

# Comparison of Procedures Between ASTM F2620 and PPI TR-33

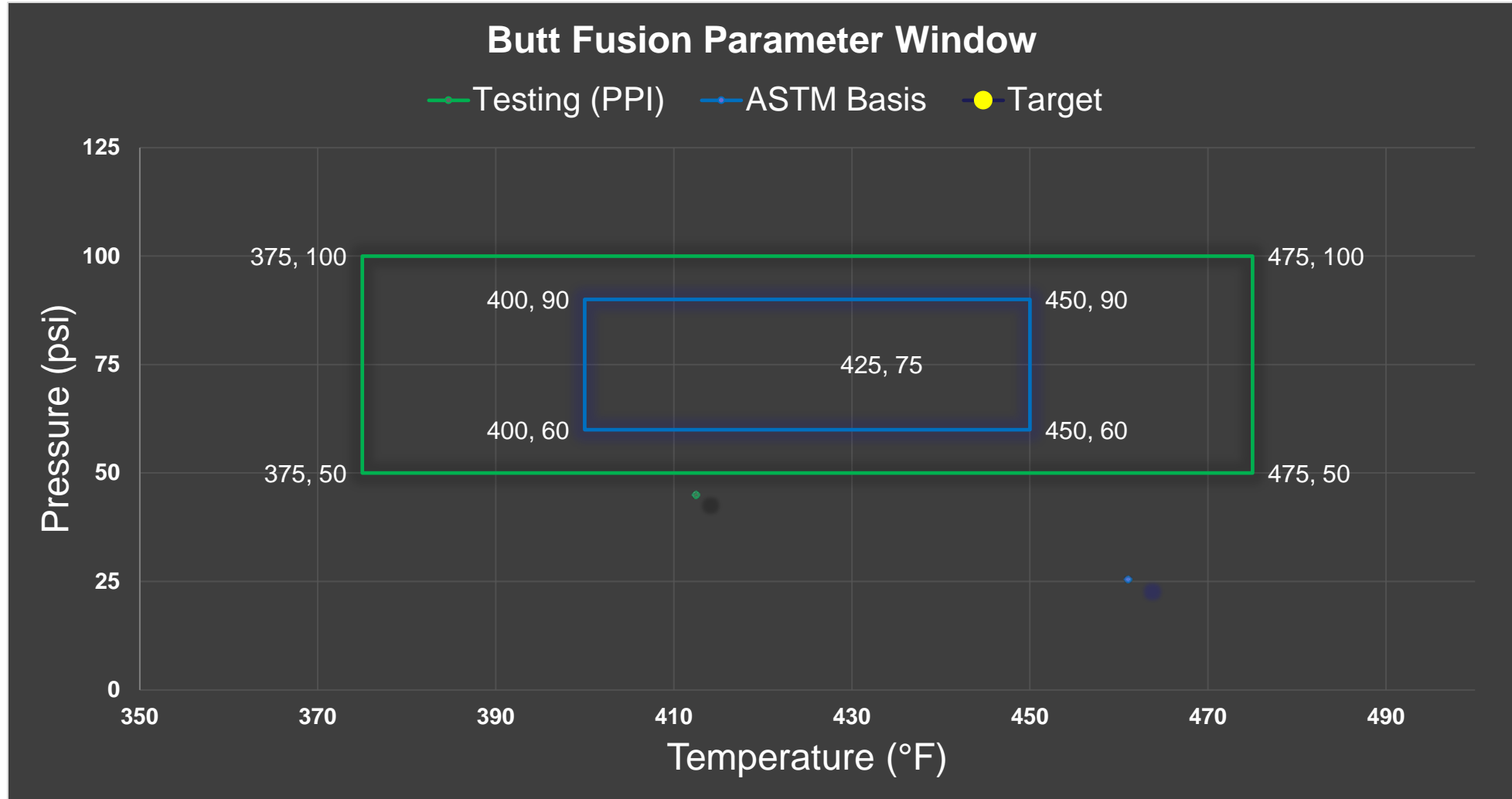
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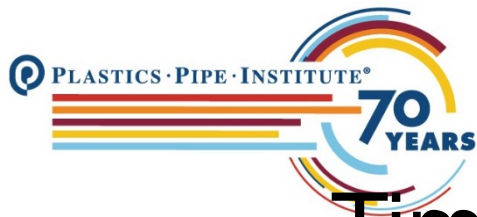
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# Generic Fusion Procedure Development Timeline

