

CHAPTER 4

CLASSIFICATION OF MILITARY EXPLOSIVES FOR STORAGE AND TRANSPORT

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1 CLASSIFICATION OF MILITARY EXPLOSIVES

1.1 Introduction

1.1.1 The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (2009) and The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (amendment) 2011¹ stipulates that, in the United Kingdom, no explosives may be conveyed, stored or supplied unless they comply with those regulations.

1.1.2 The regulations are based on the classification system known as the UN International System of Classification. This system uses as its basis the UN Recommendations on the Transportation of Dangerous Goods - Model Regulations ('The Orange Book'). It should be noted that further authorisation is required if explosives are to be offered for transportation by air and sea (see para 6.7).

1.1.3 In the UK, classifications are awarded by the Health and Safety Executive (HSE) with the exception of military explosives (see Definitions) which are classified by the Ministry of Defence. The Explosives Storage and Transportation

¹ Known as the Carriage Regs (2009) & Carriage Regs (amendment) 2011, SI 2011 No.1885
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Committee (ESTC) are the UK Competent National Authority for the classification of military explosives. The Secretary ESTC is delegated as the Ministry of Defence Classification Authority. The only exception to this policy is for Serviceable ACA's which have been previously classified for transportation of explosives. The furniture of these containers may be modified to enable on Unit transportation of prepared for use natures e.g. Armed Fire Bottles, Countermeasure Flares etc. These transit containers are to be painted RED and be suitably marked with the contents and Hazard Division. A transit container may be used for on Unit storage whilst awaiting fitment or disarming.

1.1.4 Classifications awarded by the HSE and the ESTC are normally, but not necessarily, acceptable to each other.

1.1.5 With the exception of the storage of explosives retained for Research and Development or Evaluation purposes² (see para 1.1.6) and Bird Control Explosives (see Chapter 10, Section 8 Annex D para 4), all, explosives must be classified by the ESTC before they can be stored or transported by the MOD. The Secretary, ESTC (Sec ESTC), after review and recommendation by the Technical Adviser (Explosives), (TA(Ex)), issues the classifications on behalf of ESTC. These classifications are taken into use immediately.

1.1.6 All explosives stored for Research and Development or Evaluation at Fort Halstead or Porton Down do not require formal classification by ESTC (see para 6.1.1 (7)). These explosives must be assessed by appropriately authorised competent persons and allocated a suitable Hazard Division and Compatibility Group prior to storage (see para 5.6.4). For any subsequent movement on, e.g. transport on the public road, the explosives must be classified by ESTC, using either the Temporary or Provisional process (see para 6).

1.1.7 ESTC Classifications are detailed in the ESTC Classification Database.

NOTE: The awarding of a classification does not imply the item is safe to store and transport. The classification is only applicable to items that are assessed as safe to store and transport by a competent person.

1.1.8 It is important to understand that an ESTC classification is not the only requirement to permit storage or transport. Other legal and procedural requirements to enable safe storage and transport are detailed within JSP 482 and JSP 520 (e.g. UN Package Certification and Safety Case Reports). The ESTC classification also guides the correct response by emergency services in the event of an accident.

1.2 Fundamental Principles

1.2.1 The fundamental principles underlying these regulations are:

- (1) The function of an explosive, pyrotechnic or incendiary substance or article is to explode or ignite violently. The greatest care is therefore to be taken at all times during storage, handling, transportation, processing, inspection, trials and disposal.
- (2) Explosives, even those with similar characteristics, differ in sensitiveness to heat, friction, shock and impact. They also differ in stability under varying climatic conditions, and in their rate of deterioration.
- (3) Whilst explosives are designed to be stable, this stability may decrease if they are poorly packaged or stored. Furthermore, any physical or chemical degradation in an explosive, such as could arise if explosives have exceeded their design life, almost invariably leads to greater sensitivity rather than less.

² Includes Forensic Examination
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1.3 Explosives Safety

1.3.1 Explosives, as defined in this publication, can be assumed to be SAFE when all the following have been satisfied:

- (1) The chemical composition of each explosive item in the munition, sub-munition or component has been tested and accepted as safe and suitable for service in accordance with current procedures.
- (2) They have been classified for storage and transport by ESTC.
- (3) The time elapsed since manufacture has not exceeded the service life determined in accordance with sub-para 2.3.1(1), above. Some items will come under the category of Safe to Move (for subsequent disposal), but not necessarily Safe to Use in their design.
- (4) All removable safety devices are correctly fitted.
- (5) Non-removable safety devices are set to safe or other non-live positions, as appropriate to their state of preparation.
- (6) They can be seen not to be damaged, corroded, distorted or incorrectly assembled, and are known not to have been involved in an accident/incident or otherwise subjected to excessive heat, friction, or abnormal shock.
- (7) They are not subject to 'Restrictions in Use'.

1.3.2 Explosives are to be regarded as UNSAFE when they do not fulfil the SAFE conditions, or when their condition is unknown. They are to continue to be regarded as unsafe until such time as a competent person has confirmed their safety.

1.4 Purpose of Classification of Explosives

1.4.1 Classification is a legal requirement for the transport of explosives. This classification is also used for storage by MOD. The classification is not applicable when the explosives item is removed from its packaging (see para 5.6.3) Safety in storage and transportation is based on the assignment of military explosives into various Hazard Divisions (HD), further Storage sub-Divisions (SsD) and Compatibility Groups (CG). The Classification Regulations deal with such matters as:

- (1) The standards and marking of packages.
- (2) Segregation on a basis of sensitiveness and compatibility.
- (3) The type of explosives hazard anticipated if the items are involved in a fire or explosion (e.g. probability of mass explosion).
- (4) Maximum quantity limits based on the effects of an accidental fire or explosion.
- (5) The possibilities of fighting a fire in which the items are involved.

1.5 UN International System of Classification

1.5.1 All substances and articles designated as Dangerous Goods (DG) have been assigned to one of the nine available classes (for details, see the UN Orange Book). It is principally Class 1 – "Explosives substances and articles", that is covered in this JSP.

1.5.2 All military explosives fall within DG Class 1 unless they have been excluded from Class 1 by ESTC, but with the exception of Survival Equipment holding pyrotechnics which are designated as Class 9 under UN 2990 and 3072. The following paragraphs are intended for the use of those personnel involved in the storage and transportation of military explosives.

2 SYSTEM OF CLASSIFICATION FOR CLASS 1 DANGEROUS GOODS

2.1 Hazard Divisions

2.1.1 Class 1 is divided into six Hazard Divisions according to the hazards presented in the event of an initiation. These are:

- (1) 1.1
- (2) 1.2
- (3) 1.3
- (4) 1.4
- (5) 1.5
- (6) 1.6

2.1.2 The initial figure refers to the Class of Dangerous Goods (i.e. Class 1 - Explosives); the second figure refers to the hazard. The respective definition of each is given in Chapter 13 Annex C.

