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APPROVAL REPORT

Project No: PR455700

Class: 1630

Product Type: Steel Pipe for Automatic Fire Sprinkler Systems

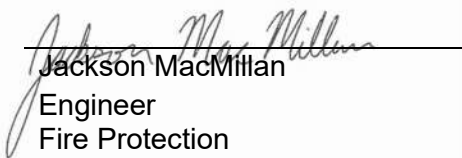
Product Name: Steel Pipe Manufactured to
ASTM A795 / A795M Schedule 7
ASTM A795 / A795M Schedule 10
ASTM A53 / A53M Schedule 40

Name of Report Holder: Thai Premium Pipe Co Ltd

Address of Report Holder: 45 Moo 2, Chaimongkol, Muang Sakut Sakhon
Samut Sakhon 74000
Thailand

Customer ID: 251624

Prepared by

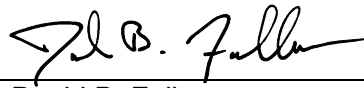


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August 24, 2021

Date of Approval

1 INTRODUCTION

1.1 Thai Premium Pipe Co. Ltd requested an FM Approval examination of their products with rated working pressures in accordance with the following:

Project Scope - Steel Pipe				
Product Type	End Connections	Sizes inch NPS	Rated Working Pressure	
			psi	kPa
Schedule 7	Welded, Rolled Groove	1, 1-1/4, 3, 4	300	2070
	Plain End	1, 1-1/4	175	1205
Schedule 10	Welded, Rolled Groove	1/2, 3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3, 4, 6	300	2070
	Plain End	1, 1-1/4, 1-1/2, 2	175	1205
Schedule 40	Threaded, Welded, Rolled or Cut Groove	1/2, 3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3, 4, 6	300	2070
	Plain End	1, 1-1/4, 1-1/2, 2	175	1205

1.2 Thai Premium Pipe Co Ltd requested that their Schedule 7 non-threadable lightwall aboveground steel sprinkler pipe be FM Approved for use with the following grooved couplings manufactured by Jinan Meide Casting Co.

- Model 1G Rigid Grooved End Coupling
- Model 1GS Rigid Grooved End Coupling
- Model 1GK Rigid Grooved End Coupling
- Model 1GKS Rigid Grooved End Coupling
- Model 1GX Rigid Grooved End Coupling
- Model 1GKX Rigid Grooved End Coupling
- Model R10 Rigid Grooved End Coupling
- Model R20 Rigid Grooved End Coupling
- Model F1 Flexible Grooved End Coupling
- Model 1N Flexible Grooved End Coupling
- Model 1NH Flexible Grooved End Coupling
- Model 1NX Flexible Grooved End Coupling

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1.4 Standards

1.4.1 FM Approvals Standards

Title	Number	Issue Date
Steel Pipe for Automatic Fire Sprinkler Systems	1630	November 2013

1.5 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.

- 1.6** In addition to the evaluation of the product itself, a First Audit has been conducted at the manufacturing location for the products discussed in this Report. Please refer to Section 6 of the Report for additional information related to the First Audit.

2 DESCRIPTION

2.1 Schedule 7 Lightwall Sprinkler Pipe

Schedule 7 non-threadable lightwall sprinkler pipe manufactured in accordance with the specifications set forth in American Society of Testing and Materials (ASTM) Standard A795 / A795M uses nominal wall thicknesses specified by Thai Premium Pipe Co. Ltd, which are detailed below. As part of the evaluation, steel manufactured to the requirements of ASTM A795 / A795M Grades A and B have been considered. The pipe is available in a black or red painted surface finish and the end connections are plain end, rolled groove and welded.

Schedule 7 Non-Threadable Lightwall Sprinkler Pipe Dimensions		
Nominal Pipe Size inch	Nominal Outside Diameter inch (mm)	Nominal Wall Thickness inch (mm)
1	1.315 (33.4)	0.065 (1.65)
1-1/4	1.660 (42.2)	0.065 (1.65)
3	3.500 (88.9)	0.092 (2.34)
4	4.500 (114.3)	0.092 (2.34)

2.2 ASTM A795 / A795M Schedule 10 Sprinkler Pipe

Schedule 10 sprinkler pipe manufactured in accordance with the specifications set forth in American Society of Testing and Materials (ASTM) Standard A795 / A795M has nominal wall thicknesses as detailed below. As part of the evaluation, steel manufactured to the requirements of ASTM A795 / A795M Grades A and B have been considered. The pipe is available in a black or red painted surface finish and the end connections are plain end, rolled groove and welded.

