

SABRe : Design Control Process.

Guidelines for completion of Design Change Proposal Forms.

Scope and Purpose

These instructions and guidance notes for completion of the Design Change Proposal (DCP) forms shall apply to all suppliers to Rolls-Royce (UK) and Rolls-Royce Energy Gas Turbines (Canada) including changes associated with scope following contract agreement, whether the change required is first identified by Rolls-Royce or the supplier, regardless of cause. This process should also be used for changes following design freeze.

Overview

The DCP documents to which this document provides introductions and guidance cover three distinct Stages of the Design Control Process:

- Problem Definition and Acceptance
- Develop Solution Concept
- Detail Design Solution

These Stages are aligned to the Rolls-Royce generic Product Change Process.

It is important to note that DCP documents returned authorised by Rolls-Royce contain recorded decisions and should be taken as a formal authorisation for appropriate further activity as relevant.

Transmittal of the forms between parties must be carried out with due consideration of Export Control and Intellectual Property Rights issues and agreed communication co-ordination arrangements e.g. under cover of coordination memorandum.

The applicable operational buyer is the point of contact for DCP forms, to and from Rolls-Royce. Communication to and from the supplier must always be with a covering letter. Stage forms and letters should be retained for a minimum of 6 years.

As a result of investigation, a reissue of stage gate forms may be required prior to Product Change Control Board.

Acceptance of changes will follow understanding of all implications and the approval through internal Change Board process. Time taken to accept the change will depend on the resultant implications.

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Instructions for Completion

Form DCP Stage 1 (Define problem)

Block 1: DCP Number and Issue

DCP Stage 1 can be initiated by either Rolls-Royce or the Supplier. The number used for all DCP stages is allocated by the Rolls-Royce Buyer. The DCP number is an alpha-numeric combination of characters starting with the abbreviation DCP for Design Change Proposal followed by a character code, the year of preparation (two digits) and a four-digit consecutive number. The consecutive number starts every year new with 0001. To ensure proper allocation, the DCP number together with the issue shall be entered in the upper right-hand corner of all pages (also on attachments, if any). The total number of sheets (not including attachments) of the document shall be entered.

Block 3: Title

A short title characterising the requested change shall be entered in this block, including a description of the part affected.

Block 4: Engine Designation

The engine type on which the change is to be performed shall be specified.

Block 5: Module

If known the designation of the module on which the change is to be performed shall be entered.

Block 6: Part

The part number of the contracted item on which the change is to be performed shall be entered.

Block 7: Reason for change (tick list)

The reason for change shall be ticked from this list. It is possible to select more than one item

Block 8: Class

To aid clarity within Rolls-Royce a class for the change shall be suggested from the following:

Class I:

A class I change is one known to affect, or have a risk of affecting one or more of the following functions:

Technical Impacts:

- Airworthiness
- Safety
- Interchangeability (form, fit or function)
- Weight, centre of gravity, moment of inertia out-side the stated tolerances,
- Reliability

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- Performance or any other operational characteristics,
- Maintainability,
- Interfaces (the change affects more than one module),
- Electromagnetic compatibility,
- Compatibility with support equipment, trainers or training devices / equipment.
- Changes to Software installed in a sub-assembly or complete component
- Change to a Key Feature or Key Process
- Changes in the identity of any reparable component, detail or sub-assembly

Contractual or Commercial Impacts:

- Costs for the customer,
- Costs to Rolls-Royce or suppliers / sub-contractors,
- Date of delivery or project milestones,
- Guarantees of deliveries.

Class II:

A class II change is considered to be any change which does not fall under the category of a class I change.

Block 9: Priority

To aid clarity within Rolls-Royce a priority for the change shall be suggested from the following:

Priority I

This priority denotes an urgent change that is essential for the product since either airworthiness or operational reliability is affected. The stocks of parts, which give rise for the change shall be reworked, scrapped or must be used in other applications.

Priority II

Priority II changes indicate that the change is not essential for airworthiness but limitations will apply if the change is not embodied.

Priority III

Priority III changes distinguishes the change as not being essential for embodiment before flight, does not impose any limitations on the engine or the aircraft, and is to be embodied as soon as practically possible. Those changes are designated as changes of routine nature.

By definition, all Class II changes are classified Priority III.

Block 10: Supplier

The name of the contractual supplier of the part has to be provided.

Block 11: Liability

The suggested liability for the requested change shall be stated (supplier, Rolls-Royce or others).

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Block 12: Initiated by

The initiator of the change (supplier or Rolls-Royce) shall be ticked.

Block 13: Rolls-Royce Unit Specification

The Rolls-Royce unit specification / requirements document shall be entered here.