2.2 Compatibility of Explosives

2.2.1 In order to identify compatible explosives, and those that may have to be segregated to promote safety in storage and transport, explosives are assigned to one of thirteen Compatibility Groups (CG) designated A to L, N and S (I is omitted to prevent possible confusion with numeral 1). These Groups have been defined so that, with the exception of CGs L and N, all explosives in the same group are compatible with each other in storage and transportation.

2.2.2 The safety of explosives would be enhanced if each type were stored and/or transported separately but logistically a degree of mixing in the transport and storage of explosives is practical. The extent of mixing is determined by the compatibility of the explosives concerned. Explosives are considered to be compatible if they may be stored or transported together without significantly increasing either the probability of an accident or, for a given net explosive quantity, the magnitude of the effects of such an accident. The table at Chapter 13 Annex D defines the thirteen CGs.

2.3 Hazard Classification Codes

2.3.1 The Hazard Divisions and Compatibility Groups combine to form the Hazard Classification Code (HCC), which is a three character code consisting of the two HD numerals and one CG letter e.g. 1.1D, 1.4S. The HCCs that are possible are detailed at Annex A.

3 DANGEROUS GOODS ASSOCIATED WITH EXPLOSIVES ITEMS

3.1 Introduction

3.1.1 There are a number of items in use in the MOD that contain non-explosive dangerous substances that are related by function to explosives. These are known as 'Dangerous Goods' and are listed in the ESTC Classification Database. For quantity distance purposes only, these items are assigned to HD 1.3.

3.2 Toxic Ammunition

3.2.1 Ammunition containing an explosive dispersing charge and a toxic chemical agent is assigned to the appropriate HD on the basis of the explosive hazard. For storage purposes, the Class 1 classification takes precedence and an appropriate HD is assigned together with the Compatibility Group K.

3.3 Pyrotechnic Substances

3.3.1 For transportation purposes, some pyrotechnic substances (e.g. CS natures, corrosive smoke agents, white phosphorus, napalm, etc) without an explosive content are individually assigned to the appropriate UN Class (6, 8, etc.) of the International System of Classification. When made up into articles that also contain explosives, the Class 1 classification takes precedence and the article is assigned to an appropriate HD and CG. Any subsidiary risk will be noted in the ESTC Classification Database, and is to be marked on the packaging for transportation purposes.

4 METHOD OF OBTAINING ESTC CLASSIFICATION

4.1 General

4.1.1 The ESTC is the only authority in the UK for assessing and classifying **military** explosives, including those imported for British and Visiting Forces, and foreign munitions for either transshipment to or within theatre, or for information gathering purposes. Military Explosives having HSE or Foreign Competent Authority Certification require classification by the ESTC. It is illegal to transport Military Explosives by road or rail within the UK without ESTC classification.

NOTE: The awarding of an ESTC classification does not imply the item is safe to store and transport. The classification is only applicable to items that are assessed as safe to store and transport by a competent person.

4.1.2 It is the responsibility of the appropriate MOD Branch or PT sponsoring the Staff Requirement or Main Supply Contract to initiate action to provide the ESTC with all the necessary information to classify the item(s). They should also provide funds for any tests that the ESTC consider necessary for classification.

4.1.3 The ESTC process of classification of military explosives as packaged (when stowed and transported in such a condition) consists of the allocation of the appropriate:

- (1) HD, as a result of tests or by analogy.
- (2) CG.
- (3) UN Number and UN Proper Shipping Name selected from the Dangerous Goods List, ('The Orange Book').

5 HAZARD CLASSIFICATION TEST SCHEME

5.1 General

5.1.1 The Test Scheme used by ESTC is that detailed in Part 1 of the UN Manual of Tests and Criteria. The sections concerning explosives are repeated in NATO AASTP 3 - Manual of NATO Principles for the Hazard Classification of Military Explosives. The UN Test Scheme relates to explosives as transported, but MOD has extended its use to cover storage. The UN Manual or NATO AASTP must be referred to for details of the Test Scheme and the sentencing criteria, as outlined below. The general scheme for classifying explosives is at Fig 1.

5.2 Exemption of Testing by Analogy

5.2.1 NATO AASTP 3 - Manual of NATO Principles for the Hazard Classification of Military Explosives, and the ESTC attach great importance to actual tests. The Sec ESTC is the custodian of test reports on both ESTC classification and other related tests of foreign explosives of interest to ESTC.

5.2.2 However it may be helpful to predict the effect of an explosion by reference to similar items, but undue reliance on such an expedient can be misleading. Minor

differences in the item construction or packaging can have a significant effect on an explosion of the item, thus necessitating a change to the hazard assessment and HCC.

5.2.3 Where the classification of an item is made by analogy to a similar item, evidence of original trials may be required by ESTC.

