THE BASICS OF PPAP

AIAG PRODUCTION PART APPROVAL PROCESS

St.Paul
Brass and Aluminum
Foundry

PRODUCTION PART APPROVAL PROCESS

- **Production Part Approval Process (PPAP is a component of Advance Product Quality Planning (APQP)**
- **Developed by the Automotive Industry Action Group (AIAG)**
- **Includes FMEA and Control Plan both as key tools of APQP and a subset of PPAP**
- **APQP is an integrated system for anticipating possible modes of failure, eliminating them in the design and production planning phases, demonstrating compliance with critical factors, assessing accuracy of measuring systems, assuring consistency, and documenting and planning for success**

St.Paul
Brass and Aluminum
Foundry

Production Part Approval Process

SECTION 1 GENERAL

Submission of PPAP

The organization Shall obtain approval for:

- **New Part**
- **Corrections**
- **Modifications**
- **Any situation required in Section 3**

St.Paul
Brass and Aluminum
Foundry

Production Part Approval Process

SECTION 2 PPAP PROCESS REQUIREMENTS

The heart of PPAP

18 Potential Requirements

St.Paul
Brass and Aluminum
Foundry

SECTION 3
CUSTOMER NOTIFICATION AND SUBMISSION REQUIREMENTS

Customer Notification

- **Shall Notify Customer of Changes**
  - ***Material***
  - ***New Tooling***
  - ***Tooling Repairs/Upgrades/Changes***
  - ***Transfer Tooling***
  - ***Suppliers***
  - ***Inactive 12 months***
  - ***Processes***

Test/Inspection method

SECTION 3 (PAGE 2)
CUSTOMER NOTIFICATION AND SUBMISSION REQUIREMENTS

- **Submission to Customer**
  - ***Shall submit for PPAP approval prior to:***
    - **New Part**
    - **Correction of Discrepancy**
    - **Engineering Change**

St.Paul
Brass and Aluminum
Foundry

Production Part Approval Process

SECTION 4 SUBMISSION TO CUSTOMER – LEVELS OF EVIDENCE

Submission Levels

- **Level 1: Warrant Only**
- **Level 2: Warrant with product samples & limited data**
- **Level 3: Warrant with product samples & complete data**
- **Level 4: Warrant and other requirements defined by customer**
- **Level 5: Warrant and complete data reviewed at organization**

- **R = Retain**

  S = Submit

  *** = Retain and Submit on Request**

Production Part Approval Process

SECTION 5 PART SUBMISSION STATUS

General – Once approved stay consistent

Customer PPAP Status

- **Approved**
- **Interim Approval**
- **Rejected**

St.Paul
Brass and Aluminum
Foundry

Production Part Approval Process

SECTION 6 RECORD RETENTION

- **As long as part is active plus 12 months**
- **Include all previous submissions**

St.Paul
Brass and Aluminum
Foundry

PRODUCTION PART APPROVAL PROCESS SECTION 2

1. Design Record

- **Blueprint or 3D Solid Model**
- **GD&T Data**
- **Additional Specifications**

