

WASC 1841

RO Explosives Div.

Design Office Instructions

COPY N° 6

Mr. J. EVANS.

# ROYAL ORDNANCE

Explosives Division

Research & Development Centre  
Waltham Abbey

## DESIGN OFFICE INSTRUCTIONS

# ROYALORDNANCE

## Memo

To Mech DO Staff  
From Mr R V Wright  
Senior Designer  
Date 3 October 1988  
Ref

Copies to Mr B Grabowski  
Mr J Evans, DO

Subject DESIGN OFFICE INSTRUCTIONS

1. Following a general update of the Design Office Instructions, DO Staff are requested to observe the following new or updated procedure:-

(a) DOI No 1: Section 1.3.6 to 1.3.10, new procedure for handling specialist injection moulding contractors drawings.

(b) DOI No 2: Section 2.4, new auto update procedure including the requirement to produce an auto update record card (Fig 5) for all 'P' drawings.

(c) DOI No 10: Section 10.3.3 clarification of 'Point of Implementation' on the Form 212.

(d) DOI No 12: The operation from this date of the specification record for 'P' drawings, including the requirement to produce an 'updating of Specifications Data Sheet' (Fig 23) for any BS or other Specification when stated on the drawings or lists. The Data Sheet on completion of the job, is to be handed to the member of staff, (Miss S Game) who will be operating the Specification Record System.

2. From this date, all 'P' drawing sheets are to have a 'General Notes' transfer applied to the top right hand corner. The transfers are stored in the stationery drawer.

3. DO staff using the drawing print machine during any absence of the print machine operator, are requested to ensure that the printing is carried out in accordance with the instructions wall-mounted above the machine.



R V WRIGHT

## DRAWING RECORDS

### A) MECHANICAL DRGS.

1/ MICROFILMED DRAWINGS START AT DRG N° 41 AND STOP AT DRG N° 7433. (THERE ARE A FEW GAPS IN THESE EARLY DRAWINGS) CIRCA. 1900 TO 1975.

A REGISTER IS AVAILABLE FROM DRG. N° 41

2/ DRAWINGS FROM 7433 UP TO PRESENT ARE AVAILABLE IN NEGATIVE DRAWN SHEETS WITH ONLY A FEW MISSING.

A REGISTER IS AVAILABLE FOR THESE DRAWINGS.

### B) OUTSIDE CONTACTOR DRAWINGS

DRAWINGS AND REGISTER START AT 1547 (JAN. 1972)

### C) CIVIL DRAWINGS

NO REGISTER IS AVAILABLE AS THIS SYSTEM HAS ALWAYS WORKED USING A CARD INDEX.

CARDS ARE AVAILABLE UNDER BUILDINGS, GROUP SECTIONS, SERVICES AND MAPS.

## DRAWING RECORDS

### A) MECHANICAL DRGS.

1/ MICROFILMED DRAWINGS START AT DRG N° 41 AND STOP AT DRG N° 7433. (THERE ARE A FEW GAPS IN THESE EARLY DRAWINGS) CIRCA. 1900 TO 1975.

A REGISTER IS AVAILABLE FROM DRG. N° 41

2/ DRAWINGS FROM 7433 UP TO PRESENT ARE AVAILABLE IN NEGATIVE DRAWN SHEETS WITH ONLY A FEW MISSING. (PRESENT DRG. N° 9281)

A REGISTER IS AVAILABLE FOR THESE DRAWINGS.

### B) OUTSIDE CONTRACTOR DRAWINGS

OUTSIDE CONTRACTOR REGISTER STARTS AT 1547 (JAN. 1972)  
OUTSIDE CONTRACTOR DRAWINGS (MICRO FILM/ PRINTS)  
START AT O/C N° 6 (CIRCA 1933) TO PRESENT, O/C N° 2148.

### C) CIVIL DRAWINGS

NO REGISTER IS AVAILABLE AS THIS SYSTEM HAS ALWAYS WORKED USING A CARD INDEX.

CARDS ARE AVAILABLE UNDER BUILDINGS, GROUP SECTIONS, SERVICES AND MAPS.

N° OF DRAWINGS LISTED ON CARDS

TOTAL 4746

NORTH SITE 1775

SOUTH SITE 2971

# ROYALORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION

### INDEX

#### Introduction

#### Project/Design Office Organisation

DOI No 1	Drawing Number and Title	
DOI No 2	Drawing Records	
DOI No 3	Drawing Procedure and Engineering Drawing Practice	
DOI No 4	Print Issue Procedure	
DOI No 5	Sketches	
DOI No 6	Security	
DOI No 7	Procedure for Control of Drawings Received from Non-R&DC (WA) Design Office Controlled Sources	
DOI No 8	Drawing Signatures	
DOI No 9	Storage and withdrawal of negatives and microfilms	
DOI No 10	Configuration Control	
DOI No 11	Design Office Job files	
DOI No 12	Updating of specifications quoted on drawings	
DOI No 13	The Control and Registration of Dies and Formers	
Figure 1	Layout of Drawing List	(See 1.3.5)
Figure 2	Layout of Item List	(See 1.3.5)
Figure 3	Drawing Master Card	(See 2.2.2)
Figure 4	Drawing Cross-Reference Cards	(See 2.2.5)
Figure 5	Automatic Update Request Card	(See 2.4.1)
Figure 6	Outline Drawing	(See 3.4.6)
Figure 7	Simple Fabrication Drawing	(See 3.4.7)
Figure 8	Compound Detail Drawing	(See 3.4.8)
Figure 9	Complex Fabrication Drawing	(See 3.4.8)
Figure 10	Tubular Drawing	(See 3.4.9)
Figure 11	Print Request Form	(See 4.2.1)
Figure 12	Print Despatch Note	(See 4.3.1)
Figure 13	PDN Receipt Reminder	(See 4.3.4)
Figure 14	PDN Hastening Position Proforma	(See 4.3.5)
Figure 15	OC Record Card, Formal System	(See 7.3.2)
Figure 16	OC Continuation Card, Formal System	(See 7.3.2)
Figure 17	OC Cross-Reference Card, Formal System	(See 7.3.3)
Figure 18	OC Record Card, Informal System	(See 7.4.2)
Figure 19	OC Continuation Card, Informal System	(See 7.4.2)

Figure 20	Modification Proposal Form 212	(See 10.3.1)
Figure 21	Design Office Information Sheet	(See 11.3.4)
Figure 22	Specification Record Card	(See 12.3.1)
Figure 23	Specification Data Sheet	(See 12.4.2)

#### DOI Index

Issue 1	19. 7.82
Issue 2	11.10.82
Issue 3	28.10.82
Issue 4	26.11.82
Issue 5	2.12.85
Issue 6	3.10.88

# ROYAL ORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION 1988

### INTRODUCTION

1. These Design Office Instructions supersede all previous issues.

2. There have been several significant changes in the practices described in Design Office Instructions since the first issue in the current format in 1982. These are mainly due to the change from an MOD R&D Establishment to 'Company' status. It should be noted that some of the changes have not been applied retrospectively and consequently it is possible to find examples of past work which do not fully conform with current practice. An example of this is in the 1985 change from the use of an oblique stroke to a horizontal dash in the Drawing Number (eg P8765/4 became P8765-4).

3. The practices described in the Design Office Instructions have been introduced to meet the requirements of DEF STAN 05-21. Whilst it should be noted that DEF STAN 05-21 is a contractual condition and not a drawing system, in respect to a contract with invokes DEF STAN 05-21, the Design Office will operate the DEF STAN 05-10/BS308 system.

4. Design Office tasks undertaken by R&DC Waltham Abbey fall into three categories:

Category (i) Project and Research tasks which arise as a result of a contract being placed onto R&DC Waltham, Abbey by an outside agency.

Research tasks within R&DC Waltham Abbey where full Quality Assurance is requested by the demander.

Category (ii) Research tasks within R&DC Waltham Abbey where full Quality Assurance is not required by the demander.

Category (iii) Civil Engineering tasks.

The practices described in the Design Office Instructions are mandatory for all Category (i) work and will apply from conception. For Category (ii) work where less formal procedures are permissible, specific references are made throughout. Category (iii) work is outside the scope of the Design Office instructions and is the subject of a separate design office instruction manual.



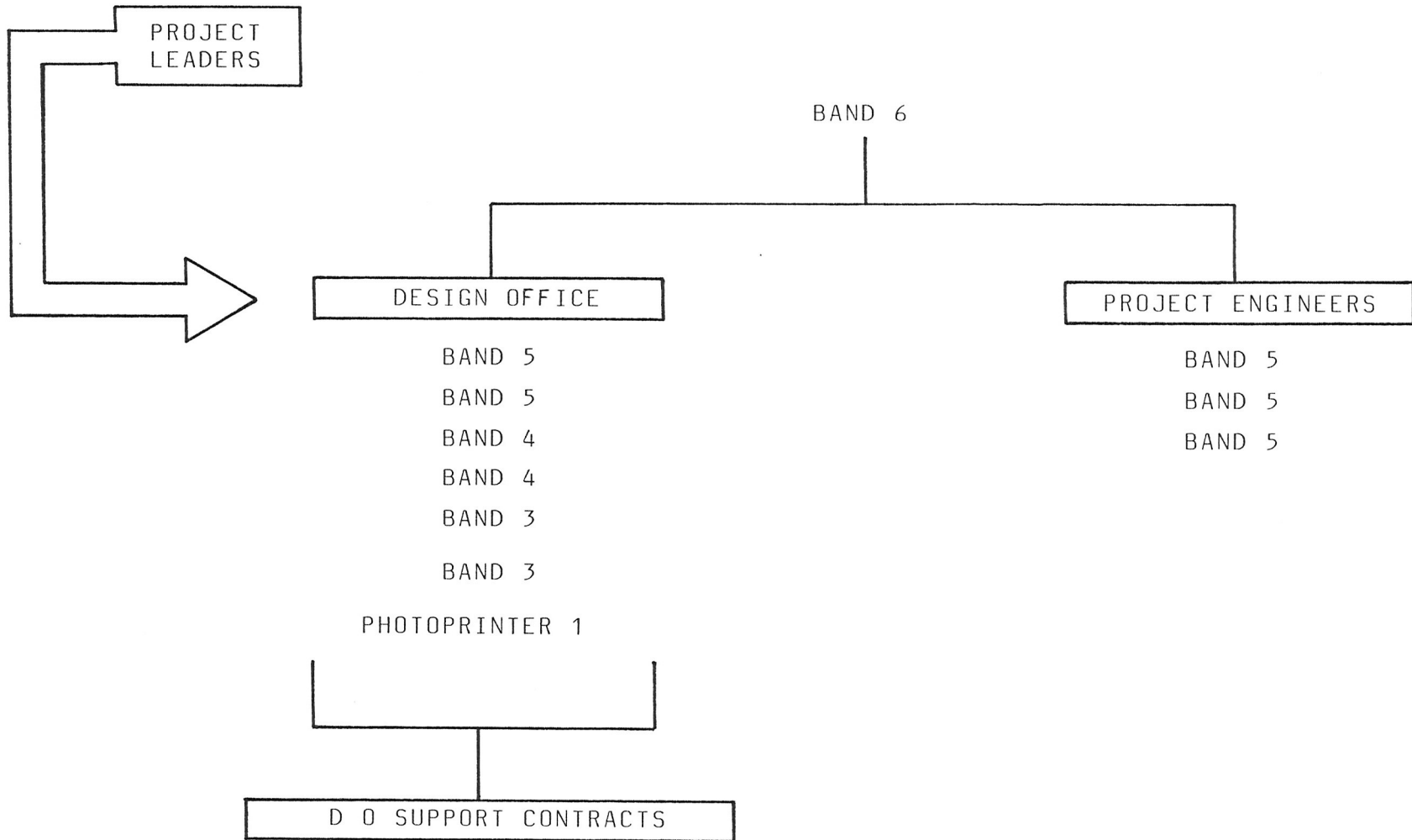
5. The R&DC (WA) Project/Design Office line of responsibility can be seen from the current family tree. The responsibility for project policy rests with the appropriate project leader, who represents the Design Authority. The responsibility in the Project/Design Office starts with the requirements as stated on the Form 51, the 'Request for Engineering Branch Effort', which is signed by the project leader's Superintendent. All local Design Office matters of administration and technical detail are the responsibility of the Head of Projects and Design who is responsible to the Superintendent of Engineering Branch. Design input from project leaders enters the Project/Design Office at Project Engineer/Design Engineer level in whom the Head of Projects and Design invests his authority.

#### DOI Introduction

Issue 1	19. 7.82
Issue 2	28.10.82
Issue 3	26.11.82
Issue 4	25.11.85
Issue 5	3.10.88

Signed:

A handwritten signature in cursive script, appearing to read 'Rijth', followed by a period.



