

S

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 656451

Proj. ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. TA Nuxall, SNF CVD, R3-86, 372-3739		4. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Date 11/29/99
	6. Project Title/No./Work Order No. W-441 Spent Nuclear Fuel Cold Vacuum Drying		7. Bldg./Sys./Fac. No. 142-K	8. Approval Designator SNQ
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) SNF-5102, Rev. 1		10. Related ECN No(s). N/A	11. Related PG No. N/A

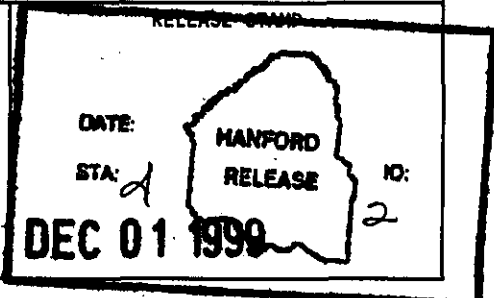
12a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 12b) <input checked="" type="checkbox"/> No (NA Blks. 12b, 12c, 12d)	12b. Work Package No. N/A	12c. Modification Work Complete N/A <hr/> Design Authority/Cog. Engineer Signature & Date	12d. Restored to Original Condition (Temp. or Standby ECN only) N/A <hr/> Design Authority/Cog. Engineer Signature & Date
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13a. Description of Change Addition of components.	13b. Design Baseline Document? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
---	--

14a. Justification (mark one)				
Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facility Deactivation <input type="checkbox"/>	
As-Found <input type="checkbox"/>	Facilitate Const <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>	

14b. Justification Details  
 CGI req. #13.

15. Distribution (include name, MSIN, and no. of copies)  
 See Distribution



**ENGINEERING CHANGE NOTICE**

**16. Design Verification Required**

Yes  
 No

**17. Cost Impact**

**ENGINEERING**

Additional  \$  
 Savings  \$

**CONSTRUCTION**

Additional  \$  
 Savings  \$

**18. Schedule Impact (days)**

Improvement   
 Delay

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

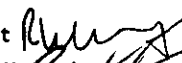
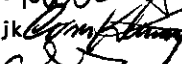



SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>	Tickler File	<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision                      Document Number/Revision                      Document Number Revision

N/A

21. Approvals

	Signature	Date	Signature	Date
Design Authority	R. Whitehurst 	11/29/99	Design Agent	_____
Designated Cog. Eng.	C. Van Katwijk 	11/29/99	PE	_____
Authorized Rep. Mgr.	T. Choho 	11/29/99	QA	_____
QA	R. Ramsgate 	11/29/99	Safety	_____
Safety <sup>N</sup>	J. Brehm 	11/30/99	Design	_____
			Environ.	_____
			Other	_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____
				_____

**DEPARTMENT OF ENERGY**

Signature or a Control Number that tracks the Approval Signature

**ADDITIONAL**

## DISTRIBUTION SHEET

<b>To</b> Distribution	<b>From</b> T. Nuxall, SNF-CVD	Page 1 of 1
<b>Project Title/Work Order</b> W-441, SNF-5102, Rev. 2		Date 11/29/99
		EDT No. N/A
		ECN No. 656451

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
C. Miska/D. Whitehurst	R3-86	x			
S. Brisbin/C. Pitkoff	R3-86	x			
A. Artzer (CVD Library)	R3-86	x			
R. Ramsgate	R3-86	x			
J. Brehm	R3-26	x			
P. Beaudet	S8-07	x			
P. Morrell (AVS)	G1-50	x			
M. Evarts (AI)	N1-29	x			
L. Price	R3-26	x			
SNF Startup	B2-64	x			
SNF Project Files	R3-11	x			
SNF Satelite Library	X3-25	x			

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# CONDUIT FASTENERS

Carl Van Katwijk  
Numatec Hanford, Richland, WA 99352  
U.S. Department of Energy Contract DE-AC06-96RL13200


EDT/ECN: 656451                      UC: 620  
Org Code: 2G300                      Charge Code: 105559/A000  
B&R Code: 39EW40400              Total Pages: 40

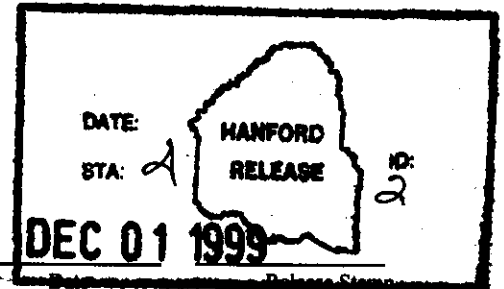
Key Words: W-441, Cold Vacuum Drying Facility (CVD), CGI, Conduit Fasteners

Abstract: W-441, Cold Vacuum Drying Facility (CVD), CGI, Conduit Fasteners

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12/1/99  
Release Approval



**Approved for Public Release**

# RECORD OF REVISION

(1) Document Number  
SNF-5102

Page 1

(2) Title  
SNF-5102, CONDUIT FASTENERS

### Change Control Record

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release		
		(5) Cog. Engr.	(6) Cog. Mgr.	Date
0	(7) EDT 627440, INITIALLY RELEASED			
1	ECN 654680, ADDED GASKETED SEALING LOCKNUTS			
2 <b>RS</b>	ECN 656451, ADDITION OF COMPONENTS	<i>Rh...</i> 11/27/99	<i>...</i>	11/29/99

<b>Commercial Grade Item Upgrade Dedication Form</b>		SNF-5102 Rev. 2
ECN No. <b>NA</b>	CGI No. <b>CGI-SNF-D-93-2-C1-056</b>	Page 1 of 38
Title: <b>CONDUIT FASTENERS</b>		

**Section 1 Part Information**

Item No.: <b>NA</b>	Manufacturer:	Supplier:
Mfg. Part/Model No.:	Supplier's P/N:	
Part Description:		
End Use Description:		

**Section 2a Component Information**

Equipment No.: <b>See attached Section 9</b>	Specification No.: <b>W-441-C1, Section 16110</b>	Manufacturer: <b>ABC Fasteners; PowerStrut; Fastenal</b>	Past P.O. No.: <b>NA</b>
Procurement and/or Model No.: <b>See attached Section 9</b>	Equipment Supplier (if different from manufacturer): <b>American Electric; George A. Grant, Inc for Fastenal</b>		Equip. Supplier's Part No.: <b>NA</b>

Component Description: **Fasteners for Safety Class Wiring Conduit.**

**Section 2b Commercial Availability of the Item**

1. Is the Item available from a catalogue of a qualified NQA1 supplier? (coordinate with project CGI interface Engineer or BTR)

YES (go to #2 below)

NO (go to procedure step 6.3.2, proceed to dedicate Item.)

