

CENTRAL TOOLING DEPARTMENT

CT0101



COMPONENT SUPPLIERS

TOOLING CONTROL DOCUMENT

ISSUE 16
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COMPONENT SUPPLIERS

TOOL CONTROL DOCUMENT

APPROVED BY:



.....
G.Miller
Central Tooling Manager

PART ONE

PRODUCTION TOOLING PHILOSOPHY

All tooling to these requirements unless Part Two is specifically contracted.

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PART TWO

TOOLING CONTRACTORS TOOLING CONTROL DOCUMENT

PART THREE

APPENDICES TO PARTS ONE & TWO

Document Control

This Document is controlled and managed by AgustaWestland Limited (AW Ltd) Central Tooling (CT) Department and its status is controlled through its issue number. Any amendments will result in the complete document being re-issued with the next issue number assigned. Any requests for amendment should be made in writing to the Central Tooling Department, Box 12, Westland Helicopters Ltd, Yeovil, Somerset, BA20 2YB.

Access to documents or manuals relevant to Suppliers are available via the following address: **www.agustawestland.com** and following path **Supplier Service, Supplier Information, Tooling**.

This document supersedes CT1096, CT0696 and EA02X001W.

PART ONE

1. SCOPE AND AUTHORITY

1.1 Introduction

This is the definitive document to qualify the Terms and Conditions to be conformed to by Suppliers producing tooling to support AW Ltd contracts.

1.2 Suppliers

The document sets out the tooling policies and requirements to be followed by Component Suppliers participating in the manufacture of tooling and/or use of tooling supplied to support the production of aircraft parts, components and assemblies. It does not cover, nor is it a requirement for standard tools, consumable tools, e.g. drills, reamers, cutters, etc. and equipment, e.g. spanners, micrometers, machine tools, etc. However, any validation, inspection, measurement or test equipment must be controlled within a calibration regime.

1.3 Sub Tier Suppliers

The supplier shall ensure that sub tier suppliers are compliant and comply with this document.

1.4 Implementation

These policies and requirements form part of the contract to supply tooling/equipment to AW Ltd. The requirements of this document shall be deemed to be accepted and complied with by the Supplier where the Contract invokes its implementation. Acceptance and conformance is instigated by the Supplier signing and returning the Contract (Purchase Order) acknowledgement copy to AW Ltd.

2. PURPOSE

2.1 The purpose of this document is to ensure that:

2.1.1 A common policy for tooling is adopted by all suppliers who will produce/procure tooling to manufacture and produce components.

2.1.2 Compliant products can be produced to a conforming and repeatable standard from tooling being provisioned by the supplier and/or tooling supplied for the contract.

2.1.3 The standard of the tooling meets the specification for achieving the contract dependent upon contractual quantities/schedules as qualified by the following sections, where relevant:

- (i) Volume manufacture (Part One)
- (ii) Low volume manufacture (Part Two)

(ii) Appendices (Part Three)

2.1.4 Ownership of the tooling, records, maintenance, identification, storage and control is defined and complied with.

3. GENERAL REQUIREMENTS

3.1 Tooling provisioned by the Contractor for use to discharge the product contract shall achieve conforming products to their respective specifications as follows:

3.1.1 All tooling shall be of a quality, accuracy and durability to allow manufacture of the required quantity of parts and assemblies to the specified production rate as identified by the contract.

3.1.2 Production tooling should be designed to be sufficiently robust and rigid in construction to avoid distortion and maintain dimensional stability and be compatible with the manufacturing processes to which the tooling will be subjected.

3.1.3 All tooling or equipment including duplicates, shall be designed and/or specified to achieve an output of a minimum of 2.5 Aircraft sets of components per calendar month, unless otherwise contracted. The tooling/equipment shall also be required to have a minimum life of 250 Aircraft sets. Where some types of tooling/equipment by virtue of the process or activity cannot sustain this level, then the quantities and costs shall be identified by the supplier and agreed by AW Ltd prior to tooling order placement.

3.1.4 The accuracy and repeatability of the tooling shall achieve the Engineering and contract requirements along with the ability to meet Interchangeability requirements where specified. A re-calibration programme for re-certification of tooling controlling interchangeable features shall be established and maintained and records of the calibration shall be held for three years.

3.1.5 The Supplier shall use a AW Ltd CT approved Tooling manufacturer where tooling is to be sub contracted for manufacture. The Supplier may request Central Tooling to approve a Tooling Supplier of their choice where a specific process is required that is not covered by existing Approved Tooling Companies. The Supplier may also request Approval of a tooling manufacturer where they are the Suppliers preferred option, by submitting Company data / approvals / accreditations. This would be reviewed and accepted/rejected by CT.

3.2 Tooling supplied as free issue shall be appraised as follows:

3.2.1 The receiving Contractor shall be responsible to make sure the tooling is compatible to the process and produces correct components to the Engineering Design or specification. The tooling shall be appraised for conformance to paragraph 3.1 and where non-conforming, then the Contractor shall have recourse in writing to AW Ltd to adjudicate and agree the acceptance criteria.

4. COMMERCIAL REQUIREMENTS

- 4.1 The supplier shall identify to AW Ltd the tooling necessary to discharge the Aircraft Component manufacturing requirements as a Tool Quotation. Below are the requirements for all Tooling Quotations:
- Quotations must be on company headed paper
 - Quotations must have a reference number and be dated
 - Quotations must identify a package description & relevant AW Ltd p/o number
 - Quotations must be signed by a representative of the company
 - The AW Ltd part number for each tool must be identified
 - AW Ltd tool number and/or description of each tool being quoted
 - Individual cost for each tool being quoted
 - Individual lead time for manufacture of each tool being quoted
 - Individual design cost for each tool if applicable
 - Quotation must include if tool is New, or Modification / Refurb to existing tool
- 4.2 Where an individual tool exceeds £2,500 CT reserve the right to request a competitive Tender.
- 4.3 For a contract which may have an extended duration to completion, the supplier may request that any subsequent Tooling Order raised to perform the work should be prepared with several line items to reflect the various activities but must have tangible verifiable milestones. The supplier can then invoice progressively for each line item as the contract is discharged.
- 4.4 Upon acceptance of the supply of any tooling or equipment from AW Ltd, the supplier shall review and confirm its compliance for suitability, conformance and condition and will be responsible for the quality of parts produced from such tooling/equipment.
- 4.5 The supplier will be responsible for maintenance, refurbishment, calibration, storage and reconditioning of the tooling, at no additional cost to AW Ltd.
- 4.6 AW Ltd reserves the right to carry out audits and progress status checks at the supplier's premises on all tooling/equipment and gauges provisioned under the contract. (see section 18 Audits) AW Ltd shall give fourteen (14) days notice to the supplier prior to an audit. For First Article Inspection Audits see checklist example in Appendix 2.
- 4.7 It may be necessary for suppliers to report at agreed intervals achievement against an agreed programme. This should be in the form of a Microsoft Project Plan. For milestone payments evidence of achievement (C of C and/or audit) will be required.

- 4.8 On completion of the tooling contract, milestone activity or line item, a Certificate of Conformity shall be raised and accompanied (unless otherwise stated on the individual item text on the purchase order) with a digital photograph of each tool. These shall be supplied via email to central_tooling@agustawestland.com. Each photo should be in a PDF format and be identified with the relevant AW Ltd Part No./Tool No. (eg WG1593-0328-041 W105.pdf). This will form part of the C of C process. The photo must clearly show the identity of the tooling manufactured, in accordance with the tooling purchase order item text.