Block 14: Blank

Can be used for any other key references for suppliers purposes e.g. the Suppliers own reference number.

Block 15: Problem Description

The problem shall be defined here along with an outline of the proposed change, and evidence of necessity, as required a continuation sheet may be used.

Block 16: Supplier signatures

This block shall contain approving signatures for the technical and commercial content of the submission. For Rolls-Royce initiated stage 1 changes, Supplier signatures are not required.

Block 17: Statement (Rolls-Royce change review board)

This block serves to record the Rolls-Royce decision on the communicated problem and proposed outline change. A clear statement will be made indicating if the proposal is rejected or approved and also any restrictions and specific instructions.

Block 18: Signature block (Rolls-Royce change review board decision)

This block serves to signify the decision of the Rolls-Royce change review board on the proposed change. The DCP should be signed by the Technical Authority (the Chief of sub-system or work package owner on behalf of Chief Engineer) the allocated Problem Owner (the Rolls-Royce owner for the related change) and Purchase Authority (the applicable operational buyer).

Continuation Sheet

The continuation sheet is to be used as required.

The return of the form to the supplier, fully signed by Rolls-Royce, signifies the end of Stage 1, unless the decision is deferred.

Outcome of the Product Change / Review Board is recorded on the return stage form prior to approval. A Change Board rejection may result in a need for reissue of the stage form.

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Form DCP Stage 2 (Develop Solution Concept)

Blocks 1 to 15 inclusive.

The information in blocks 1 to 15 inclusive can be read across from the DCP Stage 1 document. However, the originator must ensure that the original information submitted is reviewed against any new information gained during the development of the solution concept and required changes captured in the appropriate blocks.

Block 16: Supplier signatures

This block shall contain approving signatures for the detailed technical and commercial content of the submission. These cannot be read across from Stage 1 document.

Block 17: Statement (Rolls-Royce change review board)

This block serves to record the Rolls-Royce PCB decision on the proposed solution concept. A clear statement will be made indicating if the proposal is rejected or approved and also any restrictions and specific instructions.

Block 18: Signature block (Rolls-Royce change review board)

This block serves to signify the decision of the Rolls-Royce PCB on the proposed solution concept. The DCP should be signed as per stage 1

Block 19: Description of the solution concept

The technical aspects of the change solution concept shall be detailed here; continuation sheets are permissible as required.

Block 20: Incorporation policy

Propose the strategy for incorporating the product change, e.g. rework existing or new parts. Also include duration of retro fit and buffer stock if required

Block 21: Evidence of Necessity

The consequences of non-embodiment of the change shall be specified as far as possible. If known particular attention shall be given to the following points: restrictions to the serviceability of the part or equipment,

- Restrictions to the operation of the engine end user

Block 22: Complementary Changes

If known, add description of proposed complementary changes.

Block 23: Attachments

Attachments to the DCP if any, shall be specified in this block by document type (e.g. drawing) and document number.

Block 24: Anticipated effects of proposed change

If known boxes "YES" or "NO" shall be ticked as appropriate. Effects ticked "YES" shall be detailed as understood at this point.

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Interchangeability

Box "YES" shall be ticked if interchangeability is affected by the change. Interchangeability is always affected if at least one criterion of "form, fit or function" is involved. Box "NO" shall be ticked if every modified part is fully interchangeable with the old standard.

Performance

If the change affects the performance characteristics of the module or the engine, box "YES" shall be ticked. In addition, the effect of change on the performance characteristics shall be specified.

Life

If the change affects the life of a part, box "YES" shall be ticked. The effect on life, if any, shall be detailed.

Weight

If the change affects the weight of the part, box "YES" shall be ticked. The weight change shall be detailed. Weight increases shall be indicated by "+", weight de-creases by "-". Weight changes up to 0.1 lbs are considered negligible.

Airworthiness

If the change affects safety aspects, box "YES" shall be ticked. Safety in this context refers in particular to the safety of the engine on the ground and flight safety.

Interface

If the change to the part concerned affects the inter-face with an adjacent part, box "YES" shall be ticked. This applies both to physical and functional interfaces.

Maintenance

If the change part affects maintenance of the part concerned or the entire engine, box "YES" shall be ticked. The effect on maintenance intervals etc. shall be specified.

Maintainability

If the change affects maintainability of the part concerned or the entire engine, box "YES" shall be ticked. In addition, the effect on maintain-ability shall be detailed.

Spares

If spares are affected by the change, box "YES" shall be ticked. In addition, the proposed embodiment of the change in ordered or stocked spared shall be detailed.

