INTRODUCTION TO CRITICAL TO QUALITY CHARACTERISTICS

Non-Safety (KPC2, CTQP, CTQC)

February 2024

PURPOSE

The purpose of this training is to establish:

- Standard definitions & acronyms
- Understanding of CTQ non-safety as defined by HSC16199
- Drawing examples
- Process flow
  - CTQP
  - KPC2
  - CTQC
- COPS Summary
- KPC management request

****Please note this presentation is intended to act as supplemental material to HSC16199 and should not be used as a replacement for this governing specification**

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ACRONYMS

COPS: Control of Process and Safety

CTQ: Critical to Quality

CTQC: Critical to Quality Characteristic

CTQP: Critical to Quality Process

FAIR: First Article Inspection Report

PCRB: Process Certification Review Board

KPC: Key Product Characteristic

SQAR: Supplier Quality Assurance Representatives

PCA: Process Certification Admin GPUTASCOPS@collins.com

DEFINITIONS

- HSC16199 defines a CTQ Part and Characteristics as

  - Critical-to-Quality Parts- Parts that can directly affect safety, mission essential or critical performance parameters. Critical To Quality parts may also be identified for customer satisfaction and contain one or more Critical to Quality Characteristics.
  - Critical-to-Quality (CTQ) Characteristics- Any feature or Process of Critical to Quality Parts that have the greatest impact to safety and/or customer satisfaction.
    - This presentation will cover the following CTQ characteristics which are NOT designated as Safety;
      - CTQC
      - CTQP
      - KPC2
    - For the Safety characteristic (CTSC, FSC, KPC1) training please see "Safety Part Training (Flight Safety)"

DEFINITIONS

CTQP

- Frozen Process Management meeting the requirements of HS14612 (submitted through COPS)
- Processes that are not directly measurable and have the greatest impact on the quality or operation, not related to safety
- May be located on the engineering drawing or within a Procurement Spec/DRD

KPC

- Statistically Managed Characteristic
- If varied from the prescribed acceptance limits may impact performance, form, fit, function, reliability, service life, possible mission abort, failure to launch, or prevent readiness for use resulting in extreme customer dissatisfaction not related to safety.
- Sampling is permitted if the requirements of HSC16199 section 4.1 and 4.2 are met and maintained

CTQC

- Supplier design product; used for items procured via Source Control or Vendor Item drawings or specifications
- Supplier must define characteristics to control elements or functions with the greatest non-safety impact to the quality or operation of the product
- May be located on the engineering drawing or within a Procurement Spec/DRD

DRAWING/SPECIFICATION NOTE EXAMPLES

31 CRITICAL TO QUALITY CHARACTERISTICS PER HSC16199 (CAGE CODE 73030)

SEE NOTES			X	X
[redacted]		X	X	X
PART NUMBER	KPC1	KPC2	★	CTQP

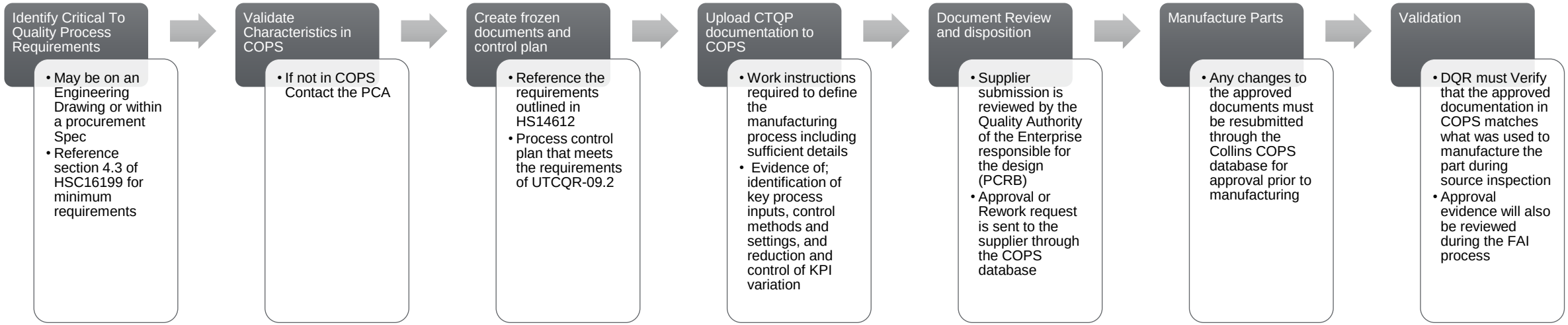
- KPC2 and CTQP will have corresponding drawing callouts either listed in the notes or in relation to a drawing dimension
- CTQC's are often defined in a procurement specification or DRD