Must Be Only 1 Design Record

1.1 Reporting of Part Material Composition

Submission Level Requirements

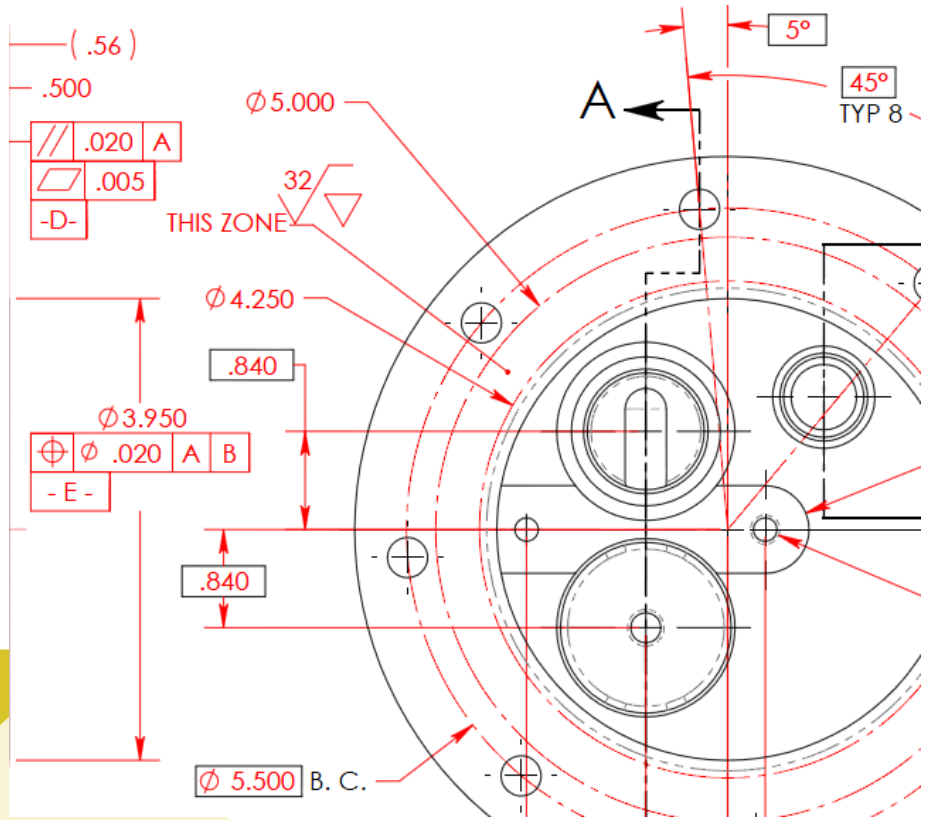
Proprietary: 1:R 2:R 3:R 4:* 5:R

All Others: 1:R 2:S 3:S 4:* 5:R

St.Paul
Brass and Aluminum
Foundry

1. Design Record

- **Blueprint or 3D Solid Model**
- **GD&T Data**
- **Additional Specifications**



St.Paul
Brass and Aluminum
Foundry

2. Authorized Engineering Change Documents

- **Only if not recorded in the design record**

Submission Level Requirements

1:R 2:S 3:S 4:* 5:R

2 1

REVISIONS				
Rev.	Description	Date	EWO	DFTG.
A	NEW RELEASE	1/7/2011	347068	LWG
B	ENLARGED BORE TO Ø.493	2/22/2011	355988	TMT

PRODUCTION PART APPROVAL PROCESS

3. Customer Engineering Approval

- **Only required where specified by customer**

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

St.Paul
Brass and Aluminum
Foundry

PRODUCTION PART APPROVAL PROCESS

4. Design Failure Mode and Effects Analysis (Design FMEA)

- **Done by design responsible organization**
- **Typically not required of foundries**

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

5. Process Flow Diagrams

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

ST. PAUL BRASS AND ALUMINUM FOUNDRY
GREEN SAND MOLDING PROCESS FLOW CHART

Customer: XXXXX
Part Number: XXXXXX
Part Name: Ring Casting

Date: 05/18/12
Revision : AA

Legends: ● Operation ➡ Transportation ■ Inspection △ Storage

Operation or Event				Description of Operation or Event	Evaluation and Analysis Method
●				Receive Ingot	Verification of delivery ticket
		■		Material Verification	Check material certifications
	➡			Move to Ingot Storage	
			△	Ingot Stored by alloy family	
●				Make Molds	Molding Process Traveler
●				Assemble Molds	Molding Process Traveler
●				Mold Identification	Attach Melt Process Traveler
●				Charge Furnace	Per Melt Process Traveler
		■		Check Chemistry	Spectroanalysis
●				Degas Metal	Add degas additive per melt Traveler
		■		Gas Content Analysis	Sample Visual Analysis
●				Pour Molds	Per Melt Process Traveler
●				Shakeout	Initial inspection
●				Segregate like castings	Secondary Inspections
●				Attach Process Traveler	

