return to the UK.

6.12.2 **Use of Prefix Letters -** To assist in the identification of these stores, a series of prefix letters have historically been used. The allocation of the prefix letters is controlled by the appropriate IPT and DOSG TS1 staff in concert. The prefix letters issued to date are shown below.

6.12.3 It is the responsibility of the stockholder to apply the prefix letter to the packages before the store leaves the deployed area.

6.12.4 Unpalletised, packaged and unpackaged explosive stores - on every item/package to precede the Lot No or Batch Key Indicator (BKI) with the prefix letter underlined as shown in the example below:

X (Alternate position)

Maker Date X Lot 123

X (Alternate position)

NOTES

(1) The alternate positions shown above are only to be used if there is insufficient space alongside the Lot No or BKI.

(2) The prefix is to be in the same colour and size as the existing Lot No or BKI.

(3) Palletised stocks - apply the prefix letter, underlined as example above, to all external packages on the pallet, and to the identity board if fitted. If however the pallet is split down each package that is unmarked is to have the prefix applied.

6.12.5 Current prefix letters issued are:

(1)	Hong Kong	V
(2)	Europe include Mediterranean Area	None
(3)	Belize	X
(4)	Gulf Area	Q plus location letter
(5)	Dahran	D
(6)	Muharraq	M
(7)	Tabuk	T
(8)	Al Kharj	K
(9)	Jordan	J
(10)	Kuwait, inc Ali Al Saleem	A

(11) General/Multiple/History Uncertain G

(12) Africa (All areas) A

NOTES

(1) Stores from the Mediterranean area may still be found with the prefix P which is now discontinued.

(2) Stores previously located in the Ascension and Falkland Island may be found with the prefix X and prefix F respectively, but these are now discontinued.

(3) The stores deployed to the Gulf area in support of Op Granby (1990-91) have an additional marking to identify the location, i.e. 'QM'. This is to continue to identify stores that were at both Dharan and Al Kharj, otherwise the individual letter shown above is to be used.

(4) A prefix is not required if the stores are not in a climatic zone for at least 6 months, unless the IPT for the store issues instructions to the contrary.

(5) When stores are moved between zones, example - the Gulf (Al Kharj) to Hong Kong, and have been in theatre for more than 6 months at each location the prefix is applied to precede all others. For the example quoted the prefix will finally be 'VQK Lot No/BKI'.

6.12.6 **Accounting Requirements -** All vouchers referring to the movement of prefixed stores are to be annotated with the zone and the date (Month/Year) they leave the zone. Example 'Despatched from the Gulf (Dharan) 12/97'.

6.12.7 Explosive lots having a zone prefix are not to be considered as homogeneous to the same Lot No not bearing a zone prefix. Consignees are to store and account for prefixed Lot Nos separately.

6.13 Identification Of Explosives Returned To UK From Overseas - Army Provisioned Natures

6.13.1 Environmental history codes exist, however there is only one space on computer generated paperwork to input the last 'storage history' of the ammunition. Technical managers are able to see the previous locations on ASTRID, but stores personnel can only locate the package from the last code stencilled on the package.

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CHAPTER 12

ANNEX A

CONTACT DETAILS OF TECHNICAL EXPLOSIVES AUTHORITIES

CONTENTS

1 WORKING HOURS

1.1 The following are the contact numbers of Ammunition Technical Officers of 11 EOD Regiment RLC, the Headquarters of which is situated at Vauxhall Barracks, Didcot, Oxon.

Appointment	**Address**	**Telephone numbers** *(During working hours)*
Commanding Officer	Headquarters 11 EOD Regiment RLC Vauxhall Barracks Didcot Oxon OX11 7ES	Didcot Military (94234) Ext 3345 or Didcot (01235) 513345
Second in Command	Headquarters 11 EOD Regiment RLC Vauxhall Barracks Didcot Oxon OX11 7ES	Didcot Military (94234) Ext 3346 or Didcot (01235) 513346
Officer Commanding **521 EOD Squadron**	Headquarters 521 Squadron 11 EOD Regiment RLC Leyburn Road Catterick Garrison Yorkshire DL9 3LP	Catterick Military (94731) Ext 2173/2047 or Richmond (N. Yorks) (01748) 87+ Extension