ASTM A795 / A795M Schedule 10 Sprinkler Pipe Dimensions		
Nominal Pipe Size inch	Nominal Outside Diameter inch (mm)	Nominal Wall Thickness inch (mm)
1/2	0.840 (21.3)	0.083 (2.11)
3/4	1.050 (26.7)	0.083 (2.11)
1	1.315 (33.4)	0.109 (2.77)
1-1/4	1.660 (42.2)	0.109 (2.77)
1-1/2	1.900 (48.3)	0.109 (2.77)

ASTM A795 / A795M Schedule 10 Sprinkler Pipe Dimensions		
Nominal Pipe Size inch	Nominal Outside Diameter inch (mm)	Nominal Wall Thickness inch (mm)
2	2.375 (60.3)	0.109 (2.77)
2-1/2	2.875 (73.0)	0.120 (3.05)
3	3.500 (88.9)	0.120 (3.05)
4	4.500 (114.3)	0.120 (3.05)
6	6.625 (168.3)	0.134 (3.05)

2.3 ASTM A53 / A53M Schedule 40 Sprinkler Pipe

Schedule 40 sprinkler pipe manufactured in accordance with the specifications set forth in American Society of Testing and Materials (ASTM) Standard A53 / A53M has nominal wall thicknesses as detailed below. As part of the evaluation, steel manufactured to the requirements of ASTM A53 / A53M Grades A and B have been considered. The pipe is available in a black or red surface finish and the end connections are plain end, rolled or cut groove, threaded and welded.

ASTM A53 / A53M Schedule 40 Sprinkler Pipe Dimensions		
Nominal Pipe Size inch	Nominal Outside Diameter inch (mm)	Nominal Wall Thickness inch (mm)
1/2	0.840 (21.3)	0.109 (2.77)
3/4	1.050 (26.7)	0.113 (2.87)
1	1.315 (33.4)	0.133 (3.38)
1-1/4	1.660 (42.2)	0.140 (3.56)
1-1/2	1.900 (48.3)	0.145 (3.68)
2	2.375 (60.3)	0.154 (3.91)
2-1/2	2.875 (73.0)	0.203 (5.16)
3	3.500 (88.9)	0.216 (5.49)
4	4.500 (114.3)	0.237 (6.02)
6	6.625 (168.3)	0.280 (7.11)

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 1.4.
- 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** Each length of pipe shall be permanently and continuously marked with the following minimum information:
- Manufacturer's name or trademark
 - Nominal pipe size and length
 - Schedule or model reference
 - Rated working pressure
 - National or International standard (including grade reference) to which the pipe was manufactured
 - Manufacturing Source code
 - Production test reference
 - Heat number or Run number
 - The FM Approvals Certification Mark
- 4.2** Markings shall be painted, inked or laser printed on the outside surface of each length of pipe at regular intervals. The spacing between the end of one complete marking and the start of the next shall not exceed 12 inches (300 mm).
- 4.3** Each marking described above shall be legible and durable and shall be applied in any of, or any combination of, the above methods.

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 locations 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

Thai Premium Pipe Co Ltd
45 Moo 2, Chaimongkol, Muang Sakut Sakhon
Samut Sakhon 74000
Thailand

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 1.4 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: PR455700

ATTACHMENTS:

Appendix A	Approval Guide Listings
Appendix B	Detailed Analysis
Appendix C	Critical Document List (CDL)

APPROVAL GUIDE LISTING**NON-THREADABLE LIGHTWALL**

Fire Protection – Automatic Sprinkler Systems – Pipes and Fittings for Aboveground – Steel Pipe
 – Lightwall Pipe – Non-threadable Non-schedule - Normal connections are welded, rolled groove
 or plain end

Thai Premium Pipe Co Ltd
45 Moo 2, Chaimongkol, Muang Sakut Sakhon, Samut Sakhon 74000, Thailand