If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate with project CGI interface Engineer or BTR)

YES (go to #2 below, then go to procedure step 6.3.2, proceed to dedicate Item)

NO (go to procedure step 6.3.2, proceed to dedicate Item.)

2. List of Candidate qualified suppliers or ISO 9000 suppliers

company name & type	contact name	phone
<b>NA</b>		

3. Recommended Procurement Strategy (coordinate with project CGI interface Engineer or BTR):

**NA**

**Section 2c CGI Determination**

1. Question #1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

YES (the Item is not commercial grade)

NO (continue)

2. Question #2: Is the Item used in applications other than nuclear facilities or activities?

NO (the item is not commercial grade)

YES (continue)

3. Question #3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the published product information (e.g. manufacturer's catalog)?

NO (the Item is not commercial grade)

YES (continue)

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<input checked="" type="checkbox"/> <b>All three criteria have been satisfied. The Item meets the definition of commercial grade.</b>
Section 2d Reason for Dedication
The above described Item is being Dedicated for use in the application cited for the following reason(s):
<input checked="" type="checkbox"/> Item is being purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Class application.
<input type="checkbox"/> Item is being purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Significant application.
<input type="checkbox"/> Item was purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Class application.
<input type="checkbox"/> Item was purchased from a non ESL manufacturer supplier as commercial grade to be used in a Safety Significant application.
<input type="checkbox"/> Other ('like-for-like', similar, substitution, replacement evaluation)
Section 3 Failure Effects Evaluation
A. Part/Component Safety Function:
1. <b>Provide conduit protection, structural support for safety class wiring conduit.</b>
2. <b>Maintain critical function before, during, and after Seismic Event.</b>
B. Part/Component Functional Mode:
Safety Function #1:
<input type="checkbox"/> Active – Mechanical or Electrical change of state is required to occur for the component to perform its safety function
<input checked="" type="checkbox"/> Passive – Change of state is not required for the component to perform its safety function
Safety Function #2:
<input type="checkbox"/> Active – Mechanical or Electrical change of state is required to occur for the component to perform its safety function.
<input checked="" type="checkbox"/> Passive – Change of state is not required for the component to perform its safety function
Safety Function #3:
<input type="checkbox"/> Active – Mechanical or Electrical change of state is required to occur for the component to perform its safety function.
<input type="checkbox"/> Passive – Change of state is not required for the component to perform its safety function
C. Host Component Safety Function (if applicable): <b>NA</b>
1.
D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):
1. <b>Fracture or material fatigue leads to loss of structural support and possible damage to wiring.</b>

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**Section 4 Environmental & Natural Phenomena Hazard Design**

Environmental Qualification Required: Yes [ ] No [ <b>X</b> ]	If yes: Environmental Qualification Requirements Limiting Environmental Conditions: Required Safety Functions: Qualification Period:
<b>Environmental Condition B</b>	

Natural Phenomena Hazard (NPH) Design Required: Yes [ <b>X</b> ] No [ ]	If yes: NPH Design Requirements Performance Category: <b>PC-3</b> NPH Design Req'ts.: <b>Seismic Condition C</b> Required Safety Functions: <b>Provide protection and support for safety class wiring conduit. Maintain critical function before, during, and after Seismic Event.</b>
<b>HNF-PRO-097, Rev. 0</b>	

**Section 5 Component Functional Classification**

[ <b>X</b> ] Safety Class (SC)	[ ] General Service (GS)	[ ] Safety Significant (SS)
If part/component classification is different from host component/system, document basis. <b>NA</b>		

**Section 6 (Reserved)**

**Section 7 (Reserved)**

**Section 8 References (for Functional Classification)**

National Codes/Standards: <b>IEEE 628</b>	Safety Analysis Report (SAR): <b>HNF-SD-SNF-SAR-002, Rev. 4A</b>	Drawings: <b>HNF-SD-SNF-SEL-002, Rev. 6A</b> <b>Dwg. H-1-82303</b>
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Vendor Manual/Manufacturer/Supplier Information:  
**Fender Washers, Lock Washers, Flat Washers, Hex Head Bolts - ABC Fasteners Page 2-1;**  
**PS-146 Continuous Threaded Rod/Clamping Nut with spring - Power Strut Pages 40, 42**  
**Phillips Drive Machine Screws - Fastenal Catalog, Pages 76 and 77**  
**Nylon Insert Lock Nuts, Fastenal Catalog, Page 104**  
**Hex Full Nuts Fastenal Catalog, Page 101**  
**SAE Flat Washers, Fastenal Catalog, Page 115**  
**Medium Split Lock Washers, Fastenal Catalog, Page 116**  
**Hose Banding, Worm-Drive Hose Clamps, Polyethylene Tubing, McMaster-Carr, Pages 153, 146, and 62.**

Other:



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Section 9: Critical Characteristics				
Critical Characteristics Verification Document:	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
<b>HNF-SD-SNF-SEL-002, Rev. 6A DWG. H-1-82303</b>				
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
<b>Fender, Flat, and Lock Washers, Page 2-1, Manufacturer</b>	<b>ABC Fasteners</b>	<b>1, IN</b>	<b>X</b>	
<b>Fender, Flat and Lock Washers - Component Number- Procurement and/or Model Number</b>		<b>1, IN</b>	<b>X</b>	
<b>Fender</b>	20004 20008 20015			
<b>Flat</b>	18020 18025 18030 18035			
<b>Lock</b>	19020 19025 19030 19035			
<b>Fender, Flat, and Lock Washers, - Size, inches</b>		<b>1, IN</b>	<b>X</b>	
<b>Fender, 20004</b>	1/4" x 1 1/4"			
<b>20008</b>	3/8" x 1 1/2"			
<b>20015</b>	1/2" x 2"			
<b>Flat, 18020</b>	#1/4			
<b>18025</b>	#5/16			
<b>18030</b>	#3/8			
<b>18035</b>	#1/2			
<b>Lock 19020</b>	#1/4			
<b>19025</b>	#5/16			
<b>19030</b>	#3/8			
<b>19035</b>	#1/2			
<b>Hex Nuts, Page 2-1, Manufacturer</b>	<b>ABC Fasteners</b>	<b>1, IN</b>	<b>X</b>	