St.Paul
Brass and Aluminum
Foundry

6. Process Failure Mode and Effects Analysis (FMEA)

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

Process:	Green Sand	Production Start Date: 05/08/2012							Date 05/09/12						
Core Team: John Pomeroy, Dan Daubenspeck, Lupe Moreno, Rick Franco															
Process or Function	Potential Failure Mode	Potential Effects	SEV	Potential Cause of Failure	OCC	Current Process Controls	DET	RPN	Recommended Action	Responsible for Action	Results of Action Taken	SEV	OCC	DET	RPN
Pour molds	Dimensionally deficient casting	Poured short	8	Incorrect casting/ladle yield info	1	Specific yield process information	6	48							
		Casting misrun	7	Pyrometer not calibrated correctly	2	In-process visual inspection	6	84	Notify Supervisor-adjust & correct-QA to verify						
	Rough casting surface	Damage Machine tooling	6	Pyrometer not calibrated correctly	2	In-process visual inspection	6	72	Notify Supervisor-adjust & verify						
Jacket placement	Shifted castings	Casting out of dimension	7	Broken or dirty jackets	1	In-process visual inspection	6	42							
	Non-metalic inclusions	Damaged machine tooling	7	Improper setting of jacket	2	In-process visual inspection	6	84	Notify Supervisor-correct problem & verify						
Greensand shakeout/knockout	Dimensionally out of spec	Production of unusable product	6	Rough handling	2	Training and visual inspection	6	72	Notify Supervisor-correct problem & verify						
			6	Casting shook out too hot	1	Training and visual inspection	6	36							
Gating system removal	Casting cut into-dimensions not to spec	Affect final product dimensions & appearance	6	Worn cut-off blades	1	16" Dia blade wears down to 12" Dia	6	36							
	Mixed alloy returns	Future heats contaminated	8	Runners system without proper ID	2	Spectroanalysis	4	64							
Belt grind outside diameter	OD Overground	Dimensionally out of spec/Inadequate machine stock	6	Employee awareness	1	JN/Traveler process info	3	18							

St.Paul Brass and Aluminum Foundry

7. Control Plan

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

St. Paul Brass & Aluminum Foundry Process Control Plan — **Green Sand**

Company - XXXXX	Key Contact / Phone - 651-312-5567	**Job No.**	**Date**	**Prototype**	**Pre – Launch**	**Production X**		
Part Number / Latest Change Level - XXXX	**Core Team – J. Pomeroy, D. Daubenspeck, L. Moreno, R. Franco**	Customer Eng. Approval / Date (If Req'd)						
Part Name / Description - Seal Ring Casting	**Supplier / Plant Approval / Date**	Customer Quality Approval / Date (If Req'd)						
Supplier / Plant St Paul Brass & Aluminum Foundry	**Supplier Code**	**Other Approval / Date (If Req'd)**	Other Approval / Date (If Req'd)					

No.	Process Name / Operation Description	Machine, Device, Jig, Tools for Mfg.	Characteristics			Special Charact. Class	Methods					Reaction Plan
			No.	Product	Process		Product / Process Specification / Tolerance	Evaluation Measurement Technique	Sample Size	Sample Freq.	Control Method	
	Delivered ingot assessment			Ingot			Aluminum ingot alloy designation A0356.1	Material certification review	Each lot received	Upon receipt	Visual check certification against specification	Notify supplier / QA to reject and issue NCMR
	Mulling sand	Eirich mixer		Molding sand	Test molding sand		Green molding sand	3-Ram compactability test	Per batch	Every 15 minutes	Visual check against standard	Notify Supervisor-Modify mix or scrap
	Sand additions				Add bentonites sand and H2O		Addition of H2O @ 2.5 -3.0% Clay @ 5.5 -6.0%	Moisture Content test / Methylene blue clay content test	Per batch	Daily	Green sand compression strength test	Notify Supervisor-Modify mix or scrap
	Make Green sand molds	Inter-national		Green sand mold	Molding		Ram up mold	Visual	100 %	Continuous	Per molding JN specification	Notify Supervisor-correct problem or scrap
					Add risers (if needeed)		(4) 3" diameter X 6 "	Tape measure or ruler	100 %	As required	Per molding JN specification	Notify Supervisor-correct problem & reaudit
	Assemble molds				Add choke core		3/8 or 7/16, see specific size per traveler	Identified	Per spec	Continuous	Visual inspection	Notify Supervisor-correct problem & resubmit to QA
					Affix mold cope to drag		Mold cope & drag axis alligned w/flush parting line interface	Visual review	100 %	Continuous	Per S.O.P.	Notify Supervisor-correct problem & reaudit
	Mold identification				Add melt traveler		Traveler on first mold per lot	Visual review during set-up	100 %	Initial mold	Per S.O.P.	Notify Supervisor-correct problem & reaudit
	Mold Staging				Amass like molds		Same P/N and or material	Review melt traveler	Per lot	Per lot	Per S.O.P.	Notify Supervisor-correct problem & reaudit
	Charge Furnace				Charge furnace		75 / 25 returns and Ingot	Count ingot	600 lbs	Per heat	Per melting process JN traveler	Notify Supervisor-correct problem & reaudit
	Check Chemistry			356.1 Aluminum	Pour button		356.0 per ASTM B26	Spectrometer	Chill mold size	Per heat	Spectrometer	

