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AEROFLUIDPRODUCTS

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SAMPLE INSPECTION PLAN

QAP019 Rev. P

Revised by: Wendy Sharp	Date: 5/21/18
Approved by: AFP Dir. of Quality Gary Peters	Date: 5/22/18
Approved by: ACX Dir. of Quality Gary Peters	Date: 5/22/18
Approved by: Director of Quality Gary Peters	Date: 5/22/18
Released By: Wendy Sharp	Date: 5/23/18

REVISION PAGE

Rev	Description	Date	By
N/R	New Release	Sept. 21, 1999	
A	Added to Scope: When required, the sample plan will be submitted to customers for approval. Added to 6.7 (no nonconformance found in sample lot).	Sept. 11, 2002	
B	Revised par. 3.0 to reflect UTC requirements. Completely revised page 8: removed Pratt & Whitney, and added United Technology Added new sample table Added all UTC participants and definitions for <u>critical, major, and minor</u> .	Mar. 19, 2003	
C	Par. 6.9with QAP021 was :with Section 4.13 of the Quality Manual Par. 6.8 form 128A was 128 and OAP034 was OAP033	Nov. 21, 2003	
D	Added Honeywell to par. 3.0 Added page 9 of 9	July 29, 2005	CS
E	Para 4.0 J and Quality Planning Guidelines added" use WI-014 for Fluid Regulators Products.	Nov.9, 2005	WRS
F	Reformatted entire document; Added Sample Chart to use for inspection of heat treat. Added Sample Chart for Legacy "FRC" Products.	Nov 21, 2005	GJP
G	Revised Sample Tables to clarify and reduce number of different sampling plans. Sample plans designed to meet or exceed the customer specified requirements. Ref. QR00598	Nov 7, 2007	GJP
H	Added Visual Insp and Visual for marking to Quality Planning Guidelines. Deleted paragraph 7.11 Added note to Quality Planning on inspection of bulk or roll material. Ref. QR00636	Dec 17, 2007	GJP
I	Revised Mechanical Sampling Requirements, added Table 1, Sampling Chart is now Table 2. Ref QR00866.	Mar 26, 2010	GJP
J	Fix Rev. on page 7. Ref. QR00873.	May 24, 2010	WRS
K	Deleted Para 6.0 Ref. QR01082	March 20, 2012	WRS
L	Error on rev of 2 pages. Ref. QR 01087. No other changes.	March 23, 2012	WRS
M	Ref. QR01250. Rev. Para. 7.1, 7.5. 7.11 was added. Removed signature page.	Sep. 30/2013	IH
N	Revised Quality Planning guidelines, added Table 3. See QR01336 for all changes.	March 31, 2014	IH
P	Removed reference to QAP034 (obsolete). Ref. QR01802	5/21/18	WRS

1.0 SCOPE

This procedure/plan establishes the basic sampling plan that is used to inspect all items delivered to and by AeroControlex. The plan consists of inspection of all characteristics contained on the drawing for Receiving/Final Inspection, and all characteristics contained on the drawing and/or process sheets and routers for In-Process Inspection. The plan is subject to change due to changes in customer requirements. When required, the sample plan will be submitted to customers for approval.

2.0 RESPONSIBILITY

The AeroControlex Director of Quality and Manufacturing Services has the authority and responsibility for the administration of this procedure. All personnel that perform final inspection of product at AeroControlex are responsible for compliance with, and implementation of, this procedure. Quality Assurance is responsible for the development and maintenance of all sample plans in accordance with this procedure.

3.0 APPLICABLE DOCUMENTS

This document and associated tables has been created to meet the requirements of the following customers and specifications; Boeing D1-8007 F, United Technologies ASQR-20.1 and Honeywell SPOC-128.

4.0 TERMS AND DEFINITIONS

- a. Characteristic
A distinguishing feature on which variable or attribute data can be collected.
- b. Defect
Any deviation from drawing requirement
- c. Lot
The units of product from which the sample is selected
- d. Sample
The units selected at random from the entire lot
- e. Random Sample
A sample selected in such a manner that each part in the lot has an equal chance of being selected. Through training, all personnel that perform final inspection are knowledgeable in random sample selection.
- f. Initial Reliability Requirement (IRR)
The expected reliability of a part as it is delivered to the customer. Operationally, it is the fraction of units of product that must conform to requirements before the supplier is eligible to perform acceptance sampling. The IRR also provides a basis for the continuing level (amount) of sampling.
- g. Acceptance Number
The maximum number of defective items in the sample that will permit acceptance of the entire lot. For AeroControlex, number is zero (0).
- h. Rejection Number
The smallest number of defective items in the sample that will require rejection of the entire lot. For AeroControlex, number is one (1).
- i. Rejected Lot
A lot that cannot be accepted based on the results of acceptance sampling due to the number of defects found within the sample.

- j. Sampling Plan
The instructions given to the personnel performing acceptance sampling. Consider this procedure the Sampling Plan.
- k. Sampling Procedure
The policy governing acceptance sampling. From this procedure a sampling plan can be developed.

5.0 TRAINING

All personnel that perform final/receiving inspection shall be trained in the proper use of this procedure. The training shall consist of: sampling philosophy, use of the sample tables, random selection of parts, and record keeping. Refresher training shall be conducted when retraining is required. Records of training shall be maintained.

Paragraph 6.0 was deleted.