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<b>Hex Nuts, - Component Number- Procurement and/or Model Number</b>	17025 17030 17035 17040	1, IN	X		
<b>Hex Nuts, - Size/Thread, inch</b>	17025 17030 17035 17040	1/4 - 20 5/16 - 18 3/8 - 16 1/2 - 13	1, IN	X	
<b>Hex Head Bolts, Manufacturer</b>	ABC Fasteners	1, IN	X		
<b>Hex Head Bolts, - Component Number- Procurement and/or Model Number</b>	38110 38111 38112 38113 38114 38115 38126 38127 38128 38141 38142 38143 38144 38155 38156 38157 38158 38159 38160 38161	1, IN	X		
1/4 inch					
5/16 inch					
3/8 inch					
1/2 inch					

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<p><b>Hex Head Bolts, - Size - Thread x Nominal Length, inch</b></p> <p>38110 38111 38112 38113 38114 38115</p> <p>38126 38127 38128</p> <p>38141 38142 38143 38144</p> <p>38155 38156 38157 38158 38159 38160 38161</p>	<p>1/4 - 20 x 1/2 1/4 - 20 x 3/4 1/4 - 20 x 1 1/4 - 20 x 1 1/4 1/4 - 20 x 1 1/2 1/4 - 20 x 2</p> <p>5/16 - 18 x 3/4 5/16 - 18 x 1 5/16 - 18 x 1 1/4</p> <p>3/8 - 16 x 3/4 3/8 - 16 x 1 3/8 - 16 x 1 1/4 3/8 - 16 x 1 1/2</p> <p>1/2 - 13 x 3/4 1/2 - 13 x 1 1/2 - 13 x 1 1/4 1/2 - 13 x 1 1/2 1/2 - 13 x 2 1/2 - 13 x 2 1/2 1/2 - 13 x 3</p>	<p>1, IN</p>	<p>X</p>	
<p><b>Fasteners, Pages 40 and 42</b></p> <p><b>Manufacturer</b></p> <p>PS 146 Continuous Threaded Rod - Size</p> <p>PS RS Clamping Nut with Regular Spring.</p> <p>PS RS - Size x Thread</p>	<p>Powerstrut</p> <p>Nominal 3/8"</p> <p>Nominal 1/2"</p> <p>Nominal 5/8"</p> <p>Nominal 3/4"</p> <p>1/4" x 20 3/8" x 16 1/2" x 13 5/8" x 11 3/4" x 10 7/8" x 9</p>	<p>1, IN</p>	<p>X</p>	
<p><b>Manufacturer, Pan Head Phillips Drive Machine Screws - All - Pages 76 and 77</b></p>	<p>Fastenal</p>	<p>1, IN</p>	<p>X</p>	

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<p><b>Pan Head Phillips Drive Machine Screws - Size - Thread, Part Number / Nominal Length, Inches</b></p>	<p><b>All 6 - 32</b> 28780 / 1/8 28781 / 3/16 28783 / 1/4 28789 / 5/16 28795 / 3/8 28801 / 7/16 28804 / 1/2 28806 / 9/16 28810 / 5/8 28816 / 3/4 28822 / 7/8 28828 / 1 28830 / 1 1/8 28834 / 1 1/4 28836 / 1 3/8 28838 / 1 1/2 28840 / 1 5/8 28842 / 1 3/4 28846 / 2 28852 / 2 1/4 28853 / 2 1/2 28854 / 3</p>	<p>1, IN</p>	<p>X</p>	
<p><b>Pan Head Phillips Drive Machine Screws - Size - Thread, Part Number / Nominal Length, Inches</b></p>	<p><b>All 8 - 32</b> 28856 / 3/16 28858 / 1/4 28864 / 5/16 28870 / 3/8 28876 / 7/16 28879 / 1/2 28881 / 9/16 28885 / 5/8 28891 / 3/4 28897 / 7/8 28903 / 1 28905 / 1 1/8 28909 / 1 1/4 28911 / 1 3/8 28913 / 1 1/2 28917 / 1 3/4 28921 / 2 28928 / 2 1/4 28929 / 2 1/2 28930 / 3</p>	<p>1, IN</p>	<p>X</p>	

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Pan Head Phillips Drive Machine Screws - Size - Thread, Part Number / Nominal Length, Inches	All 10- 24	1, IN	X
	28936 / 1/4		
	28942 / 5/16		
	28948 / 3/8		
	28954 / 7/16		
	28957 / 1/2		
	28963 / 5/8		
	28969 / 3/4		
	28975 / 7/8		
	28981 / 1		
	28987 / 1 1/4		
	28991 / 1 1/2		
	28995 / 1 3/4		
28999 / 2			
29003 / 2 1/4			
29007 / 2 1/2			
29011 / 2 3/4			
29015 / 3			
Pan Head Phillips Drive Machine Screws - Size - Thread, Part Number / Nominal Length, Inches	All 10- 32	1, IN	X
	29055 / 5/8		
29073 / 1			
Manufacturer, All Nylon Insert Lock Nuts, Page 104	Fastenal	1, IN	X
Part Number - Size - Thread	37010 6 - 32	1, IN	X
	37012 8 - 32		
	37014 10 - 24		
Manufacturer, All Size Hex Full Nuts, Page 101	Fastenal	1, IN	X
Part Number - Size - Thread	36020 6 - 32	1, IN	X
	36024 8 - 32		
	36028 10 - 24		
Manufacturer, All Size SAE Flat Washers, Page 115	Fastenal	1, IN	X
Part Number - Size - Nominal OD/ID, Inches	33070 - 6 - 3/8 / 5/32	1, IN	X
	33072 - 8 - 7/16 / 3/16		
	33074 - 10 - 1/2 / 7/32		
Manufacturer, All Size Medium Split Lock Washers, Page 116	Fastenal	1, IN	X