Supply and support of spares to the old standard

If supply and / or support of spares to the old standard is affected, box "YES" shall be ticked. Detailed information shall be provided.

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Estimated Costs

The estimated costs incurring shall be determined on page 5 of the DCP Stage 2 to provide a basis for the decision on the acceptability of the solution concept. Estimated total non-recurring and recurring costs have to be stated here. For each DCP, costs must be calculated. Additional costs or cost reduction shall be identified by "+" or "-", as applicable. If a supplier does not claim costs, this shall be noted explicitly on page 5 (box "YES" shall be ticked both for additional costs and cost reduction).

Where spares, repair and overhaul costs are affected the impact shall be identified on a continuation page

Assembly tooling

If the change affects assembly tooling (change of tools, new procurement of tools), box "YES" shall be ticked. The tools must be directly related to the change of the part. Tools shall include only those items required by Rolls-Royce or the customer (engine) for installation, maintenance and repair of the part to be changed. Detailed information shall be provided.

EBU podding affected

If the change affects EBU podding, box "YES" shall be ticked and detailed information of the effects shall be provided.

Specification

If the change affects any functions contractually stipulated in the Specifications, box "YES" shall be ticked. The effects shall be specified in detail.

Guarantees- Events, Reliability, and Maintenance Intervals

If the change affects the reliability of the product then this to be stated in appropriate terms e.g. for aerospace: Mean Time Between Failures, Mean Time Between Unit Returns, reduction in events such as In Flight Shut Down, Delays & Cancellations, Aborted take Off, Air Turn Backs etc). Additionally should the change alter the Component Maintenance Plan interval or Return to Shop rate then this should also be stated.

Noise, Electromagnetic Compatibility

If the change affects the noise characteristics of the engine or the change requires the EMC status of the engine to be reviewed, box "YES" shall be ticked. The effects have to be detailed

Emissions

If the change affects the emission characteristics of the engine, box "YES" shall be ticked. The effects have to be detailed.

Others

Effects other than those specified above shall be detailed.

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Block 25: Affected Documents

All documents, known to be affected by the proposed change are to be listed here (e.g. schemes, drawings, specifications). The proposed known change action for the documents is to be stated.

Block 26: Economic Conditions

All costs of the change shall be escalated to common economic conditions. The applied economic conditions (e.g. year 2006) shall be stated.

Block 27: Currency

All costs of the change shall be given in a common currency, which has to be stated here.

Block 28: Estimated Non-Recurring Costs

The supplier shall specify the estimated costs for the preparation of the proposed change. Non-recurring costs of a change include in particular:

- Design and Engineering costs,
- Development hardware costs,
- Qualification costs,
- Costs for additional test equipment or changes to test equipment,
- Costs for additional tools or tooling changes,
- Costs for items to be scrapped as a result of the change,
- Costs for technical documentation,
- Other costs The year in which these costs will occur shall be stated.

Block 29: Estimated Non-Recurring Costs (retrofit / spares)

In this block cost shall be provided for retrofitting the change on delivered engines (material and labour including test) and estimated costs for spare parts (material, labour and test fabrication). For each item the following details have to be given:

- Number of units,
- Costs per unit,
- Total costs.

The year in which these costs will occur shall be given.

Block 30: Anticipated Effects on Contractual Rates

Any estimated changes to the contractual rates for time and material customers or total care style agreement rates shall be entered here.

Block 31: Estimated Recurring costs per unit / engine set

The estimated recurring costs for incorporation of the change in production shall be specified. This includes:

- Material costs,
- Labour fabrication,
- Amortisation for non-recurring development costs (if applicable); costs for amortisation have to be stated only in the case of an agreement concerning amortisation. All recurring costs shall be specified per part or unit. The costs per unit as well as the cost difference to the previous standard shall be shown.

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Block 32: Anticipated / proposed validation actions

A description of the proposed validation strategy has to be given.

Block 33: Logistic data (Estimated)

The estimated number of units affected by the change shall be given for development and production units. It shall be stated how much the following are affected by the change.

- Delivered units,
- Units in manufacture,
- Units on order

It has to be stated, when the first modified unit is available for test purposes. The date for the test clearance has to be stated as well. The date for the introduction of the modification in current manufacturing and retrofitting has to be given for development and production units. The delivery rate (units per month) has to be stated. The envisaged point of embodiment in production (serial number of first modified unit) has to be stated.

Block 34: Major Milestones

From the suppliers outline plan, the key milestone dates should be entered in this section

Continuation Sheet

The continuation sheet is to be used as required.

The return of the form to the supplier, fully signed by Rolls-Royce, signifies the end of Stage 2, unless the decision is deferred.

