

TECHNICAL BULLETIN

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Chemtrol® Socket Fusion Joining Technique

This document summarizes the technique for socket fusion joining of Chemtrol® polypropylene and PVDF pipe, fitting, and valves as detailed in publication C-CHTM-0312, *Thermoplastic Piping Technical Manual*. When referring to the time and temperature table, keep in mind that good socket fusion joints can be made only when the heating tool is operating at the proper temperature and only when the length of time that the pipe and fittings remain on the heater faces does not exceed the times listed in the table.

Heating times start after pipe and fitting have advanced completely onto the heater faces. The pipe must be fitted squarely into the fitting socket immediately after removal from the heater faces because the material will begin to cool.

Higher temperatures and longer heating times will result in excessive melting at and below the surfaces of the fitting socket I.D. and pipe O.D. Under these circumstances, when the pipe is inserted into the fitting socket, excessive melt material needed for socket fusion will be scraped from the socket wall and into the fitting waterway. Conversely, low temperatures and insufficient heating times will result in lack of, or incomplete, melting.

The heating tool must be kept clean at all times. Wipe away residual material from heat faces with a clean rag. Periodic applications of silicone spray to heat faces will assist in maintaining performance. Chemtrol recommends 3M Company's Aerosol Spray (Product # 62-4678-4930-3) "food grade." 3M Technical Customer Service Center can be reached at 800-362-3550.

Proper socket fusion joining is the responsibility of the installer. Installers should follow best industry practices when engaging in socket fusion joining techniques and installing any polypropylene, and PVDF pipe, fittings, and/or valves. Installers should also confirm the most up to date manufacturers' instructions from all material manufacturers prior to preparing socket fusion joints in plumbing installation.

Thermo-Fusion Socket Heating Times and Temperatures							
Polypropylene				PVDF			
Size	Time (sec)	Temp °F	Temp °C	Size	Time (sec)	Temp °F	Temp °C
1/2"	5	495-505	257-263	1/2"	5	495-505	257-263
3/4"	5	495-505	257-263	3/4"	5	495-505	257-263
1"	5	495-505	257-263	1"	5	495-505	257-263
1-1/2"	5	495-505	257-263	1-1/2"	5	495-505	257-263
2"	5	495-505	257-263	2"	5	495-505	257-263
3"	7-9	500-510	260-266	3"	25-35	510-530	266-273
4"	12-15	500-510	260-266	4"	40-50	510-530	266-273
6"	15-20	500-520	260-271	6"	50-60	540-560	282-293

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Fusion Joining Walkthrough for Bench-Mount Machine

- Set temperature gauge on heating element
- Pipe end must be beveled on the outside diameter
- Set appropriate time into timer
- Clean pipe and fitting socket with a dry rag
- Set joint insertion stroke-limiter to appropriate pipe size
- Tighten down clamps for fitting and loosely insert pipe between clamps
- Turn hand-wheel clockwise while pushing in depth gauge stroke-limiter
- Lock set-screw
- Align pipe to the entry of the fitting
- Tighten the clamps holding the pipe to appropriate torque
- Mark pipe next to clamps using a marker (to monitor slipping)
- Unlock the set-screw
- Turn hand-wheel counter-clockwise fully opening sled
- Mark beveled pipe end with appropriate pipe depth gauge using a marker
- Spray heater faces with appropriate amount of silicone spray
- Pull down heating element and set alignment of heater faces with pipe and fitting
- Turn hand-wheel clockwise with a continuous motion. Watch the fitting move onto the male heater face being sure not to crush the material bead against the heater face
- Start timer once pipe and fitting are fully on the heater faces
- When timer beeps, turn hand-wheel counter-clockwise with a quick start then a smooth finish until fully opening sleds
- Push back the heating element
- Turn hand-wheel clockwise to join pipe and fitting until stroke-limiter is at rest with sleds
- Lock the set-screw
- Wait 30 seconds for fusion joint to set-up before releasing the set-screw

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Fusion Joining Walkthrough for Hand-Held Unit

- (Optional) Attach the auxiliary handle for additional stabilization
- Attach appropriate male and female heater faces to heating element
- Set temperature gauge on heating element
- Pipe end must be beveled on the outside diameter
- Set appropriate time into timer
- Clean pipe and fitting socket with a dry rag
- Mark beveled pipe end with appropriate pipe depth gauge using a marker
- Attach clamp next to mark on pipe exposing beveled pipe end for fusion joining
- Spray heater faces with appropriate amount of silicone spray
- Stabilize heat-tool with the use of another person and/or clamps
- Simultaneously insert pipe and fitting uniformly onto heater faces being sure not to crush the material bead against the male heater face
- Start timer once pipe and fitting are fully on the heater faces
- When timer beeps, simultaneously remove pipe & fitting and immediately insert pipe squarely and fully into socket without purposeful rotation
- Hold steady for 30 seconds for fusion joint to set-up