THE PROJECT/DESIGN OFFICE ORGANISATION

# ROYALORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 1

### DRAWING NUMBER AND TITLE

- 1.1 Date of Implementation
- 1.1.1 These instructions, listed under DOI No 1, will apply from the following date; 19 July 1982.
- 1.2 Drawing Register Book
- 1.2.1 The existing Drawing Register Book will continue to be used and all entries will be made in ink.
- 1.2.2 The following information is required to be entered by a member of the Project/Design Office staff against each Drawing Number in the Drawing Register Book:  
  
DATE, BRANCH, PROJECT or PLANT (if known), PARENT EQUIPMENT, UNIT TITLE, BUILDING NUMBER (if known) and DRAWN BY.
- 1.3 Drawing Number
- 1.3.1 Drawing Numbers will be taken in sequence and will follow on from the existing series of numbers in the Drawing Register Book.
- 1.3.2 Drawing Numbers for Category (i) work only will be prefixed with the letter 'P' (eg P8793).
- 1.3.3 One Drawing Number will be taken for every GENERAL ARRANGEMENT (GA), ASSEMBLY (Assy) and SUB-ASSEMBLY (SA).
- 1.3.4 Each Detail Drawing will be given a unique number comprising its GA/Assy/SA Number, a horizontal dash and a suffix number (eg P8793-2).
- 1.3.5 Drawing Lists and Item Lists will be given the number of the associated GA/Assy/SA plus the additional prefix 'D' or 'L' respectively (eg DP8793, LP8793); see Figures 1 and 2.

- 1.3.6 Specialist Injection/Rubber Moulds are designed and manufactured for the Non-Energetics Department by an outside contractor. The detail drawings are drawn on Waltham Abbey blank sheets by the contractor.
- 1.3.7 On request, members of the Drawing Office staff are to give the contractor a drawing number taken in sequence following on from the existing series of numbers in the Drawing Register Book.
- 1.3.8 Drawing numbers issued on behalf of the mould contractor are to be prefixed with the letter 'A'. eg A9220, AD9220 and AL9220.
- 1.3.9 On receipt of the completed mould contractors drawings, all sheets are to be filed in the print room in the normal manner.
- 1.3.10 Master cards vide 2.2.2 and cross reference cards vide 2.2.5 are to be completed on receipt/filing of mould contractors drawings.
- 1.4 Titles
  - 1.4.1 All Titles should, wherever possible, be based on the NATO Alphabetical Index of Names, Handbook 99-H6-1, Section A.
  - 1.4.2 Where an item does not appear in the Index, its Title should be based on the definitions given in the Index.
  - 1.4.3 In order to achieve consistency in Titles, when a Title is uncertain, reference will be made to the Design Engineer.
  - 1.4.4 The Index should be referred to in order to understand its philosophy. Many of its definitions are strict and help in the construction of a Title.
  - 1.4.5 Titles of GA and Assy Drawings will be subject to retrieval action using Cross-Reference Cards and should be concise but informative.

1.4.6 Each Drawing Title will comprise three lines:

First Line .... Section and Building Number (if known)

Second Line .... What it is used for/on

Third Line .... What it is

1.5 Retrospective Action

1.5.1 In order to bring as many past Drawings as possible into the retrieval system, Cross-Reference Cards will be raised which do not necessarily reflect the Drawing Title but follow the procedure described in 1.4 above.

DOI No 1

Issue 1	19. 2.82
Issue 2	26.11.82
Issue 3	7.11.85
Issue 4	3.10.88

Signed:



# ROYALORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 2

### DRAWING RECORDS

- 2.1 Date of Implementation
- 2.1.1 These instructions, listed under DOI No 2, will apply from the following date: 3 October 1988.
- 2.2 Records
- 2.2.1 All GA/Assy/SA Drawings will be recorded in the Drawing Register Book vide 1.2 by the member of the Project/Design Office staff responsible for the design work.
- 2.2.2 A Master Card, R&DC (WA) Form 91, will be raised for every GA/Assy/SA Drawing, by the member of the Project/Design Office staff responsible for the design work; see Figure 3. The following data will be entered on the Master Card:
- TITLE, JOB NUMBER, DRAWING NUMBER, AVAILABLE AS, DATE OF ORIGIN, & CARD NUMBER.
- 2.2.3 Entries in the 'PRINT ISSUES' and 'REMARKS' sections of the Master Card will be made by the Print Room staff every time prints of the associated GA/Assy/SA, Drawing List, Item List or Details are issued. The Print Despatch Note (PDN) number will be recorded in the 'ISSUED TO' section. When prints are requested 'For Information Only' and stamped as such, this will be recorded in the 'REMARKS' section.
- 2.2.4 The Drawing Issue of circulated prints will be established from the PDN number quoted on the Master Card.
- 2.2.5 Cross-Reference Cards will be completed for all GA/Assy/SA Drawings, by the member of the Project/Design Office staff responsible for the design work; see Figure 4.

- 2.2.6 When Drawings prepared on Contract are given R&DC (WA) Drawing Numbers, the Master Cards will be completed by the member of the Project/Design Office staff responsible for the design work.
- 2.3 Procedure
- 2.3.1 Master Cards will be supplied to the Print Room staff by the member of the Project/Design Office staff responsible for the design work together with the associated drawings pending the first issue of prints and entry of data on the Cards by the Print Room staff vide 2.2.3.
- 2.3.2 Completed Master Cards will be retained in numerical order in a suitable drawer in the Design Office. Cards will only be removed by members of the Project/Design Office staff to make necessary entries and will be immediately refiled on completion.
- 2.4 Automatic Update of Prints
- 2.4.1 When any package of category (i) drawings is completed within the MDO, the member of staff responsible for the design work must complete an auto update record card; see Figure 5.
- 2.4.2 Auto update record cards are to be filled out on behalf of the member from the scientific staff who approves the drawing. Unless otherwise requested, the member of staff who approves the drawing is to be ticked on the card to receive G/A and details only.
- 2.4.3 Requests at any time thereafter for automatic updating from members of staff involved in the project, will be detailed on the card with name, establishment and extent of drawing package required.
- 2.4.4 Due to the Waltham Abbey workshop and inspection policy of destroying all drawings immediately on completion of equipment manufacture, auto update procedure is not applicable to the above two departments.
- 2.4.5 Auto update record cards are to be filed in the Drawing Office print room.
- 2.4.6 When prints are required by members of staff who have not requested to be on automatic update, all prints must be stamped 'for information only - prints will not be automatically updated'. The request for these prints will be made vide 4.2.1.

2.4.7 When a category (i) drawing has been subjected to change/modification/amendment action (see DOI No 10). The member of the Design Office Staff responsible, or a designated deputy, will identify all drawings/lists affected and complete a print request form vide 4.2.1, for the re-issue of these drawings. The print request form is to be marked 'for auto update action'.

2.4.8 The print room staff, on receipt of a print request form marked for auto update action, will consult the auto update record card and insure that appropriate print copies are distributed to those listed on the card in accordance with the print issue procedure DOI No 4.

2.5 Establishment of Current Issue

2.5.1 For the current issues of any drawings, reference will be made to the associated drawing list.

DOI No 2

Issue 1 19.7.82  
Issue 2 6.11.85  
Issue 3 3.10.88

Signed:

A handwritten signature in black ink, appearing to be 'R. H.', written over a light blue horizontal line.



# ROYAL ORDNANCE

## Explosives Division

Research and Development Centre  
WALTHAM ABBEY

### DESIGN OFFICE INSTRUCTION No 3

#### DRAWING PROCEDURE AND ENGINEERING DRAWING PRACTICE

- 3.1 Date of Implementation
- 3.1.1 These instructions, listed under DOI No 3, will apply from the following date: 19th July 1982.
- 3.2 Standards Policy at R&DC (WA)
- 3.2.1 All category (i) drawings will be prepared to DEF STAN 05-10, except where otherwise stated in R & D C (WA) Design Office Instructions. Engineering Drawing Practice will be to BS 308, except where DEF STAN 05-10 and BS 308 conflict.
- 3.3 Equipment Drawn to Old Standards
- 3.3.1 Where it is necessary to redraw part or the whole of an existing piece of equipment, which had not been drawn to current Design Office Instructions, the new Drawing will be prepared vide 3.2.1.
- 3.4 Types of Drawing
- 3.4.1 General Arrangement Drawing
- This is a Drawing of all Assemblies and associated parts constituting the equipment or a major part of the equipment.
- 3.4.2 Assembly Drawing
- This is a Drawing of a number of parts or Sub-Assemblies or any combination thereof, joined together to perform a specific function.
- 3.4.3 Sub-Assembly Drawing
- This is a Drawing of an assembly of parts required for convenience of manufacture.

#### 3.4.4 Detail Drawing

This is a Drawing of a single piece part.

#### 3.4.5 Diagram

This is a Drawing showing a representation in simplified or conventional form, to illustrate function, routing, operation etc.

#### 3.4.6 Outline Drawing

This is the Drawing of a proprietary item which is to be used in a system but over which no control can be exercised by R & D C (WA); see Figure 6. The minimum requirement is to define all characteristics necessary to ensure dimensional and functional interchangeability and subsequent re-ordering. Thus, if a manufacturer slightly changes his item in the course of production, but all the features defined on the Outline Drawing are still met, then the item can still be acceptable.

#### 3.4.7 Fabrication Drawing

For a simple fabricated part, where any machining is restricted to joint preparation, a fully dimensioned single Drawing will be provided. On the same Drawing, a table will be drawn up indicating the component parts, by means of lower case characters, and specifying the material and number off; see Figure 7.

For complex fabricated parts, an Assembly Drawing, showing clearly the disposition of all the component parts, will be provided. For any item which cannot be adequately described in an integral Items Table, a separate Detail Drawing, a Drawing List and an Item List will be provided. When an integral Items Table is used, separate items will be identified by means of lower case characters.

#### 3.4.8 Compound Detail Drawing

For a fabricated part, where there is machining of the component parts before assembly, a Drawing of the assembled parts will be provided, with a separate Detail Drawing for each of the component parts. A Drawing List and an Item List will also be provided; see Figure 8, sheets 1-5.

For a fabricated part which comprises a drawn Detail and standard parts assembled in such a way that they cannot be separated without damage, the standard parts will be itemised in position on the drawn Detail. A Drawing List and an Item List will also be provided; see Figure 9, sheets 1-3.

### 3.4.9 Tabular Drawing

This is a single Drawing for similar parts, where the differences can be defined in simple tabular form. Each part will be separately identified by means of an oblique stroke and a numerical suffix to the Drawing Number; see Figure 10.

### 3.5 Drawing List and Item List

3.5.1 All GA/Assy/SA Drawings require both an Item List and a Drawing List. In addition, all Fabrication Drawings and Compound Detail Drawings which comprise more than one sheet, require an Item List and a Drawing List.

### 3.6 Used-on Column

3.6.1 The 'used-on' column, as defined in DEF STAN 05-10 section 7-16, is not considered part of the Drawing. This means that when an entry in the 'used-on' column is either changed, added to or deleted, it is not mandatory to raise the issue of the Drawing so altered.

3.6.2 Because of the construction of the R&DC (WA) Drawing Numbering System, the use of the 'used-on' column will deviate from the definition in DEF STAN 05-10 section 7-16 as follows:

Where a Detail Drawing Number contains the Number of the GA/Assy/SA, it will not quote that Number in the 'used-on' column. All other Detail Drawings and all GA/Assy/SA Drawings will quote the Drawing Number of the next GA/Assy/SA Drawing up the family tree in their 'used-on' columns.

### 3.7 Specifications

3.7.1 All reference to R&DC (WA) Specifications on Drawings, will quote the relevant issue of that Specification. All other Specifications eg BSI, DEF STAN etc will be deemed to be the latest issue.

### 3.8 Engineering Drawing Practices

3.8.1 Engineering Drawing Practice will be to BS 308 vide 3.2.1.

3.8.2 Third angle projection is mandatory at R&DC (WA).

3.8.3 The method of tolerancing will be at the discretion of the Design Engineer. Hole and Shaft type features will be unilaterally toleranced using the Hole-based system, unless there are overriding reasons for using bilateral tolerances or the Shaft-based system.

- 3.8.4 Limits and fits will be in accordance with BS4500, hole-based.
- 3.8.5 For all Category (i) work, the Drawing Number and Issue will be called for to be marked, where practicable, on every item of hardware for identification purposes. This will be stated on the Drawing by invoking the symbol ⊗, as marked on the Drawing. An additional note defining character height and marking method will be added to the Drawing.
- 3.8.6 All Drawings showing features which comply with a Standard, will have the relevant Standard listed on the Drawing.
- eg Welding Symbols to BS499. ISO Threads to BS3643.

