APPROVAL REPORT

Project No:	PR454847
Class:	1920
Product Type:	Gasketed and Non-Gasketed Pipe Fittings for Use with Aboveground Fire Protection Systems
Product Name:	Model XGQT01 Rigid Coupling, Model XGQT01P Rigid Coupling, Model XGQT02 Flexible Coupling, Model XGQT02P Flexible Coupling and Model XGQT02B Reducing Coupling For Use with Various Types of Aboveground Steel Sprinkler Pipe and Various Non-Gasketed Pipe Fittings
Name of Report Holder:	Weifang 100tong Casting Co Ltd
Address of Report Holder:	1919 Jichang South Rd., Weicheng District Weifang City, Shandong Province 261052 China
Customer ID:	104639

Prepared by

Brian N. Doyle
Associate Engineer
Fire Protection

Reviewed by

Claude Bosio
AVP, Technical Team Manager
Fire Protection

David B. Fuller
VP, Manager - Fire Protection

June 1, 2021
Date of Approval

FM Approvals
1151 Boston-Providence Turnpike
PO Box 9102
Norwood, MA 02062

1 INTRODUCTION

1.1 Weifang 100tong Casting Co. requested an FM Approval examination of their gasketed pipe fittings with rated working pressures in accordance with the following:

Project Scope - Gasketed Pipe Fittings					
Model	**Product Type**	**Nominal Pipe Size**	**Rated Working Pressure**		**Pipe**
		inch	**psi**	**kPa**	
XGQT01	Rigid Coupling	1, 1-1/4, 1-1/2, 2, 2-1/2, 3 76.1 mm	500	3445	Schedule 10, 30 & 40 Rolled Groove
		4 108.0 mm	400	2755	Schedule 10, 30 & 40 Rolled Groove
		1, 1-1/4, 1-1/2, 2, 2-1/2, 3, 4	300	2070	Wheatland Tube Co Mega-Flow
		5, 6, 8, 10, 12 133.0, 139.7, 165.1 mm	300	2070	Schedule 30 & 40 Rolled Groove
		5, 6 133.0, 139.7, 165.1 mm	300	2070	Schedule 10 Rolled Groove
		8, 10, 12	300	2070	0.188” Thick Rolled Groove
XGQT02	Flexible Coupling	1, 1-1/4, 1-1/2, 2, 2-1/2, 3 76.1 mm	500	3445	Schedule 10, 30 & 40 Rolled Groove
		4 108.0 mm	400	2755	Schedule 10, 30 & 40 Rolled Groove
		1, 1-1/4, 1-1/2, 2, 2-1/2, 3, 4	300	2070	Wheatland Tube Co Mega-Flow
		5, 6, 8, 10, 12 133.0, 139.7, 165.1 mm	300	2070	Schedule 30 & 40 Rolled Groove
		5, 6 133.0, 139.7, 165.1 mm	300	2070	Schedule 10 Rolled Groove
		8, 10, 12	300	2070	0.188” Thick Rolled Groove
XGQT01P	Rigid Coupling	5, 6 139.7, 165.1 mm	500	3445	Schedule 10, 30 & 40 Rolled Groove
		8	450	3100	Schedule 30 & 40 Rolled Groove
					0.188” Thick Rolled Groove
		10, 12	400	2755	Schedule 30 & 40 Rolled Groove
					0.188” Thick Rolled Groove

Project Scope - Gasketed Pipe Fittings					
Model	**Product Type**	**Nominal Pipe Size**	**Rated Working Pressure**		**Pipe**
		inch	**psi**	**kPa**	
XGQT02P	Flexible Coupling	5, 6 139.7, 165.1 mm	500	3445	Schedule 10, 30 & 40 Rolled Groove
		8	450	3100	Schedule 30 & 40 Rolled Groove
					0.188” Thick Rolled Groove
		10, 12	400	2755	Schedule 30 & 40 Rolled Groove
					0.188” Thick Rolled Groove
XGQT02B	Reducing Coupling	1-1/2 x 1-1/4 2 x 1-1/2 2-1/2 x 1-1/2, 2 76.1 mm x 1-1/2, 2, 2-1/2 3 x 1-1/2, 2, 2-1/2, 76.1 mm 4 x 1-1/2, 2, 2-1/2, 76.1 mm, 3	300	2070	Schedule 40 Rolled & Cut Groove
					Schedule 30 Rolled Groove
					Schedule 10 Rolled Groove

1.2 Weifang 100tong Casting Co. requested an FM Approval examination of their non-gasketed pipe fittings with rated working pressures in accordance with the following:

Project Scope – Non-Gasketed Pipe Fittings				
Model	**Product Type - Grooved**	**Nominal Pipe Size**	**Rated Working Pressure**	
		inch	**psi**	**kPa**
XGQT13	Bull Head Tee	3 x 4, 165.1 mm 4 x 165.1 mm	300	2070
XGQT21	90° Reducing Elbow	4 x 3 165.1 mm x 3	300	2070
XGQT38	Flange Adapter	2, 3, 4, 8 76.1, 165.1 mm	300	2070

1.3 The Model XGQT01P rigid coupling and Model XGQT02P flexible coupling are new products for Weifang 100tong Casting Co.

1.4 The Model XGQT01 rigid coupling and Model XGQT02 flexible coupling are currently FM Approved. These models were previously examined under Project Identification number 3024935, dated March 21, 2006 and Project Identification number 3037453, dated July 28, 2010. This project evaluated an increased rated working pressure; evaluated the couplings for use with Wheatland Tube Co Mega-Flow Lightwall pipe and evaluated galvanized, dacromet and epoxy surface finishes across all sizes.

1.5 The Model XGQT02B reducing coupling is currently FM Approved. This model was previously examined under Project Identification number 3037453, dated July 28, 2010. This project evaluated additional sizes (1-1/2 x 1-1/4 inch and 76.1 mm x 2-1/2 inch); evaluated the Model XGQT02B reducing coupling for use with Schedule 10, Schedule 30 and Schedule 40 rolled groove pipe and evaluated galvanized, dacromet and epoxy surface finishes across all sizes.

1.6 The Model XGQT13 bull head tee, Model XGQT21 90d reducing elbow and Model XGQT38 flange adapter are new products for Weifang 100tong Casting Co.

1.7 This Report may be freely reproduced only in its entirety and without modification.

1.8 Standards

1.8.1 FM Approvals Standards

Title	Number	Issue Date
Pipe Couplings and Fittings for Aboveground Fire Protection Systems	1920	November, 2007

1.9 Listing

The product(s) will be updated in the Approval Guide, an on-line resource of FM Approvals, as detailed in an attachment at the end of this report. Deletions from any current product listing are shown with strikethroughs and additions to the Approval listing are shown in red text.

2 DESCRIPTION

2.1 Grooved End Non-Gasketed Pipe Fittings

The various grooved end fittings are used to connect cut or roll grooved pipe or fittings to valves or other grooved fittings. The fittings are manufactured from Grade QT-450 GB/T 1348 (Chinese) ductile iron and are available with a painted, galvanized, dacromet or epoxy surface finish.

2.2 Model XGQT38 Flange Adapters - Grooved End Outlet

The Model XGQT38 grooved end outlet flange adapters are used to connect cut or roll grooved pipe or fittings to valves or other fittings that are supplied with ANSI Class 150 or ISO PN 16 flanges. These flange adapters are manufactured from Grade QT-450 GB/T 1348 (Chinese) ductile iron and are available with a painted, galvanized, dacromet or epoxy surface finish.

2.3 Model XGQT01 Grooved End Rigid Couplings

The Model XGQT01 grooved end rigid couplings are designed to prevent the rotation of the joined ends and provide angular and rotational rigidity upon assembly. These couplings are made using a Grade QT-450 GB/T 1348 (Chinese) ductile iron split housing, carbon steel bolts and hex nuts and are sealed at the pipe surface with an EPDM elastomer gasket. The Model XGQT01 rigid grooved end couplings are available with a painted, galvanized, dacromet or epoxy surface finish.