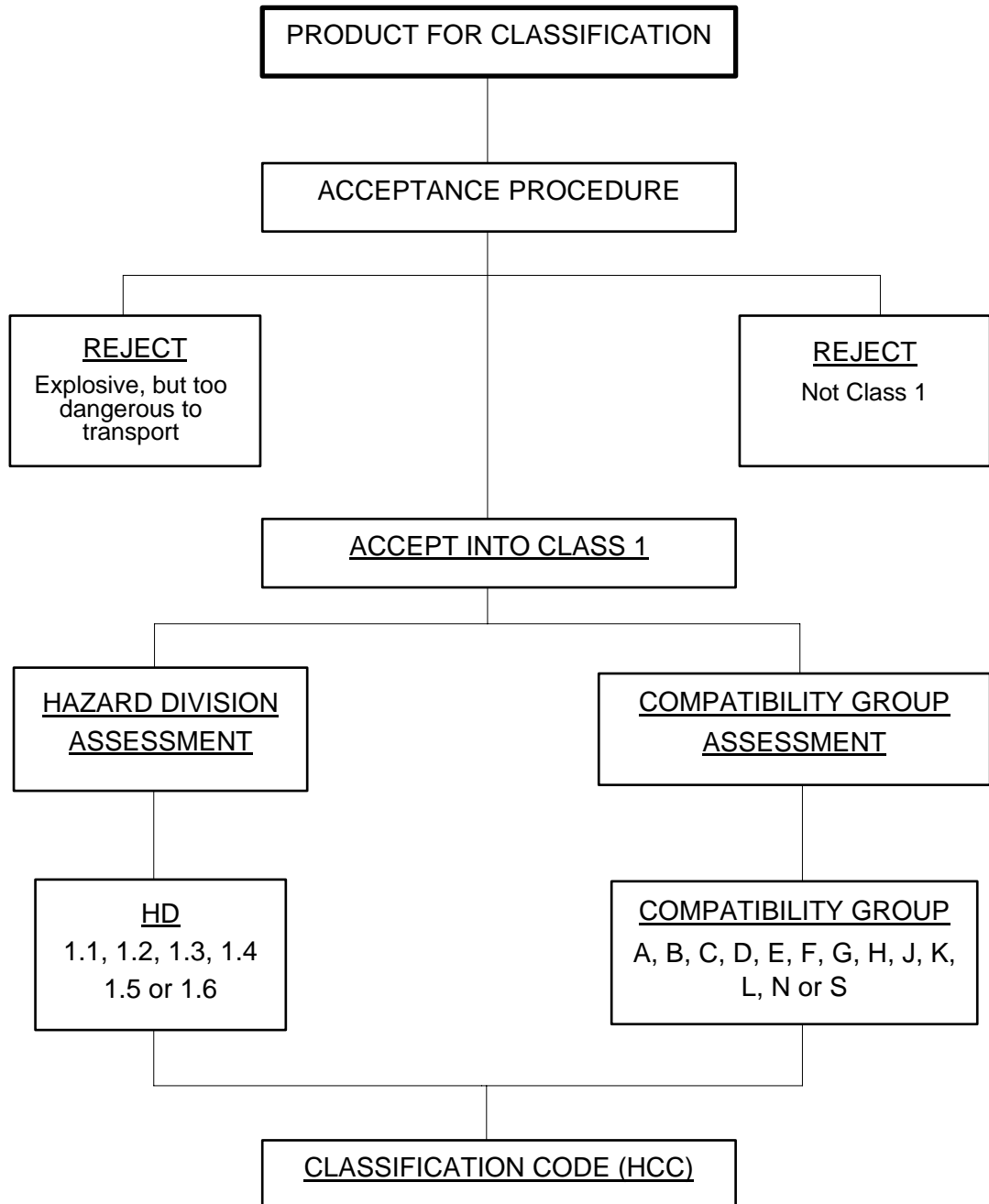


Fig 1 Overall Scheme of Procedure for Classifying Substances or Articles in UN Class 1

5.3 Purpose of Test Scheme

5.3.1 The purpose of the Test Scheme is to determine the classification of explosives as presented for storage and transport. Practical tests are essential to determine the hazard whenever required evidence cannot be made available or the hazards are not clear beyond doubt. It may sometimes be expedient to assume a more onerous classification rather than perform the tests. The UN Scheme consists of a series of seven tests, and these are described at Annex B.

5.4 Responsibilities for Testing

5.4.1 UN Test Series 1 to 4, as appropriate, are the responsibility of the party requesting ESTC classification. Test results from a recognised test authority must be submitted by the party requesting classification if requested by the Sec ESTC. In

practice much of this information is contained in MOD Explosives Hazard Data Sheets, but the 12 metre Drop Test is of particular importance for all new stores. Applicants must state on the MOD Form 1655 that this test has been carried out successfully.

5.4.2 ESTC are responsible for overseeing tests made in accordance with the UN Test Series 5 to 7. Where the ESTC and TA (Ex) consider these to be necessary, the Sec ESTC or nominated representative must inform the applicant, approve the Test Specification and witness the tests.

5.5 Assessment of Results

5.5.1 Military explosives are classified in the light of test results, and other relevant evidence. Sometimes, the observed hazard effects may vary among replicated tests or may not correspond exactly to the definitions. When this occurs, judgement will be applied in the technical advice given to the Sec ESTC who may decide that further testing is necessary. As a general rule, advice will err on the side of caution, particularly in the crucial decision as to whether or not an article is susceptible to mass explosion.

5.6 Effects of Packaging on Classification

5.6.1 Particular care must be taken to ensure that the correct classification is determined for each condition in which the explosives are to be stored or transported.

5.6.2 The type and construction of packaging can determine which HD/HCC an explosive item is assigned to. For example an item can be classified in one HD/HCC if packed in a steel box and a different HD/HCC if packed in a wooden or fibreboard box. It is therefore essential, if re-packing is required, that the approved Full Service Standard Package is used or, if the item is unpackaged, that the approved transit devices are fitted. If other packaging is used, the classification will be rendered invalid and the item will have to be reclassified. It should be noted that the classification is only valid for serviceable explosives in their serviceable packaging.

5.6.3 Additionally when explosives are removed from their packaging, for test or processing, the classification awarded to the packaged item is no longer applicable. An assessment of the reaction of the item in an event should be undertaken as it may be different from that of the packaged item (see Chapter 19).

5.6.4 Explosives in the course of research, development or evaluation must be suitably packaged and segregated in storage. The packaging and storage arrangements must be acceptable to the unit Explosives Safety Representative. Para 6.3 explains the revised system for Provisional Classification under which most Research and Development, or evaluation movements will occur.

5.7 Unpackaged Items

5.7.1 Classification is intended for explosives in their full packaging or in designated handling devices as presented for storage and transport. Account must be taken of situations where items may be unpacked, such as during processing, which then increases the hazard significantly. In such cases, a risk assessment must be carried out to enable appropriate mitigation against the increased hazard (see Chapter 19).

5.7.2 Also, under UN Special Packing Provision PP67 and L1 (for large stores), stores of certain UN Numbers may be transported in the Unpackaged state in handling devices under certain conditions. ESTC will classify all such Unpackaged articles as presented for transport, in the normal way, and issue a Competent Authority Approval letter (MOD Form 1673). This replaces the need for a UN Mark and must be attached to the transport documents.

5.8 Reclassification

5.8.1 The HCC of a particular type of military explosive must be reviewed when a modification has been effected which is recognised as significant by the ESTC. This usually results from:

- (1) A new explosive substance, or a mixture of explosive substances, which is different from other mixtures and compositions that are already classified.
- (2) A new design of article or article containing increased explosives content, a new explosive substance, or mixture of explosive substances.
- (3) A new design of package or other change in packaging for an explosives article or substance. A minor change in the inner or outer packaging can be critical and may convert a single article risk into a mass explosion risk.
- (4) Revised configurations and changes to safety and arming arrangements.

6 TYPES OF MOD CLASSIFICATION

6.1 Introduction

6.1.1 There are six types of MOD classification:

- (1) Permanent Classifications. These are intended to cover all in-service military explosives in their service packages, in unit loads, or unpackaged articles in handling devices when stored or transported in such conditions. These classifications are identified by a four figure ESTC Serial Number prefixed by the letter 'P', e.g. P3254.
- (2) Temporary Classifications. These are intended for allocation to military explosives in the development or final disposal stage, remain extant for a specified period up to a maximum of 10 years, and are automatically cancelled at the end of this period. Temporary Classifications may also be used for Foreign Munitions which are only expected to be stored or transported by MOD resources for a limited period. These classifications are identified by a four figure ESTC Serial Number prefixed by the letter 'T', e.g. T2361.
- (3) Excluded From Class 1 Classifications. These are intended for articles that satisfy certain conditions (See para 6.5 - Items excluded from Class1) and are identified by a four figure ESTC Serial Number prefixed by the letter 'N', e.g. N0025
- (4) Provisional Classifications. These are allocated for the short term storage and one-off transport of military explosives, as defined³, during research and development and disposal, normally between MOD sites, but can also be to/from sites under contract to MOD provided the journey begins / ends at a MOD site. Provisional classifications are extant initially for three months. The identifying number for these is determined by the applicant.
- (5) EOD Disposal Classifications. These are awarded to facilitate a need to transport and store EOD arisings prior to final disposal they should be classified in accordance with Chapter 13 Annex F.
- (6) Research and Development (R&D) and Evaluation Classifications. These are allocated at Fort Halstead or Porton Down only to allow the STORAGE of military explosives undergoing R&D or evaluation (see para 1.1.6). This hazard assessment must be recorded in a register (in a format agreed by ESTC) and retained for audit purposes. This classification CANNOT be used to transport explosives off site.

