

Landing Systems

Title: ENGINEERING CHANGE REQUESTS	Doc#: LS-LG-W309-ENG
Functional Group: IN-PRODUCTION ENGINEERING	Revision: 01

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1. **PURPOSE/SCOPE**

1.1. **Purpose**

1.1.1. The purpose of this document is to define the process for the management of engineering change requests within Landing Gear (LG) Engineering in all lifecycle phases post the Collins Management System (CMS) Gate 5 (Produce to Deliver, Service & Support, etc.) and optionally during the preliminary design Phase 4 (Design and Development). In the Design & Development phase (between CMS Gates 4 and 5), this document is an optional best practice for Integrated Project Teams (IPT) for use prior to drawings being released for manufacture, however, it shall be followed post drawing release for the purposes of change management and configuration control. The process has the following objectives:

- Provide a manageable system for capturing costs associated with implementing Engineering Change Requests.
- Provide a manageable system for capturing engineering hours associated with implementing Engineering Change Requests.
- Provide a manageable system for capturing timelines associated with implementing Engineering Change Requests.
- Provide traceability of the change from request to implementation.

1.1.2. This document also describes the procedures for processing the Engineering Change Proposal Request Form (ECPR), as defined in Section 5.0 of this procedure

1.2. **Scope**

This document provides the applicable procedures to generate a request for change to technical data, including:

- Drawings
- Models
- Parts Lists
- Notes Lists
- Proprietary Specifications or Acceptance Test Procedure (ATP)

ECPR can also be used for other engineering documents (ex. D, S or P docs), but not mandatory.

For supplier design data changes, see section 5.3.5.

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2. **RESPONSIBILITIES**

The requirements in this document are applicable to all Collins Landing Systems (Landing Gear) personnel using or reviewing the ECPR form, including design contractors, suppliers and temporary (co-op) employees.

2.1. **ECR Coordinator**

The ECR Coordinator is responsible for assigning the ECPR number, entering the ECPR into the PLM system, and routing it to the Design Lead/Project Lead.

The ECR Coordinator is responsible for closing the ECPR and notifying the originator of the request's closure.

2.2. **Design/Project/Material Lead**

The appropriate Design, Project or Material Lead is responsible for reviewing, approving or rejecting the ECPR and creating the approval routing.

On non-proprietary programs, the Design or Project Lead is responsible for communicating the change request (for review or incorporation) to the customer, receiving the engineering package from the customer, and releasing the engineering package to Design Engineering for release in the PLM system.

The Design or Project Lead is responsible for transferring the ECPR onto an ECP.

2.3. **Subject Matter Expert**

When required, the Design, Project or Material Lead may determine that specific Subject Matter Expert (SME) review of the change request is required and will add them to the ECPR routing.

Each SME is responsible for reviewing their area of expertise and approving/rejecting as appropriate.

NOTE: SME include (but not limited to) Stress, Performance, Materials, Production Planning, Manufacturing Engineering or Quality.

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2.4. Value Stream Leader

The Value Stream Leader (VSL) is responsible for reviewing, approving or rejecting the ECPR and must decide if the change request should be presented at CCB and/or submitted to Customer for approval (outside of the Task Review tool).). The VSL has the authority to determine if the change is obviously to be made (e.g. corrections or omissions) and can approve and provide guidance to implement the change without taking the request to the CCB.

The VSL may also be responsible for communicating the change request to the customer, receiving the approved engineering package from the customer and then sharing the approved engineering package with Design Engineering for final release in the PLM system. The VSL and the Design/Project/Material Lead should coordinate and agree on who submits the change request and coordinates with the customer depending on the particular(s) and circumstance(s) of the change.

For Programs in the Design and Development Phase: the VSL shall review and approve/reject all ECPR's, including all requests from the SME's and/or functional Chiefs for standards and commonization. This is especially important in the Development phase because of potential impact to parts, possibly already being manufactured, and thus overall impact to Program Schedule and financial impact to the program's Estimate at Complete (EAC).