2.4 Model XGQT01P Grooved End Rigid Couplings

The Model XGQT01P grooved end rigid couplings are designed to prevent the rotation of the joined ends and provide angular and rotational rigidity upon assembly. These couplings are made using a Grade QT-450 GB/T 1348 (Chinese) ductile iron split housing, carbon steel bolts and hex nuts and are sealed at the pipe surface with an EPDM elastomer gasket. The Model XGQT01P rigid grooved end couplings are available with a painted, galvanized, dacromet or epoxy surface finish.

2.5 Model XGQT02 Grooved End Flexible Couplings

The Model XGQT02 grooved end flexible couplings are designed to allow for angular or rotational differences between the components being joined after assembly. These couplings provide greater system reliability in situations involving excessive vibration, difficult alignment or seismic activity. The couplings are made using a Grade QT-450 GB/T 1348 (Chinese) ductile iron split housing, carbon steel bolts and hex nuts and are sealed at the pipe surface with an EPDM elastomer gasket. The Model XGQT02 grooved end flexible couplings are available with a painted, galvanized, dacromet or epoxy surface finish.

2.6 Model XGQT02P Grooved End Flexible Couplings

The Model XGQT02P grooved end flexible couplings are designed to allow for angular or rotational differences between the components being joined after assembly. These couplings provide greater system reliability in situations involving excessive vibration, difficult alignment or seismic activity. The couplings are made using a Grade QT-450 GB/T 1348 (Chinese) ductile iron split housing, carbon steel bolts and hex nuts and are sealed at the pipe surface with an EPDM elastomer gasket. The Model XGQT02P grooved end flexible couplings are available with a painted, galvanized, dacromet or epoxy surface finish.

2.7 Model XGQT02B Grooved End Reducing Couplings

The Model XGQT02B grooved end reducing couplings are designed for direct reduction on a piping run and eliminate the need for a concentric reducer and couplings. The specifically designed rubber gasket helps prevent small pipe from telescoping into larger pipe during vertical assembly. These couplings are made using a Grade QT-450 GB/T 1348 (Chinese) ductile iron split housing, carbon steel bolts and hex nuts and are sealed at the pipe surface with an EPDM elastomer gasket. The Model XGQT02B grooved end reducing couplings are available with a painted, galvanized, dacromet or epoxy surface finish.

3 EXAMINATIONS AND TESTS

3.1 Samples were submitted for examination and testing. The samples were considered to be representative of the product line and were examined, tested, and compared to the manufacturer's drawings. All data remains on file at FM Approvals along with other documents and correspondence applicable to this program.

3.2 All testing and analysis considered appropriate was conducted and verified to be in compliance with the standards defined in Section 1.8.

3.3 Detailed analysis of the examination and testing can be found as an attachment at the end of this Report.

4 MARKING

4.1 The following information appears on each product discussed in this Report in raised cast letters and meets Standard requirements:

- Manufacturer's name or trademark
- Product Model Number
- Nominal pipe size
- Date code / Heat code
- FM Approvals Certification Mark

4.2 The following markings appear on the inside of each gasket discussed in this Report in raised molded letters and meets Standard requirements:

- Manufacturer's name or trademark
- Product Model Number
- Manufacturing source code
- Cavity number
- Material code
- Date code / Heat code

5 REMARKS

5.1 The FM Global Property Loss Prevention Data Sheets should be strictly adhered to when installing this product.

5.2 Installations shall comply with the latest edition of the manufacturer's instruction manual.

5.3 Tampering and/or replacement with non-factory components may adversely affect the safe use of the product.

6 SURVEILLANCE AUDIT

The design and manufacturing facilities at the following location(s) are subject to follow-up audit inspections. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this Report. A revision request form shall be submitted to FM Approvals for requesting any additional manufacturing facilities which are not listed below. The Products discussed in this Report are FM Approved only when designed and manufactured in the following facility:

Design and Manufacturing

Weifang 100tong Casting Co Ltd
1919 Jichang South Rd, Weicheng District
Weifang City, Shandong Province 261052
China

7 MANUFACTURER'S RESPONSIBILITIES

7.1 Documentation considered critical to this Approval is on file at FM Approvals and is listed in the Documentation File, Section 8, of this Report. No changes of any nature shall be made unless notice of the proposed change has been given and written authorization

obtained from FM Approvals. The revision request form shall be forwarded to FM Approvals as notice of proposed changes.

7.2 The manufacturer is responsible for control of the product marking and installation instructions for the product.

7.3 The manufacturer shall provide installation, operating, and maintenance manual(s) with each system.

7.4 The manufacturer is responsible for performing the Manufacturing and Production Tests specified in the Standard defined in Section 1.8 of this Approval Report.

8 DOCUMENTATION FILE

All pertinent Report documents are outlined in the ATTACHMENTS list below.

9 CONCLUSION

The Products described in Section 1 of this Report meet FM Approvals requirements when manufactured at the facility detailed in Section 6 of this Report. Since a duly signed Master Agreement is on file for this manufacturer, Approval is effective the date of this Report.

PROJECT DATA RECORD: PR454847

ATTACHMENTS:

Appendix A	Non-Gasketed Pipe Fitting Approval Guide Listing
Appendix B	Reducing Grooved Coupling Approval Guide Listing
Appendix C	Grooved Coupling Approval Guide Listings
Appendix D	Detailed Analysis
Appendix E	Critical Document List (CDL)

APPROVAL GUIDE LISTING

Non-Gasketed Pipe Fittings

Fire Protection – Automatic Sprinkler Systems – Pipes and Fittings for Aboveground – Pipe Fittings – Pipe Fittings

Weifang 100tong Casting Co Ltd
No. 1919 Jinchang South Rd, Weicheng District, Weifang, 261052 Shandong, China

Weifang100tong, Pipe Fittings

Model No	Description	Nominal Pipe Size, in	Rated Working Pressure		Remarks
			psi	(kPa)	
XGQT06	90° Elbow	76.1, 139.7, 165.1 mm	232	(1595)	c
XGQT06	90° Elbow	8, 10, 12 216 mm	300	(2065)	c
XGQT06	90° Elbow	5, 6 133, 139.7, 159, 165.1 mm	400	(2755)	c
XGQT06	90° Elbow	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 76.1, 108 mm	500	(3445)	c
XGQT06L	90° Long Radius Elbow	8, 10, 12	300	(2065)	c, h
XGQT06L	90° Long Radius Elbow	1 1/4, 1 1/2, 2, 2 1/2, 3, 4, 6 76.1, 108, 165.1 mm	400	(2755)	c, h
06D	90° Drain Elbow	8	300	(2065)	c, h
06D	90° Drain Elbow	2, 2 1/2, 3, 4, 6 76.1, 139.7, 165.1 mm	400	(2755)	c, h
XGQT07	45° Elbow	8, 10, 12 216 mm	300	(2065)	c
XGQT07	45° Elbow	5, 6 133, 139.7, 159, 165.1 mm	400	(2755)	c
XGQT07	45° Elbow	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 76.1 mm, 108 mm	500	(3445)	c
XGQT12	Equal Tee	8, 10, 12 216 mm	300	(2065)	c
XGQT12	Equal Tee	5, 6 133, 139.7, 159, 165.1 mm	400	(2755)	c
XGQT12	Equal Tee	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 76.1 mm, 108 mm	500	(3445)	c
XGQT12L	Equal Tee, Long Radius	8, 10, 12	300	(2065)	c, h
XGQT12L	Equal Tee, Long Radius	1 1/4, 1 1/2, 2, 2 1/2, 3, 4, 6 76.1, 108, 139.7, 159, 165.1 mm	400	(2755)	c, h
XGQT13	Reducing Tee, Grooved	3 x 76.1 mm 139.7 mm x 4 165.1 mm x 139.7 mm	232	(1595)	c
XGQT13	Reducing Tee, Grooved	8 x 4, 6 219.1 mm x 165.1 mm 10 x 6, 8 12 x 4, 6, 8, 10	300	(2065)	c
XGQT13	Reducing Tee, Grooved	2 1/2 x 1, 1 1/4, 1 1/2, 2 3 x 2 1/2 4 x 2 1/2 6 x 1, 1 1/4, 1 1/2, 2, 3, 4, 76.1 mm 139.7 mm x 1, 1 1/4, 1 1/2, 2, 3, 76.1 mm 165.1 mm x 1, 1 1/4, 1 1/2, 2, 3, 4, 76.1 mm	400	(2755)	c
XGQT13	Reducing Tee, Grooved	2 x 1, 1 1/4, 1 1/2 3 x 1, 1 1/4, 1 1/2, 2 4 x 1, 1 1/4, 1 1/2, 2, 3, 76.1 mm 76.1 mm x 1, 1 1/4, 1 1/2	500	(3445)	c
XGQT13	Bull Head Tee, Grooved	3 x 4, 165.1 mm 4 x 165.1 mm	300	(2065)	c, h