- 1994** DOT requests assistance from PPI to promote greater uniformity in the joining procedures utilized by gas utilities in the butt fusion of polyethylene (PE) gas piping products
  
- 1999** PPI TR-33 publishes **Section I - Generic butt fusion procedure testing for field joining of ASTM D2513 gas piping materials** which includes **Appendix A – Generic Butt Fusion Joining Procedure for Field Joining PE (Polyethylene) Pipe**





# Generic Fusion Procedure Development

## Timeline

- 2006** ASTM F2620-06 publishes with cool time of 30-90 sec / in of pipe diameter  
PPI TR-33 is revised to add **Section II – Generic butt fusion procedure testing for field joining of ASTM F714, ASTM D3035, AWWA C-901, AWWA C-906 and PE piping for other applications**
- 2011** ASTM F2620-11 publishes with cooling time of 11 minutes / in of wall thickness
- 2012** PPI TR-33 is revised to add **Section III – Butt fusion procedure testing for field butt fusion of PE4710 pipe for all applications**  
ASTM F2620-12 publishes

## Comparison of procedures

6 Steps are Identified in TR-33

1. Securely fasten the components to be joined
2. Face the pipe ends
3. Align the pipe profile
4. Melt the pipe interfaces
5. Join the two profiles together
6. Hold under pressure

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## Melt the Pipe Interfaces

Reference	PPI TR-33	ASTM F2620
Pipe Diameter	Pipe Size (IPS)	Outside Diameter
Melt	Approximate Bead Size	Minimum Bead Size
Heating Time	Bead Size Only	<14" Bead size only ≥14" Bead size AND 4.5 mins/in wall thickness