DOI No 3

Issue 1 19. 7.82  
Issue 2 7.11.85  
Issue 3 3.10 88

Signed:

*Rjth.*

# ROYALORDNANCE

## Explosives Division

Research and Development Centre

WALTHAM ABBEY

### DESIGN OFFICE INSTRUCTION No 4

#### PRINT ISSUE PROCEDURE

#### 4.1 Date of Implementation

4.1.1 These instructions, listed under DOI No 4, will apply from the following date: 19th July 1982.

#### 4.2 Print Requests

4.2.1 All requests for printing services will be made on form WA/S565; see Figure 11. The form must be signed by, or on behalf of, the demander and countersigned by a member of the Project/Design Office staff when the request comes from outside the Project/Design Office.

4.2.2 Prints of Drawings will be supplied at the latest issue, unless the required issue is specified in the 'Drawing Number or Title' box of the request form.

#### 4.3 Issue of Prints

4.3.1 All Drawing Prints will be sent to the demander with a Print Despatch Note (PDN), form 93; see Figure 12.

Prints for reference purposes only, will be stamped with the date of despatch and 'FOR INFORMATION ONLY - PRINTS WILL NOT BE AUTOMATICALLY UPDATED'. All other prints will be stamped with the date of despatch only. The Master cards will then be updated vide 2.2.3.

4.3.2 The following three classes of print will not be accompanied by a PDN:

- (i) Drawings bearing a Civil Design Office Number. eg M343-B-23. Such prints will be date stamped only.
- (ii) Prints of Drawings which are strictly for internal use by Project/Design Office staff. Such prints will be stamped with the date and 'PRELIMINARY'.
- (iii) Unnumbered schemes and sketches.

- 4.3.3 Returned PDN receipt slips (Section B of form 93) will be attached to their appropriate carbon copies in the PDN Book.
- 4.3.4 The following action will be taken with respect to PDN receipt slips not returned to the Project/Design Office Print Room within four weeks of the despatch of prints.
- (i) A reminder will be sent to the recipient of the Prints, using proforma Figure 13.
  - (ii) If action (i) does not elicit a response within four further weeks, details of the PDN will be notified to the Deputy Quality Manager (DQM) in the case of Category (i) work and to the Design Engineer for all other work, who will assume responsibility for obtaining a reply.
- 4.3.5 A record will be kept at the back of each PDN Book, indicating the status of any outstanding receipt slips and the 'hastening' position vide 4.3.4, using proforma Figure 14.
- 4.3.6 All Prints taken from Def Stan and BSI material stored on Microfilm will be stamped 'FOR INFORMATION ONLY - PRINTS WILL NOT BE AUTOMATICALLY UPDATED'.
- 4.3.7 Prints will not be taken from microfilms unless prior permission is given by the Design Engineer.

DOI No 4  
ISSUE 1 19. 7.82  
ISSUE 2 28.10.82  
ISSUE 3 4.11.85

Signed:



# ROYALORDNANCE

Explosives Division  
Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 5

### SKETCHES

#### 5.1 Date of Implementation

5.1.1 These instructions, listed under DOI No 5, will apply from the following date: 19th July 1982.

#### 5.2 Use of Sketches

5.2.1 Sketches may only be used for Category (ii) work and must first be authorised by the Design Engineer.

5.2.2 If it is found at a later stage that it is necessary to incorporate the component covered by a sketch into the formal drawing system, then the component must be redrawn vide 3.2.1. The sketch will then be cancelled by scoring through the SK number with two lines and marking the negative with a clear reference to the new Drawing Number.

5.2.3 The use of Research and Development Centre (WA) Sketch Numbers is restricted to members of the Project/Design Office staff only.

DOI No 5  
ISSUE 1 19. 7.82  
ISSUE 2 4.11.85

Signed:



# ROYAL ORDNANCE

Explosives Division  
Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 6

### SECURITY

#### 6.1 Regulations

6.1.1 Security regulations are contained in MOD Manual 4 and R & D C Waltham Abbey Standing Security Instructions; these are held in the Design Office and are available to all staff. This DOI supplements these Instructions because of our special responsibility for security and, for this reason, contains detailed instructions on classification, recording, reproduction, handling, transmission and disposal of classified documents.

#### 6.2 Classifications of Documents

6.2.1 When assessing a security classification, the Technical Grading Committee Classification Guide will be used. Details are available from the Security officer. The security classification of a work package will be stated on the Form 51.

#### 6.3 Classified Document Register (CDR)

6.3.1 MOD Security Regulations require a record to be kept of every Classified Document graded Confidential or above, which is originated, reproduced, received, despatched or disposed of. This record includes the date of entry, appointment of the sender or the originator, the date of origin, a reference number, a title, copy number (if any) and the classification of the document. In cases of final disposal, the record will include the file reference number or details of any point of custody. Temporary disposal of a document will also be shown by appointment, name or section. The Classified Document Register, MOD form 102 (short title CDR) is available in the Design Office. Additionally, individual holders of classified documents graded Confidential or above will enter details of each document on a Personal Holding Card, which will be retained by the keeper of the CDR.



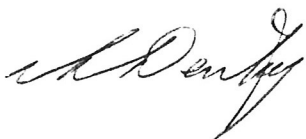
- 6.3.2 All drawings or documents classified Confidential or above will be accounted for as described above; it is unnecessary to record the movement of Unclassified or Restricted drawings or documents.
- 6.3.3 Prints or microfilms from negatives classified Confidential or above generated within R & D C Waltham Abbey or externally by DO Contractors, will be recorded in the MOD form 102 (CDR).
- 6.3.4 Post design prints or microfilms classified Confidential or above initiated at, despatched from or received by R & D C Waltham Abbey will be recorded in the MOD form 102 (CDR).
- 6.3.5 The destruction of drawings and documents classified Confidential or above, which have already been registered in a CDR, must be recorded in that CDR, in addition to certificates of destruction required internally or by any other external body. This action will be recorded in the MOD form 102 in column (0), against the original registration of the document.
- 6.3.6 If a drawing or document requiring destruction is not recorded in the MOD form 102, then a destruction certificate RO form is to be raised. For internally generated documents, one copy is raised and filed in the Design Office; for external documents, two copies will be raised: one in the aforementioned file and the other returned to the originator. When documents updating an issue are received together with destruction requirement forms, these receipts should be signed and returned on completion of the destruction.
- 6.4 Internal Movement at R & D C Waltham Abbey
- 6.4.1 All Top Secret drawings or documents marked ATOMIC, International Defence Organisations (IDO), ARTIFICER or CHEVAL will be transmitted by hand within the establishment. A timed receipt is required at the point of takeover. The internal transmission of such classified or marked documents will be carried out through the Security Officer. The envelope containing such a classified document will be sealed and addressed "EXCLUSIVE TO (NAME OF PERSON)".
- 6.4.2 A Secret drawing or document will be sealed in an envelope, marked SECRET top and bottom, front and back and addressed to the recipient's Section Clerk. Section Clerks will make the appropriate registration in the CDR. No receipts are required for security purposes, although they may be necessary for Quality Assurance reasons.

- 6.4.3 A Confidential drawing or document will be sealed in an envelope marked CONFIDENTIAL top and bottom, front and back and addressed to the recipient's Section Clerk. Section Clerks will make the appropriate registration in the CDR. No receipts are required for security purposes, although they may be necessary for Quality Assurance reasons.
- 6.4.4 Where drawings or documents carry a national caveat in addition to a security classification (eg SECRET UK EYES ONLY), the envelope will be marked SECRET and addressed "EXCLUSIVE TO (NAME OF PERSON)". A caveat must not appear on the outside of the envelope.
- 6.4.5 The senders of all drawings and microfilms despatched from the Design Office Print Room to internal recipients at RO Waltham Abbey will follow the above rules, with the addition that under the print despatch note (PDN) system, receipts are required for all drawings and microfilms, to meet the technical requirements of DEF STAN 05-21.
- 6.5 External Despatch from R & D C Waltham Abbey
- 6.5.1 All Top Secret documents (which may also be marked with ATOMIC, IDO, ARTIFICER or CHEVAL) will be passed to the Security Officer for processing.
- 6.5.2 Secret drawings and documents for recipients outside the establishment will be placed in a new, unfranked envelope with the MOD form 24 (receipt). The end of this envelope will be sealed, marked with the addressee's name and address and also the date, security classification (SECRET) top and bottom, front and back. A spare, unfranked sticky label, bearing the addressee's name and full postal address, will be attached (not stuck) to the envelope and the whole package taken to Registry for action as registered post. The return of the completed receipt should be hastened after six working days.
- 6.5.3 Confidential drawings and documents for recipients outside the establishment will be placed in a new, unfranked envelope. The end of this envelope will be sealed, marked with the addressee's name and address and also the security classification (CONFIDENTIAL) top and bottom, front and back. This envelope will then be sealed inside a larger franked envelope and marked with the addressee's name and full postal address. The stamp area will be marked with a large, red figure 1, to denote first class post and the whole package despatched to the Registry.

- 6.5.4 Care should be taken to ensure that the security classification never appears on the outside of the outer envelope.
- 6.5.5 If there is a national caveat (eg UK EYES ONLY) on the document, this should never appear on the outer envelope.
- 6.5.7 All drawings and documents posted to addressees outside the establishment from the Design Office Print Room will be despatched in accordance with the above instructions, with the addition that, under the PDN system, drawings and documents will require PDN receipt action, to meet the technical requirements of DEF STAN 05-21. Quality Assurance requires receipts on PDN forms for all receipts of drawings and documents. Security requires a MOD form 24 to accompany all drawings and documents at Secret level or higher.
- 6.6 Security Containers
- 6.6.1 Security containers will be appropriate to the grading of the contents. All containers at R & D C Waltham Abbey are identified by a number, corresponding to security requirement. All security keys (ie keys to security containers) will be held by the container user and the duplicates and triplicates by the Section Clerk. Security keys should not be taken out of the establishment. Duplicate or triplicate keys will be signed for when borrowed and losses will be reported immediately to the Security Officer.
- 6.6.2 Settings for combination lock containers will be known to three or less people, all of whom have an equal right of access to materials stored in the containers. Copies of the emergency lock setting (which will be changed at six monthly intervals, or on the departure of any person knowing the combination) will be held in sealed envelopes in a security container by the Engineering Branch Clerk.
- 6.7 Cease-work Check
- 6.7.1 To prevent security breaches or lapses, a double check (sometimes known as the night security check) will be undertaken. This does not obviate the responsibility for the security of any container from resting with the user. In the event of a breach of security, the responsibility lies with the user, but in addition, disciplinary action may be appropriate against the second checker.

DOI No 7  
ISSUE 1            20.11.85

Signed:



# ROYAL ORDNANCE

## Explosives Division

Research and Development Centre  
WALTHAM ABBEY

### DESIGN OFFICE INSTRUCTION No 7

#### PROCEDURE FOR CONTROL OF DRAWINGS RECEIVED FROM NON- R & D C WALTHAM ABBEY DESIGN OFFICE CONTROLLED SOURCES

- 7.1 Date of Implementation
- 7.1.1 These instructions, listed under DOI No 7, will apply from the following date: 11th November 1985.
- 7.2 Introduction
- 7.2.1 For the purpose of this DOI, non-R & D C Waltham Abbey Design Office Controlled Sources will be referred to as 'Outside Contractors'. Drawings from such sources will be referred to as 'OC Drawings'.
- 7.2.2 All Drawings, Prints, Microfilms and Negatives supplied to a member of the R&DC (WA) Project/Design Office by an Outside Contractor for reference will be registered, allocated an OC Number and filed by the recipient or nominated deputy.
- 7.2.3 When information from Drawings supplied by Outside Contractors relates to Category (i) work, the formal registration procedure will be applied. For all other Drawings, an abbreviated procedure will be used.
- 7.3 Formal Registration Procedure
- 7.3.1 For each GA/Assy/SA Drawing and for each Detail Drawing not supplied with a GA/Assy/SA Drawing, the next OC Base Number greater than 2000 will be taken from the OC Drawing Register Book. Against that number, the following data will be entered in ink:
- ORIGINATING FIRM OR ESTABLISHMENT, DATE RECEIVED,  
ORIGINAL DRAWING NUMBER, DATE OF DRAWING, ASSOCIATED  
PROJECT NAME and ASSEMBLY TITLE.

7.3.2 A separate OC Drawing Record Card will be raised for each OC Base Number taken; see Figure 15. The following data will be entered on the upper section of the card:

OC BASE NUMBER, ORIGINATING FIRM OR ESTABLISHMENT, ASSOCIATED PROJECT NAME and ASSEMBLY TITLE.

For the GA/Assy/SA Drawing, the Drawing List, the Item List and each Detail Drawing, the following data will be entered on the lower section of the card:

TITLE, ORIGINAL DRAWING NUMBER, ISSUE, FULL OC NUMBER and FORM OF DRAWING.

Numbered continuation cards will be used when necessary; see Figure 16. The Title, Drawing Number and Issue will be as read from the Drawing concerned. The date on the Drawing will be entered in lieu when no issue character is quoted. The Full OC Number will comprise the four-digit OC Base Number, an oblique stroke and a suffix number. Where practicable, the suffix 1 will be used for the GA/Assy/SA Drawing, the suffix 2 will be used for the Drawing List and the suffix 3 will be used for the Item List. Suffix numbers for Detail Drawings will run consecutively from 4. An additional oblique stroke and suffix number will be used to indicate sheet number, when a Drawing or List comprises more than one sheet.