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<b>Part Number - Size</b>	33610 - 6 33612 - 8 33614 - 10	1, IN	X	
<b>Supplier, Hose Banding, Page 153</b>	McMaster-Carr	1, IN	X	
<b>Part Number - Band Width</b>	5658K13 - Nominal 1/4 inch	1, IN	X	
<b>Supplier, Worm-Drive Hose Clamps, Page 146</b>	McMaster-Carr	1, IN	X	
<b>Part Number - Band Width - Diameter, inches</b>	5321K24 - Nominal 5/16 - Nominal 15/16 - 1 1/2 5321K26 - Nominal 5/16 - Nominal 1 3/16 - 1 3/4 5321K32 - Nominal 5/16 - Nominal 1 11/16 - 2 1/4	1, IN	X	
<b>Supplier, Polyethylene Tubing, Page 62</b>	McMaster-Carr	1, IN	X	
<b>Part Number - Description - OD/ID, inches</b>	5181K85 - Translucent White - Nominal 1 3/8 / 1 1/8	1, IN	X	
<b>2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)</b>				
<b>Fender, Flat, and Lock Washers, Material</b>	Zinc Coated Steel (Note 3)	1, IN 1, T	X	
<b>Hex Nuts, Material</b>	Zinc Coated Steel (Note 3)	1, IN 1, T	X	
<b>Hex Head Bolts, Material</b>	Zinc Coated Steel (Note 3)	1, IN 1, T	X	
<b>Fasteners, PS 146 Continuous Threaded Rod, Material PS RS Clamping Nut with Regular Spring, Material</b>	Steel (Note 3) Steel (Note 3)	1, IN 1, T	X	
<b>All Size Pan Head Phillips Drive Machine Screws, Material</b>	Zinc Plated Steel (Note 3)	1, IN 1, T	X	
<b>All Size Nylon Insert Lock Nuts, Material</b>	Zinc Plated Steel (Note 3)	1, IN 1, T	X	
<b>All Size Hex Full Nuts, Material</b>	Zinc Plated Steel (Note 3)	1, IN 1, T	X	
<b>All Size SAE Flat Washers, Material</b>	Zinc Plated Steel (Note 3)	1, IN 1, T	X	
<b>All Size Medium Split Lock Washers, Material</b>	Zinc Plated Steel (Note 3)	1, IN 1, T	X	

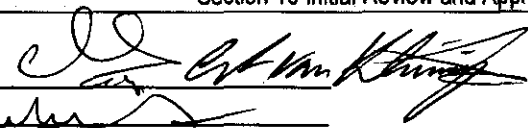
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<b>Hose Banding, Material</b>	<b>Stainless Steel (Note 3)</b>	<b>1, IN</b> <b>1, T</b>	<b>X</b>	
<b>Worm-Drive Hose Clamps, Material</b>	<b>Stainless Steel (Note 3)</b>	<b>1, IN</b> <b>1, T</b>	<b>X</b>	
<b>3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))</b>				
<b>Environmental</b>	<b>Note 1</b>			
<b>Seismic Condition C</b>	<b>Note 2</b>	<b>1, T</b> <b>1, A</b>		<b>X</b>


<b>4. Notes and Legend:</b> 1. <b>The components are not subject to degradation from the 40°F or 60% RH or 115°F and 22% RH conditions and are suitable for Environmental Condition B application.</b> 2. <b>Maintain critical function before, during, and after Seismic event. Equipment that has been shaker-table tested should not be installed in a plant (Ref. IEEE Standard 344-1984, Section 7). Consequently, the seismic test constitutes a destructive test. Seismic Design may be verified by analysis of the installed conduit system.</b> 3. <b>Material verification acceptance method may be by either inspection or test.</b>	<b>Acceptance Method:</b> 1. <b>Special Test and Inspection</b> 1, IN for Inspection 1, T for Test 1, A for Acceptance by Analysis 2. <b>Commercial Grade Survey</b> 3. <b>Source Verification</b> 4. <b>Vendor/Item History</b>
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**Section 10 Initial Review and Approval**

Approvals:

Designated Engineer:  11/27/99

Design Authority: 

QA Engineer: 

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<b>WORKSHEET 1 DETERMINATION OF FAILURE MECHANISMS/MODES</b>		
Section 1		
Typical Failure Mechanisms	Definition	Applicable to Component under Evaluation
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]; If Yes, indicate failure Mode: <u>Fracture or material fatigue-loss of structural protection to wiring</u>
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]; If Yes, indicate failure Mode: <u>Material fatigue leads to loss of structural support and enclosure of wiring</u>
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics.	Yes [ <input type="checkbox"/> ] No [ <input checked="" type="checkbox"/> ]; If Yes, indicate failure Mode _____
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]; If Yes, indicate failure Mode: <u>Fracture or material fatigue – loss of structural support and protection of wiring</u>
Section 2 Additional Failure Modes Applicable to the Component Under Evaluation		
1.		
2.		



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**CHECKLIST 1  
ACCEPTANCE METHOD 1  
SPECIAL TEST/INSPECTION VERIFICATION**

SECTION 1			
Item Description: <b>Fasteners for Safety Class Wiring Conduit.</b>		Equip #: <b>NA</b>	
System #: <b>93-2</b>		Procurement and/or Model #: <b>See Catalog Numbers in Section 8 and Characteristics in Section 9.</b>	
Manufacturer (Address/Phone): <b>Various - See Sections 8 and 9.</b>		Supplier (Address/Phone):	
P.O. #			
SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1.			
Insp	Test	Post-Test	
[ X ]	[ ]	[ ]	1. <b>Fender, Flat, and Lock Washers</b>
[ X ]	[ ]	[ ]	2. <b>Hex Nuts</b>
[ X ]	[ ]	[ ]	3. <b>Hex Head Bolts</b>
[ X ]	[ ]	[ ]	4. <b>Fasteners</b>
[ X ]	[ ]	[ ]	5. <b>Pan Head Phillips Drive Machine Screws</b>
[ X ]	[ ]	[ ]	6. <b>Nylon Insert Lock Nuts</b>
[ X ]	[ ]	[ ]	7. <b>Hex Full Nuts</b>
[ X ]	[ ]	[ ]	8. <b>SAE Flat Washers</b>
[ X ]	[ ]	[ ]	9. <b>Medium Split Lock Washers</b>
[ X ]	[ ]	[ ]	10. <b>Hose Banding</b>
[ X ]	[ ]	[ ]	11. <b>Worm-Drive Hose Clamps</b>
[ X ]	[ ]	[ ]	12. <b>Polyethylene Tubing</b>
[ X ]	[ X ]	[ ]	13. <b>Material, Fender, Flat, and Lock Washers (Verification may be by either inspection or by test)</b>
[ X ]	[ X ]	[ ]	14. <b>Material, Hex Nuts (Verification may be by either inspection or by test)</b>
[ X ]	[ X ]	[ ]	15. <b>Material, Hex Head Bolts (Verification may be by either inspection or by test)</b>
[ X ]	[ X ]	[ ]	16. <b>Material, Fasteners (Verification may be by either inspection or by test)</b>
[ X ]	[ X ]	[ ]	17. <b>Material, Pan Head Phillips Drive Machine Screws (Verification may be by either inspection or by test)</b>
[ X ]	[ X ]	[ ]	18. <b>Material, Nylon Insert Lock Nuts (Verification may be by either inspection or by test)</b>