Model No	Description	Nominal Pipe Size, in	Rated Working Pressure		Remarks
			psi	(kPa)	
XGQT13F	Reducing Pitcher Tee, Grooved x Flanged	4 x 76.1 mm	300	(2065)	c
XGQT13R	Reducing Pitcher Tee, Grooved x Threaded	4 x 76.1 mm	300	(2065)	c
XGQT13S	Reducing Tee, Grooved x Threaded	2 1/2 x 1, 1 1/4, 1 1/2, 2 6 x 1, 1 1/4, 1 1/2, 2, 3, 4, 76.1 mm 139.7 mm x 1, 1 1/4, 1 1/2, 2, 3, 76.1 mm 165.1 mm x 1, 1 1/4, 1 1/2, 2, 3, 4, 76.1 mm	400	(2755)	c, d
XGQT13S	Reducing Tee, Grooved x Threaded	2 x 1, 1 1/4, 1 1/2 3 x 1, 1 1/4, 1 1/2, 2 4 x 1, 1 1/4, 1 1/2, 2, 3, 76.1 mm 76.1 mm x 1, 1 1/4, 1 1/2	500	(3445)	c, d
XGQT18	Flange Adaptor	2, 2 1/2, 3, 4, 5, 6, 8, 10, 12 76.1, 108, 133, 139.7, 159, 165.1 mm	300	(2065)	c, e
XGQT18S	Flange Adaptor Threaded	2, 3, 4 76.1 mm	300	(2065)	c, e
XGQT20	Cap	8, 10, 12	300	(2065)	c
XGQT20	Cap	5, 6 133, 139.7, 159, 165.1 mm	400	(2755)	c
XGQT20	Cap	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 76.1, 108 mm	500	(3445)	c
XGQT14	Equal Cross	8, 10, 12	300	(2065)	c
XGQT14	Equal Cross	5, 6 133, 139.7, 159, 165.1 mm	400	(2755)	c
XGQT14	Equal Cross	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 76.1, 108 mm	500	(3445)	c
XGQT16S	Concentric Reducer, Threaded	8 x 1, 1 1/4, 1 1/2, 2, 3, 4, 76.1 mm	300	(2065)	c, d
XGQT16S	Concentric Reducer, Threaded	2 1/2 x 1, 1 1/4, 1 1/2, 2 6 x 1, 1 1/4, 1 1/2, 2, 3, 4, 76.1 mm 139.7 mm x 1 1/4, 1 1/2, 2, 3, 76.1 mm 165.1 mm x 1 1/4, 1 1/2, 2, 3, 4, 76.1 mm	400	(2755)	c, d
XGQT16S	Concentric Reducer, Threaded	2 x 1, 1 1/4, 1 1/2 3 x 1, 1 1/4, 1 1/2, 2 4 x 1, 1 1/4, 1 1/2, 2, 3, 76.1 mm 76.1 mm x 1, 1 1/4, 1 1/2, 2 139.7 mm x 1	500	(3445)	c, d
XGQT16	Concentric Reducer, Grooved	76.1 mm x 2 3 x 2, 76.1 mm 4 x 76.1 mm, 3 139.7 mm x 76.1 mm, 3, 4 165.1 mm x 76.1 mm, 3, 4, 139.7 mm 8 x 76.1 mm, 3, 4, 139.7 mm, 165.1 mm 10 x 4, 165.1 mm, 8 12 x 4, 139.7 mm, 165.1 mm, 8, 10	232	(1595)	c
XGQT16	Concentric Reducer, Grooved	6 x 2 1/2 8 x 2, 2 1/2, 76.1 mm, 3, 6 10 x 4, 6, 8	300	(2065)	a, c
XGQT16	Concentric Reducer, Grooved	1 1/4 x 1 1 1/2 x 1, 1/4 2 1/2 x 1 1/4, 1 1/2, 2 3 x 2 1/2, 76.1 mm 4 x 2 1/2 6 x 2, 3, 4, 76.1 mm, 139.7 mm 76.1 mm x 1 139.7 mm x 1 1/4, 1 1/2, 2, 3, 76.1 mm 165.1 mm x 2, 3, 4, 76.1 mm	400	(2755)	a, c
XGQT16	Concentric Reducer, Grooved	2 x 1, 1 1/4, 1 1/2 3 x 1 1/4, 1 1/2, 2 4 x 1 1/4, 1 1/2, 2, 3, 76.1 mm 76.1 mm x 1 1/4, 1 1/2	500	(3445)	a, c
XGQT20S	Concentric Drain End Cap	8 x 1 10 x 1	300	(2065)	c, d, g

Model No	Description	Nominal Pipe Size, in	Rated Working Pressure		Remarks
			psi	(kPa)	
XGQT20S	Concentric Drain End Cap	4 x 1 6 x 1 165.1 mm x 1	400	(2755)	c, d, g
XGQT21	90 Degree Reducing Elbow	4 x 3 165.1 mm x 3	300	(2065)	c, h
22	Adapter Elbow	1 1/4 x 1/2, 3/4, 1 1 1/2 x 1/2, 3/4, 1 2 x 1/2, 3/4, 1 2 1/2 x 1/2, 3/4, 1	500	(3445)	c, d
36	Adapter Nipple	1 1/2 2	500	(3445)	c, d
37	Reducing Adapter Nipple	1 1/2 x 1 2 x 1 1/2	500	(3445)	c, d
XGQT23	Eccentric Drain End Cap	2 x 1 2 1/2 x 1 3 x 1 4 x 1 6 x 1	500	(3445)	c, d
XGQT23	Eccentric Drain End Cap	8 x 2	300	(2065)	c, d, g
XGQT23	Eccentric Drain End Cap	2 x 1 1/2 3 x 1 1/2, 2 4 x 1 1/2, 2 6 x 2 76.1 mm x 1 1/2, 2 139.7 mm x 2	400	(2755)	c, d, g
XGQT09	22.5 Degree Grooved Elbow	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 76.1, 108 mm	400	(2755)	c
XGQT09	22.5 Degree Grooved Elbow	5, 6, 8, 10, 12 133, 139.7, 159, 165.1 mm	300	(2065)	c
XGQT10	11.25 Degree Grooved Elbow	1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4 76.1, 108 mm	400	(2755)	c
XGQT10	11.25 Degree Grooved Elbow	5, 6, 8, 10, 12 133, 139.7, 159, 165.1 mm	300	(2065)	c
XGQT17	Eccentric Reducer	3 x 2, 2 1/2, 76.1 mm 4 x 2, 2 1/2, 76.1 mm, 3 139.7 mm x 76.1 mm, 3, 4 159 mm x 76.1 mm, 3, 108 mm, 4 165.1 mm x 76.1 mm, 3, 4, 139.7 mm 6 x 3, 4, 139.7 mm 8 x 3, 4, 139.7 mm, 165.1 mm, 6 10 x 165.1 mm, 6, 8	300	(2065)	c
XGQT28	Flange Adapter	2, 2 1/2, 3, 4, 5, 6, 8	300	(2065)	c, f
XGQT38	Flange Adapter	2, 3, 4, 8 76.1, 165.1 mm	300	(2065)	c, f, h