- 4.9 The Certificate of Conformity on company headed paper shall contain :-
- The Purchase Order Number
 - The Purchase Order line item
 - The AW Ltd Part Number
 - The AW Ltd Tool Number
 - A statement to certify that all requirements of the Contract (Tool Purchase Order) and this Document are complied with.
 - Relevant authorised signature (electronic signature will be acceptable)
- 4.10 The Certificate of Conformity shall be sent to Central Tooling electronically central_tooling@agustawestland.com or posted to AgustaWestland, Central Tooling, Lysander Road, Yeovil, Somerset, BA20 2YB, Box 12. Upon receipt of the Certificate of Conformity and relevant tooling photograph, payment will be authorised (subject to audit or other evidence as may be required) where upon ownership title of the tooling shall pass to AW Ltd.
- 4.11 Contracts placed on your Company shall invoke the AW Ltd Commercial Purchasing Business Terms & Conditions document WA3582. Refer to Section 17 for specific Terms and Conditions.

5. **LIAISON**

- 5.1 The supplier will liaise with AW Ltd CT Department personnel prior to the commencement of a tool design/procurement programme, to confirm the requirements for interchangeability control and to ensure maximum compatibility between AW Ltd and suppliers of tool design and manufacturing standards is achieved.
- 5.2 Advice may be sought/provided as appropriate of AW Ltd approved tooling suppliers where this may assist with compliance to AW Ltd procedures and processes.

6. **RECORDS**

- 6.1 The supplier shall maintain a separate electronic register on a PC database flat file, e.g. Microsoft Excel, of all tools, jigs, fixtures, gauges, rigs, etc. provided/procured for the production of parts to which the contract relates including all sub tier suppliers who may retain tooling.
- 6.2 This register shall include particulars of any additions or alterations made to the jigs, tools etc. after the initial provision.
- 6.3 Such registers shall clearly show that tooling listed in the register and associated tooling designs are owned by AW Ltd and are held at the disposal of AW Ltd including tooling funded through amortisation. The register must also include tooling which are specific to AW Ltd contracts and are required to manufacture AW Ltd components but have been funded by the supplier.
- 6.4 The supplier shall not transfer any jig, tools, etc. without AW Ltd written permission and any such transfer must be properly recorded. Where tooling is required for transfer by AW Ltd this must be co-ordinated through AW Ltd CT Department.
- 6.5 Records of tooling despatch documentation must be held and maintained by the supplier.
- 6.6 It is mandatory for the register to record:
- a) AW Ltd Part Number / Tool Number e.g. WG1412-1234-041 / W95
 - b) Issue Status (to relate to Product identity or revision)
 - c) Product Description
 - d) Tool Location (including sub-tier locations)
 - e) Ownership (AW Ltd or Supplier owned)
 - f) AW Ltd Tooling Purchase Order Number
- 6.7 It is desirable for the register to record:
- g) Date of Manufacture
 - h) Value
- 6.8 The supplier shall, within 28 days of the request by AW Ltd, supply an electronic copy of the register of the tooling/equipment.

7. MAINTENANCE

- 7.1 All tooling produced, supplied or managed in compliance of this document shall be maintained in accordance with sections 11, 12 and 13 of this document until such time as AW Ltd request their return or issue disposal instructions. This shall include appropriate control, insurance and maintenance as required to keep the tooling in a production readiness state.
- 7.2 All original tooling drawings held by the supplier, including those supplied by AW Ltd, shall be maintained by the supplier at their cost, in good condition and kept up to date.
- 7.3 Tooling shall be used by the supplier only in connection with the contract for AW Ltd's purpose only.
- 7.4 The supplier shall indemnify AW Ltd against any loss of or damage to any such tooling which occurs, during the period commencing from the time when the supplier takes possession of the tooling and ending when the tooling is being returned to the destination specified by AW Ltd.

8. DISPOSAL

- 8.1 The supplier is not permitted by any means to dispose of any AW Ltd owned tooling, tool designs or specifications in their possession without prior written authority from Central Tooling, AW Ltd.

9. TOOL RETURNS

- 9.1 Where request are made for AW Jigs, Tools and Test equipment to be returned back to AW Ltd Yeovil which had originally been procured against an AW Tooling contract then it is the suppliers responsibility to return the requested tooling asset at zero cost to AW Ltd.
- 9.2 Where tooling has been supplied direct from AW Ltd to the supplier free issue, then it is AW Ltd responsibility to cover the transport cost for return.
- 9.3 All AW Tool returns in all instances must be accompanied with the appropriate returns paperwork and must clearly list each individual AW Part /Tool Number of the tool / tooling being returned.

Delivery address for all AW Tooling to be returned is:
Agusta Westland
Jig & Tool Receiving Wharf
Building 200
Lysander road
Yeovil
Somerset
BA20 2YB

10. TOOL DESIGN

- 10.1 Unless tooling is being procured against a tooling standard or specification, the supplier should provide a tooling design on CAD, Catia, conventional drawing or sketch. Tooling such as main assembly/sub assembly fixtures, interchangeability media, acceptance/checking gauges and test/ validation equipment should all have a tooling design. These tooling designs, whether conventional, Catia or CAD, must normally be produced on AW Ltd format JIGA0 (see Appendix 1).
- 10.2 Where requested by AW Ltd, tooling designs, specifications, models, standards or sketches shall be provided to AW Ltd. For “non design” tooling, digital photographs shall be provided where requested.
- 10.3 The supplier’s Tooling Design format requires prior written approval by AW Ltd. In such cases the design shall always be clearly identified as owned by AW Ltd.
- 10.4 Changes to AW Ltd supplied tooling for which AW Ltd has design authority should be requested using the Tool Change Request Form (see Appendix 3).

11. TOOLING PHILOSOPHY

- 11.1 This section sets out the main criteria to be implemented when producing tooling. Specialist tooling may require specific conditions.

All tooling shall conform in principal with the Central Tooling Standards Manual CT0591 Volume 2 to a production standard (see Section 3).

11.2 Assembly Fixture

Major assembly fixtures are defined as those used for the assembly of other sub-assemblies and parts. They are considered to be jigs, which would generally be sited and attached to the floor.

Jig structure shall be of welded construction, using hollow steel box section, with pads at positions of attachments.

Jig structure shall be of robust and rigid construction to avoid distortion for dimensional stability.

The utilisation and maximum use of standard materials sections, aluminium tooling plate and standard jig parts (bushes, pins, clamps, etc.) being considered wherever practical.

Jigs shall be constructed around predetermined datum points and/or surfaces, with full utilisation of optical alignment equipment and interchangeability media.

Tooling in this category producing interchangeable products will be subject to periodic inspection/calibration and must be in compliance with an agreed schedule (annual

recommended) in accordance with ISO 9001.

11.3 Sub Assembly Tooling

Sub-assembly tools are defined as tools used for the assembly of a number of several detail parts, and are to be designed and to give repeatability of product to required tolerances.

The manufacturing criteria shall be the same as for Assembly Fixtures.

Nominated tooling in this category producing interchangeable products will be subject to periodic inspection/calibration, and must be in compliance with an agreed schedule (annual recommended) in accordance with ISO 9001.

11.4 Detail Tooling

10.4.1 Detail Tooling (Sheetmetal)

All detail tools are to be manufactured to a production standard, capability and durability. It is not expected that designs will be required for all tools as it is anticipated that a proportion of tooling will be made direct from component/full scale layout information or CAD/CATIA geometry.

11.4.2 Detail Tooling (Machining)

Where suitable, N.C. machines should be used with holding fixtures being considered to hold and locate the material. Where more than 1 spindle is used, separate fixtures shall be provided for each spindle.

11.4.3 Cutting Tools/Gauges

The supplier shall be responsible for the supply, procurement, maintenance and inspection of all gauges, standard tools and consumable tools at his expense.

