

# TECHNICAL NOTE

**Number: VX-TN-10D.1**  
First Issue: 1985  
Revision 1: September 2004



Vinidex Pty. Limited  
ABN 42 000 664 942  
19-21 Loyalty Rd., (PO Box 4990)  
North Rocks, NSW. 2151, Australia

## DO'S AND DON'TS OF SOLVENT CEMENTING PVC PRESSURE PIPES

This technical note addresses only technical matters related to the application of our products. It does not address issues of health and safety practices, nor any regulatory limitations that may apply, and does not constitute a recommendation of suitability for any purpose

It looks easy doesn't it? And the instructions on the can are pretty simple. What's the problem?

Actually it is simple, but for the unwary, there are some traps. A solvent joint has about eight times the strength that it needs, if everything is right. The trouble is, that factor of safety can be reduced to 4:1 with one mistake, 2:1 with two, and disaster with three.

If you want to make sure you have a reliable joint study AS2032 -1977 Section 3.2. All the points are covered, but the reasons and consequences are sometimes obscure.

Here are some pointers:

Solvent cement is not just a glue. It works by dissolving the surfaces of the spigot and socket, and together with the PVC filler in the cement, forms an integral matrix of PVC across the interface. This can only work properly if the surfaces are scrupulously clean and all traces of lubricants (used in processing) are removed.

- **PRIMING FLUID MUST BE USED**

Do not substitute. If you don't use the pipe maker's specification, you can't expect sympathy. Further, a greasy rag will undo all your efforts.

The integral matrix across the interface is only a few microns thick. Whilst the cement does fill gaps, the real strength of the joint comes from the interference section of the spigot and socket. Since the socket is tapered, this is only the last few millimetres

at the end of the spigot. Tolerances are designed so that:

- (a) interference will always occur before the last 10% of spigot penetration, and
- (b) heaviest interference when fully homed will not cause excess socket stress.

Therefore

- **ALWAYS FORCE THE SPIGOT FULLY HOME.**

You can't be sure you've done this unless you mark the socket length on the spigot. You may not be able to get a large diameter heavy walled pipe home without mechanical aid. If you use a mechanical aid, don't go past the mark. Experience comes in here. Pretest the fit. All pipes and fittings are oval. The ovality corrects itself when the joint is made. Small light wall pipes are no problem. A large heavy walled joint with ovality can take a lot of force -and if you don't get it first time, you don't get a second chance.

The solvent 'lubricates' the surfaces for jointing. You won't get the spigot fully home if it runs dry of solvent part way down the socket. Therefore

- **ENSURE SOLVENT CEMENT COVERS THE ENTIRE SOCKET SURFACE**

If the pipe is not cut square, full interference at the end of the spigot may not be developed. Remember it's the last few millimetres of spigot that count.

- **CUT THE PIPE SQUARE. USE A MITRE BOX**

Proper action at the interface depends on an effective layer of solvent between the surfaces. The layer on the spigot is most important from this point of view.

- **ENSURE SOLVENT CEMENT COVERS THE ENTIRE SPIGOT SURFACE.**

A sharp edge on the spigot will pick up the solvent in the socket and push it towards the back of the socket. This reduces the layer of cement in the interface. It also causes dangerous 'pooling' at the back of the socket (see later).

- **DE-BURR THE SPIGOT - 0.5MM CHAMFER**

Proper action at the interface will not proceed with half dry solvent. Nor will it be easy to get the spigot fully home. Solvent cement consists of a mixture of solvents of various volatilities. The solvents all start evaporating as soon as they hit the air, some fast, some slow. The fast ones generally have the greatest solvent power. If you lose these, the strength of the joint will diminish.

- **WORK FAST BUT DON'T RUSH.**

The solvents will evaporate faster from the exposed spigot than from the socket.

- **COAT THE SOCKET FIRST**

Speed of evaporation is affected greatly by temperature and air movement. On a hot, windy day, evaporation can increase more than 10 times. Coating a hot pipe will worsen the effect too.

- **DON'T WORK ON HOT, WINDY DAYS.**

The time taken to coat the surfaces is obviously important. A small brush is supplied with many small cans of solvent cement for convenience. Do not attempt to coat large pipes with this. Buy a cheap large

brush, and decant the cement into a tin - not more than required for one joint at a time.

