Control of Substances in Collins Aerospace Products Procedure

Author: Enterprise Materials Engineering Advanced Materials & Processes	Issue Date: February 3, 2020 Effective Date: May 3, 2020

1.0 PURPOSE / SCOPE

This document defines Collins Aerospace requirements for the identification, reduction, and elimination of Materials of Concern (MOCs) in the design, manufacture, and repair of Collins Aerospace products. This includes all vendor designed and supplied items including commercial off-the-shelf (COTS) parts.

This procedure manages risk by identifying and recording substances used in the product definition and by establishing requirements for substances identified by Collins Aerospace as Prohibited, Highly Restricted, and Restricted. Risk management is required to comply with both present and future regulatory and/or customer requirements. The identification of the presence of high impact-high probability substances in our products will create a competitive advantage and lead to cost avoidance.

The substances classified as Prohibited, Highly Restricted, and Restricted are identified in the Collins Aerospace MOC List. The Collins Aerospace MOC List is located at the following URL: https://utcaerospacesystems.com/green-products/

Tracking and elimination of MOCs at the enterprise level enables Collins Aerospace to align every functional discipline to use a common set of requirements, language, process structure, compliance tooling/documentation, and alternate material evaluation strategies. Through this functional excellence principle, Collins Aerospace provides industry leading capability to mitigate evolving compliance risks and customer requests through interdisciplinary alignment.

This procedure applies to substances which are required by the product definition and those which remain with the delivered product. The controls on substances described herein will apply to delivered hardware in addition to substances required for manufacturing, operating, packaging, maintaining, and preserving hardware, including all other chemicals required for the processing of a product.

This document shall be supplemented by additional documents for each Strategic Business Unit (SBU). It is in those documents that SBU specific practices shall be made and controlled.

Compliance to regulatory standards are managed independently from this procedure. Environmental regulatory standards, such as REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals), are mandated through legislative compliance at the point of manufacture and/or customer contracts. The Collins policy and procedure regarding the EU REACH regulation is covered by COL-ENG-POL-0001 and COL-ENG-PRO-0006, respectively.

2.0 RESPONSIBILITY

2.1 General Responsibility

It is a collective responsibility across Collins Aerospace organizations to ensure compliance to this procedure. Collins Aerospace and Collins Aerospace suppliers shall identify, report, manage, and approve the use of MOCs per this process. The functional group terms in the following sections are considered representative and may vary based on individual SBU job descriptions.

It is the responsibility of each respective SBU Engineering and Supply Chain to develop a process to comply with the requirements of this procedure for heritage parts. Heritage parts not being incorporated into new designs are the responsibility of their respective SBU to determine if it is appropriate to review per this procedure. Collins Aerospace functional groups as defined by this procedure are responsible for the technical requirements of this procedure for build-to-print parts.

Suppliers that design parts for use in Collins Aerospace products shall be responsible for compliance with the technical requirements of this procedure. All supplier designs will be reviewed and approved by the appropriate SBU and engineering support teams.

Changes to this procedure are the responsibility of Enterprise Engineering Advanced Materials and Processes.

2.2 Strategic Business Unit

Each Strategic Business Unit (SBU) and each SBU site has the responsibility to track, approve, and report on Prohibited, Highly Restricted, and Restricted material usage as outlined in the requirements of this procedure. Each SBU is responsible to implement this procedure and the controls necessary to show compliance.

The SBU has the responsibility to ensure that the overhaul and repair operations, including all product maintenance and repair documentation at Collins Aerospace facilities are controlled to the requirements of this procedure. All product maintenance and repair documentation shall comply with these procedures.

The SBU shall determine which functional group is responsible for MRO and Operational Control Activity.

The SBU is responsible for implementing supplementary procedures, if applicable. The SBU Supplement procedure shall establish the responsibilities for the following functional groups.

- Engineering
- Purchasing
- Supply Chain
- Program Office and Contracts

2.3 Executive Management

Executive management of each SBU and site is responsible for the implementation of and compliance with this procedure. Managerial and supervisory staff at each site will be responsible for supporting implementation and compliance based upon their individual levels of authority and control.

3.0 REFERENCES

- COL-ENG-POL-0147 Control of Substances in Collins Aerospace Products Policy
- COL-ENG-POL-0001 Control of Substances in Collins Aerospace Products Policy
- COL-ENG-PRO-0006 EU REACH Management System: Procedure
- COL-ENG-FRM-0146 Prohibited Material Form
- COL-ENG-FRM-0147 Highly Restricted and Restricted Form
- NAS411 Hazardous Materials Management Program