(a) Standard

Standard cutting tools/gauges shall be procured and maintained by the supplier at his own expense.

(b) Special

Cutting tools/gauges are those which include features controlled by component drawing requirements, e.g. taper, profile, etc., but not corner radii which may readily be added to a standard tool. These may form part of the schedule of tooling but maintenance and replacement costs shall be at the supplier's expense.

11.5 Composite Tooling

11.5.1 Master Models/Splashes

AW Ltd shall be responsible for the manufacture and supply of all master models/splashes, which control interchangeable features unless otherwise specified.

Such master models and splashes will generally provide shape, cut-lines and hole positions, and will be fully certified by AW Ltd.

The supplier will be responsible for the quality of tools and resultant product produced from the media supplied by AW Ltd.

Tooling in this category will be subject to periodic inspection/calibration by AW Ltd unless otherwise specified in accordance with ISO 9001.

11.5.2 Moulds

For the construction of moulds, the material selection (glass, kevlar, carbon-fibre, metallic), utilisation and lay-up procedures with costs, durability and production quantities shall be the prime considerations.

Where components require to be produced from tooling in an Autoclave process then the tooling must hold a vacuum or allow for complete bagging.

Material selection must consider expansion/contraction characteristics of the component to be produced to ensure dimensional accuracy is achieved, within the appropriate environmental conditions.

For composite mould tools the lay-up procedure must place emphasis on ply orientation laminate consolidation with the achievement of a rigid structure (shape retention).

Nominated tooling in this category producing interchangeable products will be subject to periodic inspection/calibration and must be in compliance with an agreed schedule (annual recommended) in accordance with ISO 9001.

11.5.3 Drill and Trim/Rout Facility

Material utilisation for this type of facility will be greatly influenced by shape, size and complexity of component part.

For glass reinforced plastic (g.r.p.) tooling, a proven tooling resin system must be employed for the purpose of maintaining dimensional stability. Tooling location/lugs, matched across the tooling suite, must be a prime consideration in all cases.

Nominated tooling in this category producing interchangeable products will be

subject to periodic inspection/calibration and must be in compliance with an agreed schedule (annual recommended) in accordance with ISO 9001.

12. INTERCHANGEABILITY (ICY)

12.1 General Requirement

Generally, full interchangeability (ICY) is a requirement for any component or assembly, which is recognised as a spare or replacement item. Full ICY is only achieved when geometric and functional requirements are met. Geometric ICY is achieved when an item is designed and produced in such a way that it can be readily exchanged for another item without the need for select fit. Functional ICY is achieved when operational or performance characteristics are maintained on interchange.

Interchangeability control media shall be stored/transported in dedicated transport cases. Tooling either provided or made by the component supplier which controls interchangeable features shall be inspected/calibrated by the supplier (annual recommended) in accordance with ISO 9001 unless otherwise instructed.

12.2 Categorisation

Interchangeable items fall into two categories:-

11.2.1 Interchangeable

Those items which are designed to be changed during the life of an aircraft, i.e. gearboxes, engines, rotor blades, fairings etc.

11.2.2 Manufacturing Interchangeability

Those items not intended to be changed during the life of an aircraft, but for reasons of assembly/production or cost are manufactured to an interchangeable standard i.e. shelves, customer kits, panels etc.

12.3 Philosophy

The AW Ltd philosophy for producing an interchangeable item is to manufacture a set of tools for the item and its counterpart structure/interface. This set of tools must be to a standard that when the components are produced, a satisfactory assembly within the specified tolerances will be obtained.

Dependant upon the component/assembly tolerances, configuration and installation accuracy then the method of manufacture and compatibility of the set of tools can be achieved by any one of the following methods:-

- a) Co-ordinates/dimensions.
Normally used when components are fully machined or when a generous manufacturing tolerance has been specified and the tools can be measured for conformance.
- b) Physical application of the production tools to each other. Normally used when each tool can be easily applied to the other and the component has

the same manufacturing source.

c) **Interchangeability Media.**

Normally used when the component is of a complex construction and cannot be easily checked by ordinates, also used at major interfaces for ease of manufacture and certification of assembly tooling.

12.4 Media Identification

12.4.1 Control Master Gauge

A control master gauge is used for the co-ordination and inspection of the master-tooling gauge.

Only one control master gauge can exist and it shall be produced by AW Ltd.

In general it has a limited requirement, but it is essential when it is necessary to provision more than one master tooling gauge.

12.4.2 Master Tooling Gauge

A master-tooling gauge is used for the adjustment, co-ordination, inspection and re-certification of production tooling and checking gauges. It simulates the interchangeable features of a specific component. A Master Tooling Gauge will be provisioned by AW Ltd.

It is generally set to dimensions and co-ordinated to the master tooling gauge for its mating part.

When multiple master tooling gauges are provisioned, due to multiple sources of supply, these gauges will be set and co-ordinated to a control master gauge.

12.4.3 Checking Gauge

A checking gauge is an inspection facility to enable the final checking of any item to be effected efficiently and economically to a common standard, ensuring that all interchangeability features within a component are checked in relation to each other.

Checking gauges, however, will only serve to confirm the standard of component when all operations are complete and therefore should only be used when essential.

The supplier shall ensure that adequate jig control is exercised during the manufacture of the component and eliminate the need for rework after erroneous operations.

12.4.4 Master Component

Master components may be provisioned as a facility for establishing/confirming a standard to modular equipping and final line build, e.g. master pipes, cowls and LRU equipment. Master components representing role equipment may be required to enable the proving out of structural fixed fittings, ensuring an interchangeable fit of role equipment.

12.5 Responsibilities

The supplier will ensure that manufacturing methods/procedures, processes are documented to make sure tooling is used correctly/in the appropriate sequence to achieve consistent production.

Design, manufacture and supply of interchangeability control media, will normally be determined and provided by AW Ltd. Where the supplier makes both part and counter-part, the supplier may produce interchangeability media with the agreement of AW Ltd.

All interchangeability control media is subject to periodic inspection that must be in accordance with ISO 9001 with a programme and records to substantiate calibration. These records shall be held for a period of 3 years. See paragraph 15.

When requested the supplier will provide AW Ltd with identities of tooling provisioned to control interchangeable features in both part/counterpart components.

13. TOOL STORAGE

13.1 The supplier is responsible for providing an appropriate storage environment (dry, covered) for tooling, including when not in use, at his own expense for all tooling under the contract that is in his possession. Refer to the Central Tooling Manual CT0591 Volume 2 Section 3.08 for Storage requirements.

13.2 When not in use, all tooling shall be recorded and stored on racking, shelves, pallets, storage bins or a nominated area. Tools must not be stacked upon one another.

13.3 No tooling shall be stored externally.

13.4 Where the supplier produces Master Media, including Patterns and Models, then enclosed wooden boxes shall be provided by the supplier for all such media and shall be manufactured in compliance with Central Tooling Manual CT0591 Volume 2 Section 3.08.

14. PROTECTION

14.1 The supplier shall ensure that all tooling, equipment and interchangeability media, provisioned and under this contract, is protected against corrosion or degradation in accordance with Central Tooling Manual CT0591 Volume 2 Section 3.10.

15. TOOL IDENTIFICATION

- 15.1 The supplier must ensure that all tooling is correctly identified in accordance with the item text within the associated tooling order also see Central Tooling Manual CT0591 Volume 2 Sections 2.00 and 2.04.
- 15.2 All manufactured tools must have the appropriate information stamped on a suitable Name Plate (WSTD.02-03) where practical and permanently attached to the tool; if a Name Plate is impractical the information should be permanently marked, stamped, engraved or etched in a prominent and non-wearing position upon the tool.
- 15.3 The manufacturer may permanently attach the manufacturing Company's official label to the tool, or if this is not possible due to size or shape the Company's name may be permanently marked, stamped, engraved or etched in a prominent and non-wearing position upon the tool.