Appointment	Address	Telephone numbers *(During working hours)*
Catterick Troop	Catterick Troop 521 Squadron 11 EOD Regiment RLC Leyburn Road Catterick Garrison Yorkshire DL9 3LP	Catterick Military (94731) Ext 2167/2155 or Richmond (N. Yorks) (01748) 87+ Extension
Chester Troop	Chester Troop 521 Squadron 11 EOD Regiment RLC The Dale Barracks Chester CH2 4BD	Chester Military (94555) Ext 2933/2937 or (01244) 650+ Extension
Edinburgh Troop	Edinburgh Troop 521 Squadron 11 EOD Regiment RLC Cragiehall South Queensferry West Lothian EH30 9TN	Edinburgh Military (94740) Ext 2254/2255 or (0131-310)+ Extension
Officer Commanding 621 EOD Squadron	Headquarters 621 Squadron 11 EOD Regiment RLC RAF Northolt West End Road Ruislip Middlesex HA4 6NG	Northolt Military (95233) Ext 8550/8553 or (020 8833)+ Extension
Northolt Troop	Northolt Troop 621 Squadron 11 EOD Regiment RLC RAF Northolt West End Road Ruislip Middlesex HA4 6NG	Northolt Military (95233) Ext 8563/8566 or (020 8833)+ Extension

Appointment	Address	Telephone numbers *(During working hours)*
Aldershot Troop	Aldershot Troop 621 Squadron 11 EOD Regiment RLC Provost Barracks Maida Road Aldershot Hants GU11 2DN	Aldershot Military (94222) Ext 3942/2284 or Aldershot(01252)347+last 3 digits of extension
Colchester Troop	Colchester Troop 621 Squadron 11 EOD Regiment RLC Merville Barracks Colchester Essex CO2 7UT	Colchester Military (94660) Ext 6497 or Colchester (01206) 81+ Extension
Shorncliffe Troop	Shorncliffe Troop 621 Squadron 11 EOD Regiment RLC RASC Lines Shorncliffe Kent CT20 3BZ	Shorncliffe Military (94281) Ext 2047/2384 or Shorncliffe (01303) 225+last 3 digits of Extension
Officer Commanding 721 EOD Squadron	Headquarters 721 Squadron 11 EOD Regiment RLC St Barbara's Barracksor Ashchurch Tewkesbury Glos GL20 8LZ	Ashchurch Military (94249) Ext 4440/4447 Ashchurch (01684) 856+last 3 digits of Extension
Ashchurch Troop 721 EOD Squadron	Ashchurch Troop 721 Squadron 11 EOD Regiment RLC St Barbara's Barracks Ashchurch Glos GL20 8LZ	Ashchurch Military (94249) Ext 4457/4459 or Ashchurch (01684) 856+last 3 digits of Extension

Appointment	Address	Telephone numbers *(During working hours)*
Tidworth Troop	Tidworth Troop 721 Squadron 11 EOD Regiment RLC Brimstone Compound Assaye Barracks Tidworth Wilts SP9 7AB	Tidworth Military (94342) Ext 2517/2369 or Stonehenge (01980) 650+ last 3 digits of extension
Nottingham Troop	Nottingham Troop 721 Squadron 11 EOD Regiment RLC Chetwynd Barracks Beeston Notts NG9 5HA	Chilwell Military (94451) Ext 2036/2420 or Nottingham (0115 957)+ Extension
Officer Commanding **921 EOD Squadron**	Headquarters 921 Squadron 11 EOD Regiment RLC BFPO 39	Bielefeld Military (94881) Ext 3490/3473
Golf Troop	Golf Troop 921 Squadron 11 EOD Regiment RLC BFPO 39	Bielefeld Military (94881) Ext 3474/3487
Echo Troop	Echo Troop 921 Squadron 11 EOD Regiment RLC BFPO 35	Bruggen Military (94868) Ext 4592 or Bruggen (02163 97)+ Extension

The following is the contact numbers for the Explosives Safety (ES) office at Headquarters Air Command.

Appointment	**Address**	**Telephone numbers** *(During working hours)*
A4 SO1 Arm & SE	Headquarters Air Command Gladiator Block 1 Site RAF High Wycombe Buckinghamshire HP14 4UE	Military (95221) Ext 6215 or High Wycombe (01494) 496215
CE SO2 ES	Headquarters Air Command 1 Site RAF High Wycombe Buckinghamshire HP14 4UE	Military (95221) Ext 7101 or High Wycombe (01494) 497101

The following is the contact numbers of ATO Equivalents of Naval Authority.