³ Carriage Regs (2009) & Carriage Regs (amendment) 2011, SI 2011 No 1885

6.2 Procedure for Obtaining Permanent and Temporary Classification of Military Explosives

6.2.1 ESTC accepts applications from IPT or Departmental Project Managers. Applications are to be compiled and signed by a competent person and should be made as early as possible to avoid the delays that may arise if more information is required to enable an assessment to be made. Applicants must allow ESTC at least one calendar month to process a MOD Form 1655.

6.2.2 The information required to complete a MOD Form 1655 and to enable the classification to be made is available on the MOD intranet. It is the responsibility of the applicant to provide the relevant information in order that the classification can be completed. If classified by HSE, a copy of the HSE Certification should be forwarded with the MOD Form 1655. When foreign explosives are to be imported they may have the nation's Competent Authority classification, which should be submitted to ESTC with the MOD Form 1655 application as supporting evidence. For Foreign Munitions being stored and transhipped by MOD resources see para 8.

6.2.3 Classifications are made by ESTC on the understanding that the explosive substance, the design of the item and the method of packaging have been approved for transport, as packed, by the PT or Departmental Project Manager. The classification does not apply where the items cannot be assessed, for whatever reason, as safe for storage and transport by a competent person, or where the item is no longer in its approved container. These must be stored and conveyed under special arrangements (see Chapter 13 Annex F).

6.3 Procedure for Obtaining Provisional Classification

6.3.1 HoEs may appoint a Crown Employee who is a suitably qualified competent officer to allocate Provisional Classifications provided it can be demonstrated that this officer is competent to undertake this role. This competence must be endorsed by the Sec ESTC and the appropriate IE is to be notified. Similarly, Inspectors of Explosives may delegate authority to Senior Ammunition Technical Officers in operational theatres, or the equivalent in other services, to allocate Provisional Classifications; the Inspector of Explosive having been authorised to do so by Sec ESTC. The officers must be fully conversant with the procedures outlined in this chapter and possess the necessary expertise to confirm that the explosives concerned are safe to transport and are suitably packaged and marked. All proposed Provisional Classifications must be subsequently agreed by ESTC or CIE (MOD).

6.3.2 Details should be forwarded to ESTC on MOD Form 1656 (Provisional Classification Form). A copy of MOD Form 1656 is to be forwarded to the consignee, and a permanent written record is to be maintained by the establishment which is to be available for audit by CIE(MOD) or his representative. Provisional Classifications can be extended beyond the initial 3 months to a maximum of 6 months, and are automatically cancelled at this time.

6.3.3 It must be clearly understood that the authorised officer is wholly responsible for ascertaining that the explosives are safe to store and transport, are clearly and correctly labelled and conveyed in accordance with Carriage Regs (2009) & Carriage Regs (amendment) 2011. The pertinent modal regulations, which now apply, are explained in ESTC Standard No.8 Para 35 – Explosives in Development. From this it is clear that (under ADR 2.2.1.1.3) the consignor must Classify Development Explosives as UN 0190 – SAMPLES, EXPLOSIVE and consequently use Packing Instruction P101. When Sec ESTC needs to authorise the transport and packaging of such explosives samples a Competent Authority Approval of the conditions of carriage to be used for the movement must also be produced and attached to transport documents. The proforma for this CA Approval (MOD Form 1925) and the information to be contained is found in ESTC Standard No.8 Annex G.

6.4 Notification of Classification

6.4.1 Permanent, Temporary and "N" Classifications made by ESTC are notified to applicants by the issue of a Competent Authority Document (MOD Form 1657) and also added to the ESTC Classification Database available on the MOD intranet.

6.4.2 These classifications are subject to formal endorsement by the Military Explosives Classification Sub-committee of the ESTC and are taken into immediate use. Ultimately, classifications are promulgated in the ESTC Classification Database. The database is available on the MOD intranet or on a CD (updated quarterly).

6.5 Items Excluded from Class 1

6.5.1 When an item contains explosive material in such small quantity that it is considered by ESTC to present no significant hazard from explosion it may be excluded from Class 1. It is given an ESTC Item Number prefixed by 'N', (e.g. N 0001), and the applicant informed as such. Such items are listed in the ESTC Classification Database.

6.5.2 In general ESTC are prepared to accept devices such as retractors, protractors and small guillotines as excluded from Class 1, subject to their compliance with the following criteria based on guidelines laid down by the HSE:

- (1) When operated the device must not cause any effect external to the device either by fire, smoke, heat or loud noise. All material formed by burning or explosion of the contents of the device concerned must be retained within the body of the device and no part of the exterior of the device must fracture.
- (2) Any mechanical movement, external to the device itself, must not exceed 1.5cm.
- (3) Where the device can give rise to a shearing action, the shearing section must be so designed as to deny access to any circular rod with a diameter of greater than 0.5cm.
- (4) The total explosives content of any individual device must not exceed 2.5g.
- (5) Each device shall be designed for electrical initiation and shall contain no explosives external to the device itself.

6.5.3 Application for classification of such items will be by submission to ESTC on a MOD Form 1655 with packaging details and supporting evidence as per para 6.2.2.

6.5.4 While the above should deal with the majority of excluded items, some devices (e.g. thermal batteries) may be considered for exemption from Class 1 even though they are not covered by this method. Such items will be considered on a case-by-case basis.

6.6 Classification of EOD Arisings

6.6.1 Where the classification of EOD arisings is required, and the ESTC Classification is no longer applicable or the item was never classified, the arisings should be classified in accordance with Chapter 13 Annex F.

6.7 Clearance for Air Transport - Dangerous Goods By Air Committee

6.7.1 All explosives that are to be transported by Service air need the additional clearance of the Dangerous Goods By Air Committee (DGAC). Stores that have been fully approved (A) for air transport or approved subject to certain restrictions (R)⁴ by the DGAC are noted in the ESTC Classification Database. Details regarding obtaining DGAC clearance can be found in JSP 335.

⁴ These require a case-by-case authority from DTMA SO2 Frt Pol.

