

Weldfast™ CL-200 or CL-200QS Vinyl Ester Adhesive Kit

Fabrication Instruction for Vinyl Ester Centricast™ CL-2030 or Centricast CL-1520 Pipe and Fittings

Introduction

Read these instructions completely and follow all of the procedures carefully. Please contact your local NOV Fiber Glass Systems authorized distributor if you have questions or need clarification regarding these instructions.

Safety precautions

The adhesive and catalyst are **HIGHLY FLAMMABLE**. It is critical to personal safety that the work area be isolated from any source of open flames. The fumes from these materials are also **FLAMMABLE** and can travel or build up in poorly ventilated areas.

WARNING: The catalyst contains Dibenzoyl Peroxide (BPO). BPO is a strong oxidizing agent: proper safety measures should be observed when using products containing BPO:

- Always wear chemical splash goggles for eye protection when using the adhesive or catalyst. If eye contact should occur, flush immediately with water and call your physician.
- Always wear impermeable gloves to avoid direct skin contact with the adhesive and catalyst. If direct contact should occur, wash immediately with soap and water.
- Never cover a container of mixed catalyst and adhesive.
- Safety Data Sheets (SDS) are available on request.

Content of Centricast CL-200 adhesive kit:

1. CL-200, adhesive Part "A"
2. CL-200, catalyst Part "B"
3. Wooden Stir Stick
4. Plastic Putty Knife
5. Instructions



Weldfast CL-200-QS, quick Set Promoter (Part "C") available separately.



Storage of adhesive kits

Do not store adhesive kits at temperatures above 90°F (32°C). Maximum storage life for the adhesive kit is three months at 90°F (32°C) and six months at 70°F (21°C). See Shelf-Life Table. Storing adhesive at temperatures between 40°F and 50°F (4°C and 10°C) is recommended.

Adhesive component shelf life

Temperature		Part "A" shelf life	Part "B" shelf life
°F	°C	months	months
40-50	4-10	6	12
51-60	10-16	5	12
61-70	16-21	5	12
71-80	21-27	5	12
81-90	27-32	3	9
91-100	32-38	1-2	4

Bonding environment

Surfaces to be bonded must be thoroughly sanded, clean, dry, oil-free, and in the correct temperature range to ensure a proper bond.

Bonding procedures are based on temperature ranges of 70°F (21°C) to 100°F (38°C). For bonding where conditions exceed these ranges, follow the Cold Weather or Hot Weather Installation Instructions. The recommended temperature limits of CL-200, and surfaces to be bonded, must be maintained in order to assure proper cure of the joints. All bonding surfaces and materials must remain completely dry and at temperatures above 70°F (21°C).

NOTE: Air temperature is not the only factor affecting cure times.

EXAMPLE: When the air temperature is 70°F (21°C) and a pipe is exposed to direct sunlight, surface temperatures of the pipe may approach 100°F (38°C) or higher. Conversely, at 70°F (21°C), a pipe exposed to wind will affect adhesives as if conditions were colder.

Cold weather installation instructions (Below 70°F/21°C)

The curing time for CL-200 adhesive kits is directly related to the temperature. Colder temperatures can result in uncured adhesive joints. The following steps are recommended when fabricating in cold weather:

1. Adhesive Kits should be placed in a warm room for 6 to 12 hours before application so they reach temperatures of 70°F to 80°F. THE ADHESIVE AND CATALYST SHOULD NOT BE HEATED IN EXCESS OF 90°F (32°C).
2. Use all catalyst for cold weather installations.
3. Fabricate piping sub-assemblies in an inside area when possible.
4. Warm the pipe ends and fittings before joint make up.
5. Apply the heat blanket to the joint and leave on according to the Cure Time Charts.

Hot weather installation instructions (Above 100°F/38°C)

Hot weather reduces the working time and viscosity of the mixed adhesive and catalyst. The following steps are recommended when fabricating in hot weather:

1. Reduce catalyst to no less than ½ tube.
2. Avoid direct sunlight on the joining surfaces, adhesive, and catalyst.
3. Cool unopened containers of adhesive and catalyst in an ice chest with ice.
4. Plan and organize the job to reduce working time.
5. Do not use CL-200QS, Part “C”.

Catalyst usage for Weldfast CL-200

Temperature		Contents Part B
°F	°C	
40-80	4-27	1 packet
81-100	27-38	½ packet

Site equipment

Each CL-200 kit contains the correct amount of materials for the size and number of joints specified in the table.

Number of joints per kit

Pipe size (in)	Joints per kit	Kits per joint
1	12	-
1½	10	-
2	8	-
3	5	-
4	3	-
6	2	-
8	1	1
10	½	2
12	½	2
14	½	3

In addition to the material supplied in each kit, the following items are needed:

1. Clean dry rags or paper towels.
2. Impermeable gloves.
3. Chemical splash goggles.
4. Drum, or disc sander, with 36 to 60 grit abrasive. Emery cloth (36 to 60 grit) may be used for hand sanding. Do not use flapper wheels or belt sanders.