A brush size 1/3 the pipe size is a good guide.

- **DON'T USE TOO SMALL A BRUSH.**

Solvent cements are exactly what the name says -solvents. They dissolve PVC. Clearly if you apply enough they will dissolve the pipe. Pooling of cement at the bottom of the joint at the root of the socket can significantly weaken the socket at that point. The effect is worse on thin walls. Some authorities suggest that only the front half of the inside of the socket be coated for pipes up to 40mm, but watch the other factors.

- **TOO MUCH SOLVENT CEMENT IS ASKING FOR TROUBLE.**

At the same time, insufficient cement can cause problems too, bearing in mind the previous factors. How much is too much? How much is not enough? Experience comes in here strongly. It depends on all the other factors. Pipe size, temperature, fit. Larger pipes have larger tolerances and require a thicker layer. Test the fit. A double layer is advisable if the fit is a loose one (don't be fooled by ovality) or the solvent cement is not very viscous. Viscosity changes with temperature.

- **TOO LITTLE SOLVENT CEMENT IS ASKING FOR TROUBLE.**

Whilst the action of solvent cement is quite fast, it stands to reason that the surfaces must not move relative to each other during the "knitting" period. The taper on the socket can "expel" the spigot, even minutely, from the socket.

- **HOLD THE JOINING FORCE FOR 30 SECONDS.**

After this, no external strain should be placed on the joint until significant strength is developed.

## DO'S AND DON'TS OF SOLVENT CEMENTING PVC PRESSURE PIPES

VX-TN-10D.1  
September 2004

- **DO NOT MOVE JOINTS FOR 5 MINUTES.**

Even then it is not all over. Solvents evaporate slowly from the interface and strength develops slowly. At least 24 hours should elapse before pressure testing and longer if slow drying cement is used. The times above depend on temperature and humidity. Curing will be very much retarded if the pipe is filled with water.

- **DO NOT STRAIN JOINTS FOR 24 HOURS.**

One trap is to joint warm pipe from the side of the trench, and place it immediately in the cool trench. Contraction of the pipe is considerable and places the joint under axial strain. Leave the pipe in the trench before jointing for a suitable period depending on thickness, 5 minutes per mm of wall.

- **DON'T JOINT WARM PIPES**

Solvents evaporate at various speeds and the constituents of a can of cement change

if it is left open. It will get thicker and may even go "stringy". It's no good stirring it up the vital fast solvents are gone. Throw it away (disposing of it properly of course).

- **KEEP THE LID ON THE CAN.**

After long periods of time the constituents can change even through a "sealed" can. When opening a new or used can inspect the contents carefully.

- **DON'T USE SOLVENT OVER 12 MONTHS OLD**

Finally -your health. Solvent vapours are toxic and flammable.

- **DON'T WORK IN CONFINED SPACES OR NEAR NAKED FLAMES OR**

- **NON-FLAMEPROOF ELECTRICAL MACHINERY.**

---

For further information about our products and applications, see our web site at

[www.vinidex.com.au](http://www.vinidex.com.au)

Correspondence regarding this Technical Note should quote the reference number and version and be directed to:

The Technical Manager  
Vinidex Pty Limited  
Technical Services Group  
254 Woodpark Rd.  
Smithfield, NSW, 2164  
Australia

Tel +61(0)2 9604 2422  
Fax +61(0)2 9725 3363  
Email [techman@vinidex.com.au](mailto:techman@vinidex.com.au)

Technical notes published by Vinidex represent the most advanced technology drawn from world wide research and field experience available to us at the time of printing. They are published in the interest of better understanding of the technicalities of our products and more satisfactory performance for users.

The application of such technology may involve engineering judgements which cannot be correctly made without intimate knowledge of all conditions pertaining to a specific installation. Technology may be superseded in the light of new laboratory and field work or changes to product specifications, and this Technical note may be withdrawn or amended without notice.

Responsibility lies solely with the User to ensure the currency and validity of information or advice contained herein in the context of his circumstances. It is recommended that advice be obtained from a Consultant registered with the Institution of Engineers Australia.

No warranty (other than Statutory Warranty) is expressed or implied as to the content of the information or results obtained by use thereof, and Vinidex Pty. Limited will not be held liable for any costs, direct or indirect, that may arise therefrom.