6.8 Requirement for Information from Sponsors

6.8.1 Applicants for ESTC Classification are to note that for:

- (1) Temporary Classification. Sec ESTC must be notified when the explosive is formally approved, or the project is cancelled, so that the Classification can be made permanent or cancelled.
- (2) Permanent Classification. Sec ESTC must be informed by the Sponsor Service/IPT when a classified explosive is withdrawn from Service so that consideration may be given to cancelling or annotating the entry in the ESTC Classification Database.
- (3) Imported Explosives. The consignor should be notified of the classification details to be used for documentation and arrange for the supply of military explosives labels.

7 CLASSIFICATION OF EXPLOSIVES BELONGING TO VISITING FORCES

7.1 General

7.1.1 Explosives belonging to Visiting Forces (VF) may be transported and stored in the United Kingdom. The classification and marking of these explosives must comply with the requirements of UK legislation and the classification of such military explosives must be endorsed by the ESTC.

7.2 Procedure

7.2.1 The UK point of contact for the VF is to submit an application to Sec ESTC at least four weeks before the movement is to take place. The application is to list the military explosives and include information on any foreign classification, packaging and NEQ.

7.2.2 ESTC will maintain records of all the classifications of VF explosives that have been formally accepted. Units and depots are to maintain records of such classifications in respect of the explosives they hold, and these records are to be made available to IE Inspectors. Units can obtain the relevant classification codes for VF explosives from ESTC.

7.3 US Visiting Forces

7.3.1 The main VF comprises United States forces. The ESTC accept the American Master Classification List - Joint Hazard Classification System Ammunition and Explosives. US Classifications of all military explosives are recognised in the UK for use by US VF only.

8 CLASSIFICATION OF ALLIED AMMUNITION BEING TRANSHIPPED TO / FROM AND WITHIN OPERATIONAL THEATRES BY UK ASSETS OR FACILITIES

8.1 General

8.1.1 Ammunition belonging to allied nations may be transported and temporarily stored in the United Kingdom, or in operational theatres, by UK assets or facilities. Examples of such activity include:

- (1) Transportation between the owning nations or other supply points and operational theatres via the UK, where it may be temporarily stored.
- (2) Transportation between the owning nations or other supply points and operational theatres directly.
- (3) Storage in operational theatres in compounds subject to UK regulations.

(4) Transportation within operational theatres.

8.2 Procedure

8.2.1 Where the activity will involve transport of the ammunition on UK public roads, its classification and marking must comply with the requirements of UK legislation and this JSP. Any classification awarded by an allied National Competent Authority or consignor MUST be endorsed by the ESTC even if an urgent operational imperative exists. This endorsement, or instruction to apply a different classification, will take the form of an e-mail although a normal temporary classification may be issued if the specific type of ammunition is to be transported regularly.

8.2.2 Where the activity will involve temporary storage or processing of the ammunition in the UK, its classification and marking must comply with this JSP. Any classification awarded by an allied competent authority or consignor should be endorsed by ESTC. If an urgent operational imperative exists which makes this impractical, then Sec ESTC should be consulted at the earliest opportunity.

8.2.3 Where the activity will involve long term storage or frequent transport of specific explosives articles to/from or within an operational theatre, a provisional classification should be awarded by the authorised competent person in accordance with para 6.3.1 of this Chapter. Notification of the Provisional Classification to ESTC, in accordance with para 6.3.2 of this Chapter must have been completed before any subsequent transport of the munitions on UK public roads. This provision does not waive the need for DGAC clearance when transport by RAF AT aircraft is required. JSP 800 Vol 4a should be consulted.

8.2.4 Where the activity will only involve short term storage or infrequent transport to/from or in an operational theatre, the classification awarded by an allied competent authority may be recognised as an alternative to the awarding of a provisional classification, subject to a local risk assessment by a competent person. Again, this provision does not waive the need for DGAC clearance when transport by RAF AT aircraft is required. JSP 800 Vol 4a should be consulted.

8.2.5 When awarding a provisional classification or conducting a local risk assessment, any increased risk arising from the unknown robustness of the safety management system under which the munitions were acquired should be taken into consideration. Mitigating mechanisms should be implemented, where practical, to reduce this risk to ALARP. Such mechanisms may include:

- (1) Receipt inspection of the munitions or a sample thereof.
- (2) Segregation of the munitions from UK stocks.
- (3) Limitation of the time in storage or transport.
- (4) Storage in benign conditions only.

8.2.6 Where it is concluded that the overall residual risk is higher than is accepted for UK stocks, this increase must be justified by the operational imperative and formally accepted by the theatre commander or delegated competent person.

8.2.7 Where ESTC endorsement of a classification awarded by an allied competent authority or consignor is required, the Sponsor for the transshipment of foreign ammunition should notify Sec ESTC as early as possible. The notification should list the ammunition natures and include information on the overseas classification, packaging, and NEQ as a minimum. On receipt of such notification, an extraordinary meeting of the ESTC Classification Panel will be convened at their earliest convenience. The panel will award an ESTC Temporary Classification based on the information provided.

8.2.8 Depending on individual circumstances and the perceived overall risk level, the temporary classification may caveat similar mitigation action to that listed above.

8.2.9 A temporary or provisional classification may be more severe than that awarded by the owning nation, particularly when the basis for that classification is not evident.

8.2.10 ESTC will maintain records of all the classifications of, and caveats on, foreign ammunition that have been formally accepted. Units and depots are to maintain records of such classifications and caveats in respect of the ammunition they hold, and these records are to be made available to IE Inspectors. Units can obtain the relevant classification codes and caveats for foreign ammunition from ESTC or the authorised competent person in the operational theatre.

9 CLASSIFICATION FOR STORAGE OF NON-MILITARY⁵ EXPLOSIVES

9.1 General

9.1.1 Whilst the HSE Explosives Inspectorate is responsible for classifying all non-military explosives, ESTC is responsible for classifying all military explosives. However, ESTC are also responsible for classifying non-military explosives that are to be stored on MOD Sites.

9.2 Storage at MOD Sites

9.2.1 Prior to accepting any non-MOD owned explosives for storage, or for exploitation at a MOD explosives storage site, an ESTC classification must be obtained (see para 1.1.5).

9.2.2 All non-MOD owned explosives, once classified are to be stored separately from MOD stocks in fully licensed storage.

9.2.3 All non-military explosives have a limited life. Storage records must indicate the shelf life of the item.

9.2.4 For all instances not covered in paras 9.2, clarification is to be sought from Sec ESTC.

9.2.5 It should be noted that this ESTC classification is to facilitate storage in MOD assets only. Should the non-military explosives be transported this must be under a HSE classification.

10 PROCEDURE FOR THE EXPORT TO OR TRANSIT THROUGH USA OF MILITARY EXPLOSIVES

10.1 General

10.1.1 The movement of UK owned Military Explosives of UN Class 1 into or through the USA is subject to authorisations known as EX Numbers, if any part of the transit involves US commercial carriers by road, rail, sea or air.

10.1.2 The only exception to the above is where the Military Explosives are transited direct from a UK Military base directly to a US Military base by UK or US Military personnel.