NOTE: For this process, VSL is known as Program Mgmt (PM) in the PLM system

2.5. Customer

Depending on contract requirements, the customer may be the final authority for the change request to proceed.

2.6. Design Engineering

Design Engineering is responsible for final review of the ECPR, rejecting or incorporating the change into the engineering technical data. Design Engineering may also be responsible for communicating the change request (for review and/or incorporation) to the supplier or customer, receiving the engineering package from the supplier or customer, and releasing the supplier's or customer's engineering package.

Design Engineering can also transfer the ECPR onto an ECP.

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2.7. Procurement/Supply Chain

Procurement/Supply Chain (also referred to as the “Collins Contact”) is responsible for reviewing, approving or rejecting the ECPR if/when the Design/Project/Material Lead has identified them in the ECPR routing.

Procurement/Supply Chain is also responsible for communicating the change package (ECPR and ECPR Report) to the supplier via the Collins file transfer system per instructions found in the [LG Request for Data Transfer Template](#).

2.8. Materials (M&PT)

Materials is responsible for incorporating and releasing the change into the engineering documentation.

3. REFERENCES/FORMS

NOTE: Any documents referenced are considered applicable at time of writing. Changes/revisions to the documents and/or their replacements will be captured during the next release of this procedure.

The following Landing Gear documents are applicable to, form part of, or are referenced in this procedure:

•	LS-LG-P306-ENG	Engineering Release Record (ERR)
•	LS-LG-P307-ENG	Engineering Change Proposal Development Procedure
•	LS-LG-P105-ENG	Collins Management System
•	LS-LG-F014-ENG	Engineering Change Proposal Request (ECPR) – Internal
•	LS-LG-W314-ENG	ECPR: Task Manager and Task Review Data Entry
•	LS-LG-W313-ENG	Engineering Coordination Memo (ECM)
•	SI 300-002	Supplier Data Item Review

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4. DEFINITIONS/ACRONYMS/ABBREVIATION

- **Collaboration Authorization Plan (CAP)** – Document that acts as an ITC authorization tool for an activity defined by a specific scope such as authorized parties and applicable countries involved, technology/technical data involved or platforms/programs/projects or product Categories/lines and methods of transfer.
- **Change Control Board / Configuration Change Board (CCB)** - The CCB is a group of stakeholders/functional leaders responsible for functional analysis of proposed changes against the current state, and implementation of change as applicable.
- **Engineering Change Proposal (ECP)** - Generic name for engineering document used to communicate change request to the Configuration Change Board and to the Customer.
- **Engineering Change Proposal Request (ECPR)** - The ECPR form is used to notify Engineering of the need for a change against an Engineering drawing, model, Parts List, Notes List, Specifications, Acceptance Test Procedure or other engineering document.
- **Engineering Change Request (ECR)** - The ECR is the PLM object used to implement and track Engineering changes, within the PLM system. It's also the object name used for the ECPR in the PLM system.
- **Engineering Data Package** – Document, Model, Sheet, Parts List or any other engineering data affected by the ECPR.
- **Engineering Release Record (ERR)** - The ERR process is used to authorize the release of all engineering changes and related customer supporting configuration documentation.
- **File Transfer System (FTS)**: secure system allowing employees to manage, view and control file transfer activity. It is used by Collins to transfer data internally and externally.
- **Product Lifecycle Management (PLM)** - The Goodrich Landing Gear PLM System manages and secures the Engineering intellectual property and their processes in a collaborative environment for real-time access to current information by the corporation, customers and suppliers.

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5. **REQUIREMENTS**

5.1. **Change Request Form**

Engineering Change Requests objects (ECR) are generated using Engineering Change Proposal Request (ECPR) Form LS-LG-F014-ENG. The ECPR is used as a means to formally document any problem, proposal suggestion or change request to an Engineering drawing, model, Parts List, Notes List or document. The intent of the ECPR is to advise Engineering of proposed changes, which may correct any error or omission, or improve the manufacturing or design aspects of a part or assembly.