Remarks:
a. Min schedule cut groove pipe to be joined: Schedule 40.
c. Product is marked with acceptable trade name of either "100TONG" or "100T"
d. Available with NPT threaded End Connections
e. Available with GB/T 9112 Flanges
f. Available with ANSI B16.5 Class 150 Flanges
g. Available with BSPT threaded End Connections
h. Available with a painted, galvanized, dacromet or epoxy surface finish

APPROVAL GUIDE LISTING

Grooved Couplings

Fire Protection – Automatic Sprinkler Systems – Pipes and Fittings for Aboveground – Grooved Couplings or Fittings – Grooved Couplings, Reducing-Flexible

Weifang 100tong Casting Co Ltd
No. 1919 Jinchang South Rd, Weicheng District, Weifang, 261052 Shandong, China

Model XGQT02B

Model No	End Connection	Nominal Pipe Size, in	Rated Working Pressure		Remarks
			psi	(kPa)	
XGQT02B	Cut Groove, Rolled Groove	1-1/2 x 1-1/4 2 x 1-1/2 2 1/2 x 1-1/2, 2 76.1 mm x 1-1/2, 2, 2-1/2 3 x 1-1/2, 2, 2-1/2, 76.1 mm 4 x 1-1/2, 2, 2-1/2, 3, 76.1 mm 6 x 3, 4 8 x 6	300	(2065)	a, b, c, h

Remarks:
a. Min schedule cut groove pipe to be joined: ~~Schedule 40~~ 6 in. or smaller - Schedule 40; 8 in. or larger - Schedule 30
b. Min schedule rolled groove pipe to be joined: 6 in. or smaller - Schedule 10; 8 in. or larger – 0.188 in (5mm) wall
~~b~~ c. Product is marked with acceptable trade name of either "100TONG" or "100T"
h. Available with a red painted, galvanized, dacromet or epoxy surface finish

APPROVAL GUIDE LISTING

Rigid Grooved End Coupling

Fire Protection – Automatic Sprinkler Systems – Pipes and Fittings for Aboveground – Grooved Couplings or Fittings – Grooved Couplings, Standard-Rigid

Weifang 100tong Casting Co Ltd
No. 1919 Jinchang South Rd, Weicheng District, Weifang, 261052 Shandong, China

XGQT01

Pipe Description	Rated Working Pressures for Model XGQT01 Rigid Coupling by Pipe [a, b, c, d, h]																					
	Nominal Pipe Size																					
	1 (33.4)	1-1/4 (42.2)	1-1/2 (48.3)	2 (60.3)	2-1/2 (73.1)	(76.1)	3 (88.9)	(108)	4 (114.3)	(133)	(139.7)	5 (141.3)	(159)	(165.1)	6 (168.3)	8 (219.1)	10 (273.0)	12 (323.9)	14 (355.6)	16 (406.4)	18 (457.2)	20 (208)	24 (610)
Schedule 40, Cut Groove	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	400 (2760)	400 (2760)	400 (2760)	400 (2760)	400 (2760)	400 (2760)	300 (2070)	300 (2070)	300 (2070)					
Schedule 40, Rolled Groove	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	400 (2760)	~~232 (1600)~~ 400 (2760)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)		~~232 (1600)~~ 300 (2070)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)	300 (2070)					
Schedule 30, Cut Groove																~~232 (1600)~~ 300 (2070)							
Schedule 30, Rolled Groove	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	400 (2760)	~~232 (1600)~~ 400 (2760)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)		~~232 (1600)~~ 300 (2070)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)	300 (2070)					
Thinwall Pipe, Rolled Groove																							
Schedule 10, Rolled Groove	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	400 (2760)	~~232 (1600)~~ 400 (2760)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)		~~232 (1600)~~ 300 (2070)	300 (2070)								
0.188" Wall, Rolled Groove																300 (2070)	300 (2070)	300 (2070)					
Lightwall Pipe, Rolled Groove																							
Wheatland Tube "Mega Flow"	300 (2070)	300 (2070)	300 (2070)	300 (2070)	300 (2070)		300 (2070)		300 (2070)														
Schedule 5, Rolled Groove																							
Remarks:	a.) Minimum schedule cut groove pipe to be joined: 6 inch or smaller, Schedule 40; 8 inch or larger, Schedule 30 b.) Minimum schedule rolled groove pipe to be joined: 6 inch or smaller, Schedule 10; 8, 10, 12 inch - 0.188 inch (5 mm) wall c.) All couplings in table above, Approved when supplied with an EDPM gasket d.) Product is marked with acceptable trade name of either "100TONG" or "100T" h.) Available with a red painted, galvanized, dacromet or epoxy surface finish																						

~~***Remarks:***~~
~~*a. Product is marked with acceptable trade name of either "100TONG" or "100T"*~~

Weifang 100tong Casting Co Ltd
No. 1919 Jinchang South Rd, Weicheng District, Weifang, 261052 Shandong, China

XGQT01P

Pipe Description	Rated Working Pressures for Model XGQT01P Rigid Coupling by Pipe [a, b, c, d, h]																				
	Nominal Pipe Size																				
	1 (33.4)	1-1/4 (42.2)	1-1/2 (48.3)	2 (60.3)	2-1/2 (73.1)	(76.1)	3 (88.9)	(108)	4 (114.3)	(133)	(139.7)	5 (141.3)	(159)	(165.1)	6 (168.3)	(216.3)	8 (219.1)	(267.4)	10 (273.0)	(318.5)	12 (323.9)
Schedule 40, Cut Groove																					
Schedule 40, Rolled Groove											500 (3445)	500 (3445)		500 (3445)	500 (3445)		450 (3100)		400 (2755)		400 (2755)
Schedule 30, Cut Groove																					
Schedule 30, Rolled Groove											500 (3445)	500 (3445)		500 (3445)	500 (3445)		450 (3100)		400 (2755)		400 (2755)
Thinwall Pipe, Rolled Groove																					
Schedule 10, Rolled Groove											500 (3445)	500 (3445)		500 (3445)	500 (3445)						
0.188” Wall, Rolled Groove																	450 (3100)		400 (2755)		400 (2755)
Lightwall Pipe, Rolled Groove																					
Schedule 5, Rolled Groove																					
Remarks:	a.) Minimum schedule cut groove pipe to be joined: 6 inch or smaller, Schedule 40; 8 inch or larger, Schedule 30 b.) Minimum schedule rolled groove pipe to be joined: 6 inch or smaller, Schedule 10; 8, 10, 12 inch - 0.188 inch (5 mm) wall c.) All couplings in table above, Approved when supplied with a Grade E EDPM gasket using standard gasket lubricant d.) Product is marked with acceptable trade name of either “100TONG” or “100T” h.) Available with a red painted, galvanized, dacromet or epoxy surface finish																				

APPROVAL GUIDE LISTING

Flexible Grooved End Coupling

Fire Protection – Automatic Sprinkler Systems – Pipes and Fittings for Aboveground – Grooved Couplings or Fittings – Grooved Couplings, Standard-Flexible

Weifang 100tong Casting Co Ltd
No. 1919 Jinchang South Rd, Weicheng District, Weifang, 261052 Shandong, China