7.0 PROCEDURE

- 7.1 Determine the lot size (number of pieces) submitted for inspection. An acceptable FAI is required before sampling inspection can be applied.
- 7.2 Determine, per the guidelines, the IRR for characteristics to be inspected.
 - 7.2.1 Tolerances .0003 or less require 100% inspection (Class AA).
 - 7.2.2 Major Characteristic Dimensional Tolerances equal .010 inch or less and any characteristic classified as major by B/P or specification. 97% IRR (Class A).
 - 7.2.3 Minor Characteristic Dimensional Tolerances equal or greater .0101 inch and all characteristics not classified. 95% IRR (Class B).
 - 7.2.4 Specifications that are not measurable characteristics, i.e. anodize, passivation, etc., shall be inspected by review of documentation.
- 7.3 Determine the proper sample size for the lot from the sample table.
- 7.4 Randomly select the sample from the entire lot.
- 7.5 Inspect the sample using appropriate inspection methods and techniques. Additions or exchanges to the original sample are not permitted, under any circumstances.
- 7.6 The results (A/R) shall be recorded on the Inspection Record.
- 7.7 The lot shall be accepted if all characteristics conform to requirements (**no** nonconformance found in sample lot). The conforming lot is stocked or sent for further processing.
- 7.8 If inspection results indicate the parts do not conform to specifications, an Inspection Discrepancy Report (IDR), form 128A, shall be written.
- 7.9 The disposition of the material shall be in accordance with QAP021.
- 7.10 Sample inspection shall be used for Receiving, In-process, and Final Inspections unless customer requirements dictate otherwise.
- 7.11 Sampling inspection is prohibited for characteristics affected by rework or repair dispositions.

QUALITY PLANNING GUIDELINES

CLASS	TOTAL TOLERANCE	SURFACE FINISH	ANGLES	THREAD	Heat Treat
AA/Critical	.0003 or Less	-	-	-	-
A Major	.0004-.010	32 or Less	1 Degree or Less	Class 3	-
B Minor	Greater than .010	33 or Higher	Over 1 Degree	Class 2	-
C					Hardness

Mechanical Sampling Requirements	
Dim. Total Tolerance Range less than or equal to .004 inches	.65%
Radii less than .010 inches Total Tolerance Range	.65%
Angle Total Tolerance Range less than or equal to 1 degree	.65%
Surface Finish Waviness	.65%
Surface Finish Roughness (Ra) less than or equal to 20 micro inches	.65%
Threaded parts:	
• Internal Profile Pre-load Locking	.65%
• Straight screw threads – total tolerance on pitch diameter	.65%
• AN & MS parts or MH electrical connectors	1.5%
• All other thread applications/characteristics	.65%
Splines (all characteristics)	.65%
Gears (all characteristics)	.65%
Absence of magnetism	.65%
Spring Rate	.65%
Visual Inspection See Table 1 for Guidance	100%
Visual Inspection (for Marking) See Table 1 for Guidance	100%

Specific customer requirements take precedent over this table.

Material purchased in rolls or by volume shall not be sample inspected. When inspecting material such as race material, core material or wire, a sufficient number of feet will be evaluated to determine if the roll meets the drawing specification. This may include the removal of several feet of material for special testing.

Table 2 is designed to meet UTC, Honeywell and Legacy ACX and FRC requirements. The table meets or exceeds sample sizes required by UTC and Honeywell.

Table 3 is an alternative sampling table. This table can be used for in process operator inspections.

Table 1

Visual Requirement	Sample
Part Marking including serialization and acceptance symbols	100%
Completeness of Assembly	100%
Damage	100%
Existence of similar physical features	100%
Orientation and Alignment	100%
Numbers of Bearings rollers/balls	100%
Inspection of Locking installations	100%
Welds of Brazes	100%
Present of Sealant or Lubricants	100%
Presence of protective caps	100%
Plating, Coating, Surface Treatment and Protective Finishes	100%
Fuel holes and oil holes and passages	100%
Cleanliness	100%
Corrosion	100%
Adhesive Bond	100%
Evidence of Staking	100%
Contamination and freedom of debris in internal passages	100%
Radii	100%
Surface Finish Cosmetic Appearance (e.g. scratches, fingerprints, uniform color, etc	100%

Table 2

Attribute, Accept on Zero (C=0) Sampling Plan
Acceptable Quality Level (AQL) Percent

Insp Level Code		AA	A [#]	A	B	C	D	E
Classification		Critical	Major	Major	Minor			
Lot Size								
From	To	0	0.10	0.65	1.0	1.5	2.5	4.0
2	8	ALL	ALL	ALL	ALL	ALL	5	3
9	15	ALL	ALL	ALL	13	8	6**	3
16	25	ALL	ALL	20	13	8	6**	3
26	50	ALL	ALL	20	13	8	7	7
51	90	ALL	ALL	21*	13	11	11	8
91	150	ALL	125	21*	13	13	11	9
151	280	ALL	125	29	29	19	13	10
281	500	ALL	125	47	29	21	16	11
501	1200	ALL	125	47	34	27	19	15
1201	3200	ALL	125	53	42	35	23	18
3201	10000	ALL	192	68	50	38	29	22
10001	35000	ALL	294	77	60	46	35	29
35001	150000	ALL	294	96	74	56	40	29
150001	500000	ALL	345	119	90	64	40	29
	>500000	ALL	435	143	102	64	40	29

* Changed to 21 to meet the Honeywell Requirements

** Changed to 6 to meet Hamilton Sundstrand Requirements

A# is to be used for Major Dimensions on Hamilton Sundstrand Drawings

Table 3

Code	Frequency
AA	100% Inspection Required
A	100% Inspection Required
B	Every Third piece
C	Every Tenth piece
D	Every Third piece
E	Every Fifth piece
F	Every Tenth piece
G	Every Fifteenth piece
X	First Piece and after Tool Changes