16. TOOL VALIDATION, CALIBRATION & RE-CERTIFICATION

- 16.1 The supplier shall undertake the periodic re-calibration for any tooling or gauge which establishes, controls or verifies interchangeable features or interface airframe joints at regular intervals every 12 months or designated Aircraft sets as defined and agreed with AW Ltd.
- 16.2 Validation, calibration, re-certification of Master Tooling Gauges, Models and Standards supplied by AW Ltd will be controlled by AW Ltd.

17. PERFORMANCE MONITORING

17.1 Performance

The supplier will be responsible for the provisioning of appropriate tooling unless otherwise stated, for achievement of the contract and programme milestones agreed and contained within the terms of the contract and to create and monitor the tooling schedule/plan to meet the Product delivery schedule.

Where monthly progress reports are required (identified on Purchase Order) they shall be submitted in the form of a Microsoft Project Plan to the Engineer via e-mail.

The supplier shall be responsible to determine the number of tool designs and tooling and create the appropriate plan against which performance shall be measured.

The scope of performance monitoring will depend upon the size of each individual contract and will be determined prior to contract award.

17.2 Conformance

AW Ltd shall conduct a tooling audit, either against the Tooling purchase order or the Suppliers Management, Control and Processes to ensure compliance with this document. A pro forma of the checklist is included (see CT0399) for information. The results of the audit will be presented as a Questionnaire and Record document.

17.3 First Article Inspection (F.A.I.)

In conjunction with AW Ltd Supplier Quality Department the Central Tooling Department may support the F.A.I. process to ensure adequate tooling and control features have been provisioned along with supporting evidence of inspection and calibration (see Appendix 2).

Where AW Ltd has devolved re-certification responsibility to the supplier, the supplier shall have a system to record tooling which requires to be re-calibrated on a regular frequency and to undertake the re-certification and maintain records.

18. **PURCHASE ORDER TERMS & CONDITIONS**

18.1 Tool Design & Specification

18.1.1 Tool Design Clause

The design of tooling produced in compliance of a contract shall be in accordance with the principles contained in the AW Ltd Central Tooling Manual CT0591 Volume 2.

18.1.2 Intellectual Property Clause

The property in the design of tooling covered by a contract (hereinafter called 'the said Design') shall, subject to the rights of any owner in any invention or design incorporated or used in the said Design, belong to AW Ltd and or AW Ltd's customer.

18.2 Tooling/Equipment Manufacture/Supply

18.2.1 Manufacture Clause

The manufacture or supply of any tooling or equipment or repair/refurbishment covered by a contract shall be in accordance with the requirements contained in the AW Ltd Central Tooling Manual CT0591 Volume 2. Where tooling and equipment is procured through a sub-tier manufacturer or supplier then that contractor or supplier shall be a AW Ltd Central tooling approved tooling company or supplier.

18.2.2 Tooling Manufacturing Clause

The tooling manufactured in accordance with the contract shall be deemed to have been accepted following receipt and acceptance by AW Ltd of a signed and detailed Certificate of Conformity.

However, any product or tool upon usage, found to be incorrect to specified

requirements, shall be corrected at the supplier's expense, even if the time lapse between usage and delivery is such that payment has already been made. In the case of 'non-design tooling', if it is proved the tool is not to the information supplied for manufacture, the supplier will be requested to take corrective action at the supplier's expense.

The tooling shall remain the sole property of AW Ltd and or AW Ltd's customers and shall be so marked in accordance with the Tooling Purchase Order. In addition, the tooling shall be stamped or otherwise permanently marked, and the tooling shall be recorded in a tool register in a form acceptable to AW Ltd, the register and the tooling shall be made available for inspection by AW Ltd upon giving reasonable notice.

The tooling shall be maintained in good and serviceable condition and shall not be used for any third party contract without the prior written consent of AW Ltd and AW Ltd shall be entitled to payment for such use at a rate determined when the written consent to use the tool is given.

On receipt of instructions from AW Ltd the tooling shall be delivered to AW Ltd, Yeovil or to such other location as shall be notified in the instructions at no cost to AW Ltd other than fair and reasonable costs for packing and carriage.

18.2.3 Intellectual Property Clause

No tooling shall be manufactured to the design or created from specifications/requirement documents, nor any license granted to manufacture tooling to the design, for or to any person or company other than AW Ltd without the prior agreement of AW Ltd who shall be entitled to charge such sums as should be reasonably paid for the use of the said design and require a full indemnity from any party wishing to use said design.

18.3 Inspection of Equipment, Products or Work

18.3.1 Inspection Clauses

This tooling shall be deemed to have been accepted by AW Ltd on the successful manufacture of the first component using the tooling.

Should the first component so manufactured be unacceptable to AW Ltd by reason of faulty tooling, such fault being attributable to the supplier, AW Ltd shall either:-

18.3.1.1 require the supplier to modify, repair or replace at the supplier's option, the defective tooling or part thereof at no cost to AW Ltd, or

18.3.1.2 require the supplier to credit the cost of the tooling or part thereof together with the costs incurred by AW Ltd in the dismantling and return of the rejected tooling or part, or

18.3.1.3 repair, rework or otherwise correct the rejected tooling or part and charge the supplier with the cost thereof.

18.3.2 Inspection Clause

Each item of tooling produced against a contract must be new and unused and be subject to inspection for conformance with the tool design, specification and commercial/ contractual requirements for release by the supplier's inspection organisation. Evidence of this inspection and release shall be shown by the impression of the supplier's official inspection stamp.

18.3.3 Inspection Clause

Each suite of tooling produced against a contract must be subject to inspection and release by the supplier's inspection organisation with Certificates of Conformity and delivery/advise notes.

18.3.4 Calibration Clause

For tooling that requires calibration and periodic re-certification, where requested a 'Certificate of Conformity' stating Calibration carried out in accordance with Tool Design requirements shall be provided by the supplier.

18.3.5 Warranty Clause

The supplier warrants that the tooling delivered will be free from any defects in design, workmanship and material and that they will give proper services under the operating and design conditions as specified, for a period of 12 months calculated from the day on which the tooling is installed and commissioned.

The period of 12 months specified above shall be extended by any period(s), which the tooling after delivery is out of action as a result of any defect covered by this warranty.

In the event of defects covered by this warranty then AW Ltd shall notify the supplier as soon as possible and the supplier shall without delay remedy repair or replace free of charge (cost of labour and transportation not excluded) the goods having such defects or authorised AW Ltd to do so. In the latter event the supplier shall reimburse to AW Ltd labour plus overheads and administrative costs.

AW Ltd without prior approval may effect remedying and repairing by the supplier in cases where it would be unreasonable to demand that prior approval be obtained.

In such cases the supplier and AW Ltd shall agree which party shall bear the costs and expenses thereof or in what proportion these costs and expenses shall be divided between them. This warranty shall remain in effect provided the remedying and repairing do not result in any detriment to the tooling. In no event will this warranty cover defects due to normal wear and tear, disregard by AW Ltd of operating instruction, excessive overloading by AW Ltd of operating conditions.

18.4 Packaging

18.4.1 Packaging Clause

It is the responsibility of the supplier, when requested, to deliver all AW Ltd / Customer owned tooling assets to AW Ltd at the suppliers cost. This includes tooling which has either been manufactured by the holding supplier including IS3 requirements or been free issued to the holding supplier. The return of tooling assets must be with appropriate and effective preservation, packaging and shipping, to AW Ltd or designated destination. The shipment shall be marked in accordance with applicable specifications and/or purchase order requirements with appropriate documentation and records.