XGQT02

Pipe Description	Rated Working Pressures for Model XGQT02 Flexible Coupling by Pipe [a, b, c, d, h]																					
	Nominal Pipe Size																					
	1 (33.4)	1-1/4 (42.2)	1-1/2 (48.3)	2 (60.3)	2-1/2 (73.1)	(76.1)	3 (88.9)	(108)	4 (114.3)	(133)	(139.7)	5 (141.3)	(159)	(165.1)	6 (168.3)	8 (219.1)	10 (273.0)	12 (323.9)	14 (355.6)	16 (406.4)	18 (457.2)	20 (208)	24 (610)
Schedule 40, Cut Groove	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	500 (3445)	400 (2760)	400 (2760)	400 (2760)	400 (2760)	400 (2760)	400 (2760)	300 (2070)	300 (2070)	300 (2070)					
Schedule 40, Rolled Groove	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	400 (2760)	~~232 (1600)~~ 400 (2760)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)		~~232 (1600)~~ 300 (2070)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)	300 (2070)					
Schedule 30, Cut Groove																~~232 (1600)~~ 300 (2070)	~~232 (1600)~~ 300 (2070)	~~232 (1600)~~ 300 (2070)					
Schedule 30, Rolled Groove	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	400 (2760)	~~232 (1600)~~ 400 (2760)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)		~~232 (1600)~~ 300 (2070)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)	300 (2070)					
Thinwall Pipe, Rolled Groove																							
Schedule 10, Rolled Groove	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	500 (3445)	~~232 (1600)~~ 500 (3445)	~~232 (1600)~~ 500 (3445)	400 (2760)	~~232 (1600)~~ 400 (2760)	300 (2070)	~~232 (1600)~~ 300 (2070)	300 (2070)		~~232 (1600)~~ 300 (2070)	300 (2070)								
0.188” Wall, Rolled Groove																300 (2070)	300 (2070)	300 (2070)					
Lightwall Pipe, Rolled Groove																							
Wheatland Tube “Mega Flow”	300 (2070)	300 (2070)	300 (2070)	300 (2070)	300 (2070)		300 (2070)		300 (2070)														
Schedule 5, Rolled Groove																							
Remarks:	a.) Minimum schedule cut groove pipe to be joined: 6 inch or smaller, Schedule 40; 8 inch or larger, Schedule 30 b.) Minimum schedule rolled groove pipe to be joined: 6 inch or smaller, Schedule 10; 8, 10, 12 inch - 0.188 inch (5 mm) wall c.) All couplings in table above, Approved when supplied with an EDPM gasket d.) Product is marked with acceptable trade name of either “100TONG” or “100T” h.) Available with a red painted, galvanized, dacromet or epoxy surface finish																						

~~***Remarks:***~~
~~*a. Product is marked with acceptable trade name of either “100TONG” or “100T”*~~

Weifang 100tong Casting Co Ltd
No. 1919 Jinchang South Rd, Weicheng District, Weifang, 261052 Shandong, China

XGQT02P

Pipe Description	Rated Working Pressures for Model XGQT02P Flexible Coupling by Pipe [a, b, c, d, h]																				
	Nominal Pipe Size																				
	1 (33.4)	1-1/4 (42.2)	1-1/2 (48.3)	2 (60.3)	2-1/2 (73.1)	(76.1)	3 (88.9)	(108)	4 (114.3)	(133)	(139.7)	5 (141.3)	(159)	(165.1)	6 (168.3)	(216.3)	8 (219.1)	(267.4)	10 (273.0)	(318.5)	12 (323.9)
Schedule 40, Cut Groove																					
Schedule 40, Rolled Groove											500 (3445)	500 (3445)		500 (3445)	500 (3445)		450 (3100)		400 (2755)		400 (2755)
Schedule 30, Cut Groove																					
Schedule 30, Rolled Groove											500 (3445)	500 (3445)		500 (3445)	500 (3445)		450 (3100)		400 (2755)		400 (2755)
Thinwall Pipe, Rolled Groove																					
Schedule 10, Rolled Groove											500 (3445)	500 (3445)		500 (3445)	500 (3445)						
0.188” Wall, Rolled Groove																	450 (3100)		400 (2755)		400 (2755)
Lightwall Pipe, Rolled Groove																					
Schedule 5, Rolled Groove																					
Remarks:	a.) Minimum schedule cut groove pipe to be joined: 6 inch or smaller, Schedule 40; 8 inch or larger, Schedule 30 b.) Minimum schedule rolled groove pipe to be joined: 6 inch or smaller, Schedule 10; 8, 10, 12 inch - 0.188 inch (5 mm) wall c.) All couplings in table above, Approved when supplied with a Grade E EDPM gasket using standard gasket lubricant d.) Product is marked with acceptable trade name of either “100TONG” or “100T” h.) Available with a red painted, galvanized, dacromet or epoxy surface finish																				

DETAILED ANALYSIS

1 EXAMINATION

1.1 The manufacturer provided samples of their gasketed pipe fittings as detailed below for examination and testing. The samples were considered to be representative of the product line and were examined, tested, and compared to the manufacturer's drawings. All data is on file at FM Approvals along with other documents and correspondence applicable to this program.

FM 1920 **Sample Requirements - Gasketed Fittings**							**Samples Required by Test**										
NOTES: **a)** use hydrostatic strength test sample for bending moment resistance test. **b)** use vacuum test sample for leakage – assembly w/o gasket **c)** the recommended overall length of sample assembly is 4-1/2 feet. • Galvanized fittings should be assembled/tested with galvanized pipe. • Please note the minimum wall thickness for 8" (219.1mm), 10" (273 mm) and 12" (323.9) NPS Schedule 10 steel pipe is 0.188".							**Hydrostatic Strength**	**Bending Moment**	**Rot. Bending Moment**	**Vibration Resistance**	**Cycling Pressure**	**Vacuum Resistance**	**Hot Gasket**	**Cold Gasket**	**Leakage w/o Gasket**	**Friction Loss**	**TOTALS**
Model	**Product Type**	**Fitting Finish**	**Pipe Used**	**Size**	**X**	**Size**	c	c									
				inch		inch											
XGQT01	Rigid Coupling	-	-	1													-
		Painted	Mega Flow RG	1-1/4				1									1
		-	-	1-1/2													-
		Painted	Sch 10 RG	2			1	a			1						2
		Galv.	Sch 10 RG	2						1							1
		Galv.	Mega Flow RG	2				1		1							2
		-	-	2-1/2													-
		Epoxy	Mega Flow RG	3				1									1
		-	-	108mm													-
		Painted	Sch 10 RG	4			1	a			1						2
		Galv.	Sch 10 RG	4				1									1
		Dacromet	Sch 10 RG	4				1									1
		Epoxy	Sch 10 RG	4				1									1
		Painted	Mega Flow RG	4				1									1
		-	-	133 mm													-
		-	-	139 mm													-
		-	-	5													-
		-	-	165 mm													-
		Painted	Sch 10 RG	6			1	a			1						2
		-	0.188" RG	8													-
		-	0.188" RG	10													-
		Painted	0.188" RG	12			1	a			1						2
		Galv.	0.188" RG	12				1									1
		Dacromet	0.188" RG	12				1									1
		Epoxy	0.188" RG	12				1									1