St.Paul Brass and Aluminum Foundry

8. Measurement System Analysis Studies

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

GAGE REPEATABILITY AND REPRODUCIBILITY DATA SHEET
VARIABLE DATA RESULTS

Part Number	Gage Name: CALIPER			Appraiser A: VICTORIA C	
Part Name: SEAL RING CASTING	Gage Number: 8040			Appraiser B: JOHN P	
Characteristic: HEIGHT (DD)	Gage Type: CALIPER			Appraiser C: LUPE M	
Characteristic Classification: CLASSIFICATION	Trials: 3	Parts: 10		Appraisers: 3	Date Performed: 41038

Measurement Unit Analysis

Repeatability - Equipment Variation (EV)

EV = $\overline{R} \times K_1$
= 0.0043 x 0.5908
= 0.002520747

Trials	K1
2	0.8862
3	0.5908

Reproducibility - Appraiser Variation (AV)

AV = $\sqrt{(\overline{X}_{DIFF} \times K_2)^2 - (EV^2/(nr))}$
= SQRT[(0.005 x 0.5231)^2 - (0.003 ^2/(10 x 3)]
= 0.002503808

Appraisers	2	3
K_2	0.7071	0.5231

n = number of parts
r = number of trials

Repeatability & Reproducibility (GRR)

GRR = $\sqrt{EV^2 + AV^2}$
= SQRT[0.0025^2 + 0.0025^2]
= 0.003552917

Parts	K_3
2	0.7071
3	0.5231
4	0.4467
5	0.403
6	0.3742
7	0.3534
8	0.3375
9	0.3249
10	0.3146

Part Variation (PV)

PV = $R_p \times K_3$
= 0.0162 x 0.3146
= 0.005103511

Total Variation (TV)

TV = $\sqrt{GRR^2 + PV^2}$
= SQRT[0.0036^2+0.0051^2]
= 0.006218444

Tolerance

Tol = (Upper - Lower)
= (2.0950 - 2.0350)
= 0.06

% Tolerance (Tol)

Repeatability to Tolerance Index
% EV = 100 [EV*6.0/Tol]
= 100(0.003*6.0/0.060)
= 25.21

Reproducibility to Tolerance Index
% AV = 100 [AV*6.0/Tol]
= 100(0.003*6.0/0.060)
= 25.04

Precision to Tolerance Index (P/T Ratio)
% P/T = 100 [GRR*6.0/Tol]
= 100(0.004*6.0/0.060)
= 35.53
Gage system needs improvement

Part Variation to Tolerance Index
% PV = 100 [PV*6.0/Tol]
= 100(0.005*6.0/0.060)
= 51.04

% Total Variation (TV)

Measurement Capability Index (%GRR)
%GRR = 100 [GRR/TV]
= 100(0.004/0.006)
= 57.14
Gage system needs improvement

Number of Distinct Categories
ndc = 1.41(PV/GRR)

St.Paul Brass and Aluminum Foundry

9. Dimensional Results

Submission Level Requirements

1:R 2:S 3:S 4:* 5:R

Dimensional Results

ORGANIZATION:							PART NUMBER:							
SUPPLIER/VENDOR CODE: St. Paul Brass and Aluminum Foundry							PART NAME: Seal Ring Casting							
NAME OF INSPECTION FACILITY:							DESIGN RECORD CHANGE LEVEL: Rev AA							
Internal Lab							ENGINEERING CHANGE DOCUMENTS ECR 0014767							
ITEM	DIMENSION / SPECIFICATION		SPECIFICATION / LIMITS		TEST DATE	QTY. TESTED	ORGANIZATION MEASUREMENT RESULTS (DATA)						OK	NOT OK
ØAA	17.7		17.600	17.800	10-May	5	17.72	17.70	17.69	17.67	17.70		x	
ØBB	19.5		19.400	19.600	10-May	5	19.51	19.59	19.60	19.53	19.57		x	
ØCC	22.9		22.800	23.000	10-May	5	22.95	22.95	22.96	22.90	22.91		x	
DD	2.065		2.035	2.095	10-May	5	2.072	2.074	2.076	2.088	2.081		x	
	.715"	UNMARKED HEIGHT	0.685	0.745	10-May	5	0.713	0.719	0.720	0.725	0.720		x	
	MAX .100"	POS A TO BB		0.100	10-May	5	0.005	0.025	0.005	0.005	0.005		x	
	MAX .100"	POS A TO CC		0.100	10-May	5	0.019	0.021	0.018	0.027	0.033		x	
	MAX .090"	FLATNESS		0.090	10-May	5	0.039	0.029	0.035	0.025	0.031		x	