10.1.3 Commercial conveyance of UK Military Explosives must comply with the applicable US provisions contained in 49 Code of Federal Regulations (49 CFR) Subchapter C of the US Hazardous Materials Regulations (HMR) and International transport standards. The US Department of Transport's Pipeline and Hazardous Materials Safety Administration (DOT/PHMSA) regulates all commercial conveyance of any amount of Hazardous Class 1 (HC 1).

⁵ Those not covered by the "Military Explosives" definition in The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment regulations.

10.1.4 The information required by PHMSA is broadly similar to that required by DSEA/ESTC when a PT applies for an ESTC Military Explosives classification. PTs must ensure they are authorised to disclose any technical information to a third party before doing so.

10.2 Procedure

10.2.1 Before despatch of the explosives the MOD PT must have obtained a DoT EX approval from PHMSA. PHMSA have an electronic EX Number application process which can be found here: <http://phmsa.DOT.gov/hazmat/regs/sp-a>. An application submitted through the online system should receive an email confirmation containing a tracking number within 48 hours.

10.2.2 It is recommended that applications are submitted through the online system. However, applications can also be e-mailed and sent in the post.

10.2.3 ESTC also recommends that the application is supported by a Competent Authority letter from DCSA/ESTC. This letter is available here:

<http://estc.qinetiq.r.mil.uk/estc/classifications/default.htm>

10.2.4 A copy of the relevant ESTC Competent Authority Approval certificate MOD Form 1657 for the Class 1 item must also accompany the application and is available from ESTC on request. ESTC can be contacted using this e-mail address:

DSEA-DOSR-ESTGroup@mod.uk

10.2.5 On satisfactory receipt of the information PHMSA will allocate a US Classification and unique EX Number approval for each HC 1 article or substance.

10.2.6 The PT may wish to request a period of validity of any EX Number approval in light of any reoccurring exercises or training. The length of time an EX Number is valid for varies depending on the type of application applied for. EX Number approvals may be time constrained by PHMSA and PTs will need to monitor and manage re-applications to meet needs.

10.2.7 PTs should note that the approval process can be lengthy and this coupled with the DSCOM pipeline timings (168 days) for shipping Class 1 goods to the USA will mean that any application should be made as far in advance of the expected date of departure of the consignment as possible.

10.2.8 PHMSA has a comprehensive website with lots of useful help and guidance: <http://phmsa.dot.gov/hazmat/regs/sp-a/approvals/explosives>

10.2.9 The EX tracking number process can be seen here: <http://phmsa.dot.gov/hazmat/regs/sp-a/approvals/search>

10.2.10 Please note that ESTC have no level of influence over the US Department of Transport or PHMSA and the EX approval process. If difficulties are experienced by PTs it will remain the responsibility of the nominated single point of contact in the PTs to resolve.

CHAPTER 4

ANNEX A

EXPLOSIVES HAZARD CLASSIFICATION CODES

1 Theoretically, 78 HCC are possible, but certain combinations of HDs and CGs are mutually exclusive and do not occur in practice. The 35 available HCC are shown below.

HD	Compatibility Groups												
	A	B	C	D	E	F	G	H	J	K	L	N	S
1.1	1.1A	1.1B	1.1C	1.1D	1.1E	1.1F	1.1G		1.1J		1.1L		
1.2		1.2B	1.2C	1.2D	1.2E	1.2F	1.2G	1.2H	1.2J	1.2K	1.2L		
1.3			1.3C			1.3F	1.3G	1.3H	1.3J	1.3K	1.3L		
1.4		1.4B	1.4C	1.4D	1.4E	1.4F	1.4G						1.4S
1.5				1.5D									
1.6												1.6N	

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CHAPTER 4

ANNEX B

BRIEF DESCRIPTION OF THE PURPOSE AND TYPES OF TESTS CALLED FOR IN THE UN CLASSIFICATION TEST SCHEME

CONTENTS

Para

- 1 TESTS AND CRITERIA FOR ACCEPTANCE INTO CLASS 1
 - 1.1 Introduction
 - 1.2 Acceptance Tests
 - 1.2.1 Test Series 1
 - 1.2.2 Test Series 2
 - 1.2.3 Test Series 3
 - 1.2.4 Test Series 4
 - 2 TESTS AND CRITERIA FOR ASSESSING HAZARD DIVISIONS
 - 2.1 Introduction
 - 2.2 Tests to Determine the Hazard Division
 - 2.2.1 Test Series 5
 - 2.2.2 Test Series 6
 - 2.2.3 Test Series 7
- Appendix
- 1 Procedure for Provisional Acceptance of a Substance or Article in UN Class 1
 - 2 Procedure for Assignment to a Division of UN Class 1

1 TESTS AND CRITERIA FOR ACCEPTANCE INTO CLASS 1

1.1 Introduction

1.1.1 The tests for acceptance in UN Class 1 are grouped into four series of tests (further tests relate to the determination of the correct Hazard Division (HD)). This is shown diagrammatically at Appendix 1.

1.1.2 The numbering of these tests, and the tests to determine the correct HD, relates to the sequence of assessing results rather than the order in which the tests are conducted. Nevertheless it is important for the safety of experiments that certain preliminary tests using small quantities be conducted first, before proceeding to experiment with larger quantities. The result of such preliminary tests may also be used in the classification procedure.

1.1.3 The tests and sentencing criteria are fully detailed in the UN Manual of Tests and Criteria, to which reference should always be made. A brief description of the tests and their purpose is given below.

1.2 Acceptance Tests

1.2.1 Test Series 1: These tests are applied to substances and designed to answer the question "Is it an explosive substance?" and these consist of three types of tests, as follows:

- (1) Type 1a. A shock test with a defined booster and confinement to determine the ability of the substance to propagate a detonation.

(2) Type 1b. A test to determine the effect of heating under confinement.

(3) Type 1c. A test to determine the effect of ignition under confinement.

1.2.2 Test Series 2: These tests are applied to substances and designed to answer the question "Is the substance too insensitive for acceptance in Class 1?" Test Series 2 trials are essentially the same as those for Test Series 1. Series 2 tests and Series 1 tests have different pass/fail criteria, and consist of three types of tests as follows:

(1) Type 2a. A shock test with defined initiation system and confinement to determine the sensitivity to shock.

(2) Type 2b. A test to determine the effect of heating under confinement.

(3) Type 2c. A test to determine the effect of ignition under confinement.

1.2.3 Test Series 3: These tests are applied to substances and designed to answer the question "Is the substance too hazardous for transport (in the form in which it is tested)?" This Test Series consists of four types of tests as follows:

(1) Type 3a. Tests to determine the sensitiveness to impact.

(2) Type 3b. Tests to determine the sensitiveness to friction (including impacted friction).

(3) Type 3c. Tests to determine the thermal stability.

(4) Type 3d. Tests to determine the response to flame (ie, the ease of deflagration to detonation transition in small quantities when unconfined).