FM 1920	**Sample Requirements - Gasketed Fittings**						**Samples Required by Test**									
NOTES: **a)** use hydrostatic strength test sample for bending moment resistance test. **b)** use vacuum test sample for leakage – assembly w/o gasket **c)** the recommended overall length of sample assembly is 4-1/2 feet. • Galvanized fittings should be assembled/tested with galvanized pipe. • Please note the minimum wall thickness for 8” (219.1mm), 10” (273 mm) and 12” (323.9) NPS Schedule 10 steel pipe is 0.188”.							**Hydrostatic Strength**	**Bending Moment**	**Rot. Bending Moment**	**Vibration Resistance**	**Cycling Pressure**	**Vacuum Resistance**	**Hot Gasket**	**Cold Gasket**	**Leakage w/o Gasket**	**Friction Loss**	**TOTALS**
Model	**Product Type**	**Fitting Finish**	**Pipe Used**	**Size**	**X**	**Size**	c	c								
				inch		inch										
XGQT02	Flexible Coupling	-	-	1												-
		Painted	Mega Flow RG	1-1/4				1								1
		-	-	1-1/2												-
		Painted	Sch 10 RG	2			1	a			1					2
		Galv.	Sch 10 RG	2						1						1
		Galv.	Mega Flow RG	2				1		1						2
		-	-	2-1/2												-
		Epoxy	Mega Flow RG	3				1								1
		-	-	108mm												-
		Painted	Sch 10 RG	4			1	a			1					2
		Galv.	Sch 10 RG	4				1								1
		Dacromet	Sch 10 RG	4				1								1
		Epoxy	Sch 10 RG	4				1								1
		Painted	Mega Flow RG	4				1								1
		-	-	133 mm												-
		-	-	139 mm												-
		-	-	5												-
		-	-	165 mm												-
		Painted	Sch 10 RG	6			1	a			1					2
		-	-	8												-
		-	-	10												-
		Painted	0.188” RG	12			1	a			1					2
		Galv.	0.188” RG	12				1								1
		Dacromet	0.188” RG	12				1								1
		Epoxy	0.188” RG	12				1								1
XGQT01P	Rigid Coupling	-	-	139 mm												-
		Painted	Sch 10 RG	5			1	a			1	1	1	1	b	5
		Galv.	Sch 10 RG	5						1						1
		-	-	165 mm												-
		Painted	Sch 10 RG	6			1	a			1					2
		Galv.	Sch 10 RG	6				1								1
		Dacromet	Sch 10 RG	6				1								1

FM 1920 **Sample Requirements - Gasketed Fittings**							**Samples Required by Test**										
NOTES: **a)** use hydrostatic strength test sample for bending moment resistance test. **b)** use vacuum test sample for leakage – assembly w/o gasket **c)** the recommended overall length of sample assembly is 4-1/2 feet. • Galvanized fittings should be assembled/tested with galvanized pipe. • Please note the minimum wall thickness for 8” (219.1mm), 10” (273 mm) and 12” (323.9) NPS Schedule 10 steel pipe is 0.188”.							**Hydrostatic Strength**	**Bending Moment**	**Rot. Bending Moment**	**Vibration Resistance**	**Cycling Pressure**	**Vacuum Resistance**	**Hot Gasket**	**Cold Gasket**	**Leakage w/o Gasket**	**Friction Loss**	**TOTALS**
Model	**Product Type**	**Fitting Finish**	**Pipe Used**	**Size**	**X**	**Size**	c	c									
				inch		inch											
XGQT01P	Rigid Coupling	Epoxy	Sch 10 RG	6				1									1
		Painted	0.188” RG	8			1										1
		Painted	0.188” RG	10			1										1
		Painted	0.188” RG	12			1	a			1		1	1			4
		Galv.	0.188” RG	12				1									1
		Dacromet	0.188” RG	12				1									1
		Epoxy	0.188” RG	12				1									1
XGQT02P	Flexible Coupling	-	-	139 mm													-
		Painted	Sch 10 RG	5			1	a			1	1	1	1	b		5
		Galv.	Sch 10 RG	5						1							1
		-	-	165 mm													-
		Painted	Sch 10 RG	6			1	a			1						2
		Galv.	Sch 10 RG	6				1									1
		Dacromet	Sch 10 RG	6				1									1
		Epoxy	Sch 10 RG	6				1									1
		Painted	0.188” RG	8			1										1
		Painted	0.188” RG	10			1										1
		Painted	0.188” RG	12			1	a			1		1	1			4
		Galv.	0.188” RG	12				1									1
		Dacromet	0.188” RG	12				1									1
		Epoxy	0.188” RG	12				1									1
XGQT02B	Reducing Coupling	Painted	Sch 10 RG	1-1/2	x	1-1/4	1	a									1
		Painted	Sch 10 RG	2	x	1-1/2	1	a			1						2
		Galv.	Sch 10 RG	2	x	1-1/2				1							1
		-	-	2-1/2	x	1-1/2											-
		Painted	Sch 10 RG	2-1/2	x	2	1	a									1
		-	-	76.1 mm	x	1-1/2											-
		-	-	76.1 mm	x	2											-
		Painted	Sch 10 RG	76.1 mm	x	2-1/2	1	a		1	1						3
		-	-	3	x	1-1/2											-
		-	-	3	x	2											-
		-	-	3	x	2-1/2											-
		Painted	Sch 10 RG	3	x	76.1 mm	1	a									1

FM 1920 Sample Requirements - Gasketed Fittings							Samples Required by Test									
NOTES: **a)** use hydrostatic strength test sample for bending moment resistance test. **b)** use vacuum test sample for leakage – assembly w/o gasket **c)** the recommended overall length of sample assembly is 4-1/2 feet. • Galvanized fittings should be assembled/tested with galvanized pipe. • Please note the minimum wall thickness for 8" (219.1mm), 10" (273 mm) and 12" (323.9) NPS Schedule 10 steel pipe is 0.188".							Hydrostatic Strength	Bending Moment	Rot. Bending Moment	Vibration Resistance	Cycling Pressure	Vacuum Resistance	Hot Gasket	Cold Gasket	Leakage w/o Gasket	Friction Loss	TOTALS
Model	**Product Type**	**Fitting Finish**	**Pipe Used**	**Size** inch	**X**	**Size** inch	c	c									
XGQT02B	Reducing Coupling	-	-	4	x	1-1/2											-
		-	-	4	x	2											-
		-	-	4	x	2-1/2											-
		-	-	4	x	76.1 mm											-
		Painted	Sch 10 RG	4	x	3	1	a			1						2
		Galv.	Sch 10 RG	4	x	3		1									1
		Dacromet	Sch 10 RG	4	x	3		1									1
		Epoxy	Sch 10 RG	4	x	3		1									1
						Total:	24	57	0	8	17	2	4	4	2	0	

1.2 The manufacturer provided samples of their non-gasketed pipe fittings as detailed below for examination and testing. The samples were considered to be representative of the product line and were examined, tested, and compared to the manufacturer's drawings. All data is on file at FM Approvals along with other documents and correspondence applicable to this program.

FM 1920 Sample Requirements - Non-Gasketed Pipe Fittings			
Provide one sample of each size listed below.			
Model	**Product Type - Grooved**	**Nominal Pipe Size inch**	**RWP psi (kPa)**
XGQT13	Bull Head Tee	3 x 165.1 mm	300 (2070)
XGQT21	90d Elbow Reducing	4 x 3 165.1 mm x 3	300 (2070)
XGQT38	Flange Adapter	2, 3, 4, 8 165.1 mm	300 (2070)

2 DESCRIPTION

2.1 Hydrostatic Strength – Gasketed Pipe Fittings

Samples as detailed above were assembled to short lengths of steel sprinkler pipe with the ends capped. The assembly was filled with water and all air was vented out. The assembly was then subjected to four times its rated working pressure for 5 minutes. There were no signs of cracking or permanent distortion of the assembly as a result of this test. These results are considered satisfactory.

2.2 Hydrostatic Strength – Non-Gasketed Pipe Fittings

The samples detailed above were assembled into similar sized assemblies and were subjected to hydrostatic strength testing. All test assemblies were filled with water while venting all internal air out of the assemblies. One of the capped ends was connected to a hydrostatic pressure pump. The internal pressure was then increased to four times the desired rated working pressure for the grooved end fittings for five minutes. There was no evidence of fracture, distortion or cracking in any of the assemblies. These results are considered satisfactory.