St.Paul
Brass and Aluminum
Foundry

10. Material, Performance Test Results

Submission Level Requirements

1:R 2:S 3:S 4:* 5:R

APPLICABLE SPECIFICATIONS	
ASTM B26-03	CHEMICAL & PHYSICALS

CHEMICAL ANALYSIS

ELEM	ANALYSIS	MIN	MAX	MAJOR	ELEM	ANALYSIS	MIN	MAX	MAJOR
AL	92.310			N	CR	0.030		0.050	N
SI	6.610	6.500	7.500	N	NI	0.010		0.050	N
FE	0.060		0.600	N	ZN	0.090		0.350	N
CU	0.166		0.250	N	SN	0.010		0.050	N
MN	0.260		0.350	N	TI	0.070		0.250	N
MG	0.380	0.200	0.450	N	PB	0.003		0.050	N
				MAJORS>>>		0.000	0.000		

Note: Nickel analysis includes cobalt.

ALUMINUM IS THE REMAINDER, MAJORS NOT APPLICABLE

MECHANICAL PROPERTIES

	TEST BAR ONE	TEST BAR TWO	MINIMUM
TENSILE STRENGTH:	24,700		19,000
YIELD STRENGTH:	14,900		9,500
ELONGATION IN 2 INCHES:	4		2

11. Initial Process Studies

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

Certificate of Analysis - Summary			
Part #	ABC12345-0987D	COA Approved By	Pending Corrective Action
Part Name	Widget	COA Approval Date	Pending Corrective Action
Drawing #	ABC12345-0987D	Ship To Location	Carmel, IN
Revision	D	Supplier Lot Number	1
Supplier Name	ABC Molding	Mfg. Lot Size	21
Supplier Number	12345	Production Date	39722

Click Here to Move Back to Table of Contents

	Data Input Fields								Calculated Fields									
Variable Char. #	Feature	Insp. Method	Target	Upper Spec.	Lower Spec.	Criteria Type	Release Criteria	Meets Criteria?	Cpk	CpkL	CpkU	CP	DPM	Defectives Found	Average	Max	Min	Samples Size	Comments
#1	6.6+/-0.38mm	Caliper	6.6	6.98	6.22	Cpk	1.33	Pass	2.64619	2.64619	2.87449	2.76034	0	0	6.58429	6.68	6.53	21	
#2	10.13+/-	Caliper	10.13	10.89	9.37	Cpk	1.33	Pass	3.70464	4.29077	3.70464	3.99771	0	0	10.1857	10.25	10.04	21	
#3	66.93+/-	Caliper	66.93	67.69	66.17	Cpk	1.33	Pass	1.4918	1.4918	1.56066	1.52623	5	0	66.9129	67.23	66.6	21	
#4	7.87+/- 0.25mm	Caliper	7.87	8.12	7.62	Cpk	1.33	Fail	0.96199	0.96199	1.01857	0.99028	3,074	0	7.86286	8.04	7.72	21	Corrective Action: mold cavity variation must be reduced in region of concern. Due date: 31 Oct 08
#5														0		0	0	0	
#6														0		0	0	0	
#7														0		0	0	0	
#8														0		0	0	0	
#9														0		0	0	0	
#10														0		0	0	0	
#11														0		0	0	0	
#12														0		0	0	0	
#13														0		0	0	0	
#14														0		0	0	0	
#15														0		0	0	0	
#16														0		0	0	0	
#17														0		0	0	0	
#18														0		0	0	0	

EXAMPLE

	Data Input Fields							Calculated Fields		Supplier Inputs		
Attribute Char. #	Feature	Insp. Method	Target	Upper Spec.	Lower Spec.	Criteria Type	Release Criteria	Meets Criteria?	DPM	Samples Size	Defects Found	Comments
#1						DPM						
#2						DPM						
#3						DPM						
#4						DPM						
#5						DPM						
#6						DPM						
#7						DPM						
#8						DPM						

St.Paul Brass and Aluminum Foundry

12. Qualified Laboratory Documentation

Submission Level Requirements

1:R 2:S 3:S 4:* 5:R

TEAM Industrial Services, Inc
1920 OAKCREST AVE
ROSEVILLE, MN 55113
Phone 651-633 -7616 / Fax 651-633 -4928

CERTIFICATE OF INSPECTION

CERTIFICATION 122414565-1
Customer No 656781

ST PAUL BRASS FOUNDRY COMPANY
954 MINNEHAHA AVE W
SAINT PAUL, MN 55104-1587
651-488-5567

CustomerJob
Customer PO J99569-1
Date Completed 05/22/2012

Customer Count	Team Count	Part Number	Part Description	Qty Passed
5	5		SEAL RING	

Method
Liquid Penetrant Inspection
Specification
AMS-STD-2175
Procedure
23.D.L.1224
Acceptance Criteria
AMS 2175 CLASS 2 GRADE C

TEAM - 1224 PT #12

Remarks

We hereby certify that the above parts, materials, or services specified on and provided against the above referenced purchase order meet or exceed all of the requirements and specification of the purchase order. TEAM Industrial Services, Inc., is accredited to the AS9100 Quality System.