7.3.3 A separate Cross Reference Card will be raised for every sheet of every GA/Assy/SA Drawing, Drawing List, Item List and Detail Drawing; see Figure 17. The following data will be entered on the card:

ORIGINAL DRAWING NUMBER (including sheet number), ASSOCIATED PROJECT NAME, FULL OC NUMBER, FORM OF DRAWING, ISSUE, DATE RECEIVED and SECURITY CLASSIFICATION.

7.3.4 The Full OC Number will be marked on the Drawing concerned in red, in the bottom right-hand corner for Prints and Negatives and on the front of the Aperture Card for Microfilms.

7.3.5 Completed Record Cards will be retained in a suitable drawer in the Design Office in OC Base Number order. Completed Cross Reference Cards will be retained in a suitable drawer in the Design Office. These will be filed and labelled as a set for a particular project and kept in Original Drawing Number order within that set. Cards will only be removed by members of the Project/Design Office to make necessary entries and will be immediately refiled on completion.

- 7.3.6 OC Prints will be folded down to A4 size, such that the OC Number is clearly visible. They will be placed as a set, for a particular GA/Assy/SA Drawing, in OC Number order, in one or more envelope-type files, clearly marked with the Project name and the OC Base Number. The files will be stored in a suitable cabinet in the Design Office, in OC Base Number order.
- 7.3.7 OC Microfilm Aperture Cards will be retained in a suitable drawer in the Design Office. These will be filed in OC Base Number order, with the lower numbers to the front of the drawer. Sets of Aperture Cards with a common OC Base Number will be filed in suffix number order, with the lower numbers to the front of the drawer.
- 7.3.8 OC Negatives (including secondary master drawings) will be retained in the Design Office, in a suitable drawer marked 'Outside Contractors Drawings'. Such drawings will be filed in OC Number order.
- 7.3.9 No copies of OC Drawings will be taken without prior permission from the Design Engineer. Any prints taken from OC Drawings in any form must be for reference purposes only and will be stamped 'FOR INFORMATION ONLY - WILL NOT BE UPDATED'.
- 7.3.10 All OC Drawings classified Restricted or higher will be subject to the security procedures described in DOI No 6.
- 7.3.11 On removing an OC Print, Negative or Microfilm Aperture Card for reference, the member of the Project/Design Office concerned will enter the following data in the OC Drawing Record Book:  
OC NUMBER, DATE REMOVED and REMOVED BY.  
  
On returning the Document, the following data will be added to the entry:  
DATE RETURNED and SIGNATURE.
- 7.3.12 When an updated OC Drawing is received, the associated previous issue drawing and the Cross Reference Card will be located. The superseded drawing will be destroyed and the new drawing marked with the Full OC Number, then filed. The Cross Reference Card will be amended to reflect the new issue, then refiled.
- 7.4 Abbreviated Registration Procedure
- 7.4.1 For each set of Drawings for an item of Plant or Equipment, which is not associated with Category (i) work, the next OC Base Number in the series 0-1999 will be taken from the OC Drawing Register Book. Against that number, the following data will be entered in ink:  
ORIGINATING FIRM OR ESTABLISHMENT, DATE RECEIVED,  
ORIGINAL DRAWING NUMBER, DATE OF DRAWING and DESCRIPTION OF PLANT OR EQUIPMENT.

7.4.2 An OC Drawing Record Card will be raised for each OC Base Number taken; see Figure 18. The following data will be entered on the upper section of the card:

OC BASE NUMBER, ORIGINATING FIRM OR ESTABLISHMENT, DESCRIPTION OF PLANT OR EQUIPMENT and DATE RECEIVED.

For the GA/Assy/SA Drawing, the Drawing List and Item List and each Detail Drawing, the following data will be entered on the lower section of the card:

TITLE, ORIGINAL DRAWING NUMBER, ISSUE, FULL OC NUMBER and FORM OF DRAWING.

Numbered continuation cards will be used, when necessary; see Figure 19. The Title, Drawing Number and Issue will be as read from the Drawing concerned. The date on the Drawing will be used in lieu when no issue character is quoted. The full OC Number will comprise the four-digit OC Base Number, an oblique stroke and a suffix number. Suffix numbers will start at 1 and will be allocated consecutively: one per Drawing or List in the set. An additional oblique stroke and suffix number will be used to indicate sheet number, when a Drawing or List comprises more than one sheet.

7.4.3 The Full OC Number will be marked on the Drawing concerned, in red in the bottom right-hand corner for Prints and Negatives and on the front of the Aperture Card for Microfims.

7.4.4 Completed Record Cards will be retained in a suitable drawer in the Design Office. These will be filed and labelled as a set for a particular item of plant or equipment and kept in OC Number order within that set. Cards will only be removed by members of the Project/Design Office staff to make necessary entries and will be immediately re-filed on completion.

7.4.5 OC Prints will be folded down to A4 size, such that the OC Number is clearly visible. They will be placed, as a set, for a particular item of plant or equipment, in OC Number order, in one or more envelope-type files, clearly marked with the plant or equipment name and the OC Base Number. The files will be stored in a suitable cabinet in the Design Office, in OC Base Number order.

7.4.6 OC Microfilm Aperture Cards will be retained in a suitable drawer in the Design Office. These will be filed and labelled as a set for a particular item of plant or equipment and kept in OC Number order within that set.

7.4.7 OC Negatives (including secondary master drawings) will be retained in the Design Office, in a suitable drawer marked 'Outside Contractors Drawings'. Such drawings will be filed in OC number order.

7.4.8 On removing an OC Print, Negative or Microfilm Aperture Card for reference, the member of the Project/Design Office staff concerned will enter the following data in the OC Drawing Record Book:

OC NUMBER, DATE REMOVED and REMOVED BY.

On returning the Document, the following data will be added to the entry:

DATE RETURNED and SIGNATURE.

7.4.9 When an updated OC Drawing is received, the Drawing details will be amended on the associated Record Card. The new Drawing will be marked with the OC Number and the superseded Drawing will be clearly marked with the words 'SEE LATER ISSUE'. Both issues of the Drawing will be tab.

DOI No 7  
ISSUE 1 11.11.85

Signed:

A handwritten signature in cursive script, appearing to read 'M. D. ...', is written over a horizontal line.



# ROYAL ORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 8

### DRAWING SIGNATURES

#### 8.1 Date of Implementation

8.1.1 These instructions, listed under DOI No 8, will apply from the following date: 17 November 1985.

#### 8.2 General Policy

8.2.1 No Drawing will be released from the Design Office unless the 'Drawn' and 'Approved' boxes have been completed. In addition, the 'Section', 'Safety' and 'Chief Engineer' Approval boxes will be completed for all GA/Assy/SA Drawings.

#### 8.3 Drawn and Checked Boxes

8.3.1 The box labelled 'Drawn' will be completed by the member of the Project/Design Office staff or Contractor responsible for preparing the Drawing.

8.3.2 When Drawings are prepared by a Contractor, the Contract will provide for Checking and the completion of the 'Checked' box by the Contractor.

8.3.3 When Drawings are prepared by a members of the Project/Design Office staff, the 'Checked' box will be completed by a more senior member of the staff if deemed necessary by the Design Engineer, to indicate that the Drawing has been checked for accuracy and that the part is suitable for manufacture and assembly, otherwise the 'Checked' box will be scored through.

#### 8.4 Approval Boxes

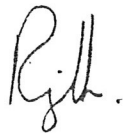
8.4.1 The 'Approved' box will be completed by the Design Engineer to indicate that the Drawing complies with Design Office Instructios and any other appropriated standards.

- 8.4.2 The 'Section' and 'Chief Engineer' Approval boxes will be signed by the Project Leader and the Chief Engineer respectively or their nominated deputies to indicate fitness for intended purpose.
- 8.4.3 The 'Safety' Approval box will be signed by the R&DC (WA) Establishment Safety Officer to certify compliance with the appropriate Explosives, Health and Safety Regulations.

DOI No 8

Issue 1 17.11.85  
Issue 2 3.10.88

Signed:

A handwritten signature in cursive script, appearing to read "Rjh.", is written over the printed word "Signed:".

# **ROYALORDNANCE**

## **Explosives Division**

Research and Development Centre

WALTHAM ABBEY

### DESIGN OFFICE INSTRUCTION No 9

#### STORAGE AND WITHDRAWAL OF NEGATIVES AND MICROFILMS

##### 9.1 Date of Implementation

9.1.1 These instructions, listed under DOI No 9, will apply from the following date: 12th November 1985.

##### 9.2 Introduction

9.2.1 The procedures described in this DOI will be carried out principally by Print Room Staff. In exceptional circumstances, the Design Engineer may direct any member of the Project/Design Office staff to provide assistance.

9.2.2 The withdrawal of Negatives from the Print Room will be strictly confined to members of the Project/Design Office.

##### 9.3 Negatives

9.3.1 Negatives delivered to the Print Room for filing will be kept in a suitably marked drawer pending action by Print Room staff. The drawer will normally be cleared and the drawings filed at least once weekly.

9.3.2 All A4 size Drawing Lists and Item Lists will be filed together in an A4 size drawer in a Print Room cabinet. They will be filed in numerical order with the lower numbers to the bottom of the drawer and the Drawing List on top of the Item List. Lists comprising several sheets will be arranged in sheet number order with the higher sheet numbers to the bottom of the drawer.

9.3.3 All GA/Assy/SA and Detail Drawings will be hole punched along the top edge and the Drawing Number will be marked in the border in the top right-hand corner of the drawing sheet. The prepared drawing will be suspended in a suitable Print Room cabinet in numerical order with the lower numbers to the rear of the cabinet. Drawings comprising several sheets will be arranged in sheet number order with the higher sheet numbers to the rear of the cabinet.

9.3.4 When a Negative is withdrawn from the Print Room, the following data will be entered in the Negative Record Book in ink:

DRAWING NUMBER, SHEET NUMBER, DATE WITHDRAWN and SIGNATURE OF NEGATIVE HOLDER.

When the Negative is returned to the Print Room for refiling, the following additional data will be entered in the Negative Record Book:

DATE RETURNED and SIGNATURE OF RECIPIENT.

9.4 Microfilms

9.4.1 All Microfilm Aperture Cards stored in the Print Room are held for Archive purposes only and on no account will be removed. A duplicate set, pink in colour, are stored in the Design Office for reference purposes only.

9.4.2 All Microfilm Aperture Cards will be marked in ink with the Drawing Number and Issue of the Drawing concerned. The Archive set will be stored in a suitable Print Room drawer in numerical order with the lower numbers to the rear of the drawer. The Reference set will be similarly stored in a suitable drawer in the Design office.

DOI No 9  
ISSUE 1 12.11.85

Signed:

A handwritten signature in cursive script, appearing to read 'M. D. ...', written in dark ink.

# ROYAL ORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 10

### CONFIGURATION CONTROL

- 10.1 Date of Implementation
- 10.1.1 These instructions, listed under DOI No 10, will apply from the following date: 21 November 1985.
- 10.2 Introduction
- 10.2.1 This section refers to the procedure for alterations or additions to drawings and documents following the first issue.
- 10.2.2 The term 'Change' is used where any alteration is made to a Category (ii) drawing or a Category (i) drawing before it reaches 'Chilled' or 'Frozen' status.
- 10.2.3 An 'Amendment' is an alteration which does not directly affect the cost or construction of any hardware or components. eg spelling or typing corrections to a chilled or frozen drawing.
- 10.2.4 A 'Modification' is an alteration which affects cost, manufacture, interchangeability or any other significant factor on a chilled or frozen drawing.
- 10.3 Alterations made to Category (i) Drawings before Chilling or Freezing
- 10.3.1 Requests for the alteration of drawings will be made using Form 212. See Figure 20. This will be approved at LCCP Level and will be signed by the DQM.
- 10.3.2 On receipt of an authorised Form 212, the member of the Project/Design Office staff responsible for implementing the change will obtain the next available Change Number from the Design Office Change Register. The project name or drawing title will be entered in ink against the change number.
- 10.3.3 The member of Project/Design Office responsible for implementing the change will obtain from the Scientist/Project Leader, a date of implementation. The implementation date is to be entered in the appropriate Box on the Form 212.