Tools for cutting Centricast pipe

Centricast pipe should be at least 55°F(13°C) before cutting. Several cutting tools for cutting pipe are acceptable, including:

1. Circular power saws with aluminum oxide abrasive blades, grit-edged carbide blades, or diamond blades. Do not use toothed blades as they may damage the pipe internal corrosion barrier.
2. Band saw with 16-22 teeth/inch at speeds of 200 to 600 feet per minute.
3. Saber saw with carbide grit-edged blade.
4. Chop saw with aluminum oxide blade.
5. Hack saw with 22-28 teeth/inch.

Surface/end preparation

1. Measure the pipe, allowing for fitting makeup lengths.
2. Scribe a cutting guide around the pipe to ensure a square cut for a proper fit.
3. Hold the pipe firmly. If chain vises or other mechanical holding devices are used, care should be taken to prevent crushing or point loading the pipe.
4. Saw the pipe as smoothly as possible. Coarse sawing with the wrong tool can result in damage to the chemically resistance liner inside the pipe.



Surface preparation

1. Prepare both ends of the pipe, or pipe and fitting to be joined together by sanding the bonding surfaces with 36 to 60 grit abrasive (See Site Equipment). The sanded area should be completely roughened, gloss free and extend ½ in. beyond the length of the fitting socket.
2. Never sand more than two (2) hours before making the joint.
3. Wipe the sanded area with a clean, dry, lint-free cloth, and avoid touching the surfaces with bare hands or dirty gloves. Do not use solvents.



Mixing CL-200 vinyl ester adhesive

Caution: Follow Safety Precautions on Page 1.

CL-200 mixing instructions:

1. Thoroughly mix the Weldfast “part “A” adhesive to fully disperse any liquid which may have separated during storage.
2. Add the recommended Part “B” catalyst to the Part “A” adhesive can. See the Catalyst Usage Table on page 2.
3. Immediately mix for a minimum of one minute or until the color is consistent. When properly mixed, the catalyzed adhesive turns light green. Check for light pink or purple streaks of unmixed adhesive in the bottom and around the edges of the can.

CL-200QS mixing instructions:

Warning: The Part (“B”) catalyst and part (“C”) promotor must never be mixed directly. The part “B” catalyst should be added only after the adhesive and part “C” are thoroughly mixed.

1. Thoroughly mix the CL-200 part “A” adhesive to fully disperse any liquid that may have separated during storage.
2. Add the entire tube of the CL-200 Part “C” promoter to the uncatalyzed adhesive and mix thoroughly for a minimum of one minute. There should be no color change after adding Part “C”.
3. Add the entire tube of CL-200 Part “B” catalyst to the adhesive can.
4. Immediately mix for a minimum of one minute or until the color is consistent. When properly mixed, the catalyzed adhesive turns light green. Check for light pink or purple streaks of unmixed adhesive in the bottom and around the edge of the can.

Typical pot life (working time) after adding part “C” catalyst is 4-15 minutes.

Pot life:

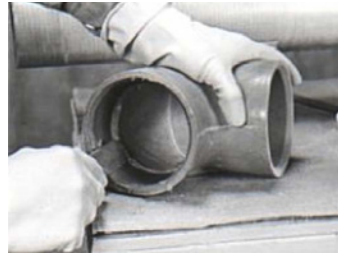
Pot life (working time) of CL-200 adhesive may vary with changes in temperature and humidity. See the Cure Time Charts.



Applying mixed adhesive and bonding pipe (1, 1½, & 2 in. Centricast Pipe)

Small diameter socket joints may be obstructed by excessive adhesive if the following instructions are not followed. Apply adhesive to the fitting socket squeezing it onto the sanded surface.

Make sure all bonding surfaces are completely coated with adhesive. Remove the adhesive with the applicator leaving only a thin film to wet all bonding surfaces. Any excessive adhesive left in the socket of the fitting will be forced into the pipe during joining and may obstruct fluid flow in the system. Wet the end of the pipe, leaving a small bead of adhesive. The adhesive will prevent the chemical attack of the pipe end. Apply a thin film of adhesive to the pipe, forcing it into the sanded bonding surface. Next, coat the bonding area of the pipe only with adhesive at least ¼ in. thick. Ensure there is no excessive adhesive on the end of the pipe or in the pipe bore before placing the fitting on the pipe.



3 - 14 in. pipe

Apply a thin layer of mixed adhesive to the fitting socket, then add more adhesive and build up to no more than ¼ in.

Repeat this procedure with the pipe but build up the adhesive to no less than ¼ in. Too little adhesive on the pipe will cause voids and result in a weak joint. Make sure you coat any cut edges of the pipe to seal the exposed fiberglass.

Use a square or level to make sure the fitting is positioned properly.

Create a fillet of adhesive at the end of the fitting using the 45° bevel on the putty knife.

Make sure the fitting is held level by supporting it while it cures. Example: Use fiberglass reinforced tape stretched from the fittings' outermost edge to the pipe and/or the table.