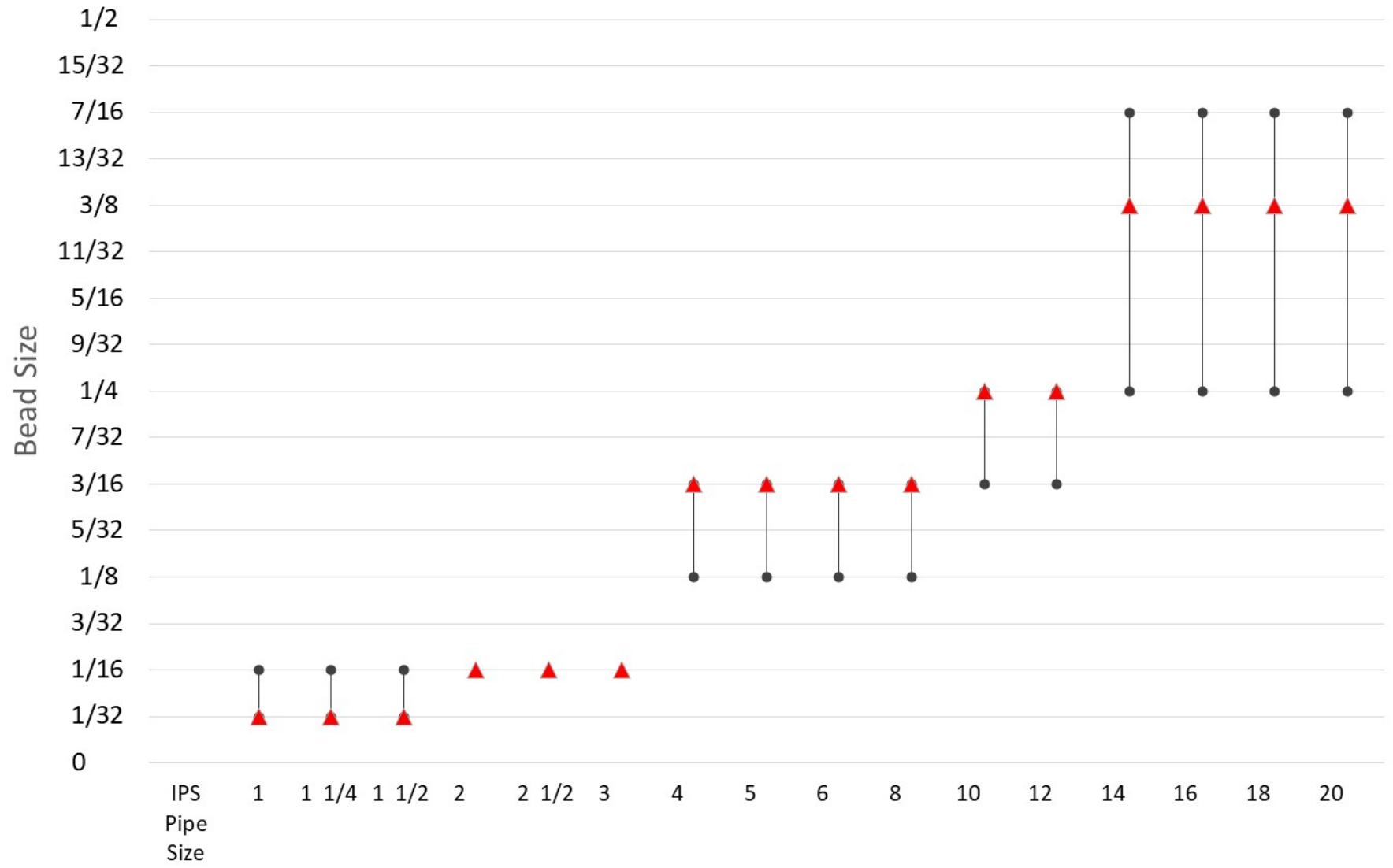


TR33 Pipe Size	TR33 approximate Bead	F2620 Pipe OD	F2620 Minimum Bead
1 ¼" and smaller	1/32" – 1/16"	< 2.37"	1/32"
**1 ½ IPS = 1.9"		< 2.37"	1/32"
Above 1 ¼" through 3"	About 1/16"	≥ 2.37" ≤ 3.5"	1/16"
Above 3" through 8"	1/8"-3/16"	> 3.5" ≤ 8.62"	3/16"
Above 8" through 12"	3/16"-1/4"	> 8.62" ≤ 12.75"	1/4"
Above 12" through 24"	1/4"-7/16"	> 12.75" ≤ 24"	3/8"
Above 24" through 36"	About 7/16"	> 24" ≤ 36"	7/16"
Above 36" through 63"	About 9/16"	> 36" ≤ 65"	9/16"

Table 1

### Bead Size Comparison by Pipe Diameter TR33 vs F2620

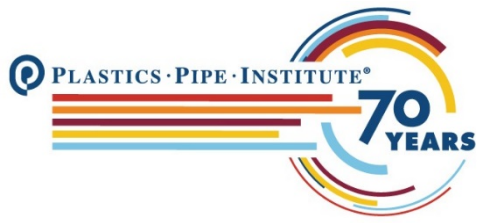
● TR33 ▲ F2620



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## Join the two profiles together Hold under pressure

Reference	PPI TR-33	ASTM F2620
Open/Close time	Inspect and immediately close	Max allowable time defined in Table 4, ASTM F2620-12 based on wall thickness
Hold under Pressure	30-90 seconds per inch of pipe diameter	11 Minutes per inch of wall thickness