The ECPR process is a twofold process which includes a “Review” cycle (approvals) cycle and an Action cycle (incorporation). The approval cycle only indicates intent to change the engineering or document. The incorporation cycle is completed when an ERR has been raised.

The ECPR is considered closed when the incorporation cycle is completed and the ECPR Report has been emailed to the originator (internal) or the supplier’s contact.

NOTE: Failure to fill out the ECPR form in its entirety may result in Engineering and/or Program Management rejecting the form and cause delays in review and implementation of the changes.

IMPORTANT: The ECPR form contains legal, government and proprietary data markings that occasionally change. Always ensure latest issue of the ECPR form is used to ensure data marking is valid and to avoid the ECPR being rejected.

5.2. **Compiling the Form**

LS-LG-F014-ENG is an electronic form and is available in Pilgrim and in the Collins file transfer system. The ECPR form can be initiated by any person requesting an Engineering change either internally, or externally. ECPRs can be raised for production and spares data.

ECPRs are serialized and the ECPR # is obtained from the ECR Coordinator (LGD.Glgecpr@collins.com).

The ECPR form shall be filled out in a clear and concise manner, as follows:

5.2.1. General Information (Originator):

5.2.1.1. ECPR #: Reserved field to be completed by Collins ECR Coordinator.

5.2.1.2. DATE INITIATED: Date ECPR is created.

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- 5.2.1.3. ORIGINATOR NAME: Identify the person who initiates the ECPR form.
- 5.2.1.4. ORIGINATOR EMAIL: Include the originator's e-mail address.
- 5.2.1.5. SUPPLIER NAME: Identify who supplies the part (internal, inter-co, supplier).
- 5.2.1.6. COLLINS CONTACT NAME: If the ECPR is generated by a supplier, clearly indicate the name of the Collins contact that will need to notify the supplier of ECPR status or work package.
- 5.2.1.7. AIRCRAFT PROGRAM: Indicate the aircraft model (i.e. A380, F35, B737, etc...)
- 5.2.1.8. COLLINS DWG/MODEL/DOC #: Indicate the Collins drawing, model or document number which is affected by the change request.

IMPORTANT: Only one drawing, model or document number can be processed on an ECPR at one time. If there is more than one number specified, the ECPR will be rejected. The drawing, model or document must be a Collins number. Multiple issues per drawing, model or document cannot be processed on the same ECPR.
- 5.2.1.9. DWG/MODEL/DOC DESCRIPTION: Briefly state the drawing, model or document title.
- 5.2.1.10. DWG/MODEL/DOC Rev.: Identify the current revision of the drawing, model or document.
- 5.2.1.11. DWG SHT/CAPTURE: Enter the affected drawing sheet number(s) or capture name.
- 5.2.1.12. DWG ZONE: Enter the drawing affected zone (not applicable to Model Based Definition programs).

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5.2.1.13. ECPR CLASS: Select one option from the drop down box.

CLASS	DEFINITION
Design Improvement	Part/Assembly design can be improved.
Engineering Data Discrepancy*	Engineering drawing, model, Parts List, Notes List, proprietary Specifications, Acceptance Test Procedure (ATP) or other engineering documentation needs to be corrected or improved.
Manufacturing Producibility *	Manufacturing, assembly or inspection can be improved or cannot be performed with the current equipment.
In-Service Support	Drawing, Model, Specification needs to be corrected/updated to support in-service reparability.
Request for Clarification	No drawing, model or specification change required. Additional information only.

** Must be used in conjunction with the IMPACT*

5.2.1.14. ECPR IMPACT: Select one option from the drop down box

IMPACT	DEFINITION
Producible *	Issue does not prevent the manufacturing, assembly, inspection or delivery of the part.
Non-Produced *	Issue prevents the manufacturing, assembly, inspection or delivery of the part.