- 10.3.4 Before any drawing alterations are made, secondary master prints of drawings and photocopies of item and drawing lists will be made and stored in the designated Print Room cabinet, with the exception of classified material which will be stored in the Design Office security cabinet.
- 10.3.5 Drawings and lists affected by the change will be raised in issue eg A to B, B to C etc and the change number will be entered in the 'Change' box against the issue. A change sheet detailing all alterations will be produced and will be signed as correct by the Design Engineer. The Design Engineer will determine whether any additional approval (eg Establishment Safety Officer) is required.
- 10.3.6 The package of altered drawings and the change sheet will be delivered to the Print Room where the Master Cards of the affected drawings will be updated and the Automatic Update procedure applied vide DOI No 2. The change sheets will be filed in numerical order in a suitable cabinet in the Design Office.
- 10.4 Chilling of Drawings
- 10.4.1 Requests to chill a drawing package will be made using a Form 714/715 or approved equivalent. This document will quote the approval number.
- 10.4.2 The member of the Project/Design Office staff responsible for carrying out the chilling action will locate the negatives of the drawings concerned and secondary master prints of the drawings and photocopies of the item and drawing lists will be made and stored in the designated Print Room Cabinet, with the exception of classified material which will be stored in the Design Office security cabinet.
- 10.4.3 Each drawing and list in the package will be raised to issue C1 and the approval number will be entered in the 'change' box against the issue. A 'Modification Sheet' detailing the drawings and lists affected by the chilling action will be produced and signed as correct by the Design Engineer.
- 10.4.4 The package of chilled drawings and the modification sheet will be delivered to the Print Room where the Master Cards of the affected drawings will be updated and the Automatic Update procedure applied vide DOI No 2. The modification sheet will be filed in numerical order in a suitable cabinet in the Design Office.

## 10.5 Alterations to Chilled Drawings

- 10.5.1 Modifications to chilled drawings normally require a proposal drawing which may be prepared to Category (ii) standards detailing the proposed alterations for submission for approval at CCP Level under the Chairmanship of the Project Manager.
- 10.5.2 Requests to Amend or Modify a chilled drawing package will be made using a Form 714/715 or approved equivalent. This document will quote the approval number.
- 10.5.3 The member of the Project/Design Office responsible for carrying out the Amendment or Modification will locate the negatives of the affected drawings and secondary master prints of the drawings and photocopies of the item and drawing lists will be made and stored in the designated Print Room cabinet, with the exception of classified material which will be stored in the Design Office security cabinet.
- 10.5.4 In the case of Amendment action, affected drawings and item and drawing lists will be raised in issue but the new issue will be enclosed in brackets. eg C1 to (C2), (C3) to (C4) etc. The approval number will be entered in the 'change' box against the issue. A 'Modification Sheet' detailing all alterations will be produced and signed as correct by the Design Engineer.
- 10.5.5 In the case of Modification action, affected drawings and item and drawing lists will be raised in issue. eg C1 to C2, (C3) to C4 etc. The approval number will be entered in the 'change' box against the issue. A 'Modification Sheet' detailing all alterations will be produced and signed as correct by the Design Engineer.
- 10.5.6 The package of Modified or Amended drawings and the modification sheet will be delivered to the Print Room where the Master Cards of the affected drawings will be updated and the Automatic Update procedure applied vide DOI No 2. The modification sheet will be filed in numerical order in a suitable cabinet in the Design Office.

## 10.6 Freezing of Drawings

- 10.6.1 Requests to Freeze a drawing package will be made using a Form 714/715 or approved equivalent. This document will quote the approval number.

- 10.6.2 The member of the Project/Design Office staff responsible for carrying out the freezing action will locate the negatives of the drawings concerned and secondary master prints of the drawings and photocopies of the item and drawing lists will be made and stored in the designated Print Room cabinet, with the exception of classified material which will be stored in the Design Office security cabinet.
- 10.6.3 Each drawing and list in the package will be raised to the next numerical issue. eg C3 to 4, (C5) to 6 etc. The approval number will be entered in the 'change' box against the issue. A 'Modification Sheet' detailing the drawings and lists affected by the freezing action will be produced and signed as correct by the Design Engineer.
- 10.6.4 The package of frozen drawings and the modification sheet will be delivered to the Print Room where the Master Cards of the affected drawings will be updated and the Automatic Update procedure applied vide DOI No 2. The modification sheet will be filed in numerical order in a suitable cabinet in the Design Office.
- 10.7 Alterations to Frozen Drawings
- 10.7.1 Modifications to frozen drawings normally require a proposal drawing which may be prepared to Category (ii) standards detailing the proposed alterations for submission for approval at LTC Level under the Chairmanship of the prime contractor.
- 10.7.2 Requests to Amend or Modify a frozen drawing package will be made using a Form 714/715 or approved equivalent. This document will quote the approval number.
- 10.7.3 The member of the Project/Design Office staff responsible for carrying out the Amendment or Modification will locate the negatives of the affected drawings and secondary master prints of the drawings and photocopies of the item and drawing lists will be made and stored in the designated Print Room cabinet, with the exception of classified material which will be stored in the Design Office security cabinet.
- 10.7.4 In the case of Amendment action, affected drawings and item and drawing lists will be raised in issue but the new issue will be enclosed in brackets. eg 2 to (3), (4) to (5). The approval number will be entered in the 'change' box against the issue. A 'Modification Sheet' detailing all the alterations will be produced and signed as correct by the Design Engineer.



10.7.5 In the case of Modification action, affected drawings and item and drawing lists will be raised in issue. eg 2 to 3, (4) to 5. The approval number will be entered in the 'change' box against the issue. A 'Modification Sheet' detailing all alterations will be produced and signed as correct by the Design Engineer.

10.7.6 The package of Modified or Amended drawings and the modification sheet will be delivered to the Print Room where the Master Cards of the affected drawings will be updated and the Automatic Update procedure applied vide DOI No 2. The modification sheet will be filed in numerical order in a suitable cabinet in the Design Office.

#### 10.8 Explanation of Issue Status

10.8.1 A typical issue history might be:

A, B, C, D, C1, (C2), 3, (4)

Since the bracketed issues denote amendments, equipment made to issue 3 will be indistinguishable from that made to issue (4), the latest issue, hence issue 3 may be considered current for manufacturing purposes.

#### 10.9 Change Procedure for Category (ii) Drawings

10.9.1 All alterations to Category (ii) drawings are referred to as 'changes'. Changes are typically initiated by Form 51 action but no formal QA authority is necessary for such action.

10.9.2 The member of the Project/Design Office staff responsible for implementing the change will obtain the next available Change Number from the Design Office Change Register. The plant/equipment name or drawing title will be entered in ink against the change number.

10.9.3 No Secondary Masters or Photocopies are required for this Category of work. When the Drawings have been changed, the issues will be raised eg A to B, B to C etc and the change number will be entered in the 'Change' box against the issue. A Change Sheet detailing the changes made will be produced and signed by the Design Engineer. The Design Engineer will determine whether any additional approval (eg Establishment Safety Officer) is required.

10.9.4 The package of altered Drawings and the Change Sheet will be delivered to the Print Room where the Master Cards of the affected Drawings will be updated. The member of the Project/Design Office staff responsible for carrying out the change will determine the distribution of any prints and complete a Print Request Form accordingly. The change sheets will be filed in numerical order in a suitable cabinet in the Design Office.

DOI No 10

Issue 1 22.11.85  
Issue 2 3.10.88

Signed:

A handwritten signature in black ink, appearing to be 'R. J. H.', written in a cursive style.

# ROYAL ORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 11

### DESIGN OFFICE JOB FILES

#### 11.1 Date of Implementation

11.1.1 These instructions, listed under DOI No 11, will apply from the following date: 24 November 1985.

#### 11.2 Initiation and Format

11.2.1 When the Chief Engineer or a nominated Deputy receives a demand for Engineering effort (Form 51) which requires Design Office input, the Form 51 will be marked with the Code 'D' and passed to the Information and Progress Office (IPO).

11.2.2 The IPO staff will allocate a CE number and prepare a Job file comprising the following:

- (i) Two copies of the Form 51
- (ii) An Estimate Sheet
- (iii) A Job History Sheet
- (iv) A Design Office Progress Card
- (v) A Job Progress Sheet

The front cover of the Job file will be marked with the CE number and the package will be delivered to the Design Engineer.

11.2.3 The Design Engineer will record the receipt of the Job file, investigate the nature of the work and complete and return the Estimate Form to the IPO. The Progress Card will be placed in the Design Office Work Chart System and the Job file will be stored in a suitable cabinet in the Design Office pending the availability of effort.

11.2.4 When effort becomes available, the Design Engineer will allocate the Job file to the Assistant Design Engineer responsible for the Design Work who will make arrangements to discuss the Design Specification with the Demander.

11.3 Job History

11.3.1 Job History Sheets will be used to record important Decisions, Minutes of Discussions with the Demander, The Establishment Safety Officer, Fire Brigade Officer etc and any data obtained from outside agencies (eg potential suppliers). Each Job History Sheet will at all times be retained in the Job file.

11.3.2 All significant or statutory calculations will be made on 'Calculation Sheets'. Each Calculation Sheet will at all times be retained in the Job file.

11.3.3 When parts are ordered by Design Office staff, copies of the Provision Demand (PD) and copies of the resultant Order will be placed in the Job file.

11.3.4 On completion of the Design and Detailing work, when the Drawings asre required to be issued for manufacture, a Design Office Information Sheet (see Figure 21) will be completed specifying:

JOB NUMBER, DRAWING NUMBER, TITLE, ISSUE, PRINT DISTRIBUTION, NUMBER OF ITEMS REQUIRED, ANY PARTS NOT REQUIRED, ANY PARTS ON ORDER and ANY OTHER RELEVANT INFORMATION.

A print request form WA/S565 will be completed for the required Drawing Prints and the Design Office Information Sheet will be delivered to the IPO for further action. A copy of the Design Office Information sheet will be inserted in the Job file.

11.3.5 The Job file will be retained by the Assistant Design Engineer until the Manufacture, Installation and Commissioning phases are satisfactorily completed. Any changes that occur during these phases will be recorded on Job History Sheets and placed in the Job file. On completion of the work, to the satisfaction of the demander, the Job file will be stored in the Design Office Archive cupboard for future reference.

DOI No 11

Issue 1 24.11.85  
Issue 2 3.10.88

Signed:



# ROYAL ORDNANCE

Research and Development Centre  
WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 12

### UPDATING OF SPECIFICATIONS QUOTED ON DRAWINGS

- 12.1 Date of Implementation
- 12.1.1 These instructions, listed under DOI No 12, will apply from the following date: 3 October, 1988.
- 12.2 Introduction
- 12.2.1 When a Specification quoted on a Drawing is subsequently altered, it may affect the design or functioning of the part detailed on that Drawing. To monitor such changes, a Card System will be maintained to record the Drawings which quote a particular Specification.
- 12.2.2 The monitoring of Specifications will be mandatory for Chilled and Frozen Drawings of equipment in current use only but, for convenience, records will be kept for all Category (i) Drawings.
- 12.3 Specification Record Cards
- 12.3.1 The Specification Record Cards will be headed with the Specification Number (including part number) and a descriptive title. The lower section of the card will be divided into columns headed 'Drawing Number'. See Figure 22.
- 12.3.2 Completed Specification Record Cards will be stored in a suitable drawer in the Design Office. The Cards will be filed in separate sections in type order eg BSI, DEF STAN, RO(WA) Propellant Specifications etc and will be filed in numerical order, lowest to the front, within each section.
- 12.4 Specification Data Sheets
- 12.4.1 The member of the Project/Design Office staff responsible for the Design work will also be responsible for supplying the data to be entered on the Specification Record Cards for a particular set of Drawings.

12.4.2 The Full Drawing Number and all Specifications quoted on that Drawing will be entered on a Specification Data Sheet. See Figure 23. Completed sheets (or part sheets) will be signed and passed on to the member of the Project/Design Office staff responsible for maintaining the Specification Record Cards for action. The Specification Data Sheet will be initialled against the Drawing Number when the information has been transferred to the appropriate Specification Record Card and will be filed in a suitable drawer in the Design Office on completion.

12.5 Changes to Specifications Quoted on Drawings

12.5.1 When information of a change in issue to a Specification is received in the Project/Design Office, the Design Engineer will consult the Specification Record Cards to ascertain whether that Specification is quoted on any Drawing. All affected Drawings will be examined and corrective action taken when necessary.

DOI No 12

Issue 1 24.11.85  
Issue 2 3.10.88

Signed:

A handwritten signature in cursive script, appearing to read 'Rijk'.

# ROYAL ORDNANCE

Explosives Division

Research and Development Centre

WALTHAM ABBEY

## DESIGN OFFICE INSTRUCTION No 13

### THE CONTROL AND REGISTRATION OF DIES AND FORMERS

#### 13.1 Date of Implementation

13.1.1 These instructions, listed under DOI No 13, will apply from the following date: 27th November 1985.

#### 13.2 Documentation Procedure

13.2.1 All GA/Assy/SA drawings for rocket motor formers and dies will include the following notes:

- (i) Serial number and date of manufacture to be marked where shown thus: †
- (ii) Serial number to be obtained from R & DC (WA) Project/Design Office.

An additional note defining character height and marking method will also be included.