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<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19. Material, Hex Full Nuts (Verification may be by either inspection or by test)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	20. Material, SAE Flat Washers (Verification may be by either inspection or by test)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21. Material, Medium Split Lock Washer (Verification may be by either inspection or by test)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	22. Material, Hose Banding (Verification may be by either inspection or by test)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	23. Material, Worm-Drive Hose Banding (Verification may be by either inspection or by test)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	24. Seismic Condition C (Seismic verification may be by test or by analysis)

**SECTION 3 VERIFIED BY INSPECTION**

\* See Attachment H of Desk Instruction for Sampling Size: **Reduced Sampling Plan Was Selected Due to The Product History and Simplicity of Product**

Characteristic: **Manufacturer, Fender, Flat, and Lock Washers**

Sample Size\*: **REDUCED SAMPLING PLAN**

Acceptance Criteria: **ABC Fasteners**

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): \_\_\_\_\_

Characteristic: **Fender, Flat, and Lock Washers - Component Number- Procurement and/or Model Number and Size, inches**

Sample Size\*: **REDUCED SAMPLING PLAN**

ID Number/Acceptance Criteria:

<b>Fender</b>	<b>20004</b>	<b>1/4 x 1 1/4</b>
	<b>20008</b>	<b>3/8 x 1 1/2</b>
	<b>20015</b>	<b>1/2 x 2</b>
<b>Flat</b>	<b>18020</b>	<b>#1/4</b>
	<b>18025</b>	<b>#5/16</b>
	<b>18030</b>	<b>#3/8</b>
	<b>18035</b>	<b>#1/2</b>
<b>Lock</b>	<b>19020</b>	<b>#1/4</b>
	<b>19025</b>	<b>#5/16</b>
	<b>19030</b>	<b>#3/8</b>
	<b>19035</b>	<b>#1/2</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): \_\_\_\_\_

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Characteristic: **Hex Nuts, Manufacturer**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **ABC Fasteners**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Hex Nuts - Component Number- Procurement and/or Model Number and Size/Thread, inches**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID Number - Size / Acceptance Criteria:

<b>17025</b>	<b>1/4 - 20</b>
<b>17030</b>	<b>5/16 -18</b>
<b>17035</b>	<b>3/8 - 16</b>
<b>17040</b>	<b>1/2 - 13</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Hex Head Bolts - Manufacturer**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **ABC Fasteners**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
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Title: **CONDUIT FASTENERS****Characteristic: Hex Head Bolts - Component Number- Procurement and/or Model Number - Size/Thread and Nominal Length, inches**Sample Size\*: **REDUCED SAMPLING PLAN**

ID Number - Size - Thread - Nominal Length / Acceptance Criteria:

<b>1/4</b>	<b>38110</b>	<b>1/4 - 20 x 1/2</b>
	<b>38111</b>	<b>1/4 - 20 x 3/4</b>
	<b>38112</b>	<b>1/4 - 20 x 1</b>
	<b>38113</b>	<b>1/4 - 20 x 1 1/4</b>
	<b>38114</b>	<b>1/4 - 20 x 1 1/2</b>
	<b>38115</b>	<b>1/4 - 20 x 2</b>
<b>5/16</b>	<b>38126</b>	<b>5/16 - 18 x 3/4</b>
	<b>38127</b>	<b>5/16 - 18 x 1</b>
	<b>38128</b>	<b>5/16 - 18 x 1 1/4</b>
<b>3/8</b>	<b>38141</b>	<b>3/8 - 16 x 3/4</b>
	<b>38142</b>	<b>3/8 - 16 x 1</b>
	<b>38143</b>	<b>3/8 - 16 x 1 1/4</b>
	<b>38144</b>	<b>3/8 - 16 x 1 1/2</b>
<b>1/2</b>	<b>38155</b>	<b>1/2 - 13 x 3/4</b>
	<b>38156</b>	<b>1/2 - 13 x 1</b>
	<b>38157</b>	<b>1/2 - 13 x 1 1/4</b>
	<b>38158</b>	<b>1/2 - 13 x 1 1/2</b>
	<b>38159</b>	<b>1/2 - 13 x 2</b>
	<b>38160</b>	<b>1/2 - 13 x 2 1/2</b>
	<b>38161</b>	<b>1/2 - 13 x 3</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): \_\_\_\_\_

**Characteristic: Manufacturer, Fasteners**Sample Size\*: **REDUCED SAMPLING PLAN**Acceptance Criteria: **Powerstrut**

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): \_\_\_\_\_

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Characteristic: **Fasteners - Component Number- Procurement and/or Model Number and Size, inches**  
Sample Size\*: **REDUCED SAMPLING PLAN**

ID Number - Size/Acceptance Criteria: **PS 146 Continuous Threaded Rod / Nominal 3/8"**

Size	/ Nominal 1/2"
	/ Nominal 5/8"
	/ Nominal 3/4"

**PS RS Clamping Nut with Regular Spring / 1/4" x 20**

Size x Thread	/ 3/8" x 16
	/ 1/2" x 13
	/ 5/8" x 11
	/ 3/4" x 10
	/ 7/8" x 9

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): \_\_\_\_\_

Characteristic: **Manufacturer, All Pan Head Phillips Drive Machine Screws**  
Sample Size\*: **REDUCED SAMPLING PLAN**

Acceptance Criteria: **Fastenal**

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): \_\_\_\_\_

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Characteristic: **Pan Head Phillips Drive Machine Screws**

Sample Size\*: **REDUCED SAMPLING PLAN**

ID All Size – Thread Part Number / Nominal Length, Inches / Acceptance Criteria:

<b>All 6 - 32</b>	<b>28780 / 1/8</b>
	<b>28781 / 3/16</b>
	<b>28783 / 1/4</b>
	<b>28789 / 5/16</b>
	<b>28795 / 3/8</b>
	<b>28801 / 7/16</b>
	<b>28804 / 1/2</b>
	<b>28806 / 9/16</b>
	<b>28810 / 5/8</b>
	<b>28816 / 3/4</b>
	<b>28822 / 7/8</b>
	<b>28828 / 1</b>
	<b>28830 / 1 1/8</b>
	<b>28834 / 1 1/4</b>
	<b>28836 / 1 3/8</b>
	<b>28838 / 1 1/2</b>
	<b>28840 / 1 5/8</b>
	<b>28842 / 1 3/4</b>
	<b>28846 / 2</b>
	<b>28852 / 2 1/4</b>
<b>28853 / 2 1/2</b>	
<b>28854 / 3</b>	

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): **Machine Screws - Fastenal Catalog, Pages 76 and 77**

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Characteristic: **Pan Head Phillips Drive Machine Screws**

Sample Size\*: **REDUCED SAMPLING PLAN**

ID All Size – Thread Part Number / Nominal Length, Inches / Acceptance Criteria:

<b>All 8 - 32</b>	<b>28856 / 3/16</b>
	<b>28858 / 1/4</b>
	<b>28864 / 5/16</b>
	<b>28870 / 3/8</b>
	<b>28876 / 7/16</b>
	<b>28879 / 1/2</b>
	<b>28881 / 9/16</b>
	<b>28885 / 5/8</b>
	<b>28891 / 3/4</b>
	<b>28897 / 7/8</b>
	<b>28903 / 1</b>
	<b>28905 / 1 1/8</b>
	<b>28909 / 1 1/4</b>
	<b>28911 / 1 3/8</b>
	<b>28913 / 1 1/2</b>
	<b>28917 / 1 3/4</b>
	<b>28921 / 2</b>
	<b>28928 / 2 1/4</b>
	<b>28929 / 2 1/2</b>
	<b>28930 / 3</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)

Receipt Inspection Plan / Report #: \_\_\_\_\_

References (see Section 8): **Machine Screws - Fastenal Catalog, Pages 76 and 77**

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Characteristic: **Pan Head Phillips Drive Machine Screws**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID All Size – Thread Part Number / Nominal Length, Inches / Acceptance Criteria:

<b>All 10- 24</b>	<b>28936 / 1/4</b>
	<b>28942 / 5/16</b>
	<b>28948 / 3/8</b>
	<b>28954 / 7/16</b>
	<b>28957 / 1/2</b>
	<b>28963 / 5/8</b>
	<b>28969 / 3/4</b>
	<b>28975 / 7/8</b>
	<b>28981 / 1</b>
	<b>28987 / 1 1/4</b>
	<b>28991 / 1 1/2</b>
	<b>28995 / 1 3/4</b>
	<b>28999 / 2</b>
	<b>29003 / 2 1/4</b>
	<b>29007 / 2 1/2</b>
	<b>29011 / 2 3/4</b>
	<b>29015 / 3</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **Machine Screws - Fastenal Catalog, Pages 76 and 77**

Characteristic: **Pan Head Phillips Drive Machine Screws**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID All Size – Thread Part Number / Nominal Length, Inches / Acceptance Criteria:

<b>All 10- 32</b>	<b>29055 / 5/8</b>
	<b>29073 / 1</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **Machine Screws - Fastenal Catalog, Pages 76 and 77**

Characteristic: **Manufacturer, All Nylon Insert Lock Nuts**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Fastenal**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
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References (see Section 8): \_\_\_\_\_



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**Characteristic: Nylon Insert Lock Nuts**  
**Sample Size\*: REDUCED SAMPLING PLAN**  
ID Part Number Size -- Thread / Acceptance Criteria:

<b>37010</b>	<b>6 - 32</b>
<b>37012</b>	<b>8 - 32</b>
<b>37014</b>	<b>10 - 24</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **Nylon Insert Lock Nuts, Fastenal Catalog, Page 104**

**Characteristic: Manufacturer, All Size Hex Full Nuts**  
**Sample Size\*: REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Fastenal**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8):

**Characteristic: All Size Hex Full Nuts**  
**Sample Size\*: REDUCED SAMPLING PLAN**  
ID - Part Number - Size-Thread / Acceptance Criteria:

<b>36020</b>	<b>- 6-32</b>
<b>36024</b>	<b>- 8-32</b>
<b>36028</b>	<b>- 10-24</b>

As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **Hex Full Nuts, Fastenal Catalog, Page 101**

**Characteristic: Manufacturer, All Size SAE Flat Washers**  
**Sample Size\*: REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Fastenal**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
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Characteristic: **SAE Flat Washers**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID - Part Number - Size - Nominal OD/ID, Inches / Acceptance Criteria:  
**33070 - 6 - 3/8 / 5/32**  
**33072 - 8 - 7/16 / 3/16**  
**33074 - 10 - 1/2 / 7/32**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **SAE Flat Washers, Fastenal Catalog, Page 115**

Characteristic: **Manufacturer, All Size Medium Split Lock Washers**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Fastenal**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8):

Characteristic: **Medium Split Lock Washers**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID - Part Number - Size / Acceptance Criteria:  
**33610            6**  
**33612            8**  
**33614            10**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **Medium Split Lock Washers, Fastenal Catalog, Page 116**

Characteristic: **Supplier, Hose Banding**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **McMaster-Carr**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8):

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Characteristic: **Hose Banding**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID - Part Number - Band Width / Acceptance Criteria:  
**5658K13 - Nominal 1/4 inch**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **McMaster-Carr, Page 153**

Characteristic: **Supplier, Worm-Drive Hose Clamps**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **McMaster-Carr**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8):

Characteristic: **Worm-Drive Hose Clamps**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID - Part Number - Band Width - Diameter, inches / Acceptance Criteria:  
**5321K24 - Nominal 5/16 - Nominal 15/16 - 1 1/2**  
**5321K26 - Nominal 5/16 - Nominal 1 3/16 - 1 3/4**  
**5321K32 - Nominal 5/16 - Nominal 1 11/16 - 2 1/4**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **McMaster-Carr, Page 146**

Characteristic: **Supplier, Polyethylene Tubing**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **McMaster-Carr**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8):

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Characteristic: **Polyethylene Tubing**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
ID - Part Number - Description - OD / ID, inches / Acceptance Criteria:  
**5181K85 - Translucent White - Nominal 1 3/8 / 1 1/8**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): **McMaster-Carr, Page 62**