4.5 Critical-to-Quality Characteristics

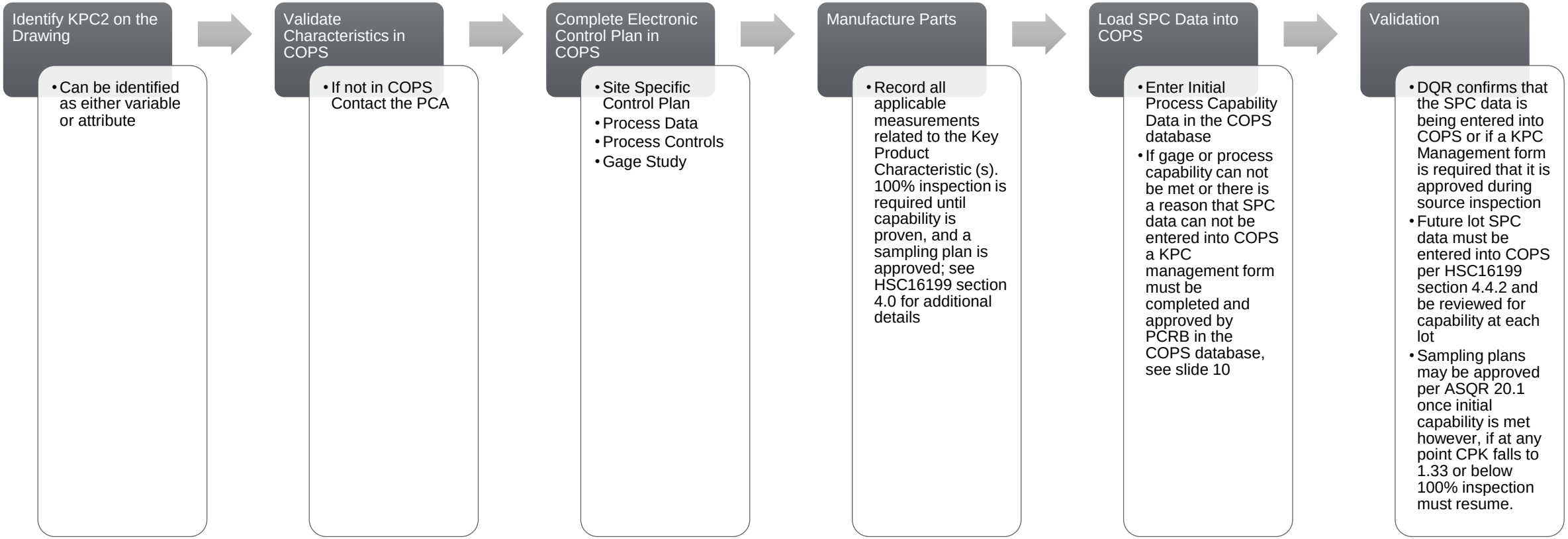
Critical-to-Quality (CTQ) Characteristics and Critical-to-Safety (CTS) Characteristics shall be defined and controlled in order to ensure that the requirements of this specification, and those of the drawing that it supports, are consistently met. Definition, classification and management of CTQ & CTS characteristics shall be per HSC16199. Key product characteristics (KPCs) shall be defined in coordination with the responsible UTAS Engineering and Quality representatives. Some CTQ characteristics are be defined on the applicable drawing and this specification. Key product characteristics are to be defined for supplier detail parts or subassemblies. The supplier shall prepare a Control Plan in accordance with the requirements of HSC16199 for all KPCs identified.