Naval Authority Explosives	SSG NAEXP Ash 3c #3311 Abbey Wood Bristol BS34 8JH	Military (9352) Extn 35085 or Bristol (0117) 913 5085
HQ 3 Cdo Bde RM SAT	UK/NL Landing Forces Royal Marines Barracks Stonehouse Plymouth Devon PL1 3QS	Military (9375) Extn 36298 or Plymouth (01752) 836298

2 IN EMERGENCY AND OUT OF WORKING HOURS

2.1 In an emergency or out of normal working hours contact the Joint Service Explosive Ordnance Disposal Operations Centre (JSEODOC). The JSEODOC will nominate an Ammunition Technician (AT) to assist you as required. Contact address and telephone numbers are:

JSEODOC	Telephone:
11 EOD Regiment RLC	Didcot Military (94234)
Vauxhall Barracks	Ext 3360/1/2 or 3349
Didcot	or
Oxon OX11 7ES	Didcot (01235) 51+ Extension

JSEODOC is manned 24 hours a day.

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CHAPTER 12

ANNEX B

GUIDE TO THE PREPARATION OF UNIT STANDING ORDERS – UNDER REVIEW

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CHAPTER 12

ANNEX C

EXAMPLE –CONTRABAND NOTICE

This is a Ministry of Defence Establishment where military explosives are stored and processed. Stringent regulations for safety are necessary and staff and visitors must be fully conversant with them. These rules are framed for the protection of the establishment and of all personnel on site, and are to be observed at all times.

Unless formally authorized in advance, the following items must not be taken into an explosives facility:

a. Matches or any other means of producing flame or high temperatures.

b. Tobacco in any form, including snuff.

c. Any articles used in connection with smoking.

d. Radio transmitters or receivers, including mobile phones.

e. Tools and other equipment.

f. Any battery or mains operated item.

g. Unauthorized explosives.

h. Dangerous or flammable substances.

i. Cameras.

j. Firearms.

k. Drugs and Medicines.

l. Metal shod footwear.

M. Magnetic Therapy Products.

Food and Drink. Food and drink must be declared on entry and only consumed at authorised locations.

Liability to Search. Persons are admitted into an explosives area only on the understanding that they are liable to search, by a person so authorized, at any time. Refusal to submit to search will preclude entry to the explosives facility.

Additional Measures. Additional stringent control measures, if in operation, will be notified separately in local orders.

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CHAPTER 12

ANNEX D

VENTILATION PROCEDURE AND EQUIPMENT

CONTENTS

1 EQUIPMENT

1.1 General

1.1.1 To avoid the use of cumbersome service designations the following terms are used in this Annex:

Colloquial term	Service designation
a. Common thermometer	Thermometer, self indicating, liquid in glass.
b. Wet and dry bulb thermometer	Psychrometer, mercury in glass, general purpose.

1.1.2 A list of instruments and associated stores required to control ventilation, together with full service designation and catalogue numbers, is given in Table 1.

1.2 Common Thermometers

1.2.1 One common thermometer is to be provided for each ESH or group of ESH qualifying for ventilation. ESH similar in type and construction may be grouped for this purpose on the advice of SATO.

1.2.2 Common thermometers are to be installed in positions as follows where they are unaffected by draughts and can be read without being handled:

(1) In non-heated class A ESH the thermometer maybe placed on any inside wall.

(2) In non-heated class B ESH the thermometer is to be placed on an inside wall, the exterior of which is in contact with the earth traverse or native rock/soil.

(3) In heated ESH, the thermometer is to be installed remote from main heating sources and not more than one metre above floor level.

1.3 **Wet and Dry Bulb Thermometers**

1.3.1 Every ammunition depot is to be provided with at least one wet and dry bulb thermometer, the use of which is to be controlled by the SATO. Units and ranges are only to be provided with wet and dry bulb thermometers when the SATO considers it necessary for ventilation to be carried out.

1.3.2 Atmospheric conditions, especially in relation to the amount of water vapour in the atmosphere, can vary between locations in close proximity, especially where there are steep hills. This effect may be intensified when prevailing winds blow off the sea or across desert country. In areas where it is considered possible that topographical and climatic factors may give rise to such local variations, additional wet and dry bulb thermometers are to be installed at suitable points to establish the facts. Should the variations warrant the additional wet and dry bulb thermometers they are to be installed permanently.