18.4.2 Packaging Clause

Tooling shall be adequately protected against corrosion, contamination and damage during shipment and handling. All fluid openings and connectors must be protected against contamination and damage. Hydraulic or fuel component parts or openings shall be plugged or sealed with proper fitting closures that will not deteriorate in contact with these fluids. Only closures of metal material are acceptable for sealing hydraulic or fuel system component, but must be so designed as to prevent the fitting of these components without the removal of the closures.

Plastic closures are acceptable for non-fluid application such as electrical connectors.

18.4.3 Weight & Centre of Gravity Requirements

The weight of tooling, rig or equipment in excess of 20kg shall be suitably and prominently marked and where stored in an enclosed container shall also include the total weight value and an approximate Centre of Gravity position identified on the container for safe lifting or handling.

19. AUDITS

The scope of audits is to determine compliance and conformance with the contract order and the Terms and Conditions document CT0101.

19.1 Supplier Tooling Control & Purchase Order Audit Document, CT0399

19.11 *Section 1:*

Section 1 of this audit document will be used when auditing component suppliers against specific Tooling Purchase Orders.

Frequency of audits shall be determined by the Central Tooling Dept, dependant upon utilisation and/or total Purchase Order Value criteria.

This audit, when performed, will, upon a successful outcome sanction Invoice settlement.

19.12 Section 2:

Section 2 of this audit document will be used when auditing component suppliers that manufacture and or hold supplied, free issue tooling.

It may also be used in conjunction with section 1, if section 1 is unsuccessful and payment is to be withheld.

Frequency of auditing will be based on using a new component supplier identified by commercial department and thereafter annually or at the direction of Central Tooling.

Existing component suppliers which hold tooling for the use on AW Ltd parts, will be audited annually or at the direction of Central Tooling using this section of the document.

19.2 Supplier Self Certification, CT0499/2

CT0499/2 is a self certification certificate issued at the discretion of Central Tooling to Suppliers holding AW Ltd tooling with an attached SAP generated tool list for that Supplier's vendor code.

The Supplier shall evaluate the submitted list and to confirm compliance sign and return the certificate.

Deviations to be advised to Central Tooling for corrective action.

PART TWO

**ADDENDUM TO
DOCUMENT
FOR
LOW VOLUME MANUFACTURE**

(Shall be a specific contracted requirement when
this type of philosophy is required)

PART TWO

INTRODUCTION

Part Two of the Tooling Supplier Control Document CT0101 identifies the approach, when specifically contracted within the Tooling Purchase Order, to qualify the philosophy to be adopted to achieve a low volume production policy, commensurate with achieving an acceptable build standard whilst minimising tooling costs. Where a Tooling Purchase Order does not invoke this Part Two Section, then Part One shall always be the precedent.

Where sections are omitted then the relevant existing sections contained within Part One shall apply given that they do not conflict with Part Two.

SECTION 1 SCOPE & AUTHORITY

This document sets out the tooling philosophy and requirements to be adopted by suppliers provisioning tooling in the support of component packages being undertaken for low volume production of Aircraft parts, components and assemblies.

SECTION 2 PURPOSE

The purpose of Part Two is to ensure that where the method of production engineering of package details, sub assemblies, assemblies and installations has considered and eliminated free hand produced manufacturing techniques, then any tooling to be provisioned is to be to a 'diluted' standard.

Wherever possible and practical, the tooling should be capable of being economically upgraded to full production requirements should production rates dictate at a later period.

SECTION 9 TOOLING PHILOSOPHY

9.1 Assembly Fixtures

Where an existing fixture can be utilised by modification or by the provisioning of a new fixture, then the philosophy to be adopted shall be:-

a) **Modification to existing Tooling**

Additional jig features to be incorporated, but to a production standard.

b) **New Tooling**

Only the absolute minimum of features necessary to control the standard to be incorporated, but to a production standard.

9.2 Sub Assembly Tooling

Where an existing fixture can be utilised by modification or by the provisioning of a new fixture, then the philosophy to be adopted shall be:-

a) Modification to existing Tooling

Additional jig features to be incorporated, but to a full production standard. Where practical and cost effective, consideration may be given to use densified wood or similar approach as alternative to metal.

b) New Tooling

Only the absolute minimum of features necessary to control the standard to be incorporated, but to production standard. When practical and cost effective, consideration may be given to use densified wood or similar approach as alternative to metal.

9.3 Detail Tooling

9.3.1 Detail Tooling - Sheet Metal

Where tooling is essential to enable the manufacture of a detail part to be produced then the following philosophy shall be adopted:

- Templates to be light alloy (for marking out) and unbushed.
- Form Blocks - Utilise production solution materials but to be to a 'diluted' standard i.e.:

no over bend
no top plates
no intensifiers.

9.3.2 Detail Tooling (Machining)

Where suitable N.C. machines should be utilised which will minimise tooling requirements. Holding fixtures should be to a basic standard or consideration should be given to utilising Catia or similar tooling techniques.

9.3.3 Cutting Tools/gauges

The supplier shall consider wherever practical the utilisation of standard cutters, form tools, drills etc. Where specials are required, they are to be kept to a minimum. Where gauging is necessary then these shall be kept to a minimum with consideration directed to co-ordinated measuring machine techniques.

9.4 Composite Tooling

9.4.3 Drill and Trim/rout Facility

Wherever practicable the drilling and routing of components shall employ either:

- No fixturing by utilising 'end of part lines' and hole centres by the transfer of this geometry from the mould tool and hand finishing the component.
- By utilising a 'splash' from the Master Model.
- A thin gauge bushless cage.

SECTION 10 INTERCHANGEABILITY PHILOSOPHY

The achievement of full interchangeability status for components produced by employing a diluted standard of tooling approach will be difficult to reconcile.