2.3 Bending Moment Resistance

Samples as detailed above were assembled to two short lengths of steel sprinkler pipe with the ends capped. The assembly was filled with water, cleared of all entrapped air, and subjected to its rated working pressure. The assembly was centered in a fixture that provided support at a spacing of 24 inches (0.6 m) for couplings 4 inch NPS and smaller, a spacing of 48 inches (1.2 m) for couplings 5 and 6 inch NPS or a spacing of 72 inches (1.8 m) for couplings 12 inch NPS and was subjected to the required bending moment. The bending moment was calculated based on water filled Schedule 40 steel sprinkler pipe, maximum hanger spacing [12 or 15 ft (3.6 or 4.6 m) depending on pipe size], the assumption of a missing hanger and a safety factor of two. There was no observed evidence of leakage, cracking, or rupture as a result of this test. These results are considered satisfactory.

2.4 Vibration Resistance

Samples as detailed above were assembled to two short lengths of steel sprinkler run pipe with the ends capped. The assembly was filled with water, cleared of all entrapped air, and subjected to an internal pressure of 80 psi (550 kPa) which was maintained throughout the vibration test sequence. The assembly was then subjected to the following vibration conditions:

Amplitude, inch (mm)	Total Displacement, inch (mm)	Frequency, Hz	Time, hours
0.020 (0.51)	0.040 (1.02)	18 – 37 (Variable)	5
0.035 (0.90)	0.070 (1.78)	18 – 37 (Variable)	5
0.010 (0.25)	0.020 (0.51)	28	5
0.020 (0.51)	0.040 (1.02)	28	5
0.075 (1.91)	0.150 (3.81)	28	5

After the completion of the vibration sequence, the assembly was subjected to 4 times its rated working pressure for 5 minutes. There was no observed evidence of leakage, cracking, or rupture as a result of this test. These results are considered satisfactory.

2.5 Cycling Pressure Resistance

Samples as detailed above were assembled to short lengths of steel sprinkler pipe and capped at each end. The assembly was filled with water, cleared of all entrapped air, and subjected to its rated working pressure for 5 minutes. The assembly was then connected to a cycling test apparatus which increased the internal pressure to the rated working pressure, and then released the pressure. This pressure profile was repeated for 20,000 cycles. At the conclusion of the pressure cycling sequence, the assembly was subjected

to four times its rated working pressure for 5 minutes. There was no observed evidence of leakage, cracking, or rupture as a result of this test. These results are considered satisfactory.

2.6 Vacuum Resistance

Samples as detailed above were assembled with the joint of interest in the center of short lengths of steel sprinkler pipe, capped at each end. The assembly was filled with water, cleared of all entrapped air, and subjected to its rated working pressure for 5 minutes. The assembly was then drained and subjected to an internal vacuum of 25 inHg (85 kPa) for 5 minutes. Following the vacuum test, the assembly was pneumatically pressurized from zero to 50 psi (354 kPa) while submerged in a water bath. There was no observed evidence of leakage or permanent deformation as a result of this test. These results are considered satisfactory.

2.7 Hot Gasket Test

Samples as detailed above were assembled to short lengths of steel sprinkler pipe and capped at each end. The assembly was filled with water, cleared of all entrapped air, and subjected to its rated working pressure for 5 minutes. The assembly was then drained and placed in an air oven at a temperature of 275°F (135°C) for a period of 45 days. Following the exposure period, the assembly was removed from the oven, allowed to cool to room temperature, and then pneumatically pressurized from zero to 50 psi (354 kPa) while submerged in a water bath. There was no observed evidence of leakage as a result of this test. The assembly was then disassembled and the gasket was removed. The gasket was squeezed so that the opposite sides touched, squeezed again in an orientation 90 degrees from the first, twisted into a figure eight shape, and checked for signs of cracking or tearing. There was no observed evidence of cracking or tearing as a result of this test. These results are considered satisfactory.

2.8 Cold Gasket Test

Samples as detailed above were assembled to short lengths of steel sprinkler pipe and capped at each end. The assembly was filled with water, cleared of all entrapped air, and subjected to its rated working pressure for 5 minutes. The assembly was then drained and placed in a freezer at a temperature of -40°F (-40°C) for a period of 4 days. Following the exposure period, the assembly was removed from the freezer, and then pneumatically pressurized from zero to 50 psi (354 kPa) while submerged in a bath of -40°F (-40°C) anti-freeze. There was no observed evidence of leakage as a result of this test. The assembly was then disassembled and the gasket was removed. The gasket was squeezed so that the opposite sides touched, squeezed again in an orientation 90 degrees from the first, twisted into a figure eight shape, and checked for signs of cracking or tearing. There was no observed evidence of cracking or tearing as a result of this test. These results are considered satisfactory.

2.9 Leakage Test – Assembly without Gasket

Samples as detailed above were assembled, without a gasket, to short lengths of steel sprinkler pipe and subjected to a hydrostatic pressure of 30 psi (205 kPa). Leakage from the assembly did not exceed 32 gal/min (120 L/min). These results are considered satisfactory.

3 Conclusion

Based on the above results, no additional tests were deemed necessary.

CRITICAL DOCUMENT LIST (CDL)

The following drawings describe the various gasketed and non-gasketed pipe fittings discussed in this Report and are filed under Project Identification number 454847.

Drawing No.	Description	Rev. Level
BCJ-114X48	XGQT02B - Reducing Coupling - Gasket	B
BCJ-114X60	XGQT02B - Reducing Coupling - Gasket	A
BCJ-114X73	XGQT02B - Reducing Coupling - Gasket	A
BCJ-114X76	XGQT02B - Reducing Coupling - Gasket	A
BCJ-114X89	XGQT02B - Reducing Coupling - Gasket	A
BCJ-48X42	XGQT02B - Reducing Coupling - Gasket	A
BCJ-60X48	XGQT02B - Reducing Coupling - Gasket	A
BCJ-73X48	XGQT02B - Reducing Coupling - Gasket	A
BCJ-73X60	XGQT02B - Reducing Coupling - Gasket	A
BCJ-76X48	XGQT02B - Reducing Coupling - Gasket	A
BCJ-76X60	XGQT02B - Reducing Coupling - Gasket	A
BCJ-76X73	XGQT02B - Reducing Coupling - Gasket	A
BCJ-89X48	XGQT02B - Reducing Coupling - Gasket	A
BCJ-89X60	XGQT02B - Reducing Coupling - Gasket	A
BCJ-89X73	XGQT02B - Reducing Coupling - Gasket	A
BCJ-89X76	XGQT02B - Reducing Coupling - Gasket	A
CJ-108	Rigid & Flexible Coupling Gasket	A
CJ-114	Rigid & Flexible Coupling Gasket	F
CJ-133	Rigid & Flexible Coupling Gasket	B
CJ-140	Rigid & Flexible Coupling Gasket	F
CJ-141	Rigid & Flexible Coupling Gasket	A
CJ-159	Rigid & Flexible Coupling Gasket	A
CJ-165	Rigid & Flexible Coupling Gasket	F
CJ-168	Rigid & Flexible Coupling Gasket	A
CJ-219	Rigid & Flexible Coupling Gasket	F
CJ-273	Rigid & Flexible Coupling Gasket	B
CJ-324	Rigid & Flexible Coupling Gasket	B
CJ-33	Rigid & Flexible Coupling Gasket	A
CJ-42	Rigid & Flexible Coupling Gasket	B
CJ-48	Rigid & Flexible Coupling Gasket	B
CJ-60	Rigid & Flexible Coupling Gasket	C
CJ-73	Rigid & Flexible Coupling Gasket	B
CJ-76	Rigid & Flexible Coupling Gasket	B
CJ-89	Rigid & Flexible Coupling Gasket	A
01-108-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-108	XGQT01 - Rigid Coupling - Detail	C
01-114-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-114	XGQT01 - Rigid Coupling - Detail	C
01-133-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-133	XGQT01 - Rigid Coupling - Detail	C
01-140-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-140	XGQT01 - Rigid Coupling - Detail	C
01-141-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-141	XGQT01 - Rigid Coupling - Detail	C
01-159-Assembly	XGQT01 - Rigid Coupling - Assembly	C