4.0 DEFINITIONS/ABBREVIATIONS

- Article: An object that during production is given a special shape, surface, or design that determines its function to a greater degree than does its chemical composition.
- Approved Suppliers: Suppliers approved for procurement by Collins Aerospace Quality System.
- Build-to-Print Parts: Parts that are either made in house or made at an outside vendor according to the design details prescribed on the engineering drawing. Build-to-Print parts includes both Collins Aerospace designed parts and customer designed parts that are built within Collins Aerospace facilities.
- COTS: Commercial Off-the-shelf (COTS): A term used to describe the purchase of packaged solutions, such as catalog items, which then may be adapted to satisfy the needs of the purchaser.
- Design: Refers to any part designed and controlled by Collins Aerospace specifications and drawings.
- Design Owner: Company and/or organization that owns design authority of a part or product.
- EH&S: Environment, Health, and Safety
- Engineering: The functional group within an SBU that has the responsibility of defining the product. Actions assigned to Engineering, unless otherwise stated, are assigned to the appropriate Director, General Manager, Chief Engineer or equivalent of Engineering, or their designees.
- ETFA: Economic and Technical Feasibility Analysis
- Functional Group (functional discipline): A department, organization, or group that performs a specific function for Collins Aerospace. This includes Engineering, Supply Chain, Procurement, Executive Management, and many other groups. This may include sub-groups within a functional group, for example: project engineering, design engineering, materials engineering, etc.
- Highly Restricted Material: A material is classified as “Highly Restricted” when it poses a high Environmental Health & Safety risk, is likely to be more stringently regulated in the future, and is highly restricted by our customers. Suitable alternatives may not exist for all materials/applications in this group but technology to qualify suitable replacements is being actively pursued. Substances marked as "HR - Military" apply to military programs only. Highly restricted materials shall be moved to the prohibited list when technically and economically viable alternatives are qualified for use or when policies and regulatory activities dictate.
- Heritage Parts: Parts designed and/or manufactured prior to the newer regulations and rigorous MOC review processes.

- IAEG: International Aerospace Environmental Group (IAEG) industry standard list of potentially harmful substances that may be incorporated into aerospace and defense products. Updated periodically. Located at the official IAEG website.
- Materials of Concern (MOCs): Materials of Concern (MOCs) are substances that have been identified as potentially harmful or threatening to human health and/or the environment.
- Military Standard Parts: A part manufactured to a military design standard.
- MRO: Maintenance, Repair, and Overhaul
- NAS411: National Aerospace Standard (NAS) 411 was created by the Aerospace Industries Association (AIA) as an industry standard to manage hazardous material (HAZMAT) used in Products and Services.
- Personal Protective Equipment (PPE): Clothing, helmets, googles, or other garments or equipment designed to protect works from potential hazards in the work environment.
- Process Family: Database of chemical processes defined by Green Products office, which identifies common constituents with similar specifications.
- Product: A Collins Aerospace product includes sub-assemblies, parts, substances, components, articles, and packaging.
- Product Definition: Product definition is defined as an explicit statement of a material or process on a Collins Aerospace or supplier drawing and the compositional data pertaining to the solution or material used to meet the drawing requirement for the material and processes specified. This includes final product substances and process substances.
- Product Family: Group of products that have definable characteristics that are expected to result in consistent material compositions.
- Prohibited Material: Group of substances identified as prohibited by Collins Aerospace. A material is classified as 'Prohibited' when it poses high Environmental Health and Safety (EH&S) risk and it is regulated and/or it is banned by our customers. Substances marked as "P - Military" apply to military programs only.
- REACH: REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) is the European Union regulation for chemical usage, which went into effect in June 2008. The European Chemicals Agency (ECHA), located in Helsinki, Finland was formed in 2006 to manage technical, scientific and administrative aspects of REACH including providing information on chemicals to ensure their safe use, competitiveness and consistency across the European Union. The ECHA website is a source of information on REACH. This site provides the latest technical guidance, tools, data on chemicals and the Regulation. Reference link: https://echa.europa.eu/web/guest/home
- Restricted Material: A material is classified as 'Restricted' when it poses high EH&S risk, and/or its use is restricted by our customers. Restricted materials shall be moved to the prohibited list when technically and economically viable alternatives are qualified for use or to the highly restricted list when policies and regulatory activity dictate.
- SBU: Strategic Business Unit. This refers to the high-level internal divisions within Collins Aerospace.
- SME: (Subject Matter Expert) A person who is an authority in a particular area or topic.
- Suppliers/Supply Chain: First-tier and all sub-tier direct material suppliers for supplier designed and Collins Aerospace Build-to-Print parts.

5.0 REQUIREMENTS

5.1 General Requirements

Collins Aerospace uses many different sources such as Collins Aerospace SBU, IAEG, UTC, NAS411-1 and customer inputs to compile the Collins Aerospace MOC List. All substances required by the product definition which are identified in the Collins Aerospace 0147 MOC List will require identification, documentation, and approval in accordance with this procedure. Collins Aerospace drawings and specifications shall be reviewed for the use of MOCs at time of release and/or change. If a specific SBU business process does not support review of all engineering changes, other risk based approaches can be implemented to mitigate the risk associated with an evolving MOC list and the modification of materials and processes within the design. The specific SBU shall develop a risk based process which shall be documented per the applicable SBU supplementary procedures, which are listed in Section 3.0 of this document.