1.3.3 Each wet and dry bulb thermometer is to be installed out of doors in a permanent correctly designed screen. The screen is to provide protection from direct or reflected sunlight, rain, draughts and wind. A guide to the method of construction of a suitable screen is given in the Meteorological Office publication *Instructions for Making Thermometer Screens of the Stevenson type* (MO 6 70) published by HMSO. The position of the thermometer should be such that it can be read without being handled.

1.3.4 The wet bulb is to be well supplied with water, and the muslin covering and strand of wick kept clean, thoroughly wet and in good condition at all times. The muslin should cover the bulb completely and no reading is to be taken without ensuring that it *is* thoroughly wet. Distilled water is to be used whenever possible. Should this be impracticable rain water, filtered if necessary, may be used in lieu. Tap water or sea water is not to be used. Only the service water container is to be used and containers are to be emptied and rinsed out, with distilled or rain water, at least once a month to prevent the accumulation of impurities. The muslin or wick is to be replaced every fortnight or as soon as it shows any sign of becoming dirty or unserviceable.

1.4 **Accuracy**

1.4.1 All approved thermometers are manufactured to British Standard Specifications which call for a high degree of accuracy and it is important that all thermometers in use remain accurate. Wet and dry bulb thermometers should give identical readings when both bulbs are dry. Common thermometers are to be compared with a wet and dry bulb thermometer. Where appreciable variations are noted, arrangements are to be made with local meteorological authorities for the thermometers to be tested, and a correction factor applied. When this is impracticable the thermometer is to be replaced. Spare receptacles containing water are not to be stored in the screen with the thermometer as this may increase the humidity of the surrounding air and lead to incorrect results.

1.5 **Reading of thermometers**

1.5.1 No reading is to be taken for at least an hour after cleaning or adjusting a thermometer. Observers are to read thermometers so that their line of sight is at right angles to the scale. In order to avoid heating effects from the warmth of their breath or bodies, or from torches (if used), they are not to approach the thermometer too

closely. They are to avoid breathing on the wet bulb, as this may cause a slight variation in local humidity in addition to the possible heating error. Readings are not to be taken when the water of the wet and dry thermometer is frozen.

1.6 **Care of Thermometers**

1.6.1 After installation, thermometers should only be handled when it is necessary to clean the scale, rewet the muslin on the wet bulb, or to clean or refit the water container of the wet and dry bulb thermometer. These operations should be performed with the least possible disturbance of the instrument.

2 **VENTILATION PROCEDURE**

2.1 **General**

2.1.1 When ventilation procedures are applicable to particular ESH or ammunition stocks, the ESH are to be opened for ventilation purposes when directed by OIC Storage in accordance with paras 2.2, 2.3 and 2.4 inclusive.

2.1.2 The actual times at which the thermometers are to be read and ESH opened will depend on local conditions; the Commandant is to issue orders to suit local circumstances.

2.1.3 ESH should be closed as soon as favourable conditions cease to apply unless this is impracticable due to work continuing. Ventilation shafts and all other openings are to be closed as well as doors and windows.

2.2 **Class A ESH**

2.2.1 Class A ESH maybe ventilated when the temperature outside does not exceed 40 degrees F and the weather is fine. They may also be ventilated when the temperature exceeds 40 degrees F providing the difference between temperatures recorded by wet and dry bulb thermometers is as shown below (i.e. when the relative humidity is less than 80 per cent):

Temperature of dry bulb:	Degrees F			
From	40	50	70	Over 90
To	50	70	90	
Difference between wet and dry bulbs not less than	2	3	4	5

2.3 **Class B ESH**

2.3.1 Class B ESH maybe ventilated when the reading of the thermometer in the ESH is equal to, or higher than the reading in column (3) of the Hydrometric Table, illustrated at Appendix 1, a copy of which is to be attached to a board and hung in a convenient position near each wet and dry bulb thermometer. When opportunities for ventilation during the morning or afternoon are insufficient and, subject to security requirements, class B ESH maybe ventilated between sunset and sunrise.

2.4 **Class A and B ESH**

2.4.1 Both classes of ESH may be opened without reference to the Hydrometric Table in the following circumstances:

(1) When the dry bulb reads 32 degrees F or below.

(2) When the dry bulb reads 100 degrees F or above, provided that the reading of the thermometer inside the ESH is higher than the reading of the wet bulb outside.

(3) When the difference between the dry and wet bulbs exceeds 10 degrees F.