1 - 14 in. fittings

Align the fitting to minimize rotation and movement while the fitting is being placed on the pipe. More than one inch of rotation or large movements to obtain final alignment on the pipe can cause joint leaks. Push the fitting onto the pipe until the internal pipe stop is fully engaged. Do not scrape the sides of the socket when placing the fitting on the pipe. Create a fillet of adhesive at the end of the fitting using the 45° bevel on the putty knife.

Use a square or level to make sure the fitting is positioned properly before curing. The fitting must be held level and supported while curing. For example: Use a strip of fiberglass reinforced tape stretched from the fittings' outermost edge to the pipe and/or the table.

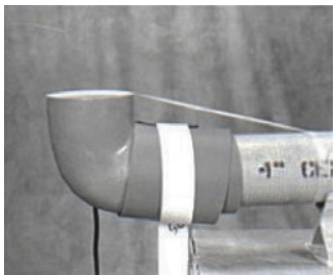
Joint Cure

The joint will cure in 24 hours at ambient temperatures from 70°F (21°C) to 100°F (38°C). Cure time can be decreased, and joint strength increased by heating the joint from 175°F (79°C) to 275°F (135°C).

After the fillet has become tacky or slightly firm to the touch, use a heat gun held 8 to 10 in. from the fillet to start the heat cure process. Constantly move the gun over the fillet to prevent burning. Use the heat gun to harden the adhesive surface to the point that it is tack-free. Then, wrap the heat blanket around the joint, referring to the Cure Time Charts for the appropriate curing time.

Applying the heat blanket before the adhesive is tack-free can cause bubbling of the adhesive. The use of heat blankets to cure piping systems carrying fluids at temperatures above 120°F (49°C) is recommended.

Before moving the piping, the joint must be hardened completely. Cure the joint per the Cure Time Charts before pressurizing the system.



Cure time chart for CL-200

Temperature		Pot life (mins)	Gel time (mins)	Cure time (hours)
°F	°C			
40-60	4-16	-	-	N/R
61-70	16-21	20-60	40-60	N/R
71-80	21-27	13-35	18-30	24
81-90	27-32	12-20	15-25	24
91-100	32-38	9-15	10-20	24
NOV FGS heat blanket assisted				½

Cure time chart for CL-200QS

Temperature		Pot life (mins)	Gel time (mins)	Cure time (hours)
°F	°C			
40-60	4-16	N/R	N/R	N/R
61-70	16-21	7-15	9-17	4
71-80	21-27	7-12	8-16	2
81-90	27-32	4-7	<10	1
91-100	32-38	N/R	N/R	N/R
NOV FGS heat blanket assisted				½

N/R = Not Recommended

Adhesive Disposal: Once the adhesive and hardener have been mixed and reacted, nothing can be extracted, and it is classified as non-hazardous material. Dispose of in a normal manner as other solid waste. Excess adhesive and hardener agents can be mixed, allowed to react, and disposed of as above. If extra jars of adhesive or hardener have accumulated without the other component to mix and react, contact your NOV Fiber Glass Systems regional manager. Hardener jars, when empty are not subject to EPA regulation and can be disposed of in a normal manner. These guidelines are based on federal regulations. State and local regulations and ordinances should be reviewed.

Fiber Glass Systems

17115 San Pedro Avenue, Ste. 200, San Antonio, Texas 78232, USA
Phone: 210 477 7500 Fax: 210 477 7560

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Hydrostatic Testing

NOV Fiber Glass Systems piping systems should be hydrostatically tested before being put into service. Avoid water hammer during testing to prevent serious damage to the piping system. All anchors, guides, and supports must be in place before testing the line. Hydrostatically test the line as follows:

1. Water should be introduced at the lowest point in the test section, and the air bled off through partially open valves or loose flanges at all the highest points. Slowly introduce water into the system to prevent water hammer. Slowly close the bleed points when all the air has been forced from the system.
2. Bring the system gradually up to the test pressure. Test pressure should not be more than 1½ times the working pressure of the piping system and must never exceed 1½ times the rated operating pressure of the lowest-rated component in the system.
3. When testing is completed, open all high-point air bleeds before draining the piping through the fill lines. This will prevent the vacuum collapse of the pipe.

Compressed Air / Gas Testing

Compressed air or gas testing of the piping systems is NOT recommended. When air or compressed gas is used for testing, tremendous amounts of energy can be stored in the system. If a failure occurs, the energy may be released catastrophically, resulting in property damage and personal injury. When system contamination or fluid weight prevents the use of hydrostatic testing, use compressed air or gas testing with extreme caution. To reduce the risk of air testing, pressurize the system to no more than 15 psig. When pressurizing the system with compressed air or gas, the area surrounding the piping must be cleared of personnel to prevent possible injury.

Hold the pressure for one hour; then reduce the pressure to one-half the original pressure. Personnel may then enter the area to perform "soap testing" of all the joints. If compressed air or gas testing is used, NOV Fiber Glass Systems will not be responsible for any resulting injury to personnel or damage to property, including the piping system. Compressed air or gas testing is done entirely at the discretion and complete risk of the customer, contractor and user.

**Call Chem Tel for chemical emergencies, spills:
Hotline/MSDS Fax Access: 800-255-3924
Internationally: +01-813-248-0585**