

B&G Precision, Inc.

pFMEA

(Process failure modes and effects analysis)

B&G Precision, Inc.

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Rating Method

RISK LEVEL =(SEVERITY OF PRODUCT FAILURE POST DELIVERY*(100*PROBABILITY OF OCCURRENCE))/ ABILITY TO DETECT POTENTIAL FAILURE)

1.) SEVERITY OF PRODUCT FAILURE POST DELIVERY

- Failure that does not affect the sellable good or represent a potential financial impact less than \$5,000.00*
- Failure that does affect the sellable good with NO potential harm to human life or represent a potential financial impact between \$5,000.00 and \$10,000.00*
- Failure that does affect the sellable good with potential harm to human life and/or represent a financial impact more than \$10,000.00*

SCALE

10
20
30

2.) ABILITY TO DETECT POTENTIAL FAILURE AT MULTIPLE INSPECTION POINTS

Rating based on actual found Nonconformance's **POST DELIVERY** (see PEAR-8.2.3-013 INTERNAL Pfmea and N.C. Log)

3.) PROBABILITY OF OCCURRENCE

Rating based on actual found Nonconformance's **PRE AND POST DELIVERY** (see PEAR-8.2.3-013 INTERNAL pFMEA and N.C. Log)

Process Effectiveness Scale

RISK LEVEL

- 0 TO 20** Process is effective and above expectation, No actions required.
- 21 TO 40** Process is effective and within expectation. No actions required
- 41 TO 60** Process is effective but below expectation. Additional actions are required to reduce the risk and bring process effectiveness within expectation. CEO and CQO must be informed of process after additional actions stays outside process effectiveness level.
- 61 TO** Process is not effective. Additional actions are required to reduce the risk and bring process effectiveness within expectation. Customer, CEO and CQO must be informed if process after additional actions stays outside process effectiveness level.

General Failure Mode Analysis

PROCESS	FAILURE MODE	CAUSE	PROCESS CONTROLS	RECORDS	severity	occurrence	detectability	RISK LEVEL	NOTES
					1	2	3		
F.O.D. Foreign Objects Debris	Sharp Edges, plugged holes and other nonconforming conditions	Foreign objects, dirt or debris in product. This will most likely occur at: a) intersection of features b) interrupted cuts c) counter bores d) chamfers	1) Mandatory FOD training for all manufacturing personal 2) Line Clearance 3) 6S 4) Trending and feedback	1) PEAR-7.5.1-006 2) PEAR-7.5.1-002 3) TRAININGS RECORD, Internal audit record 4) Paynter Chart PEAR-8.3-013	30	0.52%	100.00%	15.6	Manufacturer reported in 2013: 4 FOD related nonconformance's

O.T.D. On-Time Delivery	Product delivered to customer passed the committed delivery date.	1) Missing customer information 2) Supply Chain related 3) Capacity related 4) Run Time related	1) Risk Management meeting 2) Supplier evaluation and monitoring 3) Daily Production meetings 4) Product status monitoring	1) PEAR-7.1.2-010 (RISK ASSESMENT FORM) 2) AVL 3) PRODUCT REALIZATION CHART 4) PEAR-7.0 (SALES AND PLANNING PROCESS)				96%	Manufacturer reported in 2013: O.T.D.
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Product Specific Failure Mode Analysis