Characteristic: **Material, Fender, Flat, and Lock Washers**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Coated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, Hex Nuts**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Coated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, Hex Head Bolts**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Coated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

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Characteristic: **Material, Fasteners**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria:  
**PS 146 Continuous**  
**Threaded Rod.                      Steel**  
**PS RS Clamping Nut with**  
**Regular Spring.                      Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, All Pan Head Phillips Drive Machine Screws**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Plated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, All Nylon Insert Lock Nuts**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Plated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, All Size Hex Full Nuts**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Plated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, All Size SAE Flat Washers**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Plated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

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Characteristic: **Material, All Size Medium Split Lock Washers**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Zinc Plated Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, Hose Banding**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Stainless Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

Characteristic: **Material, Worm-Drive Hose Clamps**  
Sample Size\*: **REDUCED SAMPLING PLAN**  
Acceptance Criteria: **Stainless Steel**  
As Found: \_\_\_\_\_ Passed: Y / N (Circle)  
Receipt Inspection Plan / Report #: \_\_\_\_\_  
References (see Section 8): \_\_\_\_\_

**SECTION 4 VERIFIED BY SPECIAL TEST**

\* See Attachment H of Desk Instruction for Sampling Size: **NA**

Characteristic for Test: **Seismic Condition C - All Items**  
Acceptance Criteria: **Maintain Critical Function Before, During, and After Seismic Event.**  
Sample Size\*: **Sample Size is NA because seismic verification of the installed conduit system with fittings, supports, etc, will be done by analysis. Physical testing is not anticipated.**  
Actual Test Value:  
Test Plan and Report #: \_\_\_\_\_ References (see Section 8): \_\_\_\_\_

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## Section 5 Test / Inspection Summary (Acceptance Method 1)

### 1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS, THEIR VERIFICATION METHODS, AND RESULTS

**ITEM DESCRIPTION:**

Critical Characteristics		Verification Results									
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Fender, Flat and Lock Washers - Manufacturer</b>	<b>ABC Fasteners</b>	<b>X</b>		<b>IN</b>							
<b>Fender, Flat and Lock Washers - Component Number- Procurement and/or Model Number</b>	20004 20008 20015	<b>X</b>		<b>IN</b>							
<b>Flat</b>	18020 18025 18030 18035										
<b>Lock</b>	19020 19025 19030 19035										

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Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check- list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Fender, Flat, and Lock Washers, - Size, inches</b> Fender 20004 20008 20015  Flat 18020 18025 18030 18035  Lock 19020 19025 19030 19035	1/4" x 1 1/4" 3/8" x 1 1/2" 1/2" x 2"	X		IN							
	#1/4 #5/16 #3/8 #1/2										
	#1/4 #5/16 #3/8 #1/2										
<b>Hex Nuts - Manufacturer</b>	<b>ABC Fasteners</b>	X		IN							
<b>Hex Nuts, - Component Number- Procurement and/or Model Number</b>	17025 17030 17035 17040	X		IN							
<b>Hex Nuts, - Size - Thread, inch</b>	1/4 - 20 5/16 - 18 3/8 - 16 1/2 - 13	X		IN							



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Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-List ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Hex Head Bolts - Manufacturer</b>	<b>ABC Fasteners</b>	<b>X</b>		<b>IN</b>							
<b>Hex Head Bolts, - Component Number- Procurement and/or Model Number</b>		<b>X</b>		<b>IN</b>							
<b>1/4 inch</b>	38110 38111 38112 38113 38114 38115  38126 38127 38128  38141 38142 38143 38144  38155 38156 38157 38158 38159 38160 38161										
<b>5/16 inch</b>											
<b>3/8 inch</b>											
<b>1/2 inch</b>											

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Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure of RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Hex Head Bolts, - Size - Thread x Nominal Length, inches</b>		<b>X</b>		<b>IN</b>							
38110	1/4 - 20 x 1/2										
38111	1/4 - 20 x 3/4										
38112	1/4 - 20 x 1										
38113	1/4 - 20 x 1 1/4										
38114	1/4 - 20 x 1 1/2										
38115	1/4 - 20 x 2										
38126	5/16 - 18 x 3/4										
38127	5/16 - 18 x 1										
38128	5/16 - 18 x 1 1/4										
38141	3/8 - 16 x 3/4										
38142	3/8 - 16 x 1										
38143	3/8 - 16 x 1 1/4										
38144	3/8 - 16 x 1 1/2										
38155	1/2 - 13 x 3/4										
38156	1/2 - 13 x 1										
38157	1/2 - 13 x 1 1/4										
38158	1/2 - 13 x 1 1/2										
38159	1/2 - 13 x 2										
38160	1/2 - 13 x 2 1/2										
38161	1/2 - 13 x 3										

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Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Fasteners - Manufacturer</b> PS 146 Continuous Threaded Rod, Size  PS RS Clamping Nut with Regular Spring PS RS Size x Thread	<b>Powerstrut</b> Nominal 3/8" Nominal 1/2" Nominal 5/8" Nominal 3/4"  1/4" x 20 3/8" x 16 1/2" x 13 5/8" x 11 3/4" x 10 7/8" x 9	X		IN							
All Size Pan Head Phillips Drive Machine Screws - Manufacturer	Fastenal	X		IN							

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Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Pan Head Phillips Drive Machine Screws - Size 6 - 32</b>  <b>Part Number / Nominal Length, Inches</b>	28780 / 1/8	X		IN							
	28781 / 3/16										
	28783 / 1/4										
	28789 / 5/16										
	28795 / 3/8										
	28801 / 7/16										
	28804 / 1/2										
	28806 / 9/16										
	28810 / 5/8										
	28816 / 3/4										
	28822 / 7/8										
	28828 / 1										
	28830 / 1 1/8										
	28834 / 1 1/4										
	28836 / 1 3/8										
28838 / 1 1/2											
28840 / 1 5/8											
28842 / 1 3/4											
28846 / 2											
28852 / 2 1/4											
28853 / 2 1/2											
28854 / 3											

Critical Characteristics

Verification Results

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Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Pan Head Phillips Drive Machine Screws - Size 8 - 32</b>  <b>Part Number / Nominal Length, Inches</b>	28856 / 3/16	X		IN							
	28858 / 1/4										
	28864 / 5/16										
	28870 / 3/8										
	28876 / 7/16										
	28879 / 1/2										
	28881 / 9/16										
	28885 / 5/8										
	28891 / 3/4										
	28897 / 7/8										
	28903 / 1										
	28905 / 1 1/8										
	28909 / 1 1/4										
28911 / 1 3/8											
28913 / 1 1/2											
28917 / 1 3/4											
28921 / 2											
28928 / 2 1/4											
28929 / 2 1/2											
28930 / 3											