CTQ Characteristic	Ref. Paragraph	Category*
Structural Strength	3.2.6	CTQC
Flow Characteristics	3.4.2	CTSC
External Leakage	3.4.4	CTQC
Hysteresis	3.4.5	CTQC
Threshold	3.4.6	CTSC
Null Bias	3.4.8	CTSC
Null Shift	3.4.9	CTSC
Actuation Step Response	3.4.10	CTSC
Vibration Resistance	3.5.8	CTQC
Service Life	3.6.1	CTQC
Cleanliness	3.10.3	CTQC
Preservation and Packing	5.1	CTQC
Identification Marking	5.2	CTQC

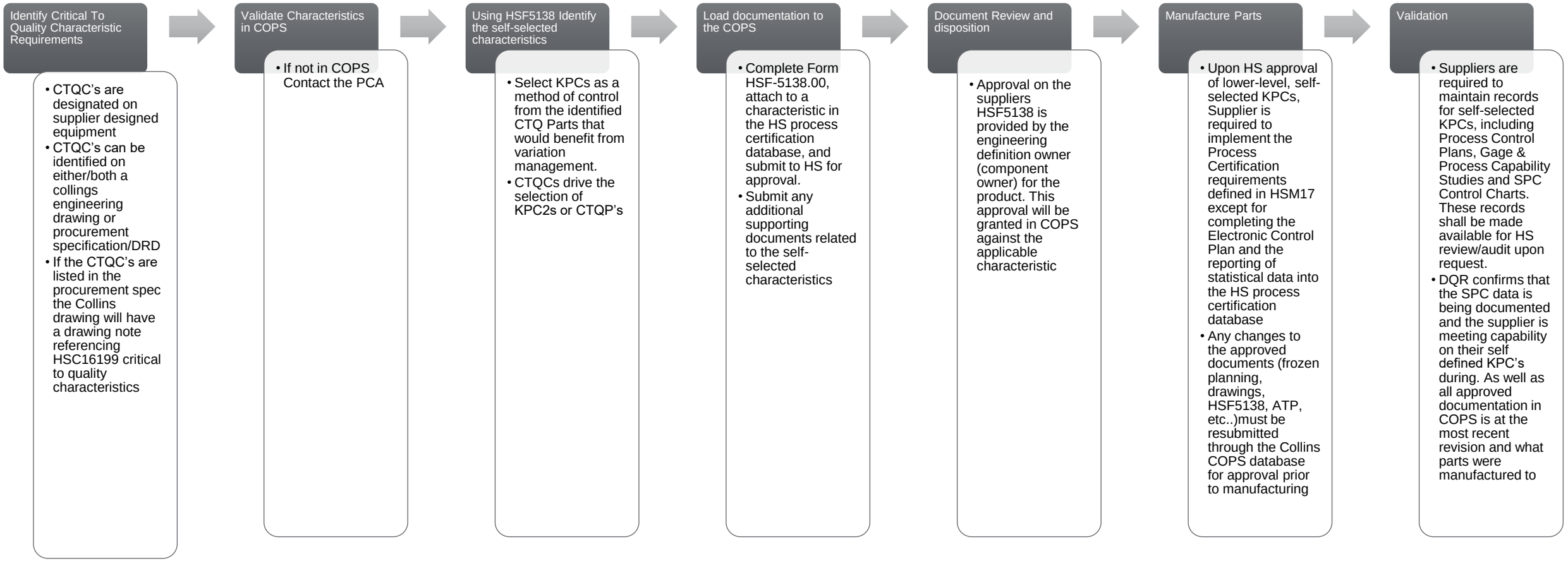
PROCESS FLOW-CTQP



PROCESS FLOW- KPC2

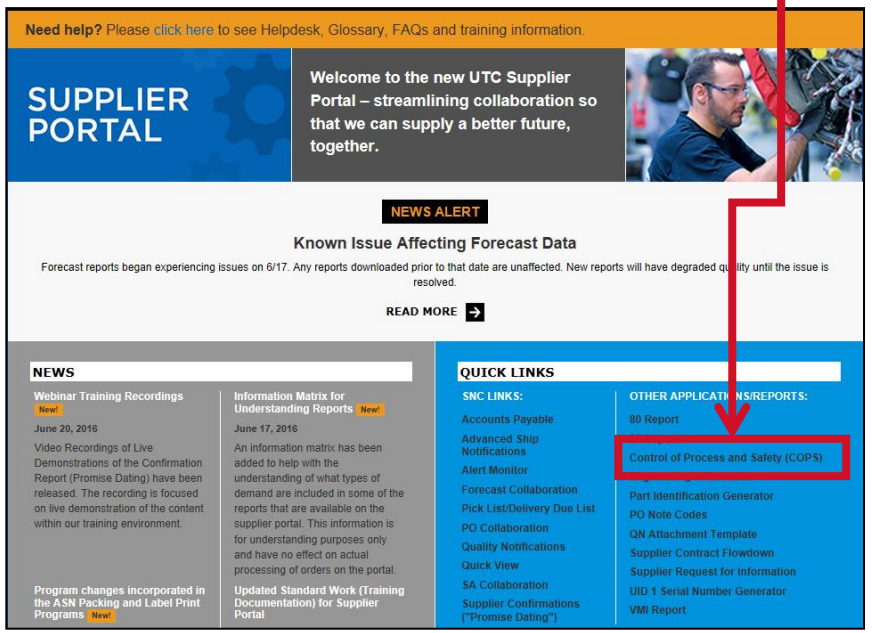


PROCESS FLOW- CTQC



COPS SUMMARY
ACCESSING THE DATABASE

For suppliers: To access COPS, logon to the Collins Aerospace Supplier Portal:
https://suppliers.utc.com/Pages/Home
Click on the "**Control of Process and Safety (COPS)**" link