Heritage parts, not being incorporated into new designs, will be evaluated if appropriate to meet customer and regulatory requirements.

An economic and technical feasibility review shall be completed for prohibited and highly restricted materials and shall be examined per sections 5.2 and 5.3 and performed per section 5.6.

5.2 Prohibited Substances

Prohibited substances shall not be introduced into new designs, or any manufacturing, assembly, test, maintenance, or repair operation unless required by Collins contract, specification, or engineering drawing. The use of prohibited substances in new designs and drawing changes shall only be permitted after authorized approval at the time of release. For new designs, engineering changes, and heritage parts incorporated into new designs, the following apply:

- Identify prohibited substance(s) used as part of product definition
- Perform Economic and Technical Feasibility Analysis per Section 5.6
- Invoke Operational Control per Section 5.7
- Obtain approval from SBU Materials Engineering, or equivalent
- Obtain approval from the designated SBU Director

The above requirements shall be documented per Section 5.5.

5.3 Highly Restricted Substances

Highly restricted substances shall not be used for new designs or engineering changes when an economically and technically feasible alternative is qualified. The use of highly restricted substances in new designs and drawing changes shall be permitted after authorized approval at the time of release. For new designs, engineering changes, and heritage parts incorporated into new designs, the following apply.

- Identify highly restricted substance(s) used as part of product definition
- Perform Economic and Technical Feasibility Analysis per Section 5.6
- Obtain approval from SBU Materials Engineering, or equivalent

The above requirements shall be documented per Section 5.5.

5.4 Restricted Substances

Restricted substance use is permitted in new designs and engineering changes without engineering approval, but shall be documented per section 5.5.

5.5 Documentation Methods

Documentation of reportable substances, economic and technical feasibility study, management policies, and approvals shall use one or more of the following methods:

- 0147 MOC Workflow Tool (preferred method)
- COL-ENG-FRM-0146 Prohibited Material Reporting Form
- COL-ENG-FRM-0147 Highly Restricted Material Reporting Form

Or equivalent process as determined by the SBU.

Data management is required for MOC reviews, validation, and compliance. Data shall be kept for 10 years, at a minimum.

Documents and files shall be reviewed to determine whether they contain technical data and if so shall be classified and marked prior to transfer outside of a working group. Transfer resulting in an export shall be authorized appropriately.

5.6 Economic and Technical Feasibility Analysis (ETFA)

An economic and technical feasibility analysis shall result in a determination of whether a given alternate to a controlled substance or process is technically or economically feasible. Technical feasibility shall consider possible alternatives in addition to customer requirements and restrictions. Economic feasibility shall consider the entire life cycle of the product, material, or process, including disposal.

This shall be documented per Section 5.5.

5.7 Operational Controls

Applicable substances impose risk to operators and processors and an evaluation of the safe and responsible use of these substances shall be completed. Factors to consider include, but are not limited to:

- Operator training procedure
- Hazard awareness training
- Personal Protective Equipment (PPE) training
- Emission controls
- Waste disposal training procedures

This shall be documented per Section 5.5.

5.8 Declarable Substances from Suppliers

Suppliers shall comply with the requirements of this procedure for all supplier-designed parts including commercial off-the-shelf (COTS) parts. Prohibited substances shall not be used in any supplier-designed parts without approval from Collins Aerospace. Highly restricted substances shall

not be used in supplier-designed parts unless required by Collins Aerospace specification or otherwise approved by Collins Aerospace.

5.9 Process/Product Family

The Process/Product Family Evaluation can be used to report MOCs on many similar products in a large format document. By filling out a form, a Process/Product Family Evaluation can be completed, thus giving an approximation of substance use in a group of parts. Additionally, this can be used to classify a process individually. For completion of a Process/Product Family Evaluation, the following apply:

- Identify MOCs, if applicable
- Record the revision date of Collins Aerospace MOC List that was used for evaluation
- Perform Economic and Technical Feasibility Analysis per Section 5.6
- Invoke Operational Control per Section 5.7
- Obtain approval from SBU Materials Engineering, or equivalent

The above requirements shall be documented per Section 5.5.

5.10 Maintenance, Repair, and Overhaul (MRO)

All repair processes performed on parts shall be reviewed to determine if any of the MRO activities have met the requirements of this document. This shall include reporting the presence of any MOCs required in the design or processing of products. All substances shall be documented per this procedure. MRO activity shall work to actively reduce the use of MOCs through coordination with engineering.

5.11 SBU Specific Substances

SBU specific substances shall be managed and controlled locally. This process shall be defined in the SBU Supplement.

6.0 SUPERSEDED DOCUMENT(S)

- Materials of Concern, Requirement Specification for (HS14722)
- COL-ENG-PRO-0147-00

7.0 FLOWCHART(S)

None.

8.0 REVISION HISTORY

00	Initial Issue	January 2, 2019
01	Clarify requirements and associated responsibilities for control of substances in Collins Aerospace Products.	February 3, 2020