13.2.2 Serial numbers will be allocated by a member of the Project/Design Office in response to a request by the manufacturer/inspector of a former or die produced from a R & D C (WA) drawing. Such requests must include the following data:

DRAWING NUMBER, ISSUE, REQUESTED BY, WHERE MANUFACTURED and DATE OF MANUFACTURE.

The recipient of the request will use the drawing number to obtain the project title then check the index of the Former and Die Documentation Book for an entry against that project.

13.2.3 If the project title does not appear in the index, a new serial number page will be allocated and headed and the project name and page number will be added to the index in black or blue ink. The new serial number will comprise an abbreviated form of the project title and a numerical suffix starting at 1. The Design Engineer will be informed of all proposed new serial numbers before allocation.

13.2.4 When the project title does appear in the index, the page containing the associated serial number entries will be located and the data supplied by the requestor will be entered in black or blue ink against the next consecutive serial number. The serial number will then be communicated to the requestor for marking on the Former or Die.

13.3 Modifications to Existing Formers and Dies

13.3.1 All Formers and Dies manufactured from R & DC (WA) drawings will retain their original serial numbers regardless of any modifications which take place after the initial registration.

13.3.2 It is the responsibility of the manufacturer/inspector carrying out a modification to a Former or Die to inform the R & DC (WA) Project/Design Office, at the time of modification, of the following data:

EXISTING SERIAL NUMBER, NEW DRAWING NUMBER, NEW ISSUE, REQUESTED BY, WHERE MODIFIED and DATE OF MODIFICATION.

The recipient of this data will strike through the original entry in the Former and Die Documentation Book against the serial number quoted and add the words 'See Update' to the 'remarks' column. The revised data will then be entered in red ink immediately below the last allocated serial number on the appropriate page of the Former and Die Documentation Book.

DOI No 13  
ISSUE 1 27.11.85

Signed:

A handwritten signature in cursive script, appearing to read 'M. Bentley', written in dark ink.





USED ON.

SECURITY CLASSIFICATION

U

ITEM	IDENTIFICATION/ DRAWING No.	TITLE/NSN	No.OFF	REMARKS
1	P8793-1	BODY	1	
2	P8793-2	BASE	1	
3	P8794	WELDMENT	1	
4	P8793-3	AXLE	2	
5	P8793-4	STRAP	4	
6	P8795	BONDMENT	1	
7	P8793-5	COLLAR	4	
8	P8831	COATING DETAIL	1	
9				
10				
11	N.A	CYLINDER, AIR, DOUBLE ACTING, Ø32 BORE x 250 STROKE - TYPE 3SS-32 D	1	MAXAM LTD.
12	N.A	CLEVIS, FORK, STEEL, M8 - TYPE C08M	2	MAXAM LTD.
13				
14	BS 4518	RING, TOROIDAL SEALING, NITRILE - (73 I.R.H.D) 0316-24	2	
15				

B	2.11.82	15											
A	1.8.82												
ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.		
DRAWN	CONTRACTOR												
L.J.P													
CHECKED	CONTRACTORS DRG. No.												
DC													
APPROVED	RO EXPLOSIVES DIVISION												
A.D.	WALTHAM ABBEY												
TITLE	SECTION					BLDG		ITEM LIST No.					
WHAT IS IT FOR/ON							LP8793						
WHAT IS IT													
												A 4	
												2 SHEETS / SHEET 1	

3756-783

FIG 2 SHEET 1 LAYOUT OF ITEM LIST (SEE 3.5.1)

USED ON

SECURITY CLASSIFICATION

U

ITEM	IDENTIFICATION/ DRAWING No.	TITLE/NSN	No.OFF	REMARKS
16	BS 3692	SCREW, SET, HEX HD, STEEL, GRADE 8.8 M8 x 25 LG.	8	
17	BS 4183	SCREW, M/C SLOTTED PAN HD, STAINLESS STEEL, M6 x 20 LG.	12	
18				
19	BS 3692	NUT, FULL, STEEL, M8	8	
20				
21	BS 4464	WASHER, SPRING, SINGLE COIL, SQUARE SECTION, STEEL, M8	16	
22	BS 4320	WASHER, PLAIN, STAINLESS STEEL, FORM 'A', M6	12	
23				
24	AFS 1206J	THREAD LOCKING COMPOUND - TYPE 222.	AS REQ'D UK	LOCTITE

A 18-82											
ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.
DRAWN		CONTRACTOR									
L.J.P											
CHECKED		CONTRACTORS DRG. No.									
DC											
APPROVED		RO EXPLOSIVES DIVISION									
A.D.		WALTHAM ABBEY									
TITLE SECTION						BLDG					
WHAT IS IT FOR/ON						LP8793					
WHAT IS IT											

SHEETS / SHEET 2

3756-783

FIG 2 SHEET 2 LAYOUT OF ITEM LIST (SEE 3.5.1)



	8491
TANK SURGE	
BOMB LIQUID STRAND BURNING	
P2	NSSO

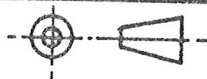
CARD 1

	8491
BOMB LIQUID STRAND BURNING	
TANK SURGE	
P2	NSSO

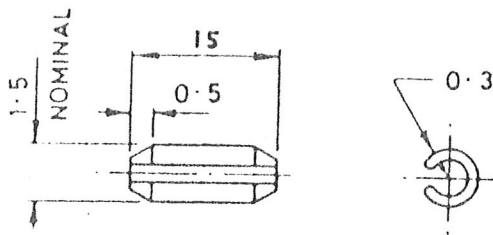
CARD 2

FIG 4 DRAWING CROSS-REFERENCE CARDS (SEE 2.2.5)





USED ON



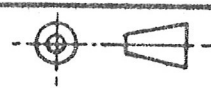
IN THE EVENT OF NATO CODIFICATION  
THE CODIFICATION AUTHORITY SHOULD  
OBTAIN ALL NECESSARY INFORMATION  
FROM THE MANUFACTURER

NOTE :-  
1 MAY BE OBTAINED  
FROM (INSERT NAME, ADDRESS  
OF SUPPLIER AND HIS REF NO)

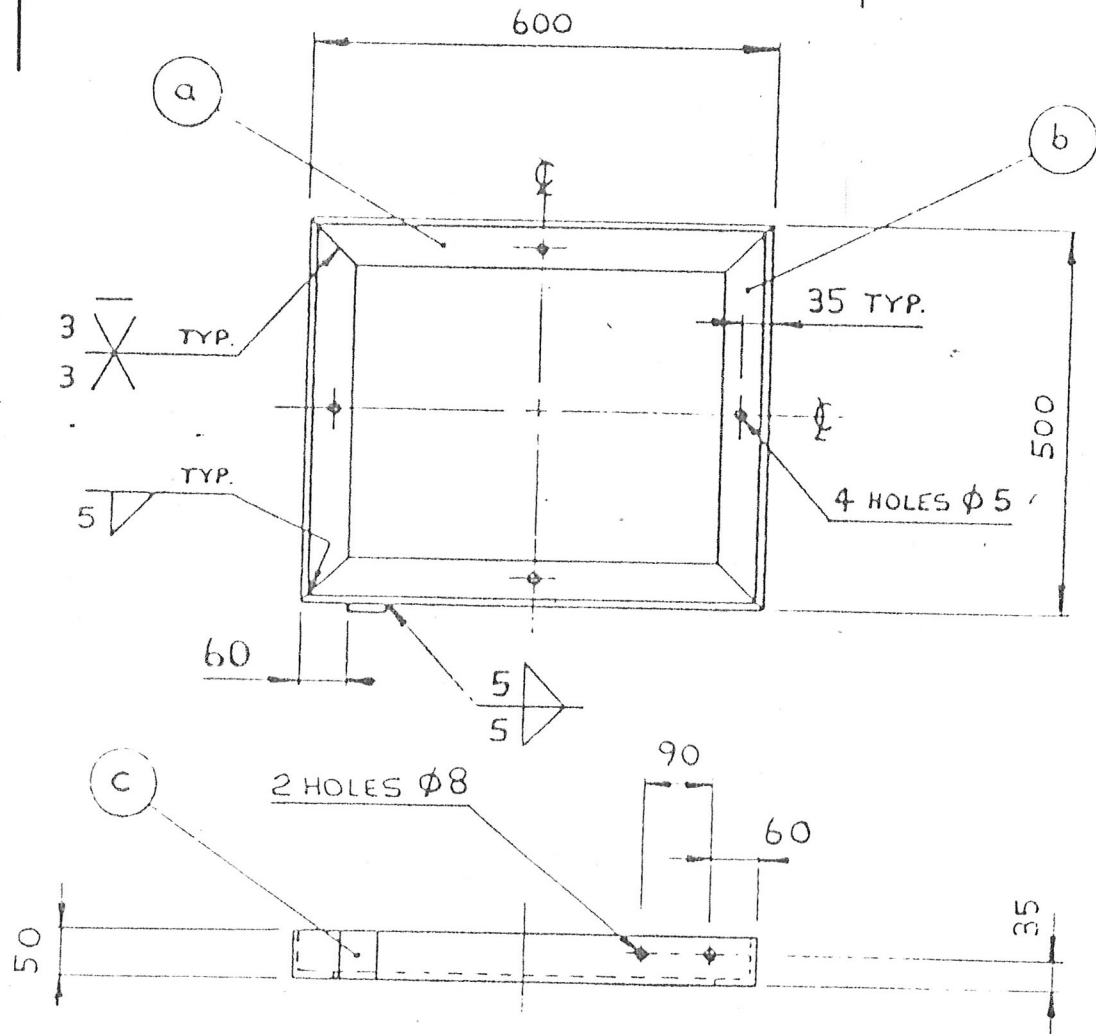
DRG.No. & ISSUE TO BE MARKED ON WHERE SHOWN THUS ⊗			CH. No.				
SCALE <b>5:1</b>	REMOVE ALL BURRS AND SHARP EDGES	TOLERANCE  UNLESS STATED OTHERWISE	ISSUE	<b>A</b>			
DRAWN <b>FB</b>	PROTECTIVE FINISH	SURFACE TEXTURE  UNLESS STATED OTHERWISE	DATE	<b>1-6-83</b>			
CHECKED	CONTRACTOR		MATERIAL				
APPROVED 	<b>RO EXPLOSIVES DIVISION WALTHAM ABBEY</b>		SECURITY CLASSIFICATION <b>L1</b>				
TITLE <b>OUTLINE DRAWING OF SPRING PIN</b>			DRAWING NUMBER <b>P8769-10</b>				
			SHEETS/SHEET				
			<b>A 4</b>				

3755-783

FIG 6 OUTLINE DRAWING (SEE 3.4.6)



USED ON



REF.	MATERIAL	Nº OFF
a	50 x 50 x 6 STEEL BS 4848 PT. 4.	2
b	50 x 50 x 6 STEEL BS 4848 PT. 4	2
c	50 x 40 x 8 STEEL BS 970 070 M20	1

DRG.No. & ISSUE TO BE MARKED ON WHERE SHOWN THUS ⊗

SCALE <b>1:10</b>	REMOVE ALL BURRS AND SHARP EDGES	TOLERANCE <b>± 1</b> UNLESS STATED OTHERWISE	CH. No.				
DRAWN <b>FB</b>	PROTECTIVE FINISH	SURFACE TEXTURE UNLESS STATED OTHERWISE	ISSUE <b>A</b>				
CHECKED	CONTRACTOR		DATE <b>1-8-82</b>				
APPROVED <b>AD</b>	<b>RO EXPLOSIVES DIVISION WALTHAM ABBEY</b>		MATERIAL <b>AS STATED</b>				
TITLE <b>FRAME</b>			SECURITY CLASSIFICATION <b>U</b>				
			DRAWING NUMBER <b>P8797-1</b>				
			SHEETS/SHEET				

FIG 7 SIMPLE FABRICATION DRAWING (SEE 3.4.7)