For the link to be visible the user must first request access from their designated Supplier Portal Admin.

Once the supplier admin verifies the users citizenship, they can request access for COPS under-
manage users > restricted access

The access request will go to the COPS administrator to disposition, for issues or questions contact gputascops@hs.utc.com

** See Supplier Circular 208 on the Supplier Portal for instructions on launching COPS in Compatibility Mode

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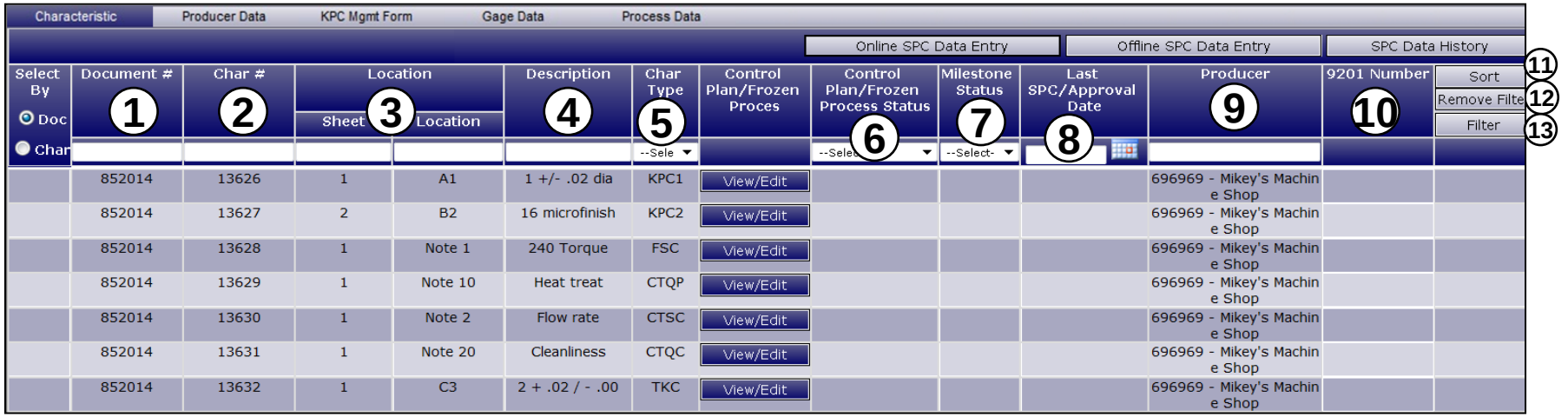
COPS SUMMARY
SCREEN FIELDS

This is the COPS home screen or characteristic grid. It provides a listing of all the CTQ/CTS features (FSC, KPC1, KPC2, CTQC, CTSC, CTQP & TKC) assigned to the producer. All the features of this COPS screen will be explained in the following chapters.