** Mandatory for Engineering Data Discrepancy and Manufacturing Producibility classes*

5.2.1.15. TECHNICAL DATA: Indicate if the content of the ECPR is considered Technical data (YES) or not (NO).

5.2.1.16. JURISDICTION/CLASSIFICATION: Use this section to provide all classifications if required.

5.2.1.17. REF. QN(s) or OTHER: If the change is quality related, enter the affected QN(s), otherwise use this space for any other reference needed.

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5.2.2. Problem

The originator shall clearly indicate the nature of the problem such as (but not limited to) identifying the affected model, drawing sheet number, zone, view, dimension, note, Notes List, Parts List, document paragraph, or exact Engineering characteristic.

5.2.3. Recommendation

The originator shall clearly describe the FROM statement (i.e. condition prior to the change) and the TO statement (i.e. condition after the change).

5.2.4. Benefits

- 5.2.4.1. PRICE REDUCTION (PER UNIT): For Design Improvement and Manufacturing Producibility (Producible) ECPRs, it is expected that cost savings will accompany the ECPR request.
- 5.2.4.2. LEAD TIME REDUCTION (PER UNIT): For Design Improvement and Manufacturing Producibility (Producible) ECPRs, where cost savings are not possible, it is expected that Lead Time reduction will accompany the ECPR request.
- 5.2.4.3. ADDITIONAL COMMENTS: For Design Improvement and Manufacturing Producibility (Producible) ECPRs, where cost savings or lead time reduction are not possible, it is expected that a detailed description of the benefit of this change be added in this section. The continuation sheet can also be used for that effect but must be referenced in this section.

IMPORTANT: Failure to fill out the Benefits section can result in the form being rejected and cause delays in review and implementation of the changes.

5.2.5. Continuation Sheet

The Continuation Sheet can be used for any additional information pertinent in the evaluation of the change such as (but not limited to) photos, special instructions, email communications, etc. It is the only space where attachments can be added.

NOTE: A Safety Data Sheet (SDS) is required to be attached to the ECPR form for any new product or chemical addition into LGPS, LGMS, LGQP, drawings or models. A best effort should be made to submit SDSs for all world-wide locations where that product could be used in the manufacture of the part. For example, if sealant PR-1234 B1/2 is being added to a spec, an SDS

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for US, Canada and EU jurisdictions are required to ensure proper assessment against all chemical regulations. Assessment gaps will increase the risk of business disruptions

5.3. Process Flow

5.3.1. The flow of an ECPR as it is being processed is shown in Section 6 and is detailed in LS-LG-W314-ENG.

5.3.2. The ECPR shall be completed as described in Section 5.2.

5.3.3. Submission of Internal ECPRs

Domestic (same location as ECR Coordinator) ECPR shall be reviewed for technical data by the originator, the appropriate TECHNICAL DATA box will be checked and the word document will then be emailed to the ECR Coordinator (LGD.Glgecpr@collins.com).

International (location other than ECR Coordinator) shall be reviewed for technical data by the originator and the appropriate TECHNICAL DATA box will be checked. For ECPR containing technical data and where no CAP is in place, the originator will proceed with xClass and TEXTPORT prior to releasing the ECPR to the Collins file transfer system. Non-technical ECPR can be emailed to the ECR Coordinator or posted in the program/location transfer folder.

The ECR coordinator will review for completeness (reject if incomplete), and log it into the PLM System (which will automatically generate a number), and notify the originator via email. The ECR Coordinator will proceed with the Jurisdiction/Classification of the ECPR and then will route the ECPR to a Design/Project/Materials Lead.