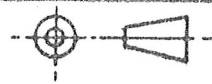




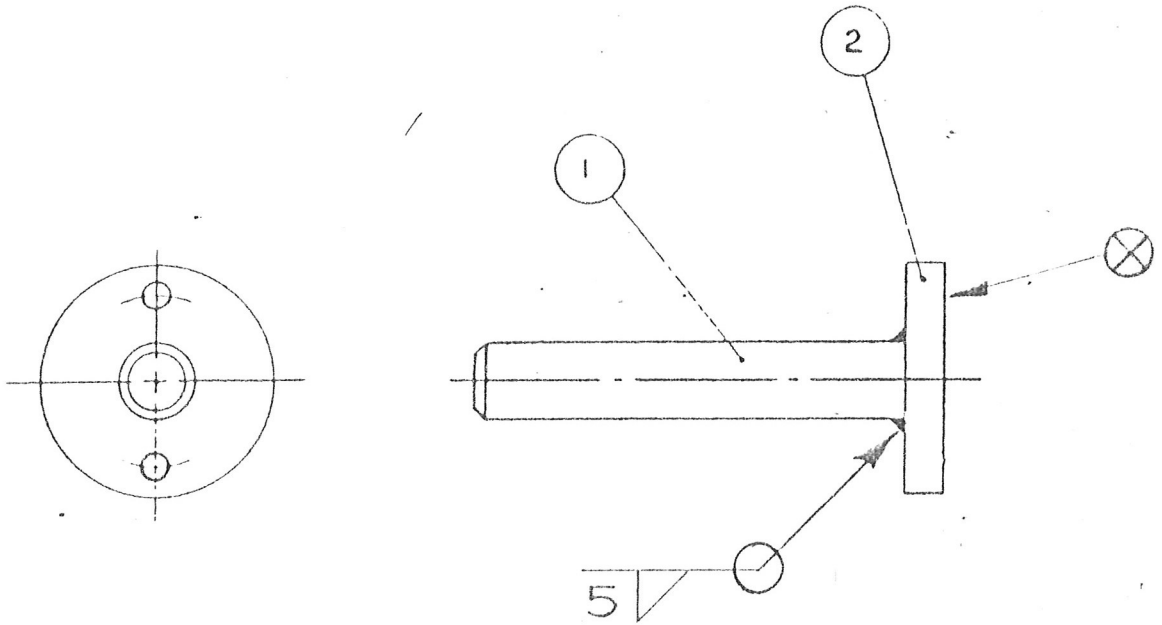


SECURITY CLASSIFICATION U

3rd ANGLE PROJECTION  
DIMENSIONS IN MILLIMETRES



USED ON



WELDING SYMBOL TO BS499 PT.2

DRG.No. & ISSUE TO BE MARKED ON WHERE SHOWN THUS ⊗

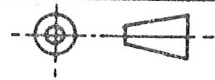
SCALE 1:2	REMOVE ALL BURRS AND SHARP EDGES	TOLERANCE UNLESS STATED OTHERWISE	CH. No.				
DRAWN FB	PROTECTIVE FINISH	SURFACE TEXTURE UNLESS STATED OTHERWISE	ISSUE	A			
CHECKED DC	CONTRACTOR		DATE	1-8-82			
APPROVED AD	RO EXPLOSIVES DIVISION WALTHAM ABBEY		MATERIAL				
TITLE HANDLE.			SECURITY CLASSIFICATION U				
			DRAWING NUMBER P8998				
			SHEETS/SHEET				
			A 4				

3755-783

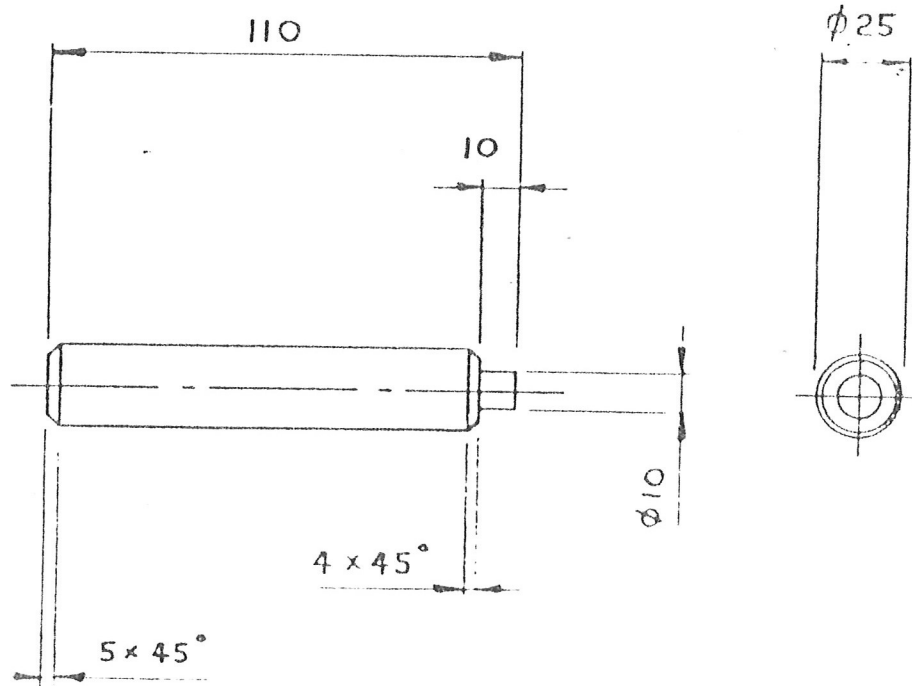
FIG 8 SHEET 3 COMPOUND DETAIL DRAWING (SEE 3.4.8)

SECURITY CLASSIFICATION U

3rd ANGLE PROJECTION  
DIMENSIONS IN MILLIMETRES



USED ON



~~DRG No. A ISSUE TO BE MARKED ON WHEN SHOWN THIS~~

SCALE 1:2		REMOVE ALL BURRS AND SHARP EDGES	TOLERANCE ±0.2 UNLESS STATED OTHERWISE	CH. No.				
DRAWN FB	PROTECTIVE FINISH		SURFACE TEXTURE 3.2 UNLESS STATED OTHERWISE	ISSUE A				
CHECKED DC	CONTRACTOR			DATE 1-8-82				
APPROVED AD	RO EXPLOSIVES DIVISION WALTHAM ABBEY			MATERIAL MILD STEEL BS970 070 M20				
TITLE PIN				SECURITY CLASSIFICATION U	DRAWING NUMBER P8998-1			
				SHEETS/SHEET				A 4

3755-783

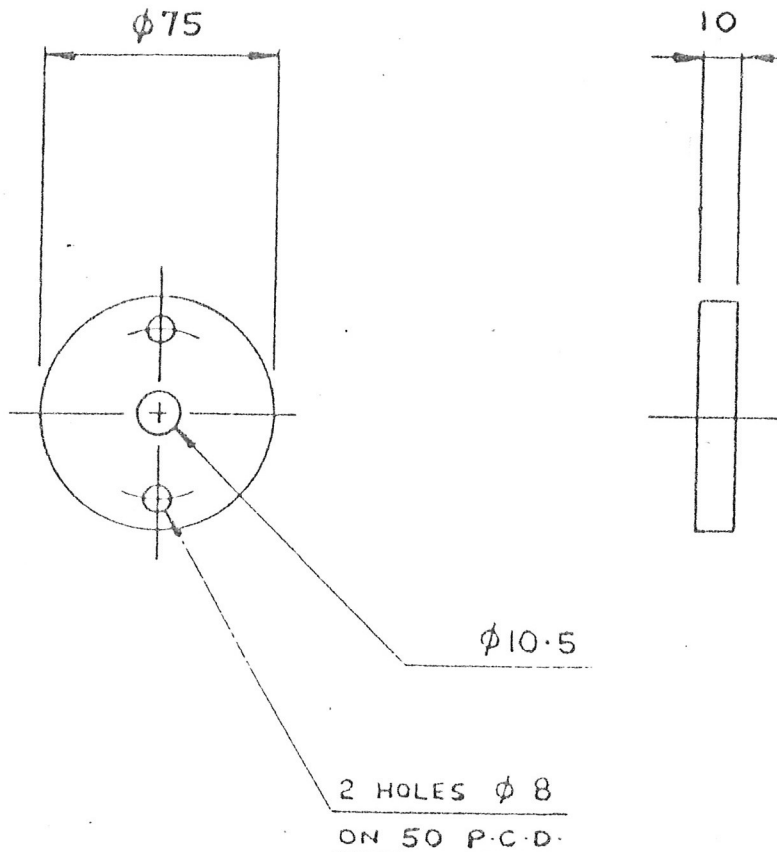
FIG 8 SHEET 4 COMPOUND DETAIL DRAWING (SEE 3.4.8)

SECURITY CLASSIFICATION **U**

3rd ANGLE PROJECTION  
DIMENSIONS IN MILLIMETRES



USED ON



~~DRG No. & ISSUE TO BE MARKED ON WHERE SHOWN THUS~~

SCALE <b>1:2</b>	REMOVE ALL BURRS AND SHARP EDGES	TOLERANCE <b><math>\pm 0.2</math></b> UNLESS STATED OTHERWISE	CH. No.				
DRAWN <b>FB</b>	PROTECTIVE FINISH	SURFACE TEXTURE <b>3.2</b> UNLESS STATED OTHERWISE	ISSUE	<b>A</b>			
CHECKED <b>DC</b>	CONTRACTOR		DATE	<b>1.8.82</b>			
APPROVED <b>AD</b>	<b>RO EXPLOSIVES DIVISION WALTHAM ABBEY</b>		MATERIAL <b>MILD STEEL BS970 070 M20</b>				
TITLE	<b>BASE</b>		SECURITY CLASSIFICATION <b>U</b>				
			DRAWING NUMBER <b>P8998-2</b>				
			SHEETS/SHEET				
			<b>A 4</b>				

3755-783

FIG 8 SHEET 5 COMPOUND DETAIL DRAWING (SEE 3.4.8)



USED ON

SECURITY CLASSIFICATION U

ITEM	IDENTIFICATION/ DRAWING No.	TITLE/NSN	No.OFF	REMARKS
1	P8898	PANEL	1	
5		RIVET BUSH (GIVE ALL NECESSARY INFORMATION)	4	
6	DEF STAN. 59-40 (PART 2) SECT 2/1	TERMINALS, POST TP/14/8 (GIVE ALL NECESSARY INFORMATION)	6	
7	DEF-32-A	VARNISH, (GIVE ALL NECESSARY INFORMATION)	AS REQD	

ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.	ISSUE	DATE	CHANGE No.
A	1-8-82										
DRAWN		CONTRACTOR									
FB											
CHECKED		CONTRACTORS DRG. No.									
APPROVED		RO EXPLOSIVES DIVISION		SECURITY CLASSIFICATION		U					
AD		WALTHAM ABBEY		ITEM LIST No.		LP8898					
TITLE		PANEL									
											A
											4
											SHEETS / SHEET

3756-783

FIG 9 SHEET 2 COMPLEX FABRICATION DRAWING (SEE 3.4.8)

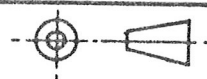




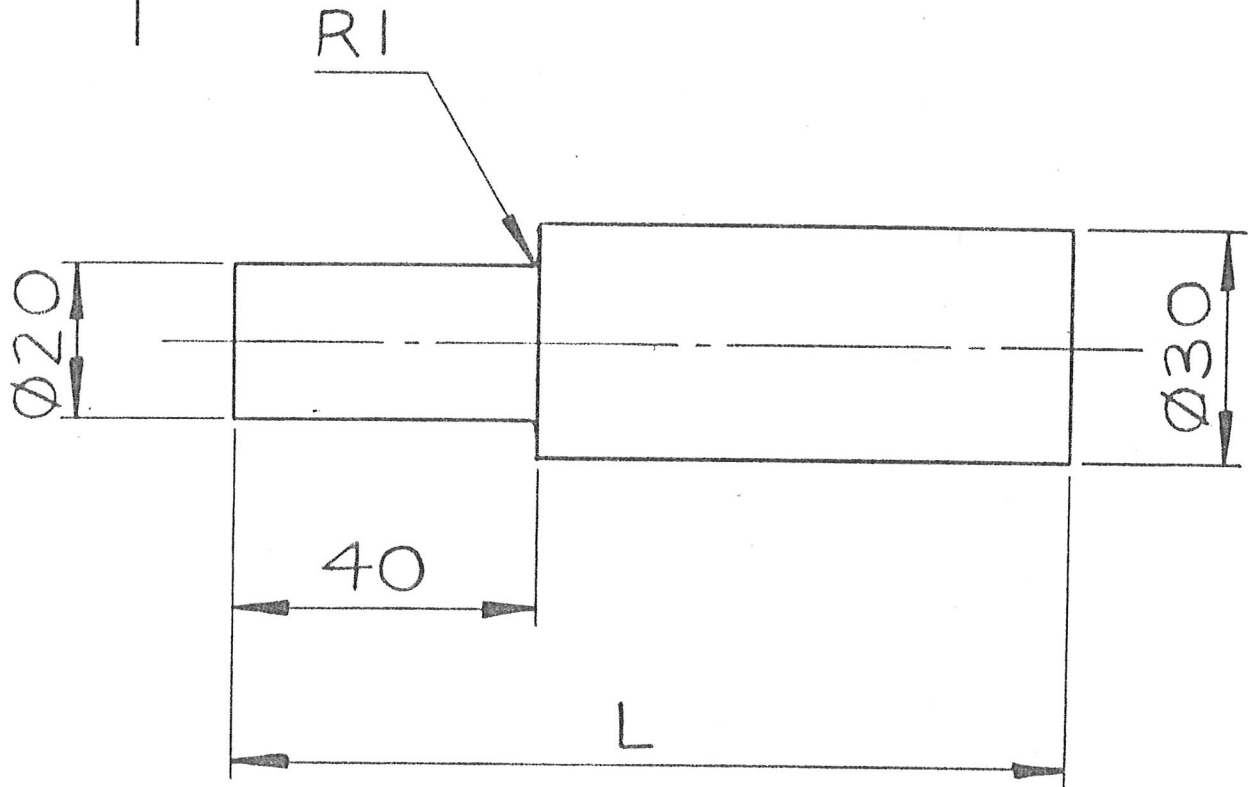
SECURITY CLASSIFICATION

U

3rd ANGLE PROJECTION  
DIMENSIONS IN MILLIMETRES



USED ON



P8794-1/3	B	135
P8794-1/2	A	120
P8794-1/1	C	115
DRG. N <sup>o</sup>	ISSUE	DIM 'L'