1. **Document #** – the document (drawing or specification) where the CTQ/CTS symbol is displayed.
2. **Char #** – a computer generated number which uniquely identifies the CTQ/CTS feature.
3. **Location**
   - **Sheet** – the sheet of the drawing or the page in the specification where the CTQ/CTS symbol is located.
   - **Location** – the zone/paragraph within the sheet where the CTQ/CTS symbol is located.
4. **Description** – a brief description of the CTQ feature.
5. **Char Type** – a code which specifies the type of CTQ/CTS feature (FSC, KPC1, KPC2, CTQC, CTSC, CTQP or TKC).
6. **Control Plan/Frozen Process Status** - indicates status of Control Plan/Frozen Process for a CTQ/CTS feature.
7. **Milestone Status** – the highest milestone requirements the CTQ/CTS feature has satisfied.
8. **Last SPC/Frozen Process Approval Date** – indicates the last SPC data submittal/Frozen Process Approval date.
9. **Producer** – identifies the producer or internal manufacturing site that is producing the relevant CTQ/CTS feature.
10. **9201 Number** – allows foreign nationals to view the characteristic
11. **Sort** – allows the user to sort data by using one or more columns.
12. **Remove Filter** – allows all previously set filters to be removed in order to display all data.
13. **Filter** – filters data with all previously set filters.

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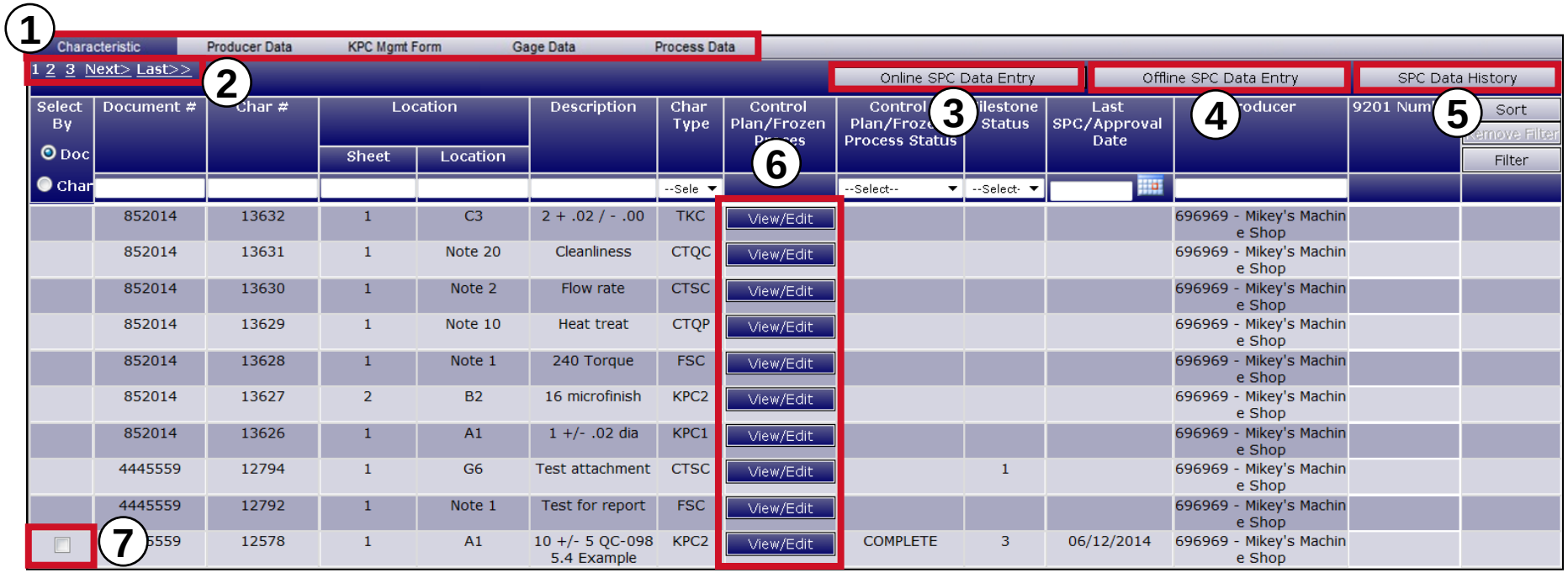
COPS SUMMARY
SCREEN NAVIGATION BUTTONS



1. **Screen Navigation Tabs** – click on any of these TABS from any screen and you will be returned to the selected screen.
2. **Page Navigator** – numbers indicate more characteristics for a producer reside on other pages.
3. **Online SPC Data Entry** – this link opens a screen for real time SPC data input.
4. **Offline SPC Data Entry** – this link opens a screen that creates an MS Excel spreadsheet template for off-line data entry.
5. **SPC Data History** – view and edit SPC data previously entered.
6. **View/Edit** – allows updates to the Site Specific Control Plan/Frozen Process/supplier-designed characteristics and viewing of the Primary Control plan and Milestone Status screen.
7. **Check Box –** indicates the Site Specific plan is complete and SPC data may be input for that CTQ characteristic.