1.2.4 Test Series 4: These tests are applied to packaged and unpackaged ammunition and to packaged/unpackaged explosives and designed to answer the question "Is the article, packaged article or packaged substance too hazardous for transport?" This Test Series consists of two types of tests as follows:

(1) Type 4a. Tests to determine the thermal stability of packaged substances, packaged articles and unpackaged articles.

(2) Type 4b. Tests to determine the effect of dropping the packaged substances, packaged articles or unpackaged articles from up to 12 metres. There is a special test for liquids.

2 TESTS AND CRITERIA FOR ASSESSING HAZARD DIVISIONS

2.1 Introduction

2.1.1 After making sure that the substance or article is in Class 1, a further series of tests related to the determination of the correct HD (Tests Series 5, 6 and 7) is undertaken as appropriate. This is shown diagrammatically at Appendix 2.

2.1.2 A brief description of the tests and their purpose is given below.

2.2 Tests to Determine the Hazard Division

2.2.1 Test Series 5: These tests are applied to substances and designed to answer the question "Is it a very insensitive explosive substance with a mass explosion hazard?" Any candidate of HD 1.5 must pass all the following types of test:

(1) Type 5a. Shock tests that determine the sensitivity to detonation by a standard detonator.

(2) Type 5b. Thermal tests that determine the tendency of transition from deflagration to detonation.

(3) Type 5c. Tests to determine if the substance, when in large quantities, explodes when subjected to a large fire.

- (4) Type 5d. Tests to determine if the substance ignites when subjected to an incendiary spark (i.e., it is the intention to exclude easily ignitable substances, such as black powder, from HD 1.5).

2.2.2 Test Series 6: These tests are to determine the correct HD (from 1 to 4) to be applied to packaged and unpackaged ammunition and to packaged/unpackaged explosives. Test 6a and Test 6b are normally carried out at least three times unless explosion of the entire contents occurs earlier. Test 6c is normally performed once only. However, if the wood or other fuel used for the fire is all consumed leaving a significant quantity of unconsumed explosives substance in the remains or in the vicinity of the hearth, consideration should be given to performing the test again using more fuel or a different method to increase the intensity and/or duration of the fire. Test 6d is normally carried out three times, in different package orientations, unless a decisive (negative) result is observed earlier. If the results of the recommended number of tests do not enable the Hazard Division to be determined, the number of tests is increased. The four types of test are as follows:

- (1) Type 6a (Single Package Test). Test on a single package for the purpose of determining:
 - (a) Whether initiation or ignition in the package causes burning or explosion and whether burning or explosion is propagated in the package,
and
 - (b) In what way the surroundings could be endangered by these effects.
- (2) Type 6b (Stack Test). Test on a stack of packages of ammunition or explosives, or unpackaged ammunition/explosives for the purpose of determining:
 - (a) Whether burning or explosion in the stack is propagated from one package to another, or from one unpackaged ammunition article to another,
and
 - (b) In what way the surroundings could be endangered in this event.
- (3) Type 6c (External fire (Bonfire) Stack Test). Test on a stack of packages of ammunition or explosives, or of unpackaged ammunition or explosives for the purpose of determining:
 - (a) How the packages or unpackaged ammunition/explosives in the stack behave when involved in an external fire simulating a realistic accident,
and
 - (b) Whether and in what way the surroundings are endangered by blast waves, heat radiation and/or fragment projection.
- (4) Type 6d (Unconfined package test). Test on an unconfined package of explosive articles to which special provision 347 of Chapter 3.3 of the Modal Regulations applies, to determine if there are hazardous effects outside the package arising from the accidental ignition or initiation of the contents.

2.2.3 Test Series 7: These tests are applied to articles to answer the question "Is it an extremely insensitive article?" Any candidate, including explosive substance(s), for HD 1.6 (articles, explosives, extremely insensitive (EEI)) must pass all applicable Test Series 7 tests:

- (1) Type 7a. Shock test to determine the sensitivity of the explosive substance to detonation by a standard detonator.
- (2) Type 7b. Shock test with a defined booster and confinement to determine the sensitivity of the explosive substance to shock.

- (3) Type 7c. Test to determine the sensitivity of the explosive substance to deteriorate under the effect of an impact.
- (4) Type 7d. Test to determine the degree of reaction of the explosive substance to impact or penetration resulting from a given energy source.
- (5) Type 7e. Test to determine the reaction of the explosive substance to an external fire when the material is confined.
- (6) Type 7f. Test to determine the reaction of the explosive substance in an environment in which the temperature is gradually increased to 365 °C.
- (7) Type 7g. Test to determine the reaction to an external fire of an article that is in the condition as presented for transport.
- (8) Type 7h. Test to determine the reaction of an article in an environment in which the temperature is gradually increased to 365 °C.
- (9) Type 7j. Test to determine the reaction of an article to impact or penetration resulting from a given energy source.
- (10) Type 7k. Test to determine if an article will detonate a similar item adjacent to it that is in the condition as presented for transport.

2.2.4 A substance intended for use as the explosive filling in an article of HD 1.6 should be tested in accordance with Test Series 3 and Test Series 7. Test Series 7 substance tests should be conducted on the substance in the form (i.e., composition, granulation, density, etc.) in which it is to be used in the article.