Seq#	PROCESS	FAILURE MODE	CAUSE	PROCESS CONTROLS	RECORDS	1	2	3	RISK LEVEL	NOTES
3	Raw Material Purchase	Receiving of wrong material	1) Supplier error 2) Unclear purchasing requirements 3) Insufficient training 4) Purchasing error	1) Supplier Evaluation 2) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system and onto the purchase order. 3) Trainings Process 4) Incoming Inspection	1) AVL 2) PEAR-7.1.2-010 (risk management form), purchase order, customer drawing 3) Trainings log 4) Material certification or test report	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Raw Material related nonconformance's 0 Post. Del. Raw Material related nonconformance's
5	Saw Cut	Cut to nonconforming condition	1) Unclear or missing work instructions 2) Insufficient training 3) Operator error 4) Equipment issue 5) Environmental conditions	1) Risk Management Process used to communicate process requirements into the Job Traveler . 2) Trainings process 3) First Part Inspection 4) Maintenance and Validation Process 5) Maintenance Process	1) PEAR-7.1.2-010 (risk management form), customer drawing 2) Trainings log 3) Inspection Report 4) Maintenance Log 5) PEAR-6.3 (Infrastructure and Work Environment Process)	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Saw Cut related nonconformance's 0 Post. Del. Saw Cut related nonconformance's
10	CNC Lathe Operation	Wrong or missing dimension, angle, flatness, holes, threads or any other feature as required by the customer	1) Unclear or missing work instructions 2) Insufficient training 3) Operator error 4) Equipment issue 5) Environmental conditions 6) Programing error 7) Wrong tools 8) Wrong or inadequate fixturing 9) Tool wear or breakage	1) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system 2) Trainings process 3) First Part Inspection 4) Maintenance and Validation Process 5) Maintenance Process 6) First Part Inspection 7) First Part Inspection ,set-up sheet) 8) First Part Inspection, In process Inspection, set-up sheet 9) In process Inspection	1) PEAR-7.1.2-010 (risk management form) Customer drawing 2) Trainings log 3) Inspection Report 4) Maintenance Log 5) PEAR-6.3 (Infrastructure and Work Environment Process) 6) Inspection Report 7) Inspection Report 8) Inspection Report 9) SPC report	30	1.55%	98.97%	47.0	Manufacturer reported in 2013: 12 Pre. Del. Manufacturing related nonconformance's 8 Post. Del. Raw Manufacturing related nonconformance's
15	Stress relief	incomplete or wrong stress relief method	1) Unclear or missing work instructions 2) Supplier error 3) Purchasing error	1) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system and onto the purchase order. 2) Supplier qualification 3) Trainings Process	1) PEAR-7.1.2-010 (risk management form), purchase order, customer drawing 2) AVL 3) Trainings log	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Stress Relief related nonconformance's 0 Post. Del. Stress Relief related nonconformance's
25	CNC Milling Operation	Wrong or missing dimension, angle, flatness, holes, threads or any other feature as required by the customer	1) Unclear or missing work instructions 2) Insufficient training 3) Operator error 4) Equipment issue 5) Environmental conditions 6) Programing error 7) Wrong tools 8) Wrong or inadequate fixturing 9) Tool wear or breakage	1) Risk Management Process used to communicate process requirements into the Job Traveler . 2) Trainings process 3) First Part Inspection 4) Maintenance and Validation Process 5) Maintenance Process 6) First Part Inspection 7) First Part Inspection ,set-up sheet) 8) First Part Inspection, In process Inspection, set-up sheet 9) In process Inspection	1) PEAR-7.1.2-010 (risk management form), Customer drawing. 2) Trainings log 3) Inspection Report 4) Maintenance Log 5) PEAR-6.3 (Infrastructure and Work Environment Process) 6) Inspection Report 7) Inspection Report 8) Inspection Report 9) SPC report	30	1.55%	98.97%	47.0	Manufacturer reported in 2013: 12 Pre. Del. Manufacturing related nonconformance's 8 Post. Del. Raw Manufacturing related nonconformance's

30	Deburring	Burrs on finished product, too much material removed, debris on finished product, wrong surface finish	1) Unclear or missing work instructions 2) Insufficient training 3) Operator error 4) Equipment issue	1) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system 2) Trainings process 3) First Part Inspection 4) Maintenance and Validation Process	1) PEAR-7.1.2-010 (risk management form), Customer drawing 2) Trainings log 3) Inspection Report 4) Maintenance Log	30	0.52%	100.00%	15.6	Manufacturer reported in 2013: 4 Pre. Del. FOD related nonconformance's 0 Post. Del. FOD related nonconformance's
35	Zinc Plate	Wrong Chemicals used, Wrong color, wrong plating thickness, missing RoHS compliance	1) Unclear or missing work instructions 2) Supplier error 3) Purchasing error	1) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system and onto the purchase order. 2) Supplier qualification 3) Trainings Process	1) PEAR-7.1.2-010 (risk management form), purchase order, customer drawing 2) AVL 3) Trainings log	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Outside Process related nonconformance's 0 Post. Del. Outside Process related nonconformance's
45	Assembly	Assembly of wrong components, using components with wrong revision level, wrong dimension, FOD, surface finish issue	1) Unclear or missing work instructions 2) Insufficient training 3) Operator error 4) Equipment issue	1) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system 2) Trainings process 3) First Part Inspection 4) Maintenance and Validation Process	1) PEAR-7.1.2-010 (risk management form), Customer drawing 2) Trainings log 3) Inspection Report 4) Maintenance Log	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Assembly related nonconformance's 0 Post. Del. Assembly related nonconformance's
50	Part Marking	Wrong location, wrong font size, wrong font, wrong part marking method, wrong Inc., wrong or missing part marking content	1) Unclear or missing work instructions 2) Insufficient training 3) Operator error 4) Equipment issue	1) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system 2) Trainings process 3) First Part Inspection 4) Maintenance and Validation Process	1) PEAR-7.1.2-010 (risk management form), Customer drawing 2) Trainings log 3) Inspection Report 4) Maintenance Log	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Identification related nonconformance's 0 Post. Del. Identification related nonconformance's
55	Documentation	Wrong documentation, missing documentation, incomplete documentation	1) Insufficient training 2) Operator error	1) Trainings process 2) Final Inspection	1) Trainings log 2) Inspection Report	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Documentation related nonconformance's 0 Post. Del. Documentation related nonconformance's
65	Packaging and Shipping	Packaging method did not preserve the conformity and integrity of the product during storage, handling and delivery to the intended destination. Missing or wrong identification and, packaging. Part mix-ups	1) Unclear or missing work instructions 2) Insufficient training 3) Operator error	1) Risk Management Process used to communicate process requirements into the Job Traveler and into the ERP system 2) Trainings process 3) Final Inspection	1) PEAR-7.1.2-010 (risk management form), Customer drawing 2) Trainings log 3) Inspection Report	30	0.00%	100.00%	0.0	Manufacturer reported in 2013: 0 Pre. Del. Packaging related nonconformance's 0 Post. Del. Packaging related nonconformance's