Drawing No.	Description	Rev. Level
01-159	XGQT01 - Rigid Coupling - Detail	C
01-165-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-165	XGQT01 - Rigid Coupling - Detail	C
01-168-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-168	XGQT01 - Rigid Coupling - Detail	C
01-219-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-219	XGQT01 - Rigid Coupling - Detail	C
01-273-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-273	XGQT01 - Rigid Coupling - Detail	C
01-324-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-324	XGQT01 - Rigid Coupling - Detail	C
01-33-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-33	XGQT01 - Rigid Coupling - Detail	C
01-42-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-42	XGQT01 - Rigid Coupling - Detail	C
01-48-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-48	XGQT01 - Rigid Coupling - Detail	C
01-60-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-60	XGQT01 - Rigid Coupling - Detail	C
01-73-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-73	XGQT01 - Rigid Coupling - Detail	C
01-76-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-76	XGQT01 - Rigid Coupling - Detail	C
01-89-Assembly	XGQT01 - Rigid Coupling - Assembly	C
01-89	XGQT01 - Rigid Coupling - Detail	C
01P-140-Assembly	XGQT01P - Rigid Coupling - Assembly	C
01P-140	XGQT01P - Rigid Coupling - Detail	C
01P-141-Assembly	XGQT01P - Rigid Coupling - Assembly	C
01P-141	XGQT01P - Rigid Coupling - Detail	C
01P-165-Assembly	XGQT01P - Rigid Coupling - Assembly	C
01P-165	XGQT01P - Rigid Coupling - Detail	C
01P-168-Assembly	XGQT01P - Rigid Coupling - Assembly	C
01P-168	XGQT01P - Rigid Coupling - Detail	C
01P-219-Assembly	XGQT01P - Rigid Coupling - Assembly	C
01P-219	XGQT01P - Rigid Coupling - Detail	C
01P-273-Assembly	XGQT01P - Rigid Coupling - Assembly	C
01P-273	XGQT01P - Rigid Coupling - Detail	C
01P-324-Assembly	XGQT01P - Rigid Coupling - Assembly	C
01P-324	XGQT01P - Rigid Coupling - Detail	C
XGQT02-108-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-108	XGQT02 - Flexible Coupling - Detail	C
XGQT02-114-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-114	XGQT02 - Flexible Coupling - Detail	C
XGQT02-133-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-133	XGQT02 - Flexible Coupling - Detail	C
XGQT02-140-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-140	XGQT02 - Flexible Coupling - Detail	C
XGQT02-141-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-141	XGQT02 - Flexible Coupling - Detail	C

Drawing No.	Description	Rev. Level
XGQT02-159-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-159	XGQT02 - Flexible Coupling - Detail	C
XGQT02-165-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-165	XGQT02 - Flexible Coupling - Detail	C
XGQT02-168-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-168	XGQT02 - Flexible Coupling - Detail	C
XGQT02-219-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-219	XGQT02 - Flexible Coupling - Detail	C
XGQT02-273-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-273	XGQT02 - Flexible Coupling - Detail	C
XGQT02-324-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-324	XGQT02 - Flexible Coupling - Detail	C
XGQT02-33-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-33	XGQT02 - Flexible Coupling - Detail	C
XGQT02-42-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-42	XGQT02 - Flexible Coupling - Detail	C
XGQT02-48-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-48	XGQT02 - Flexible Coupling - Detail	C
XGQT02-60-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-60	XGQT02 - Flexible Coupling - Detail	C
XGQT02-73-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-73	XGQT02 - Flexible Coupling - Detail	C
XGQT02-76-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-76	XGQT02 - Flexible Coupling - Detail	C
XGQT02-89-Assembly	XGQT02 - Flexible Coupling - Assembly	C
XGQT02-89	XGQT02 - Flexible Coupling - Detail	C
02-114X48-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-114X48	XGQT02B - Reducing Coupling - Detail	C
02-114X60-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-114X60	XGQT02B - Reducing Coupling - Detail	C
02-114X73-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-114X73	XGQT02B - Reducing Coupling - Detail	C
02-114X76-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-114X76	XGQT02B - Reducing Coupling - Detail	C
02-114X89-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-114X89	XGQT02B - Reducing Coupling - Detail	C
02-48X42-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-48X42	XGQT02B - Reducing Coupling - Detail	C
02-60X48-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-60X48	XGQT02B - Reducing Coupling - Detail	C
02-73X48-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-73X48	XGQT02B - Reducing Coupling - Detail	C
02-73X60-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-73X60	XGQT02B - Reducing Coupling - Detail	C
02-76X48-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-76X48	XGQT02B - Reducing Coupling - Detail	C
02-76X60-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-76X60	XGQT02B - Reducing Coupling - Detail	C
02-76X73-Assembly	XGQT02B - Reducing Coupling - Assembly	C

Drawing No.	Description	Rev. Level
02-76X73	XGQT02B - Reducing Coupling - Detail	C
02-89X48-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-89X48	XGQT02B - Reducing Coupling - Detail	C
02-89X60-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-89X60	XGQT02B - Reducing Coupling - Detail	C
02-89X73-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-89X73	XGQT02B - Reducing Coupling - Detail	C
02-89X76-Assembly	XGQT02B - Reducing Coupling - Assembly	C
02-89X76	XGQT02B - Reducing Coupling - Detail	C
02P-140-Assembly	XGQT02P - Flexible Coupling - Assembly	C
02P-140	XGQT02P - Flexible Coupling - Detail	C
02P-141-Assembly	XGQT02P - Flexible Coupling - Assembly	C
02P-141	XGQT02P - Flexible Coupling - Detail	C
02P-165-Assembly	XGQT02P - Flexible Coupling - Assembly	C
02P-165	XGQT02P - Flexible Coupling - Detail	C
02P-168-Assembly	XGQT02P - Flexible Coupling - Assembly	C
02P-168	XGQT02P - Flexible Coupling - Detail	C
02P-219-Assembly	XGQT02P - Flexible Coupling - Assembly	C
02P-219	XGQT02P - Flexible Coupling - Detail	C
02P-273-Assembly	XGQT02P - Flexible Coupling - Assembly	C
02P-273	XGQT02P - Flexible Coupling - Detail	C
02P-324-Assembly	XGQT02P - Flexible Coupling - Assembly	C
02P-324	XGQT02P - Flexible Coupling - Detail	C
13-114x165	XGQT13 - Bull Head Tee	A
13-89x114	XGQT13 - Bull Head Tee	A
13-89x165	XGQT13 - Bull Head Tee	A
21-114x89	XGQT21 - 90d Reducing Elbow	A
21-165x89	XGQT21 - 90d Reducing Elbow	A
38-60	XGQT38 - Flange Adapter	B
38-76	XGQT38 - Flange Adapter	B
38-89	XGQT38 - Flange Adapter	B
38-114	XGQT38 - Flange Adapter	B
38-165	XGQT38 - Flange Adapter	B
38-219	XGQT38 - Flange Adapter	B
YBT-LM01-B	Carbon Steel Nut	B
YBT-LM03-B	Carbon Steel Nut	B
YBT-LS01-C	Carbon Steel Bolt	C
YBT-LS05-A	Carbon Steel Bolt	A
YBT-LS06-B	Carbon Steel Bolt	B
YBT-LS08-A	Carbon Steel Bolt	A