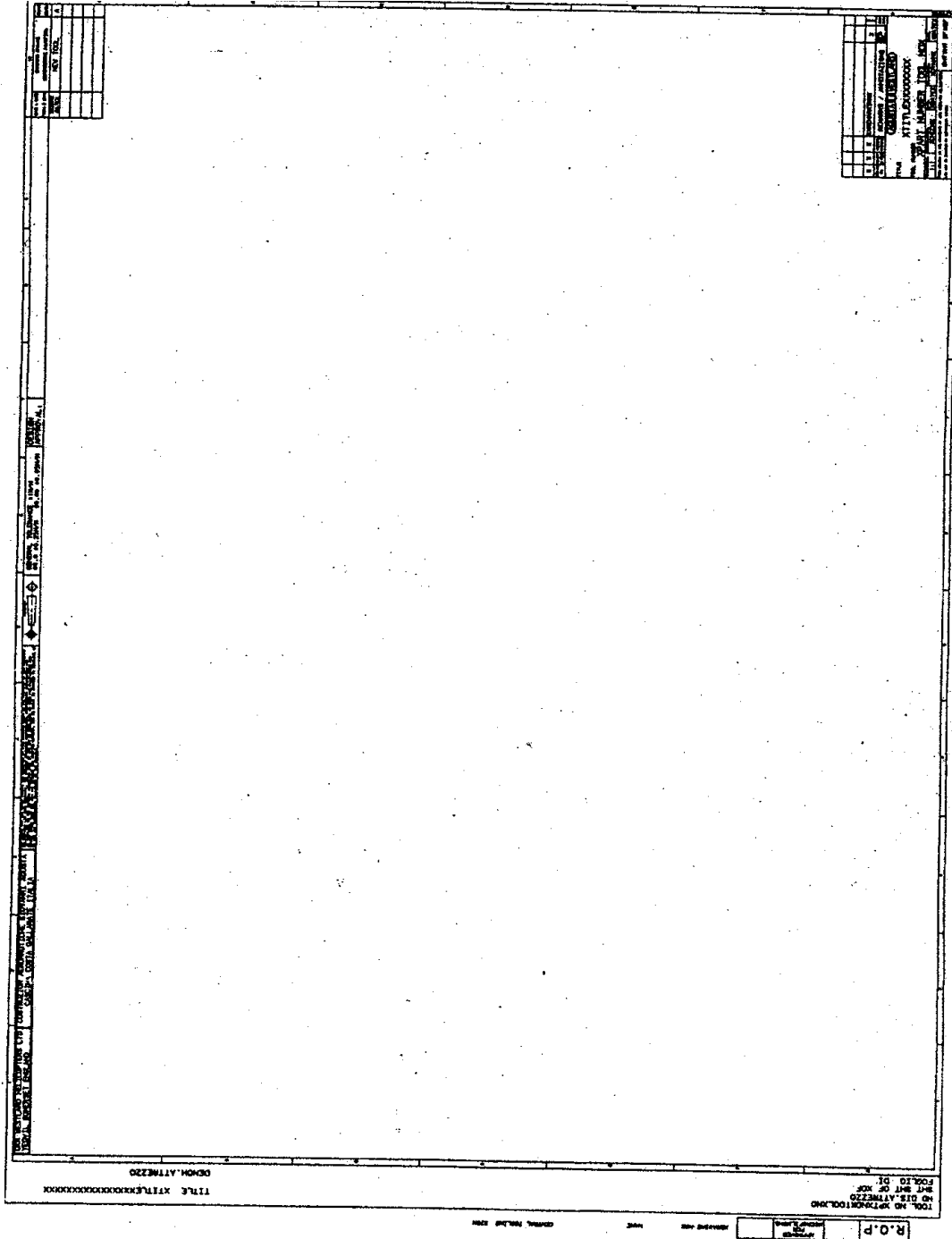
As the basic Airframe and Major interchangeable items may be already controlled with existing full production tooling, the instances where a conflicting circumstance will prevail should be minimal.

Product features that require controlling to enable compatibility with an interface or are features that are identified as interchangeable will determine the minimum controls necessary to be built into the tooling.

Where features or components are required to a standard at variance with a diluted tooling philosophy, then recourse to AW Ltd Central Tooling Department for dispensation shall prevail.


PART THREE
APPENDICES TO PARTS ONE & TWO

APPENDIX 1 - DRAWING FORMAT JIGA0
(EH101 format shown as example)




The drawing format is a large rectangle with a double-line border. It contains several small tables and text blocks, all rotated 180 degrees. The text is mirrored and difficult to read, but appears to be technical drawing metadata. At the bottom center, there is a small box containing the text "R.O.P.". At the bottom right, there is a small box containing the text "NO. 1010000000".

APPENDIX 2 - PRE-FIRST ARTICLE INSPECTION

		CENTRAL TOOLING DEPARTMENT PRE-FIRST ARTICLE INSPECTION TOOLING AUDIT CHECKLIST			CT0398 ISSUE B		
SUPPLIER							
WORK PACKAGE				ORDER No.			
CONTACT			POSITION				
DESCRIPTION					CLEARED	NOT CLEARED	N/A
COMPLIANCE WITH AW Ltd ORDER							
TOOL CONTROL AUDIT CONDUCTED TO ACHIEVE CONFORMANCE WITH THIS SUPPLIER CONTROL DOCUMENT							
ICY FEATURES ADEQUATELY CONTROLLED							
ICY FEATURES CROSS MATCHED WITH AW Ltd MEDIA							
TOOLS TO THE REQUIRED MANUFACTURING STANDARD TO MEET PRODUCTION REQUIREMENTS E.G. RATE & DURABILITY							
TOOL DESIGNS AVAILABLE AND COMPLIANT							
TOOL DESIGNS SUBMITTED TO AW Ltd							
AW Ltd PART / TOOL No.'s ALLOCATED							
AW Ltd LABELS ATTACHED (IF PRACTICAL)							
REGISTER OF TOOLING SUBMITTED TO AW Ltd							
CAN ALL REGISTERED TOOLS BE ACCOUNTED FOR							
PROGRAMME FOR RE-CERTIFICATION OF ICY TOOLING							
CONFIRM ADVICE NOTE & C of C SENT TO AW Ltd							
SIGN SUPPLIER QUALITY F.A.I. CHECK SHEET							
REMARKS / ACTIONS							
ACTIONEE							
PRE-FIRST ARTICLE AUDIT ACCEPTABLE TO AW Ltd CENTRAL TOOLING					YES	NO	
AW Ltd CENTRAL TOOLING REPRESENTATIVE:-							
PRINT		SIGN		DATE			
NOTE : DOCUMENT TO BE HELD WITH SUPPLIER TOOLING CONTROL AUDIT RECORD							

APPENDIX 3 – TOOL CHANGE REQUEST

 <p>AgustaWestland A Finmeccanica Company</p>		<p>CENTRAL TOOLING DEPARTMENT</p> <p>TOOL CHANGE REQUEST</p>		<p>Doc No.: CT0201 Issue : 1</p>
<p>Serial No.: TCR/___ 0001-01</p>				
<p>ORIGINATOR: Name: Company: Phone: Fax: E-mail:</p>	<p>TOOL DETAILS: Part No.: Tool No.: Issue: Description:</p>	<p>TO: Westland Helicopters Ltd Central Tooling Dept. Box 12 For Attention of: Date:</p>		
<p>REQUEST:</p> <p align="center" style="font-size: 48px; opacity: 0.3; transform: rotate(-30deg);">Sample</p> <p>A drawing, sketch or photograph should be included to clarify the request.</p>				
<p>RESPONSE <i>(For AW Ltd use only):</i></p>				
ACCEPTED		AW Ltd NOTIFICATION RAISED		SIGNED
REJECTED		DESIGN UPDATED		DATE

APPENDIX 4 – CENTRAL TOOLING APPROVED TOOLING SUPPLIERS

OPERATIONS DIRECTORATE

CENTRAL TOOLING DEPARTMENT PREFERRED TOOLING SUPPLIERS

Vendor No	Supplier	Design	Detail Tool	Turning M/C	Sub Assy Tooling	Main Assy Tooling	Composite Tooling	3/5 Axis Mach	Icy Media	Gauges	Hyd Equip	Electrical Equip	Fuel Equip	Electronic Specialist	Cutting Tool	Mech Cal	Elect Cal	Support Tooling	Blanks and Covers
10006493	Production Pattern																		
10008223	North West Aertooling		✓	✓	✓	✓	✓	✓	✓	✓									
10006385	PBS Tools			✓	✓					✓									
10007947	Frome Tool & Gauge	✓	✓	✓	✓					✓									
10006448	Manufax Engineering			✓	✓	✓				✓									
10006879	Ramp Industries					✓													
10006938	Keyford Precision	✓												✓					
10007210	GMM Contractors													✓					
10006981	Westminster Engineering													✓					
10007241	SG Equipment	✓									✓	✓	✓						
10008258	Brinksway		✓	✓	✓	✓								✓					
10006471	Combined Composite Tech	✓					✓							✓					
10012221	Shell Mould		✓	✓	✓	✓	✓	✓	✓										
10006571	SFM Technology	✓												✓					
10006577	Nelson Tool		✓	✓	✓	✓													
10008323	Aim Engineering Limited					✓													
10008313	Aerotech Design Consultants	✓																	
10013289	Atlas Composites						✓												
10013584	Brunel Patterns						✓												
10018695	G Parker Engineering				✓														
10018693	Kernan Tooling					✓													
10018684	Lifting Services North West Ltd																		
10008131	STS (Yeovil) Ltd			✓	✓														
10015498	H Ecodes (Patternmaking) Ltd			✓	✓														
10006904	MPE (Manchester precision)	✓	✓	✓															