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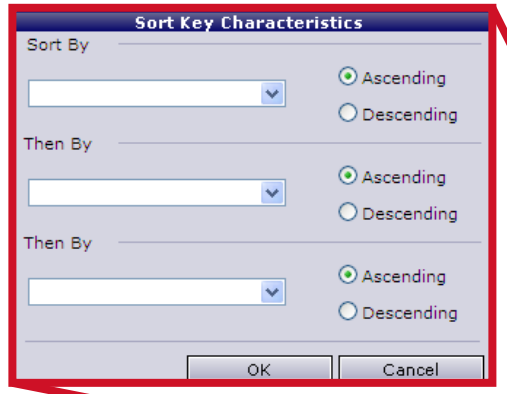
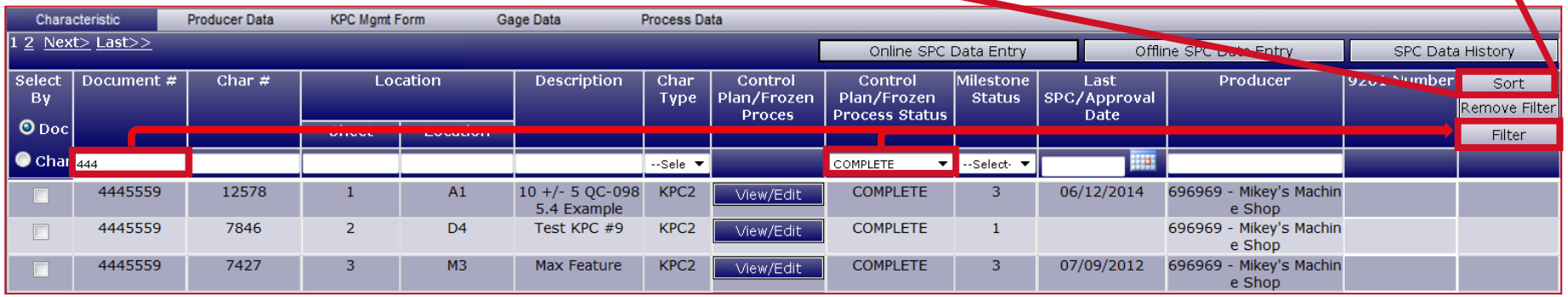
COPS SUMMARY
SORT AND FILTER



- The “**Sort**” button sorts the visible cases by user-defined parameters.
- This efficiently organizes the visible cases



- The “**Filter**” button execute the filters the user-defined parameters.
- This narrows down the amount of files visible based on the parameters.
- Use “**Remove Filter**” to disable.