Product	Nominal Pipe Size, in.	Rated Working Pressure, psi	Rated Working Pressure, kPa	Listing Country	Certification Type	Class of Work
Schedule 7 ^a , c, h, m, n, q	1 1-1/4 3 4	300	2070	Thailand	FM Approved	1630-Steel Pipe Spklr Sys Serv
Schedule 7 ^a , c, g, h, m, n, q	1 1-1/4	175	1205	Thailand	FM Approved	1630-Steel Pipe Spklr Sys Serv

a - FM Approved for use with FM Approved pipe couplings on rolled grooves.

c - FM Approved for use in welded systems when supplied with standard bevel on ends.

g – FM Approved for use with plain-end fittings

h – FM Approved for use when the listing of the couplings or fittings make specific mention of their suitability with this sprinkler pipe.

m - FM Approved for use in all steel sprinkler systems composed of uncoated steel pipe.

n - FM Approved for use in hybrid sprinkler systems composed of uncoated steel and plastic piping.

q – FM Approved when manufactured out of steel conforming to ASTM A795 / A795M Grade A or B specifications.

APPROVAL GUIDE LISTING**SCHEDULE 10**

Fire Protection – Automatic Sprinkler Systems – Pipes and Fittings for Aboveground – Steel Pipe
 – Schedule 10 – Normal connections are welded, rolled groove or plain end

Thai Premium Pipe Co Ltd

45 Moo 2, Chaimongkol, Muang Sakut Sakhon, Samut Sakhon 74000, Thailand

Product	Nominal Pipe Size, in.	Rated Working Pressure, psi	Rated Working Pressure, kPa	Listing Country	Certification Type	Class of Work
Schedule 10 a, c, j, m, n, s	1/2 3/4 1 1-1/4 1-1/2 2 2-1/2 3 4 6	300	2070	Thailand	FM Approved	1630-Steel Pipe Spklr Sys Serv
Schedule 10 a, c, g, m, n, s	1 1-1/4 1-1/2 2	175	1205	Thailand	FM Approved	1630-Steel Pipe Spklr Sys Serv

a - FM Approved for use with FM Approved pipe couplings on rolled grooves.

c - FM Approved for use in welded systems when supplied with standard bevel on ends.

g – FM Approved for use with plain-end fittings

j – 1/2 in (15 mm) and 3/4 in (20 mm) nominal size limited for use in valve trim

m - FM Approved for use in all steel sprinkler systems composed of uncoated steel pipe.

n - FM Approved for use in hybrid sprinkler systems composed of uncoated steel and plastic piping.

s – FM Approved when manufactured out of steel conforming to ASTM A795 / A795M Grade A or B specifications.

APPROVAL GUIDE LISTING**SCHEDULE 40**

Fire Protection – Automatic Sprinkler Systems – Pipes and Fittings for Aboveground – Steel Pipe
 – Schedule 40 – Normal connections are threaded, welded, rolled or cut groove or plain end

Thai Premium Pipe Co Ltd

45 Moo 2, Chaimongkol, Muang Sakut Sakhon, Samut Sakhon 74000, Thailand

Product	Nominal Pipe Size, in.	Rated Working Pressure, psi	Rated Working Pressure, kPa	Listing Country	Certification Type	Class of Work
Schedule 40 a, b, c, e, j, m, n, p	1/2 3/4 1 1-1/4 1-1/2 2 2-1/2 3 4 6	300	2070	Thailand	FM Approved	1630-Steel Pipe Spklr Sys Serv
Schedule 40 a, b, c, e, g, m, n, p	1 1-1/4 1-1/2 2	175	1205	Thailand	FM Approved	1630-Steel Pipe Spklr Sys Serv

a -FM Approved for use with FM Approved pipe couplings on rolled grooves.

b- FM Approved for use with FM Approved pipe fittings when threaded

c -FM Approved for use in welded systems when supplied with standard bevel on ends.

e -Any FM Approved pipe coupling or fitting suitable for use with Schedule 10 pipe may be used with this product at the lower rated pressure of the pipe or the fitting.

g -FM Approved for use with plain-end fittings.

j- 1/2 in (15mm) and 3/4 in (20mm) nominal size limited for use in valve trim

m -FM Approved for use in all steel sprinkler systems composed of uncoated steel pipe.