Services

APPENDIX 5 – CENTRAL TOOLING TOOL CODES

TOOL No.	TOOL DESCRIPTION – PROCESS DESCRIPTION
W1	PROFILE TEMPLATE
W2	DRILL AND ROUT TEMPLATE
W3	ROUT TEMPLATE
W4	DRILL AND ROUT TEMPLATE - FIXED HEAD ROUTER
W5	ROUT TEMPLATE - FIXED HEAD ROUTER
W6	SPINDLE FIXTURE
W7	SPINDLE FIXTURE - CANTED HEAD
W8	DRILL AND ROUT FIXTURE - HAND ROUT
W9	BAND SAW FIXTURE OR TEMPLATE
W10	ROUT FIXTURE – MACHINE ROUT
W11	MULTIPLE JOGGLE BLOCKS
W12	JOGGLE BLOCK
W13	PIERCE AND/OR BLANK TOOL - SMALL CUTTING OPERATIONS
W14	FORM TOOL – SMALL FORMING OPERATIONS
W15	CLAPPER BLANK TOOL
W16	BLANKING OR PIERCING TOOL – SMALL CUTTING OPERATIONS
W17	SPINNING FORMER
W18	HOT FORM STRETCH TOOL - HUFFORD
W19	CROPPING TOOL
W20	PIERCE AND/OR BLANK TOOL - POWER PRESS - LARGE CUTTING OPERATIONS
W21	FORM TOOL - POWER PRESS - LARGE FORMING OPERATIONS
W22	RUBBER BOLSTER PRESS TOOL
W23	MODEL – COMPOSITE MOULD MANUFACTURE
W24	STRETCH FORM TOOL - STRAIGHTENING M/C
W25	JAWS FOR STRAIGHTENING MACHINE
W26	STRETCH FORM TOOL – HUFFORD
W27	JAWS AND INSERTS FOR H.S.F.M.
W28	FARNHAM ROLL TEMPLATE
W29	HOT FORM RUBBER BOLSTER TOOL
W30	LOOM LAYOUT BOARD – PHOTOGRAPHIC METHOD
W31	METAL PIPE PAYOUT, CUT OFF AND ASSEMBLY BOARD
W32	HAND SWAGGING TOOL
W33	DIE - PIPE BENDING M/C
W34	DIE - HILLMORE PIPE BENDING M/C CI
W35	DIE - HILLMORE BENCH PIPE BENDING M/C K1-4
W36	BRAZING AND SILVER SOLDER FIXTURE
W37	SPECIAL HAND BEADING TOOL
W38	SPECIAL HAND BELLING TOOL
W39	PIPE BENDING MASTER TABLE
W40	CONTOUR ROLLS
W41	DRILL AND CUT-OFF JIG
W42	DRILL AND FILE TEMPLATE
W43	DRILL AND TRIM CAGE
W44	MARKING-OFF TEMPLATE
W45	DRILL, BANDSAW, NIBBLE AND FILE TEMPLATE
W46	ENGRAVING TEMPLATE
W47	FLAME CUTTING TEMPLATE
W48	BENCH BEND BLOCK
W49	EDWARDS FOLDER SETTING PLATE AND MARKHAM FOLDER LOCATION PLATE
W50	MARKHAM FOLDER SPECIAL EQUIPMENT
W51	HEEL LINE TEMPLATE

TOOL No.	TOOL DESCRIPTION – PROCESS DESCRIPTION
W52	JIG AND TOOL LOFT TEMPLATE
W53	PULLMAN TOOL
W54	PULLMAN EQUIPMENT
W55	WELDING FIXTURE
W56	SPOT WELD FIXTURE
W57	BONDING FIXTURES - FOR HONEYCOMB PANELS
W58	BALANCING EQUIPMENT
W59	HEAT TREATMENT FIXTURE
W60	TREATMENT FIXTURE - SURFACE FINISH/PLATING
W61	GEAR SHAPING FIXTURE OR MANDREL
W62	GEAR CUTTER
W63	CHUCK JAWS - LATHES AND CYLINDRICAL GRINDERS
W64	DRILL OR DRILL AND REAM JIG OR PLATE
W65	PANTOGRAPH DRILL PLATE
W66	SPECIAL DRILL OR REAMER
W67	SPECIAL COUNTER - BORE, COUNTER-SINK OR SPOTFACE CUTTER
W68	SPECIAL TAP
W69	SPECIAL DIE
W70	MILLING FIXTURE - HORIZONTAL AND VERTICAL
W71	SPECIAL MILLING CUTTER
W72	MILLING MANDREL
W73	PROFILE MILLING FIXTURE - HYDRO-TEL, RIGID OR BRIDGEPORT
W74	PROFILE MILLING TEMPLATE - HYDRO-TEL, RIGID OR BRIDGEPORT
W75	PROFILE MILLING FIXTURE AND TEMPLATE – ASQUITH
W76	PROFILE TEMPLATE - TURNING/GRINDING/MILLING
W77	TURNING OR BORING FIXTURE – LATHE
W78	JIG BORING FIXTURE - JIG HORIZONTAL AND VERTICAL BORDER
W79	TURNING ADAPTOR, MANDREL
W80	TURNING MANDREL
W81	FORM TOOL - LATHE OR BORER
W82	BORING BAR
W83	BROACHING FIXTURE
W84	BROACH
W85	SLOTING FIXTURE
W86	GRINDING FIXTURE - ROTARY AND SURFACE
W87	GRINDING MANDREL
W88	HONING FIXTURE
W89	PROFILE TRACK PLANE MILL AND FIXTURE
W90	VICE JAWS – MACHINE
W91	HAND GAUGE – INSPECTION
W92	JIG BORING FIXTURE - NEWALL AND SPACEMATIC
W93	SPECIAL PURPOSE MACHINE
W94	MAIN ASSEMBLY FIXTURE - TO COMPLETE MAJOR AIRCRAFT ASSEMBLIES
W95	SUB-ASSEMBLY JIG OR FIXTURE - TO COMPLETE MINOR AIRCRAFT ASSEMBLIES
W96	CHECKING JIG
W97	REFERENCE PLATE
W98	MECHANICAL TEST RIG – TRANSMISSION
W99	TRANSPORT TROLLEY
W100	HOLDING FIXTURE – CONTOURMATIC
W101	ACCEPTANCE GAUGE
W102	TOOL/TEMPLATE SET UP
W103	MOCK UP
W104	SKINNING HORSE