5.3.4. Submission of Supplier initiated ECPRs

ECPR shall be done through the supplier's file transfer folder. The ECR Coordinator will retrieve the ECPR, review for completeness, log it into PLM system (which will automatically generate a number), notify the Originator AND their Collins Contact (as indicated on ECPR) of the number. The ECR Coordinator will proceed with the Jurisdiction/Classification and route the ECPR to a Design/Project/Materials Lead.

Supplier may or may not provide Jurisdiction/Classification as mandated by their organisation.

IMPORTANT: *if the Collins Contact receiving notification is not the right person, the ECR Coordinator must be informed as the ECPR Closure Report is sent to the Collins contact and the posting the closed ECPR/Report is their responsibility.*

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5.3.5. Submission of Supplier Design Data proposed changes

5.3.5.1. If the change request involves a change to supplier design data only, supplier shall contact Collins Procurement/Supply Chain in order to obtain the change request package. Once the engineering data is completed, the supplier will return the package to Engineering on an ECM via the file transfer system. Engineering will review the package and provide the SDIR disposition as per SI 300-002.

5.3.6. Design/Project/Materials Lead ECPR Assessment

- 5.3.6.1. If a change is not required and/or feasible, the Design/Project/Material Lead shall enter a detailed reason for their decision and reject the change in the PLM system. The ECR Coordinator will be notified and send the ECPR Status Report to the originator. The ECPR is automatically rejected in the PLM System.
- 5.3.6.2. If it is determined that the ECPR should be transferred to another process (Engineering Change Proposal (ECP) for example), the Design/Project/Materials Lead will indicate the number in the "Forms" and complete their task. The ECR Coordinator will be notified and send the ECPR Status Report to the originator.
- 5.3.6.3. If it is determined a change is necessary, the Design/Project/Material Lead creates an approval routing and an incorporation routing in the Task Manager and proceed to Section 5.3.6. The Program Manager (PM) shall be added on every routing.

5.3.7. ECPR Review Cycle

IMPORTANT: An ECPR can be rejected at any level of the review cycle. The ECR Coordinator is notified of the rejection and will send out the ECPR Status Report to the originator or the Collins contact and copies all approvers that have already completed their task. Transferred ECPR are processed the same way. Refer to Table 1 for Turn-Around-Time requirements.

- 5.3.7.1. The Design/Project/Material Lead completes their review activity by including an estimate of the number of Engineering hours and/or any other relevant information required to implement the change in the Remarks section and complete their Task Manager activity. The approved ECPR shall then be forwarded to the next task (SME or directly to PM) in the task routing for review and approval.

During any phase, if the incorporation of the change is estimated at 100 hours or \$10,000 in expense, an ECE shall be raised prior to starting the work.

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- 5.3.7.2. The PM shall review each ECPR (other than Clarification Request ECPR) for scheduling and financial impact. If the Program Manager determines the change is not required, the Program Manager will reject the ECPR and the ECR Coordinator will be notified and send the ECPR Status Report to the originator. The ECPR is closed by the PLM system.
- 5.3.7.3. The PM may determine that a Program Change Request (PCR) is required to manage the change. Once the PCR is raised, the PM will indicate the number in the PLM system and complete their task. The ECR Coordinator will be notified and send the ECPR Status Report to the originator and the ECPR is closed by the PLM system.
- 5.3.7.4. In the event that it is determined a change is commercially acceptable, Program Management will approve the ECPR by completing their task review activity.
- 5.3.8. ECPR Implementation Cycle
- IMPORTANT: An ECPR can be rejected at any level of the implementation cycle. The ECR Coordinator is notified of the rejection and will send out the ECPR Status Report to the originator or the Collins contact and copies all approvers that have already completed their task. Transferred ECPR are processed the same way. Refer to Table 1 for Turn-Around-Time requirements.*
- 5.3.8.1. If the change request involves a change to customer data, Engineering shall generate an engineering change proposal in accordance with contract requirements and will transfer the ECPR to the ECP process per LS-LG-W314-ENG. Should an ECP not be required, the Customer will be notified of the change request by Design Engineering via an ECM which will include all relevant information. The ECPR can then be closed using the ECM/SEM number used to communicate the change proposal.
- 5.3.8.2. If the change request involves a change to **supplier design data, Collins** Procurement/Supply Chain will provide them with the change request package. Once the engineering data is completed, the supplier will return the package to Engineering on an ECM via the file transfer system. Design Engineering will review the package and if acceptable, they will complete the "Design Partner" task, raise the ERR in accordance with LS-LG-P306-ENG and complete the final Task Manager activity (Design Eng > ERR). The ECPR shall be associated with these Change Objects via the ERR number. **This paragraph is only applicable to supplier design data only.**
- 5.3.8.3. If the change request involves a change to Collins data, Engineering shall incorporate the applicable changes and release the affected items (Change Objects) into the PLM System, raise the ERR in accordance with LS-LG-P306-ENG and complete their Task