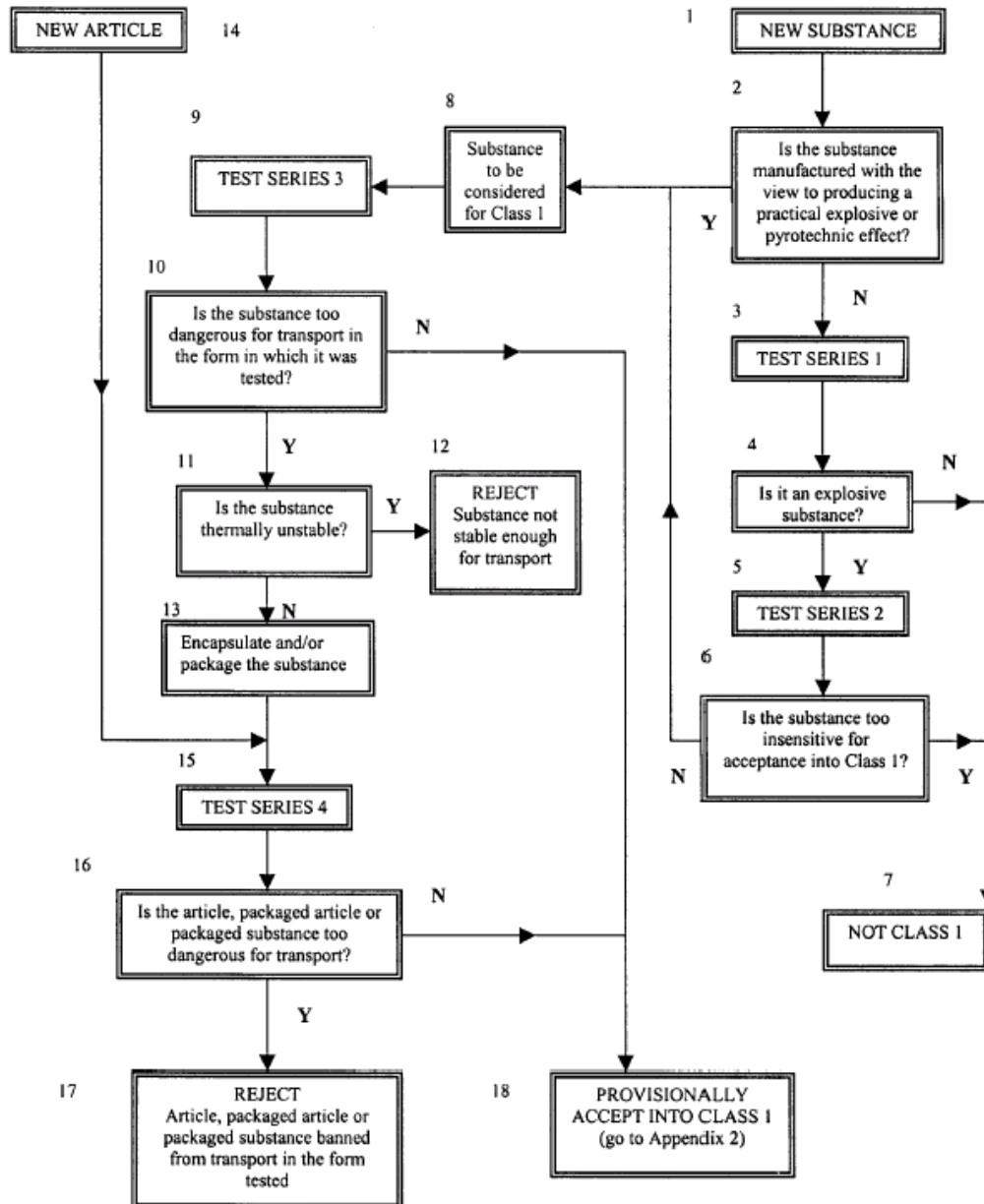
2.2.5 An article being considered for inclusion in HD 1.6 should not undergo Test Series 7 until after its explosives filling has undergone Test Type 7a to Test Type 7k to determine whether it is an extremely insensitive detonating substance (EIDS).

2.2.6 To determine whether the article with an EIDS filling is in HD 1.6, Test Type 7g to Type 7k need to be completed. These tests are applied to articles in the condition and form in which they are to be stored and transported, except that non-explosive components may be omitted or simulated if the competent National Authority is satisfied that this does not invalidate the results of the test.

CHAPTER 4 ANNEX B

APPENDIX 1

PROCEDURE FOR PROVISIONAL ACCEPTANCE OF A SUBSTANCE OR
ARTICLE IN UN CLASS 1

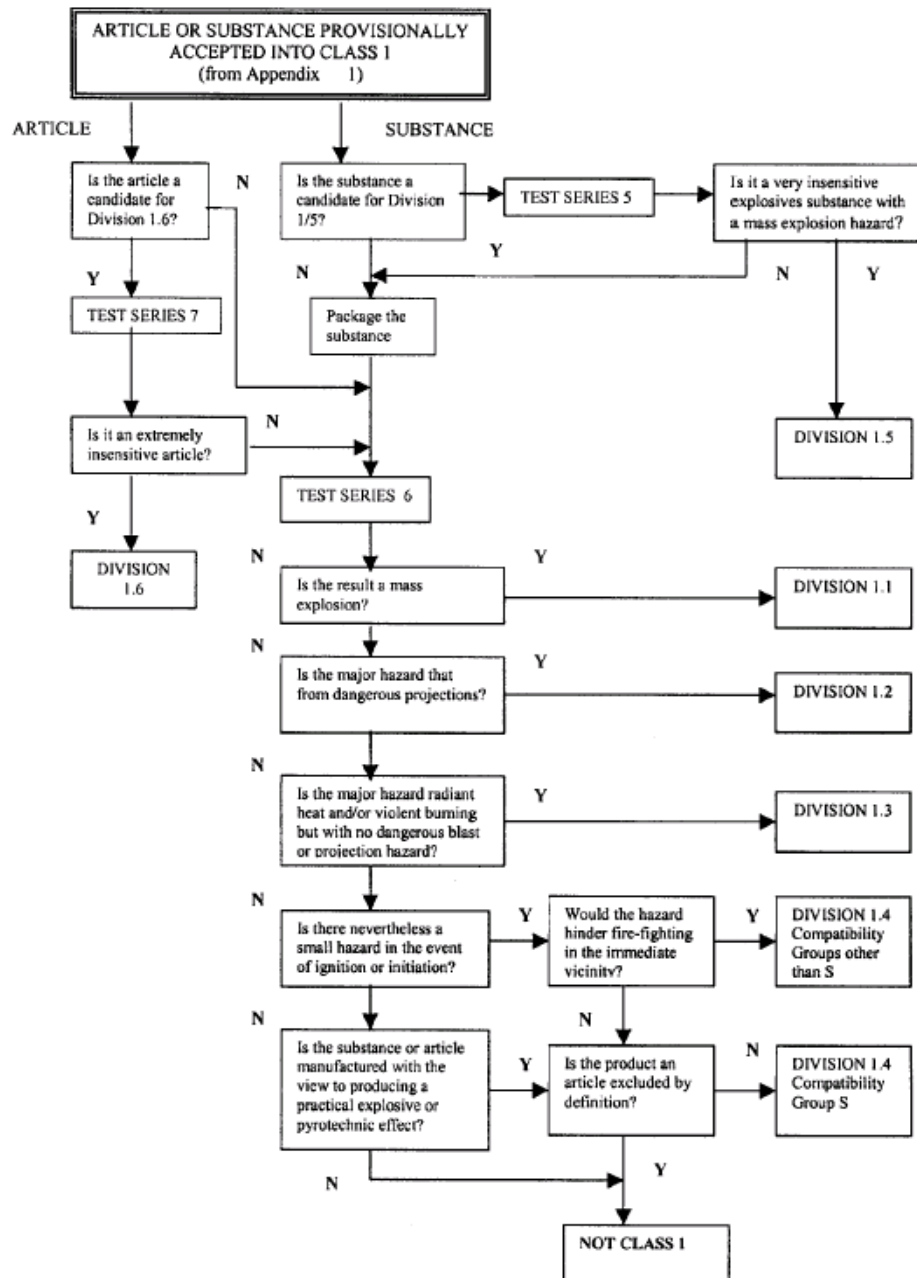


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CHAPTER 4 ANNEX B

APPENDIX 2

PROCEDURE FOR ASSIGNMENT TO A DIVISION OF UN CLASS 1



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