DRG.No. & ISSUE TO BE MARKED ON WHERE SHOWN THUS ⊗

SCALE 1:1	REMOVE ALL BURRS AND SHARP EDGES	TOLERANCE $\pm 0.2$ UNLESS STATED OTHERWISE	CH. No.	087	127	
DRAWN LJP	PROTECTIVE FINISH	SURFACE TEXTURE 1.6 UNLESS STATED OTHERWISE	ISSUE	A	B	C
CHECKED <i>DR</i>	CONTRACTOR		DATE	1-8-83	12-11-83	3-5-85
APPROVED A.D.	RO EXPLOSIVES DIVISION WALTHAM ABBEY		MATERIAL MILD STEEL B5 970 070M20			
TITLE SHAFT			SECURITY CLASSIFICATION U			
			DRAWING NUMBER P8794-1			

A  
4

3755-783

FIG 10 TABULAR DRAWING (SEE 3.4.9)

ROF EXPLOSIVES DIVISION

WA/S565

WALTHAM ABBEY

To Design Office

Please supply the following prints:

Drawing Number or title	No Off	Remarks

FOR DESIGN OFFICE USE ONLY

Authorised by \_\_\_\_\_

Date issued \_\_\_\_\_

Requested by \_\_\_\_\_

Section \_\_\_\_\_

Date \_\_\_\_\_

FIG 11 PRINT REQUEST FORM  
(SEE 4.2.1)

Propellants, Explosives & Rocket Motor Establishment  
Waltham Abbey, Essex.

PDN No. 0951

Date.....

To:.....

.....

Enclosed herewith ( ) prints of drawings listed below

Drawing	Iss	Drawing	Iss	Drawing	Iss

SECTION A

To: Mr.....

No: .....

Date.....

Please sign and return to DO Print Room,  
PERME, Waltham Abbey

Drawings received. All previous issue(s) has/have been destroyed.

Signature.....

PERME Form 93

SECTION B

WAP L2910 0588133/9103346 100 Bks. 7/79 Grp. 712

RECEIPT/DESTRUCTION CERTIFICATE REMINDER

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

RECEIPT/DESTRUCTION CERTIFICATE NO. \_\_\_\_\_

To comply with the requirements of Defence Standard 05-21 it is necessary for a Receipt/Destruction Certificate to be held by the PERME Design Office for every drawing and/or specification issued by them

The Certificate indicated above was issued to you on \_\_\_\_\_ covering the drawings and/or specifications detailed below. To date, the signed Certificate has not been received back from you. Failure to return the Certificate, duly signed, will necessitate escalation of the omission to Superintendent level as per the Quality Manual. Would you therefore please return the signed Certificate to allow completion of the drawing/specification issuing procedure.

Drawings/Specifications covered by Certificate No. \_\_\_\_\_ :-

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date: \_\_\_\_\_

Signed: \_\_\_\_\_

FIG 13 PDM RECEIPT REMINDER  
(SEE 4.3.4)



FIG 15 O.C. RECORD CARD, FORMAL SYSTEM (SEE 7.3.2)

CARD 1			
O.C. NO 2005			
WESTCOTT		PRINT:	P
NUTHATCH		M/F:	M
209 MM MOTOR ASSEMBLY		NEG:	N
FOR ISSUE OF DRAWING SEE CROSS REF CARD			
TITLE	DRG NO	O.C. NO	
209MM, MOTOR ASSY	RG19602	2005	P
209MM, TUBE ASSY	RG19601	2005/01	P
FOWARD END	RG19548	2005/02	P
JOINT RING (FWD)	RG19546	2005/03	P
THRUST RING	RG19563	2005/04	P
REAR END ASSY	RG19537	2005/05	P
ADAPTOR	RG19564	2005/06	P
CHARGE BREAKER	RG19590	2005/07	P

FIG 16 O.C CONTINUATION CARD, FORMAL SYSTEM (SEE 7.3.2)

CARD 2			
OC NO 2005			
TITLE	DRG NO	O.C. NO	
RET. DISC	RG19549	2005/08	P
BREAKER RETAINER	RG19550	2005/09	P
RETAINING NUT	RG19551	2005/10	P
SEALING CAP	RG19552	2005/11	P
JOINT RING	RG19544	2005/12	P
TUBE	RG19547	2005/13	P
TUBE (REAR)	RG19562	2005/14	P
MOTOR REAR	RG19453	2005/15	P
MOTOR FORWARD	RG19592	2005/16	P
REAR END AS LINED & 3 <sup>RD</sup> STAGE M/CG	RG19538	2005/17	P
REAR END AS LINED & 2 <sup>ND</sup> STAGE M/CG	RG19539	2005/18	P
REAR END 1 <sup>ST</sup> STAGE M/CG	RG19540	2005/19	P
THROAT INSERT	RG19545	2005/20	P
INSERT	RG19685	2005/21	P
REAR END 2 <sup>ND</sup> STAGE M/CG	RG19695	2005/22	P
REAR END ASSY (ASBESTOS LINING)	RG19697	2005/23	P

RG19601	PRINT	M/F	NEG	ISSUE	DATE REC'D
OC2005/01 NUTHATCH	✓			B	21-10-83

CARD 1

RG19548	PRINT	M/F	NEG	ISSUE	DATE REC'D
OC2005/02 NUTHATCH	✓			C	21-10-83

CARD 2

FIG 17 O.C CROSS-REFERENCE CARD, FORMAL SYSTEM (SEE 7.3.3)



CARD 1

O.C. N<sup>o</sup> 1659

WILLIAM BOULTON LTD

TWO TIER PUGMILL

DATE REC'D 26-3-82

PRINT: P  
M/F: M  
NEG: N

TITLE	DRG N <sup>o</sup>	ISSUE	O.C. N <sup>o</sup>	
GEN. ARRGT	102-6-12-5-1	D	1659/01	M
PARTS LIST (3 SHEETS) SHT. 1.	102-6-12-5-2	14-7-82	1659/02/1	M
" " " " 2.	102-6-12-5-3	"	1659/02/2	M
" " " " 3.	"	"	1659/02/3	
BOTTOM BARREL DETAIL	102-6-12-5-3	A	1659/03	M
TOP HALF VACUUM CHAMBER	102-6-12-5-4	A	1659/04	NA
B'M BEARING HOUSING	102-6-12-5-5	24-11-81	1659/05	M
BRG. HOUSING & CAP	102-6-12-5-6	21-12-81	1659/06	M
SEAL HOUSING	102-6-12-5-7	25-11-81	1659/07	M
TOP BEARING HOUSING	102-6-12-5-8	1-2-81	1659/08	M

FIG 19 O.C CONTINUATION CARD, INFORMAL SYSTEM (SEE 7.4.2)

CARD 2				
O.C. N° 1659				
TITLE	DRG N°	ISSUE	O.C. N°	
FEED HOPPER BARREL	102-6-12-5-9	1-12-81	1659/09	M
BOTTOM SHEET	102-6-12-5-10	8-12-81	1659/10	M
TOP SHEET	102-6-12-5-11	15-12-81	1659/11	M
DETAILS	102-6-12-5-12	A	1659/12	M
JACKET PTS.	102-6-12-5-13	16-12-81	1659/13	M
MOTOR STAND/TIE RODS	102-6-12-5-14	2-12-81	1659/14	M
BED PLATE & DETAILS	102-6-12-5-15	15-12-81	1659/15	M
TACHO PICK UP ARRGT	102-6-12-5-16	21-1-82	1659/16	M
SIGHT GLASS KEEPER PLATE	102-6-12-5-17	17-12-81	1659/17	M
JACKET PLATE JOINTS	102-6-12-5-18	6-1-82	1659/18	M
VAC. CHAMBER WINDOWS	102-6-12-5-19	21-1-82	1659/19	M
SPEED & TORQUE CONTS.	102-6-12-5-20	6-5-82	1659/20	M
SPEED INDICATOR BOX	102-6-12-5-21	26-1-82	1659/21	M
CONTROL ROOM PANEL	102-6-12-5-22	15-3-82	1659/22	M
ELECT. CIRCUIT DIAG.	102-6-12-5-23	20-4-82	1659/23	M
HYDR. CIRCUIT DIAG.	102-6-12-5-24	15-7-82	1659/24	M

# ROYALORDNANCE

RESEARCH AND DEVELOPMENT CENTRE

SECURITY CLASSIFICATION:  
**DESIGN CHANGE PROPOSAL FORM**

PROJECT		MOTOR* UNIT*		ITEM/SUB-ASSEMBLY		PROPOSAL NUMBER SHT OF		SPONSOR	
FEATURES AFFECTED		YES	NO	* Delete as appropriate TITLE OF MODIFICATION		CHANGE COSTS (EXCLUDING VAT) WHERE APPLICABLE			
PERFORMANCE				DESCRIPTION OF MODIFICATION		1. Development			
PROPELLANT/COMPOSITION						Preparation .....			
MATERIAL SPECIFICATION				ORIGIN OF MODIFICATION		Trial Installation .....			
LEVEL TWO DOCUMENTS						Static Tests .....			
LEVEL ONE SPECIFICATIONS				REASON FOR MODIFICATION		Dynamic Tests .....			
INTERFACE DRAWING						Total £			
INTERCHANGEABILITY				CONSEQUENTIAL (GROUP B) MODIFICATION REQUIRED TO:		NB. Costs in excess of this figure are not to be incurred without CCP authority.			
LEVEL TWO DRAWINGS						2. Manufacturing			
LEVEL ONE DRAWINGS				REASON FOR MODIFICATION		Estimated change in UMC .....			
CHARGE DESIGN						Estimated delay in weeks:			
RETROSPECTIVE ACTION				REASON FOR MODIFICATION		Serial No ..... Delay .....			
SAFETY						Scrap Cost .....off £.....			
TOOLING				CONSEQUENTIAL (GROUP B) MODIFICATION REQUIRED TO:		Total Development Programme Cost £			
PACKAGING						3. Production			
MASS				CONSEQUENTIAL (GROUP B) MODIFICATION REQUIRED TO:		Estimated change in UPC .....			
PUBLICATIONS						Estimated delay to .....			
SALVAGE ACTION				CONSEQUENTIAL (GROUP B) MODIFICATION REQUIRED TO:		.....Weeks			
STRESS ANALYSIS						Estimated Scrap Cost £			
ISSUE/DATE	A		B		C		4. Tools, Test and Measuring Equipmen		
DESIGN OFFICE APPROVAL							Estimated Costs .....		
PROJECT OFFICER/MANAGER APPROVAL							Total Production Programme Cost £		
SAFETY APPROVAL							OTHER DAs AFFECTED		
QUALITY MANAGER APPROVAL							DATE OF IMPLEMENTATION/POE		
PRODUCTION AUTHORITY APPROVAL							MODIFICATION/ AMENDMENT No.		
CCP RATIFICATION									

FIG 20 CHANGE PROPOSAL FORM 212 (SEE 10-3-1)

TO

# DESIGN OFFICE INFORMATION

SHEET NO.

## PERME WALTHAM ABBEY

CE JOB NO.  
PRIORITY

TITLE OF JOB

HEREWITH: MATERIALS (SPECIAL)  
ADVANCE MFG INF  
COMPLETE MFG INF  
MODIFIED MFG INF

G/ARR DRG

No. OFF	DESCRIPTION	DRG OR REF NO.

ISSUED BY

DATE	SIGNED	SENIOR DRAUGHTSMAN
------	--------	--------------------

DATE	SIGNED	CHIEF ENGINEER
------	--------	----------------

PERME FORM 88

Bas 41974/BM7726 2500 11/7

FIG 22 SPECIFICATION RECORD CARD (SEE 12.3.1)

1016: PROPELLANT SPEC. (LIVE)			CARD No	1
ISSUE C2				
DP 8584 SHT 2				
P 8584 SHT 1				
P 8584 SHT 2				
P 8584 SHT 3				
DP 8585				
DP 8786				
P 8786 SHT 1				
DP 8791				
P 8791 SHT 2				

UPDATING OF SPECIFICATIONS DATA SHEET

DRAWING No \_\_\_\_\_

SPEC/BS No	PART/ISSUE	INIT	RECORDED	INIT

DRAWING No \_\_\_\_\_

SPEC/BS No	PART/ISSUE	INIT	RECORDED	INIT

DRAWING No \_\_\_\_\_

SPEC/BS No	PART/ISSUE	INIT	RECORDED	INIT