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Manager activity. The ECPR shall be associated with these Change Objects via the Engineering Release Record (ERR) number.

5.3.9. ECPR Closure

The ECR Coordinator is notified of the Task Manager Activity completion and will send out the ECPR Status Report to the originator (internal ECPR) or Collins Contact (supplier ECPR) and Design/Project/Material Lead informing them the ECPR is closed. The Collins Contact is responsible for notifying the supplier.

NOTE: Only the domestic Collins contact will receive a copy of the ECPR; all other originators will need to access the PLM system to view the document. No technical data will be sent via email outside of ECR Coordinator's location.

Table 1: Turn-Around-Time (TAT)

CLASS	IMPACT	TAT (d)	DEFINITION	Benefit
Design Improvement	N/R	120	Part/Assembly design can be improved.	YES
Engineering Data Discrepancy	Producible	120	Drawing, Model, Specification needs to be corrected. Does not prevent producibility of part.	N/R
Engineering Data Discrepancy	Non-Produced	45	Drawing, Model, Specification needs to be corrected. Prevents producibility of part.	N/R
Manufacturing Producibility	Producible	120	Manufacturing, assembly or inspection can be improved.	YES
Manufacturing Producibility	Non-Produced	45	Manufacturing, assembly or inspection cannot be performed with the current requirements.	N/R
In-Service Support	N/R	120	Drawing, Model, Specification needs to be corrected/updated to support in-service reparability.	N/R
Request for Clarification	N/R	5	No drawing, model or specification change required. Additional information only.	N/R
Design and Development	Producible	30	Drawing, Model, Specification needs to be corrected or manufacturing, assembly or inspection can be improved. If deviation in TAT is acceptable, target for completion should be agreed by the IPT at CCB.	YES
Design and Development	Non-Produced	5	Drawing, Model, Specification needs to be corrected to allow producibility of part, manufacturing, assembly or inspection that cannot be performed with the current requirements.	YES