Critical Characteristics

Verification Results

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Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
<b>Pan Head Phillips Drive Machine Screws - Size 10 - 24</b>  <b>Part Number / Nominal Length, Inches</b>	28936 / 1/4	X		IN							
	28942 / 5/16										
	28948 / 3/8										
	28954 / 7/16										
	28957 / 1/2										
	28963 / 5/8										
	28969 / 3/4										
	28975 / 7/8										
	28981 / 1										
	28987 / 1 1/4										
	28991 / 1 1/2										
	28995 / 1 3/4										
	28999 / 2										
<b>Pan Head Phillips Drive Machine Screws - Size 10 - 32</b>  <b>Part Number / Nominal Length, Inches</b>	29003 / 2 1/4										
	29007 / 2 1/2										
	29011 / 2 3/4										
<b>All Size Nylon Insert Lock Nuts - Manufacturer</b>	29015 / 3	X		IN							
	29055 / 5/8 29073 / 1										
<b>Nylon Insert Lock Nuts - Part Number - Size - Thread</b>	Fastenal	X		IN							
	37010 6 - 32	X		IN							
	37012 8 - 32 37014 10 - 24										

Critical Characteristics

Verification Results

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Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/TN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
All Size Hex Full Nuts - Manufacturer	Fastenal	X		IN							
Hex Full Nuts - Part Number - Size - Thread	36020 6 - 32 36024 8 - 32 36028 10 - 24	X		IN							
All Size SAE Flat Washers - Manufacturer	Fastenal	X		IN							
SAE Flat Washers - Part Number - Size - Nominal OD/ID, inches	33070 - 6 - 3/8 / 5/32 33072 - 8 - 7/16 / 3/16 33074 - 10 - 1/2 / 7/32	X		IN							
All Size Medium Split Lock Washers - Manufacturer	Fastenal	X		IN							
Medium Split Lock Washers - Part Number - Size	33610 - 6 33612 - 8 33614 - 10	X		IN							
Hose Banding, Supplier	McMaster-Carr	X		IN							
Hose Banding - Part Number - Band Width	5658K13 - Nominal 1 1/4 inch	X		IN							
Worm-Drive Hose Clamps, Supplier	McMaster-Carr	X		IN							

Critical Characteristics

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Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Worm-Drive Hose Clamps - Part Number - Band Width - Diameter	5321K24 - Nominal 5/16 - Nominal 15/16 - 1 1/2	X		IN							
	5321K26 - Nominal 5/16 - Nominal 1 3/16 - 1 3/4										
	5321K32 - Nominal 5/16 - Nominal 1 11/16 - 2 1/4										
Polyethylene Tubing, Supplier	McMaster-Carr	X		IN							
Polyethylene Tubing, Part Number - Description - OD / ID, inches	5181K85 - Translucent White - Nominal 1 3/8 / 1 1/8	X		IN							
Material Identification:											
Fender, Flat, and Lock Washers	Zinc Coated Steel	X		IN, T							
Hex Nuts	Zinc Coated Steel	X		IN, T							
Hex Head Bolts	Zinc Coated Steel	X		IN, T							

Critical Characteristics						Verification Results					
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date

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Fasteners,																				
PS 146 Continuous Threaded Rod.	Steel	X																		
PS RS Clamping Nut with Regular Spring.	Steel																			
Pan Head Phillips Drive Machine Screws	Zinc Plated Steel	X																		
Nylon Insert Lock Nuts	Zinc Plated Steel	X																		
All Size Hex Full Nuts	Zinc Plated Steel	X																		
All Size SAE Flat Washers	Zinc Plated Steel	X																		
All Size Medium Split Lock Washers	Zinc Plated Steel	X																		
Hose Banding	Stainless Steel (Note 3)	X																		
Worm-Drive Hose Clamps	Stainless Steel (Note 3)	X																		
Seismic Condition C	Maintain Critical Function Before, During, and After Seismic Event. Seismic verification of the installed conduit system will be provided by analysis.		X																	

## 2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic

Disposition

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**3. SIGNATURE INDICATES ALL CRITICAL CHARACTERISTICS VERIFIED SATISFACTORY OR ACCEPTABLY DISPOSITIONED AND COMMERCIAL GRADE DEDICATION IS SATISFACTORY AND COMPLETE.**

### BUYER VERIFICATION

Testing Agency Approval: \_\_\_\_\_ Date \_\_\_\_\_

Design Authority: \_\_\_\_\_ Date \_\_\_\_\_

Testing Agency QA Engineer: \_\_\_\_\_ Date \_\_\_\_\_

QA Engineer: \_\_\_\_\_ Date \_\_\_\_\_

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<b>SECTION 6 CONTACTS / PHONE NUMBERS</b>	
Name	Phone
Design Authority	( )
QA	( )
QC	( )
Cog - Engineer	( )
CGI Engineer	( )
Procurement Engineer	( )
Other	( )
<b>SECTION 7 SUPPORTING DOCUMENTATION FOR THIS CHECKLIST</b>	
Initial Procurement Documents	For Critical Characteristics
<input type="checkbox"/> Drawings:	
<input type="checkbox"/> Manuals (specify type & number):	
<input type="checkbox"/> Design Calculations	
<input type="checkbox"/> Installation Instructions	
<input type="checkbox"/> Operation Instructions	
<input type="checkbox"/> Calibration Instructions	
<input type="checkbox"/> Manufacturer's Recommended Spare Parts List	
<input type="checkbox"/> Other:	
Procurement Documents	
<input type="checkbox"/> Certificate of Conformance/Compliance	
<input type="checkbox"/> Seismic Qualification Certificate	
<input type="checkbox"/> Environmental Qualification Certificate	
<input type="checkbox"/> Test Report (s):	
<input type="checkbox"/> Inspection Report (s):	
<input type="checkbox"/> CMTRs for ASME Pressure Retaining Materials	
<input type="checkbox"/> Valve Seat Leakage Report	
<input type="checkbox"/> Weld Records	
<input type="checkbox"/> Material Traceability Record	
<input type="checkbox"/> Other:	