No Mercury Contamination of parts by Vendor.

Brandon Giesen

BRANDON GIESEN LEVEL III Expires - 9/1/16

13. Appearance Approval Report (AAR)

Submission Level Requirements

1:R 2:S 3:S 4:* 5:R

APPEARANCE APPROVAL REPORT

PART NUMBER NUMBER	DRAWING NUMBER	APPLICATION (VEHICLES) APPLICATION	
PART NAME NAME	BUYER CODE	E/C LEVEL ECL	DATE
SUPPLIER NAME SUPPLIER	MANUFACTURING LOCATION ADDRESS CITY STATE ZIP	SUPPLIER CODE CODE	
REASON FOR SUBMISSION ☐ PART SUBMISSION WARRANT ☐ PRE TEXTURE	☐ SPECIAL SAMPLE ☐ FIRST PRODUCTION SHIPMENT	☐ RE-SUBMISSION ☐ ENGINEERING CHANGE	OTHER

APPEARANCE EVALUATION

ORGANIZATION SOURCING AND TEXTURE INFORMATION	PRE-TEXTURE EVALUATION	AUTHORIZED CUSTOMER REPRESENTATIVE SIGNATURE AND DATE
	CORRECT AND PROCEED	
	CORRECT AND RESUBMIT	
	APPROVED TO ETCH/TOOL/EDM	

COLOR EVALUATION

COLOR SUFFIX	TRISTIMULUS DATA					MASTER NUMBER	MASTER DATE	MATERIAL TYPE	MATERIAL SOURCE	HUE				VALUE		CHROMA		GLOSS		METALLIC BRILLIANCE		COLOR SHIPPING SUFFIX	PART DISPOSITION
	DL*	Da*	Db*	DE*	CMC					RED	YEL	GRN	BLU	LIGHT	DARK	GRAY	CLEAN	HIGH	LOW	HIGH	LOW		