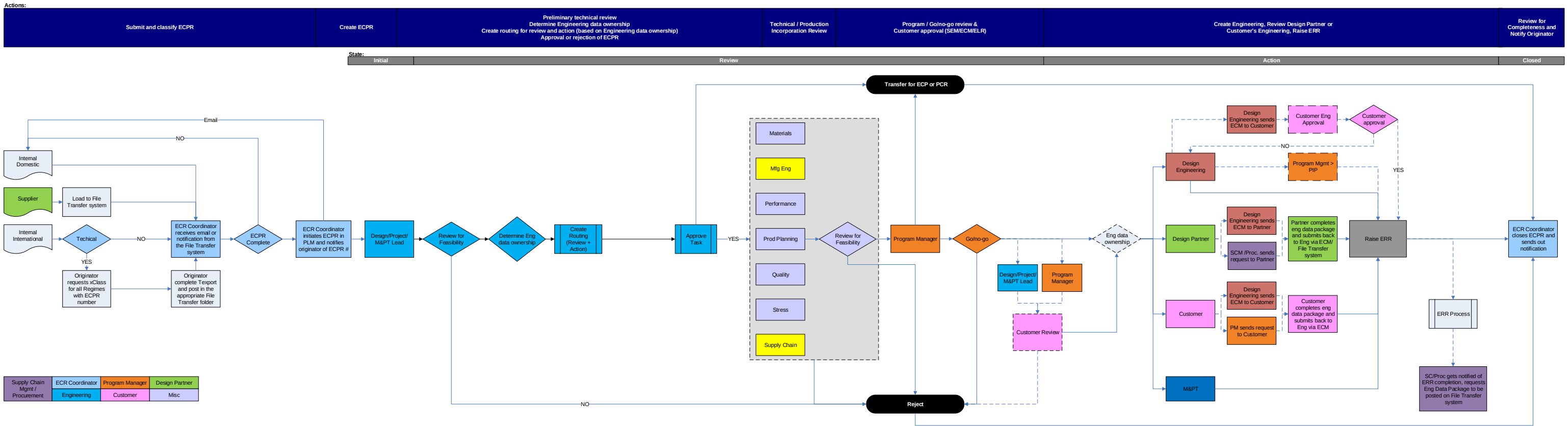
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6. ENGINEERING CHANGE PROPOSAL REQUEST (ECPR) FLOW



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7. SIPOC

7.1. ECR Coordinator

Suppliers	Inputs		Process	Output		Customers
	Description	Quantified measure		Description	Quantified measure	
Suppliers Ops Tech Pubs Customer	Engineering Change Proposal Request (ECPR)	Email checked daily and ECPRs entered or closed in the system twice daily or as required.	Releasing ECPRs in the PDM system for review and action. Closing ECPRs when they are completed or have been rejected.	Email record with ECPR number and copy of amended ECPR. Closure Report with copy of ECPR and signature report.	ECPR number and ECPR closure report ≤ 24 hrs.	Suppliers Ops Tech Pubs Customer

7.2. Design/Project/Material Lead

Suppliers	Inputs		Process	Output		Customers
	Description	Quantified measure		Description	Quantified measure	
Suppliers Ops Tech Pubs Customer	Engineering Change Proposal Request (ECPR)	ECPR routing and remarks	Reviewing the ECPR. Assigning the routing.	ECPR approval and recommendations or ECPR rejection and reasons or other process reference numbers.	ECPR is reviewed, routed, approved or rejected in < 5 to 120 days	Suppliers Ops Tech Pubs Customer

7.3. Subject Matter Experts

Suppliers	Inputs		Process	Output		Customers
	Description	Quantified measure		Description	Quantified measure	
Design/ Project/ Material Leads	ECPR approvals and recommendations	ECPR remarks	Reviewing the ECPR. Rejecting the ECPR. Transferring the ECPR to another process	ECPR approval and recommendations or ECPR rejection and reasons or other process reference numbers.	ECPR is reviewed, approved or rejected in < 5 to 120 days	Suppliers Ops Tech Pubs Customer Reviewers and actionnees.

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7.4. Actionees

Suppliers	Inputs		Process	Output		Customers
	Description	Quantified measure		Description	Quantified measure	
Subject Matter Experts/ PM	ECPR approvals and recommendations	ECPR remarks	Reviewing the ECPR. Rejecting the ECPR. Transferring the ECPR to another process	ECPR approval and recommendations or ECPR rejection and reasons or other process reference numbers.	ECPR is reviewed, approved or rejected in < 5 to 120 days	ECR Coordinator

Revision Description			
Revision	Date Entered into SmartSolve	Summary and Reasons for Changes	Originator
00	11-Nov-2021	>> LS-LG-W309-ENG supersedes LS-LG-W-309-ENG <<	L. St-Pierre
01	24-May-2024	Added LS-LG-W313-ENG to Section 3 Added Section 5.3.5.	P. Sherman/ S. Alibeigi

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