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Item	Catalogue No	Designation	Remarks
1 a	H6/6685-99-943-1645	Thermometer self indicting liquid in glass	-10 to +130^{o}F
b	H6/6685-99-522-9203	Thermometer self indicting liquid in glass	-20 to +55^{o}C
2	W10/6685-99-943-1646	Psychrometer mercury in glass general purpose	
3	W10/8125-99-200-2597	Bottle applicator polythene 1.75 in diameter x 3 in diameter x 3 in high with cap, plug and spout	
4	W10/VC/2444	Muslin	In lieu
5	W10/VC/2446	Wick	W10/9390-99-200-2562 Wick psychrometer cotton woven 9 in long x ¼ in wide

Table 1 – List of Thermometers and Associated Stores

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CHAPTER 12

ANNEX D APPENDIX 1

HYGROMETRIC TABLE

Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature
(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
°F	°F	°F	°F	°F	°F	°F	°F	°F
100	99	100	96	95	96	92	91	92
	98	99		94	94		90	90
	97	97		93	93		89	89
	96	95		92	91		88	87
	95	94		91	89		87	85
	94	92		90	88		86	84
	93	90		89	86		85	82
	92	89		88	85		84	81
	91	87		87	83		83	79
	90	86		86	82		82	77
99	98	99	95	94	95	91	90	91
	97	97		93	93		89	89
	96	96		92	92		88	88
	95	94		91	90		87	86
	94	93		90	88		86	84
	93	91		89	87		85	83
	92	89		88	85		84	81
	91	88		87	84		83	79
	90	86		86	82		82	78
	89	85		85	80		81	76
98	97	98	94	93	94	90	89	90
	96	96		92	92		88	88
	95	95		91	91		87	87
	94	93		90	89		86	85
	93	92		89	87		85	83
	92	90		88	86		84	82
	91	88		87	84		83	80
	90	87		86	83		82	78
	89	85		85	81		81	77
	88	84		84	79		80	75
97	96	97	93	92	93	89	88	89
	95	95		91	91		87	87
	94	94		90	90		86	86
	93	92		89	88		85	84
	92	91		88	86		84	82
	91	89		87	85		83	81
	90	87		86	83		82	79
	89	86		85	82		81	77
	88	84		84	80		80	76
	87	83		83	70		79	74
88	87	88	83	82	83	78	77	78
	86	86		81	81		76	76

Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature
(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
°F	°F	°F	°F	°F	°F	°F	°F	°F
	85	85		80	79		75	74
	84	83		79	78		74	73
	83	81		78	76		73	71
	82	80		77	74		72	69
	81	78		76	73		71	68
	80	76		75	71		70	66
	79	75		74	69		69	64
	78	73		73	68		68	63
87	86	87	82	81	82	77	76	77
	85	85		80	80		75	75
	84	84		79	78		74	73
	83	82		78	77		73	72
	82	80		77	75		72	70
	81	79		76	73		71	68
	80	77		75	72		70	67
	79	75		74	70		69	65
	78	74		73	68		68	63
	77	72		72	67		67	61
86	85	86	81	80	81	76	75	76
	84	84		79	79		74	74
	83	83		78	77		73	72
	82	81		77	76		72	71
	81	79		76	74		71	69
	80	78		75	72		70	67
	79	76		74	71		69	65
	78	74		73	69		68	64
	77	73		72	67		67	62
	76	71		71	66		66	60
85	84	85	80	79	80	75	74	75
	83	83		78	78		73	73
	82	81		77	76		72	71
	81	80		76	75		71	70
	80	78		75	73		70	68
	79	77		74	71		69	66
	78	75		73	70		68	64
	77	73		72	68		67	63
	76	72		71	66		66	61
	75	70		70	65		65	59
84	83	84	79	78	79	74	73	74
	82	82		77	77		72	72
	81	80		76	75		71	70
	80	79		75	74		70	69
	79	77		74	72		69	67
	78	75		73	70		68	65
	77	74		72	69		67	63
	76	72		71	67		66	62
	75	71		70	65		65	60
	74	69		69	64		64	58
73	72	73	68	67	68	63	62	63
	71	71		66	66		61	61
	70	69		65	64		60	59
	69	67		64	62		59	57
	68	66		63	61		58	55

Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature
(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
°F	°F	°F	°F	°F	°F	°F	°F	°F
	67	64		62	59		57	53
	66	62		61	57		56	52
	65	61		60	55		55	50
	64	59		59	53		54	48
	63	57		58	52		53	46
72	71	72	67	66	67	62	61	62
	70	70		65	65		60	60
	69	68		64	63		59	58
	68	66		63	61		58	56
	67	65		62	59		57	54
	66	63		61	58		56	52
	65	61		60	56		55	51
	64	59		59	54		54	49
	63	58		58	52		53	47
	62	56		57	51		52	45
71	70	71	66	65	66	61	60	61
	69	69		64	64		59	59
	68	67		63	62		58	57
	67	65		62	60		57	55
	66	64		61	58		56	53
	65	62		60	57		55	51
	64	60		59	55		54	49
	63	58		58	53		53	47
	62	57		57	51		52	46
	61	55		56	49		51	44
70	69	70	65	64	65	60	59	60
	68	68		63	63		58	58
	67	66		62	61		57	56
	66	64		61	59		56	54
	65	63		60	57		55	52
	64	61		59	56		54	50
	63	59		58	54		53	48
	62	57		57	52		52	46
	61	56		56	50		51	45
	60	54		55	48		50	43
69	68	69	64	63	64	59	58	59
	67	67		62	62		57	57
	66	65		61	60		56	55
	65	63		60	58		55	53
	64	62		59	56		54	51
	63	60		58	55		53	49
	62	58		57	53		52	47
	61	56		56	51		51	45
	60	55		55	49		50	43
	59	53		54	47		49	42
58	57	58	53	52	53	48	47	47
	56	56		51	51		46	45
	55	54		50	49		45	43
	54	52		49	47		44	41
	53	50		48	45		43	39
	52	48		47	43		42	37
	51	46		46	40		41	35

Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature
(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
°F	°F	°F	°F	°F	°F	°F	°F	°F
	50	44		45	38		40	33
	49	42		44	36		39	31
	48	40		43	34		38	28
57	56	57	52	51	52	47	46	46
	55	55		50	50		45	44
	54	53		49	47		44	42
	53	51		48	45		43	40
	52	49		47	43		42	38
	51	47		46	41		41	36
	50	45		45	39		40	34
	49	43		44	37		39	31
	48	41		43	35		38	29
	47	39		42	33		37	27
56	55	56	51	50	51	46	45	45
	54	54		49	48		44	43
	53	52		48	46		43	41
	52	50		47	44		42	39
	51	48		46	42		41	37
	50	46		45	40		40	35
	49	44		44	38		39	32
	48	42		43	36		38	30
	47	40		42	34		37	28
	46	38		41	32		36	26
55	54	54	50	49	49	45	44	44
	53	53		48	47		43	42
	52	51		47	45		42	40
	51	49		46	43		41	38
	50	47		45	41		40	36
	49	45		44	39		39	33
	48	43		43	37		38	31
	47	41		42	35		37	29
	46	39		41	33		36	27
	45	37		40	31		35	25
54	53	54	49	48	48	44	43	43
	52	52		47	46		42	41
	51	50		46	44		41	39
	50	48		45	42		40	37
	49	46		44	40		39	35
	48	44		43	38		38	32
	47	42		42	36		37	30
	46	40		41	34		36	28
	45	38		40	32		35	26
	44	36		39	30		34	24
43	42	42	40	39	39	37	36	36
	41	40		38	37		35	34
	40	38		37	35		34	31
	39	36		36	32		33	29
	38	34		35	30		32	26
	37	31		34	28			
	36	29		33	25			
	35	27		32	23	36	35	35
	34	25					34	32
	33	22					33	30

Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature	Dry Bulb	Wet Bulb	Close Building if inside temperature of walls is below following temperature
(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
°F	°F	°F	°F	°F	°F	°F	°F	°F
42	41	41					32	27
	40	39	39	38	38			
	39	37		37	36			
	38	35		36	34	35	34	34
	37	32		35	33		33	31
	36	30		34	30		32	29
	35	28		33	27			
	34	26		32	24			
	33	23						
	32	21				34	33	33
41	40	40					32	30
	39	38	38	37	37			
	38	36		36	35			
	37	33		35	32			
	36	31		34	30	33	32	30
	35	29		33	27			
	34	27		32	25			
	33	24						
	32	22						

Instructions for use of the Hydrometric Table

Obtain the reading of the controlling wet and dry thermometer.

Note the reading of the dry bulb thermometer in column (1) (say 51°F), then find the reading of the wet bulb in column (2) (say 46°F) in the set of figures opposite the dry bulb reading. Opposite the reading 46°F in column (2) will be found a reading 42°F in column (3).

Read the common thermometer, provided that it records a temperature of 42°F or over, the ESH may be opened for ventilation.

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