n -FM Approved for use in hybrid sprinkler systems composed of uncoated steel and plastic piping.

p - FM Approved when manufactured out of steel conforming to ASTM A53 / A53M Grade A or B specifications

DETAILED ANALYSIS**1 EXAMINATION**

The manufacturer provided samples of their pipe 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 1630 Sample Requirements - Steel Pipe										
Provide samples of each size listed below using the guidelines for number of samples by test based on end connection type										
Product Type	End Connection	Examination	Hydrostatic Strength	Bending Moment Resistance	Rotational Bending Moment Resistance	Vibration Resistance	Marking Durability	Corrosion Resistant Coatings	Long Term Corrosion	Chemical Compatibility
		NPS	NPS	NPS	NPS	NPS	NPS	NPS	NPS	NPS
ASTM A795 Schedule 7	Plain End									
	Welded									
	Roll Groove		1 1/4, 3, 4	1 1/4, 3, 4		2				
ASTM A795 / A795M Schedule 10	Plain End						4			
	Welded									
	Roll Groove	2	1 1/4, 2, 3, 4, 6	1 1/4, 2, 3, 4, 6		2				
ASTM A53 / A53M Schedule 40	Plain End									
	Threaded									
	Welded									
	Roll Groove									
	Cut Groove									

Provide samples as specified below for each size listed in the Sample Requirements table.									
End Connection	Examination	Hydrostatic Strength	Bending Moment Resistance	Rotational Bending Moment Resistance	Vibration Resistance	Marking Durability	Corrosion Resistant Coatings	Long Term Corrosion	Chemical Compatibility
Plain End	1	2	2	2	2	1	3	1	1
Roll Groove	1	4	4	4	4	1	3	1	1
2	For plain, threaded, roll groove and welded end connections, provide samples that have been assembled using couplings from two different Approved manufacturers for a total of two different combinations per size.								
4	For roll and cut grooved end connections, provide samples that have been assembled using rigid couplings from two different Approved manufacturers and flexible couplings from two different manufacturers for a total of four different combinations per size.								

2 DESCRIPTION**2.1 Hydrostatic Strength**

Samples as detailed above were filled with water, cleared of all entrapped air, and subjected to four times their rated working pressure for 5 minutes. There were no signs

of cracking, rupture or permanent distortion of the assembly as a result of this test. These results are considered satisfactory.

2.2 Bending Moment Resistance

2.2.1 Schedule 7 Non-Threadable Lightwall Aboveground Steel Sprinkler Pipe

Samples as detailed above were filled with water, cleared of all entrapped air, and subjected to their rated working pressure. The assembly was centered in a fixture that provided support at a spacing of 48 inches (1.2 m) and was subjected to the required bending moment. The bending moment was calculated based on a water filled hybrid sprinkler system comprised of both schedule 10 and schedule 40 steel sprinkler pipe, a maximum hanger spacing of 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.

2.2.2 Schedule 10 Aboveground Steel Sprinkler Pipe

Samples as detailed above were filled with water, cleared of all entrapped air, and subjected to their rated working pressure. The assembly was centered in a fixture that provided support at a spacing of 48 inches (1.2 m) and was subjected to the required bending moment. The bending moment was calculated based on water filled schedule 40 steel sprinkler pipe, a maximum hanger spacing of 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.

2.3 Vibration Resistance

Samples as detailed above were 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 samples were 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 samples were subjected to four times their 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.

2.4 Marking Durability

Samples as detailed above were subjected to water immersion for 5 minutes on each of 10 working days. After the 10 day period, the samples were removed from the water and were rubbed vigorously on the marked surface with cotton or paper towels. Subsequently, the print line on the samples were covered in petroleum based grease for a period of 24

hours, after which the grease was removed with cotton or paper towels. There was no evidence of smearing, bleeding, or removal of the markings as a result of this test. 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 steel sprinkler pipe detailed in this Approval Report and are filed under PR455700.

Drawing No.	Description	Rev. Level
S-QA-034	Specification Standard ASTM A53 & A795 Gr.A	00
S-QC-028	Standard Groove Specifications	00
S-QC-XXX	Standard Threads Specifications	00