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DCP Stage 3 (Detail Design Solution)

Blocks 1 to 15 inclusive.

The information in blocks 1 to 15 inclusive can be read across from the DCP Stage 2 document. However, the originator must ensure that the original information submitted is reviewed against any new information gained during the development of the detailed design solution and required changes captured in the appropriate blocks.

Block 16: Supplier signatures

This block shall contain approving signatures for the detailed technical and commercial content of the submission. These cannot be read across from Stage 2 document.

Block 17: Statement PCB

This block serves to record the Rolls-Royce PCB decision on the proposed detail design solution. A clear statement will be made indicating if the proposal is rejected or approved and also any restrictions and specific instructions.

Block 18: Signature block (PCB Decision)

This block serves to signify the decision of the Rolls-Royce PCB on the proposed detailed design solution. The DCP should be signed as per stage 1.

Block 19: Description of the detailed design solution

The technical aspects of the detail design solution shall be detailed here, continuation sheets are permissible as required.

Blocks 20, 21 and 22: Evidence of Necessity / Incorporation Policy / Complementary Changes

The information in blocks 20, 21 and 22 can be read across from the DCP Stage 2 document. However, the originator must ensure that the original information submitted is reviewed against any new information gained during the development of the detailed design solution and required changes captured in the appropriate block. Any new inputs should be in addition to that recorded in Stage 2.

Block 23: Attachments

Attachments to the DCP, if any, shall be specified in this block by document type (e.g. drawing) and document number.

Block 24: Effects of proposed change

Boxes "YES" or "NO" shall be ticked as appropriate. Effects ticked "YES" shall be detailed.

The guidance for the completion of this table is as defined in Stage 2. However it is expected that the information is defined more accurately at this Stage. Therefore any read across should be approached with extreme care.

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Block 25: Affected Documents

All documents, which are affected by the proposed change have to be listed here (e.g. schemes, drawings, specifications). The proposed change action for the documents have to be stated. Any new inputs should be in addition to that recorded in Stage 2.

Block 26: Economic Conditions

See guidance in Stage 2.

Block 27: Currency

See guidance in Stage 2.

Block 28: Non-Recurring Costs

The supplier shall specify the costs for the preparation of the proposed change. Non-recurring costs of a change include in particular:

- Design and Engineering costs,
- Development hardware costs,
- Qualification costs,
- Costs for additional test equipment or changes to test equipment,
- Costs for additional tools or tooling changes,
- Costs for items to be scrapped as a result of the change,
- Costs for technical documentation,
- Other costs (i.e. Regularity Body fees etc).

The year in which these costs will occur shall be stated.

Block 29: Non-Recurring Costs (retrofit / spares)

In this block cost shall be provided for retrofitting the change on delivered engines (material and labour) and costs for spare parts (material and labour fabrication). For each item the following details have to be given:

- Number of units,
- Costs per unit,
- Total costs.

The year in which these costs will occur shall be given.

Block 30: Effects on Contractual rates

Any changes to the contractual rates for time and material customers or total care style agreement rates shall be entered here.

Block 31: Recurring costs per unit / engine

The recurring costs for incorporation of the change in production shall be specified. This includes:

- Material costs,
- Labour fabrication,
- Amortisation for non-recurring development costs (if applicable); costs for amortisation have to be stated only in the case of an agreement concerning amortisation.

All recurring costs shall be specified per part or unit. The costs per unit as well as the cost difference to the previous standard shall be shown.

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Where spares, repair and overhaul costs are affected the impact shall be identified on a continuation page

Block 32: Planned validation actions

A description of the planned validation strategy has to be given.

Block 33: Logistic data

The number of units affected by the change shall be given for development and production units. It has to be stated how much the following are affected by the change.

- Delivered units,
- Units in manufacture,
- Units on order

It has to be stated, when the first modified unit is available for test purposes. The date for the test clearance has to be stated as well. The date for the introduction of the modification in current manufacturing and retrofitting has to be given for development and production units. The delivery rate (units per month) has to be stated. The envisaged point of embodiment in production (serial number of first modified unit) has to be stated.

Block 34: Major Milestones

From the suppliers plan, the key milestone dates should be entered in this section.

Continuation Sheet

The continuation sheet is to be used as required.

The return of the form to the supplier, fully signed by Rolls-Royce, signifies the end of Stage 3, and the go ahead to complete work up to modification/ standardisation approval commencement, unless the decision is deferred.

Authorisation and Change History

Issue	Reason for Issue	Date
1.0	First Issue of Guidelines.	1 st . Oct. 2006
2.0	Various changes to clarify process	1 st April 2007