COMMENTS

ORGANIZATION SIGNATURE	PHONE NO.	DATE	AUTHORIZED CUSTOMER REPRESENTATIVE SIGNATURE	DATE

St.Paul Brass and Aluminum Foundry

14. Sample Product

Submission Level Requirements

1:R 2:S 3:S 4:* 5:R

St.Paul
Brass and Aluminum
Foundry

PRODUCTION PART APPROVAL PROCESS

15. Master Sample

Submission Level Requirements

1:R 2:R 3:R 4:* 5:R

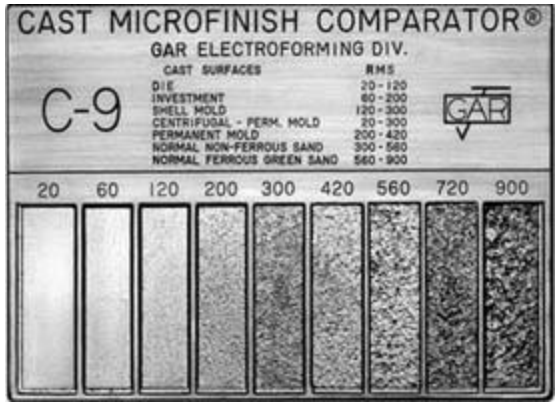
St.Paul
Brass and Aluminum
Foundry

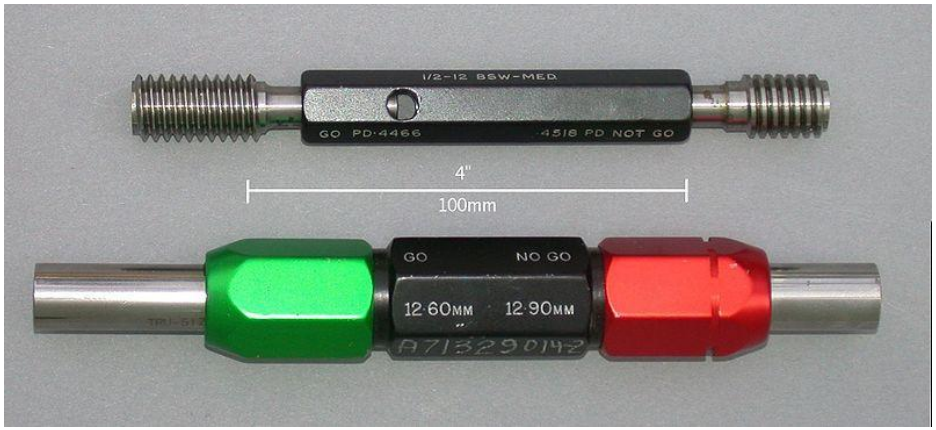
PRODUCTION PART APPROVAL PROCESS

16. Checking Aids

Submission Level Requirements

1:R 2:R 3:R 4:* 5:R





St.Paul
Brass and Aluminum
Foundry

17. Records of Compliance With Customer Specific Requirements

Submission Level Requirements

1:R 2:R 3:S 4:* 5:R

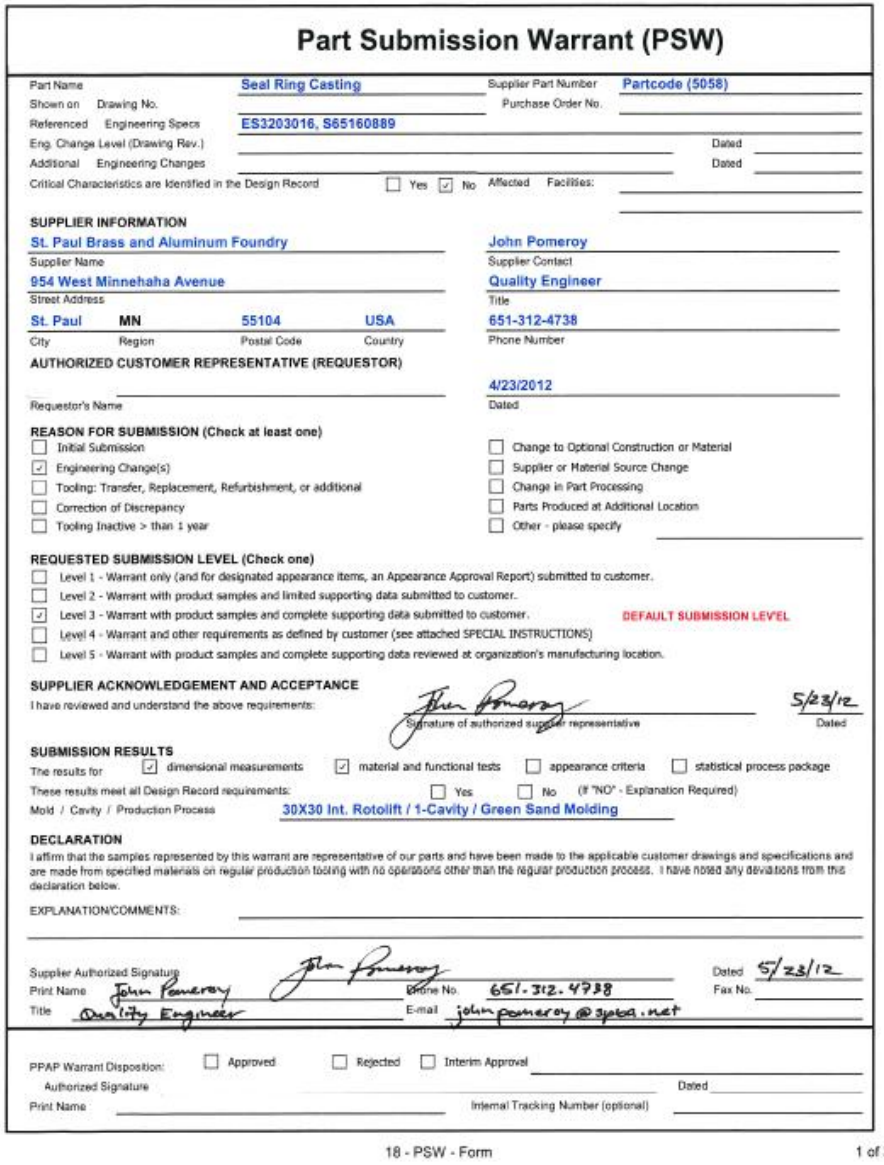
Exceptions to AIAG Production Part Approval Process (4th Edition) [1]:

1. Significant Production Run (PPAP Section 2.1).
   a. A minimum of 50 consecutive parts is required.
   b. The Authorized Customer Representative (ACR), in conjunction with input from the supplier, may adjust the required number of consecutive parts.
2. PPAP Requirements (PPAP section 2.2)
   a. Always consult your Authorized Customer Representative (ACR) to determine which items or records will apply to a particular PPAP.
3. Reporting of Part Material Composition (PPAP section 2.2.1.1)
   a. International Materials Data System (IMDS) is not currently used by CS.
4. Marking of Polymeric Parts (PPAP section 2.2.1.2)
   a. This section does not apply.
   b. Marking is done per the design record.
5. PPAP sections 2.2.4 through 2.2.8
   a. See the Global Supplier Quality Manual for available forms.
6. Dimensional Results (PPAP section 2.2.9)
   a. Master samples are not required.
7. Master Sample (PPAP section 2.2.15)
   a. Master samples are not required.
8. Part Weight (Mass) (PPAP section 2.2.18.1)
   a. Part weight is not required.
9. Critical Features / Key Characteristics
   a. CS may classify Critical Characteristics as Critical Features (CF), Key Characteristics, Safety Characteristics, or Critical to Quality (CTQ) Characteristics.

18. Part Submission Warrant (PSW)

Submission Level Requirements

1:S 2:S 3:S 4:S 5:R



Part Submission Warrant (PSW)

Part Name: Seal Ring Casting — Supplier Part Number: Partcode (5058)
Shown on Drawing No. — Purchase Order No.
Referenced Engineering Specs: ES3203016, S65160889
Eng. Change Level (Drawing Rev.) — Dated
Additional Engineering Changes — Dated
Critical Characteristics are Identified in the Design Record: ☐ Yes ☑ No — Affected Facilities:

SUPPLIER INFORMATION

St. Paul Brass and Aluminum Foundry — Supplier Name
954 West Minnehaha Avenue — Street Address
St. Paul | MN | 55104 | USA — City | Region | Postal Code | Country

John Pomeroy — Supplier Contact
Quality Engineer — Title
651-312-4738 — Phone Number

AUTHORIZED CUSTOMER REPRESENTATIVE (REQUESTOR)

Requestor's Name — 4/23/2012 Dated

REASON FOR SUBMISSION (Check at least one)

- ☐ Initial Submission
- ☑ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year
- ☐ Change to Optional Construction or Material
- ☐ Supplier or Material Source Change
- ☐ Change in Part Processing
- ☐ Parts Produced at Additional Location
- ☐ Other - please specify

REQUESTED SUBMISSION LEVEL (Check one)

- ☐ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
- ☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
- ☑ Level 3 - Warrant with product samples and complete supporting data submitted to customer. DEFAULT SUBMISSION LEVEL
- ☐ Level 4 - Warrant and other requirements as defined by customer (see attached SPECIAL INSTRUCTIONS)
- ☐ Level 5 - Warrant with product samples and complete supporting data reviewed at organization's manufacturing location.

SUPPLIER ACKNOWLEDGEMENT AND ACCEPTANCE

I have reviewed and understand the above requirements: John Pomeroy — Signature of authorized supplier representative — 5/23/12 Dated

SUBMISSION RESULTS

The results for ☑ dimensional measurements ☑ material and functional tests ☐ appearance criteria ☐ statistical process package
These results meet all Design Record requirements: ☐ Yes ☐ No (If "NO" - Explanation Required)
Mold / Cavity / Production Process: 30X30 Int. Rotolift / 1-Cavity / Green Sand Molding

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts and have been made to the applicable customer drawings and specifications and are made from specified materials on regular production tooling with no operations other than the regular production process. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS:

Supplier Authorized Signature: John Pomeroy — Dated 5/23/12
Print Name: John Pomeroy — Phone No. 651.312.4738 — Fax No.
Title: Quality Engineer — E-mail: johnpomeroy@spbaa.net

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Interim Approval
Authorized Signature — Dated
Print Name — Internal Tracking Number (optional)

18 - PSW - Form — 1 of 3

St.Paul
Brass and Aluminum
Foundry

http://www.stpaulfoundry.com

St.Paul
Brass and Aluminum
Foundry

954 Minnehaha Avenue West
St. Paul, MN 55104

Voice: (651) 488-5567

Fax: (651) 488-0908

www.stpaulfoundry.com

sales@stpaulfoundry.com

timhartigan@stpaulfoundry.com