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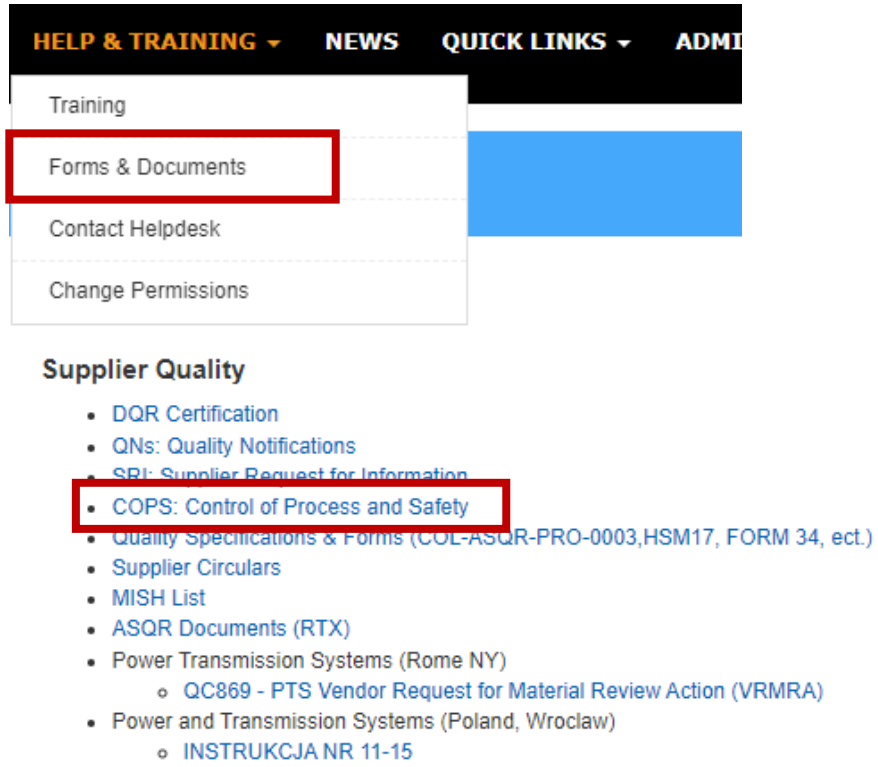
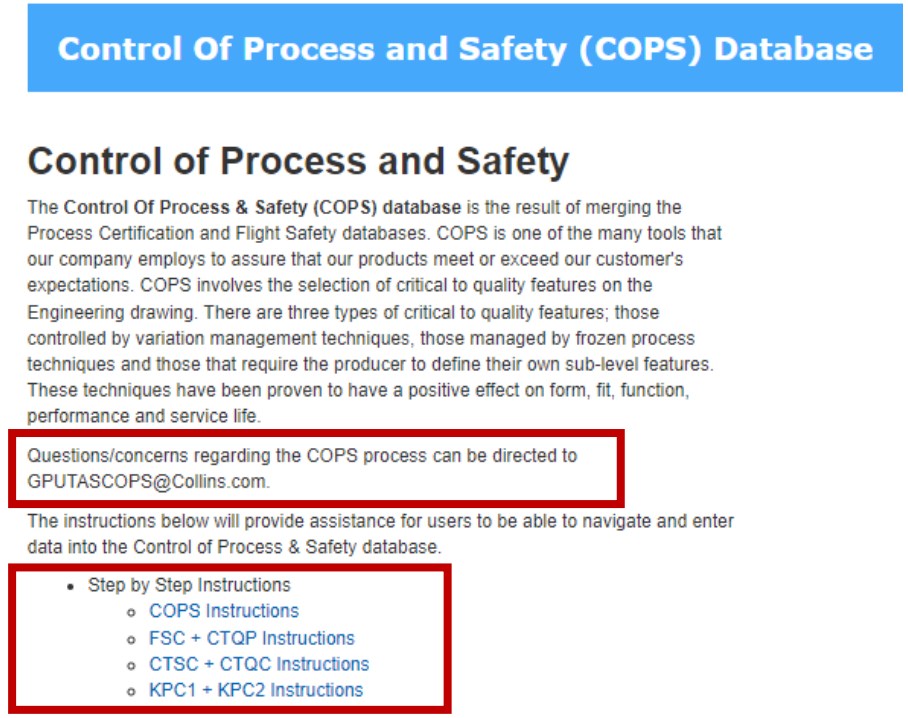
COPS SUMMARY
ADDITIONAL TRAINING MATERIAL

- For additional training materials and references to the COPS process please see the instructions located on the supplier portal





KPC MANAGEMENT FORM

- A KPC Management Form is an electronic document that is initiated by a producer to request an exemption of their KPC requirements:
  1. When gage capability requirements cannot be economically met
  2. When process capability requirements cannot be economically met
  3. When the use of variable gaging is impractical for the type of characteristic being measured
  4. To request waiver of all HSC16199 requirements for a specific KPC due to an alternate method of control
- KPC Management Forms apply only to characteristics controlled by variation management (KPC1s & KPC2s)
- The KPC Management Form is documented and stored in the COPS database
  - A completed KPC Management Form 0996 must be included with the request submitted in COPS
  - Forms and Documents> Supplier Quality> DQR> HSC16199>KPC Management Form 0996
- For Instructions on submitting a Management Request through COPS reference the “COPS Overview”; Chapter 3E on the supplier portal

FOR ANY ADDITIONAL QUESTIONS OR CLARIFICATION PLEASE CONTACT;

Process Certification Admin GPUTASCOPS@collins.com or your assigned SQAR