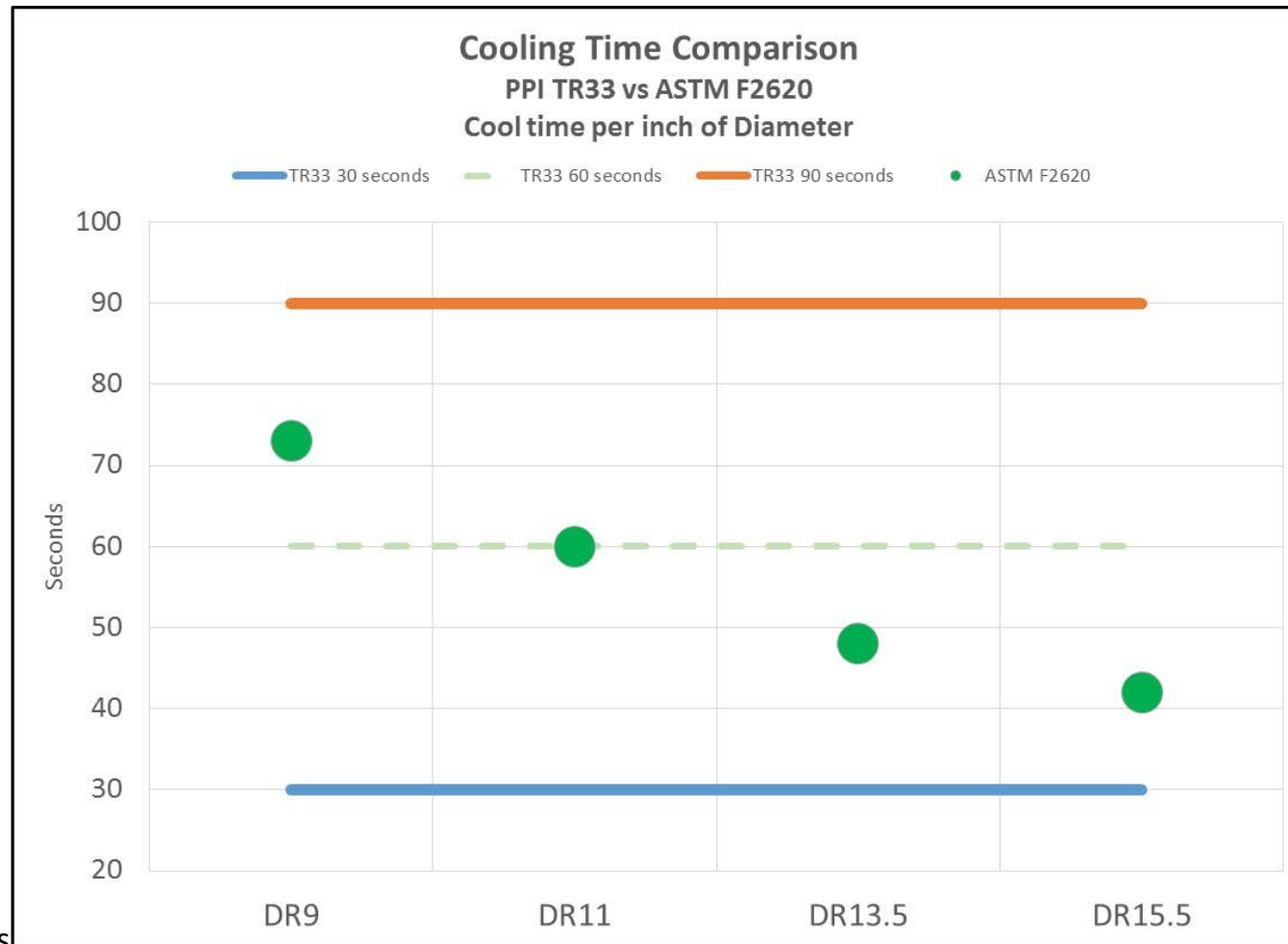
		TR33 Cooling			
IPS Pipe size	OD	30s	60s	90s	ASTM F2620 DR11 Cooling Time
1/2	0.84	0:00:15	0:00:30	0:00:45	0:00:30
3/4	1.05	0:00:22	0:00:45	0:01:07	0:00:45
1	1.32	0:00:30	0:01:00	0:01:30	0:01:00
1 1/4	1.66	0:00:37	0:01:15	0:01:52	0:01:15
1 1/2	1.9	0:00:45	0:01:30	0:02:15	0:01:30
2	2.37	0:01:00	0:02:00	0:03:00	0:02:00
4	4.5	0:02:00	0:04:00	0:06:00	0:04:00
6	6.63	0:03:00	0:06:00	0:09:00	0:06:00
8	8.63	0:04:00	0:08:00	0:12:00	0:08:00
10	10.75	0:05:00	0:10:00	0:15:00	0:10:00
12	12.75	0:06:00	0:12:00	0:18:00	0:12:00
14	14	0:07:00	0:14:00	0:21:00	0:14:00
16	16	0:08:00	0:16:00	0:24:00	0:16:00
18	18	0:09:00	0:18:00	0:27:00	0:18:00

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1 1/2	1.9	0:00:45	0:01:30	0:02:15	0:01:30
2	2.37	0:01:00	0:02:00	0:03:00	0:02:00
4	4.5	0:02:00	0:04:00	0:06:00	0:04:00
6	6.63	0:03:00	0:06:00	0:09:00	0:06:00
8	8.63	0:04:00	0:08:00	0:12:00	0:08:00
10	10.75	0:05:00	0:10:00	0:15:00	0:10:00
12	12.75	0:06:00	0:12:00	0:18:00	0:12:00
14	14	0:07:00	0:14:00	0:21:00	0:14:00
16	16	0:08:00	0:16:00	0:24:00	0:16:00
18	18	0:09:00	0:18:00	0:27:00	0:18:00

**Minimum Cooling time per inch of diameter based on F2620 cooling time of 11 minutes per inch of wall thickness**

DR9	DR11	DR13.5	DR15.5
73 secs	60 secs	48 secs	42 secs

**Table 2**



**Figure 2**

# Questions?