TOOL No.	TOOL DESCRIPTION – PROCESS DESCRIPTION
W105	MOULD TOOL - COMPOSITES MANUFACTURE,
W106	INCIDENCE BOARD
W107	STENCILS
W108	MISCELLANEOUS (TO BE APPROVED BY THE P.E. - TOOL DESIGN)
W109	HOLDING FIXTURE - N.C. M/C
W110	VERO DRILL FIXTURE
W111	MOULD LOFT LOOM LAYOUT
W112	PATTERN TEMPLATE FOR WOVEN COMPOSITE CLOTH
W113	HOLDING FIXTURE FOR FERRANTI OR GZIP CHECKING MACHINE
W114	FIXTURE FOR SHRINKING IN LINERS
W115	MANDREL FOR W114
W116	TRANSPORT BOXES
W117	SCRIBING TEMPLATE - CHEMICAL ETCHING
W118	HORIZONTAL BORING FIXTURE - COLLECT AND ENGLEHARD
W119	PROFILE TEMPLATE – HYPOWERMATIC
W120	PROFILE FIXTURE – HYPOWERMATIC
W121	HOLDING FIXTURE - DEEP HOLE/GUN DRILLING MACHINE
W122	MILLING FIXTURE - DROOP AND REIN PROFILE MILL
W123	SPLIT BUSH
W124	MILLING BLOCK
W125	HOLDING FIXTURE
W126	FILM CUTTING TEMPLATE
W127	SANDWICH JIG – HONEYCOMB
W128	CORING TOOL – HONEYCOMB
W129	INSERT SETTING TEMPLATE – HONEYCOMB
W130	DISCONTINUED. ROTOBOR CUTTER
W131	DISCONTINUED. CORING TEMPLATE HONEYCOMB
W132	DISCONTINUED. USE W44. PRIMER MASK TEMPLATE
W133	HONEYCOMB CRUSH ROLLER
W134	N.C. TAPE
W135	N.C. TAPE/DATA -(FORMAT NOT KNOWN I.E. S/CON)
W136	DISCONTINUED. USE W134. N.C. DRILLING MACHINE TAPE
W137	HOBBING, SHAPING ARBOR
W138	DISCONTINUED. USE PA OR GB. GLEASON ARBOR, BUSH - GEAR CUTTING AND GRINDING ARBOR
W139	DISCONTINUED. USE GA. GLEASON REGISTER PLATES - GLEASON CUTTING AND GRINDING
W140	SPUR AND HELECAL FIXTURE
W141	SHOT PEENING FIXTURE
W142	ASSEMBLY AND DISMANTLING TOOLS FOR TRANSMISSION AND COMPOSITE DEPARTMENT
W143	DISCONTINUED. USE W151. ASSEMBLY AND DISMANTLING TOOLS FOR AIRCRAFT
W144	DISCONTINUED. USE W151. ASSEMBLY AND DISMANTLING TOOLS FOR HYDRAULICS
W145	ELECTRICAL TEST EQUIPMENT
W146	FUEL TEST EQUIPMENT
W147	HYDRAULIC TEST EQUIPMENT
W148	MECHANICAL TEST EQUIPMENT
W149	GUILLOTINE GAUGE STRIP WIDTH FOR PRESS TOOLS
W150	GEAR CHECKING FIXTURE
W151	GROUND HANDLING/LIFTING EQUIPMENT
W152	FIT OUT FIXTURE
W153	DISCONTINUED. USE W204

TOOL No.	TOOL DESCRIPTION – PROCESS DESCRIPTION
W154	DISCONTINUED, USE FP. GRINDING CAMS - MATRIX S.10
W155	DISCONTINUED, USE FP. DRESSER CAM – HOGLUND
W156	PROJECTION LAYOUT
W157	DISCONTINUED, USE IP OR IB. RED RING INDEX PLATES
W158	DISCONTINUED, USE IP OR IB. MATRIX INDEX PLATE
W159	DISCONTINUED, USE IP OR IB. ORCUT INDEX PLATE
W160	ALIGNMENT MEDIA
W161	APERTURE CONTROL FIXTURE
W162	TOOL FOR DROP HAMMER PRESS
W163	DISCONTINUED, USE W167. CROSSLAND TYPE PRESS TOOL - ALLOCATED FOR AEROSPATIALE
W164	CUTTING FORM TOOL - EDWARDS ROLLER PRESS
W165	TESTING FIXTURE - (FOR USE IN MATERIALS LAB)
W166	DISCONTINUED, USE W48. SQUEEZE FORM BLOCK – VICE
W167	STEEL RULE TYPE - FLYPRESS AND KNIFE TOOL – FLYPRESS
W168	RIVETING TOOL – SPECIAL
W169	BEARING OR BUSH ASSEMBLY TOOL
W170	INSPECTION AID – INSPECTION
W171	DISCONTINUED, HAND HELD ROUTING MACHINE – ROTOR BLADES
W172	NYLON PIPE LAYOUT, CUTOFF AND ASSEMBLY BOARD - PITOT STATIC
W173	DISCONTINUED, USE W172. HOT FORMED NYLON PIPE WITHOUT END FITTINGS, LAYOUT AND CUT OFF BOARD
W174	SPACE MODEL - DUMMY COMPONENT, MOCK UP, ETC.
W175	LOCATION TEMPLATE – WAL
W176	DISCONTINUED, PARALLEL BLOCKS (PATTERN PRESS)
W177	DISCONTINUED, USE W105. VACUUM FORMING BLOCK - NOMEX GLASS FIBRE HONEYCOMB
W178	VACUUM FORMING TOOL - VACUUM MOULDING
W179	DISCONTINUED, USE W44. FOAM CUTTING TEMPLATE
W180	TOOL TO CONSOLIDATE BY VACUUM PROCESS - COMPOSITE MANUFACTURE
W181	HOT DIMPLING TOOL
W182	INJECTION MOULDING TOOL - INJECTION MOULDING
W183	TOOL PROFILE CHECKING TEMPLATE - TOOL MANUFACTURE
W184	DISCONTINUED, USE W1. COMPONENT PROFILE CHECKING TEMPLATE
W185	DISCONTINUED, USE W211. HOT FORM TOOL - FOR TITANIUM
W186	HOLDING FIXTURE (FITTING)
W187	STRESS RELIEVING FIXTURE
W188	RUBBER MASK PLATING
W189	MOULD FOR RUBBER MASK PLATING
W190	COLD FORM DIMPLING TOOL
W191	DISCONTINUED, USE I.R. BURNISHING TOOL
W192	CASTING EQUIPMENT (METAL)
W193	FORGING DIE – FORGING
W194	CURING CAM - CURING SEQUENCE FOR HYDRAULIC PRESS
W195	WATER JET CUTTING EQUIPMENT - WATER JET CUTTING
W196	SUPERFORM TOOLING - TI SUPERFORM PROCESS
W197	MANTREL EXTRACTOR TOOL - COMPOSITES MANUFACTURE
W198	PNEUMATIC TEST EQUIPMENT
W199	COLD RUBBER BOLSTER PRESS TOOL - COLD FORMING ON S.P.S. 23000 TONNE PRESS
W200	CONTROL MASTER GAUGE (FORMALLY JIG REFERENCE MASTER)
W201	MASTER TOOLING GAUGE (FORMALLY JIG REFERENCE)
W202	I.C.Y. CHECKING GAUGE

TOOL No.	TOOL DESCRIPTION – PROCESS DESCRIPTION
W203	MASTER COMPONENT
W204	JIG REFERENCE SUPPORT AND APPLICATION
W205	MASTER PIPE REFERENCE - FOR PIPE LAYOUT AND CUTOFF BOARDS
W206	SUB-MASTER - COMPOSITE MANUFACTURE
W207	DIGITAL MASTER SURFACE MODEL
W208	RESERVED FOR REFERENCE TOOLING
W209	RESERVED FOR REFERENCE TOOLING
W210	MOULD LOFT PRINT – MANUFACTURE AID
W211	HOT FORM RUBBER BOLSTER TOOL - HOT FORMING ON S.P.S. 23000 TONNE PRESS
W212	SHOP MADE TEMPLATE
W213	N.C. FIXTURE – COMPOSITE MANUFACTURE
W214	AIRCRAFT STAGING
W215	ASEA FLUID CELL PRESS
W216	BLANKS AND COVERS