

How I Install PVC Pipes

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Introduction

G'day—I'm Percival Vincent Cuttingsworth, but all my friends call me 'Pipeline Percy' (you should too!) I've laid so many PVC pipes, they asked me to write this little book to tell you my secrets!

To illustrate my methods I have used drawings of large pipes only – but it's the same way whether the pipes are large or small. Make sure you know and obey your Local Body / Council Specifications. I can't detail them, as they vary throughout the country. The ground conditions do too!

Follow these steps, and you will:

- Do the job faster,
- Do it right first time,
- Avoid those costly mistakes!

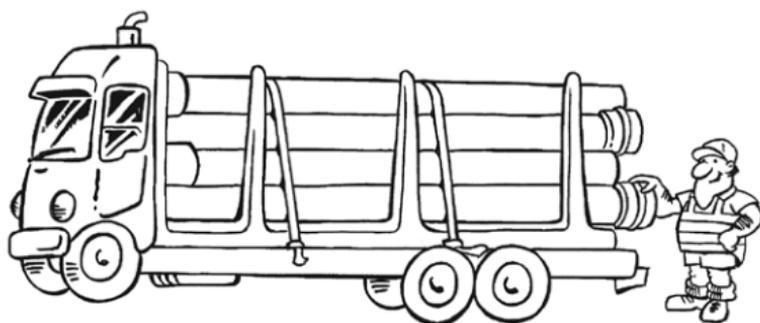
I know I can call on the guys at Iplex Pipelines – they've answered any problems that have stumped me in the past. Don't you be afraid to contact them, they have a call free number 0800 800 262 and ask for the Iplex Technical Team.

I hope this helps you.



Pipeline Percy

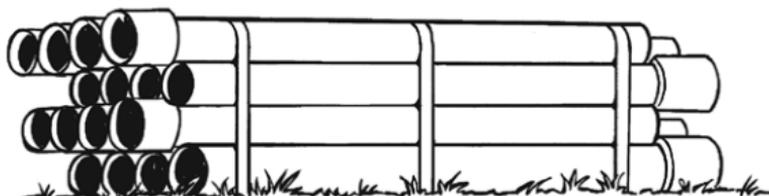
How I Transport & Store Pipes



Y'know – you've got to look after these PVC pipes. They **must NOT** roll around the truck deck and the socket ends must stick out and be protected to avoid damage.



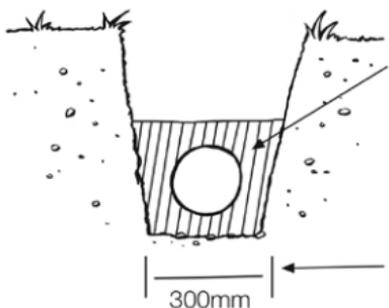
They're so light these days; I can unload a truck quickly – one at a time – **NEVER TIP THEM OFF!** Then I have to store them correctly on dunnage, on flat ground with supports. Iplex pipes have scalloped timber dunnage these days, so when I cut the pipe packs open they don't roll everywhere!



It's better if I can lift them off with my digger in the crates. I use a nylon strap (no chains guys) around the crate and store on flat ground until the trench is dug. For safety's sake only one crate at a time!

The Trench

The engineer's plans always tell me how deep the trench will be. The width is important too. For PVC pipe it should not be more than 300mm wider than the pipe size at the top of the pipe, if heavy traffic is to pass over it. For example; 160mm Pipe – trench width should be 460mm. Above the crown of the pipe any width will do.

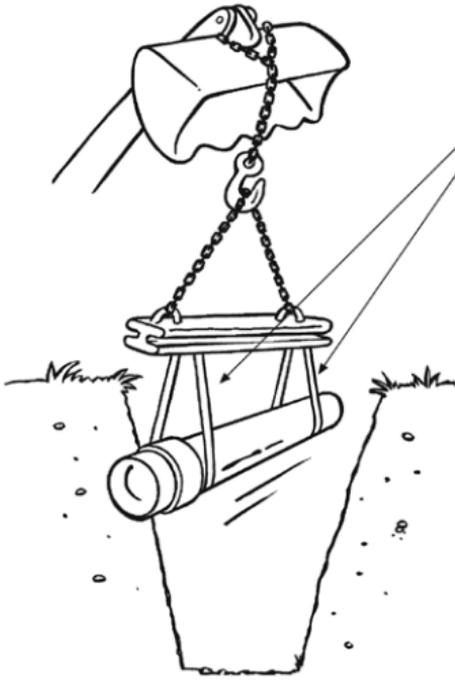


I always throw in a bed of compactable gravel, sand or fine scoria for the pipe bedding and surround.

Pipe size – plus 300mm
(This 300mm saves backfill material as well!)

My mate Willy helps me to get the pipe into the trench.





Nylon straps. No chains around the pipe.

For big PVC pipes and depths, I've rigged up the digger for the job. Don't forget to use trench shields where required, that'll keep OSH happy!

The ol' coffin rope trick helps for deep trenches.



Cutting Marking & Chamfering



Y'know sometimes a shorter bit of pipe is needed. I used to use ol' newspapers wrapped round the pipe evenly... now I use that new plastic strapping as a ruler around the pipe. I get a perfectly straight line to use as a guide when cutting my pipe.

Here... ol' strapping from old pipe packs works well



I always cut pipe using a fine-tooth hand saw, it's much easier with blocks of wood under each pipe. Y'can use a petrol power saw with an abrasive disk too.



A witness mark is needed on the spigot (plain) end of the pipe to:

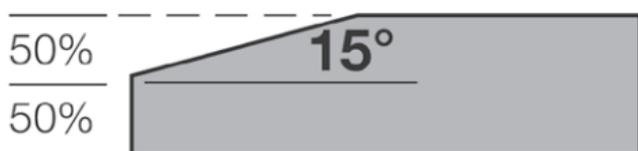
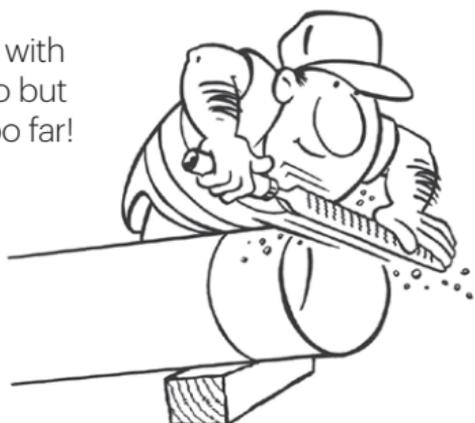
- Make sure the pipe goes right into the socket.
- Act as a guide to apply solvent cement or lubricant.



I measure the pipe socket inside and subtract 5mm to make it shorter. This is the **witness mark** measurement. The witness mark should be **just visible** once installed.

I take off the rough edges with a rasp. A grinder works too but make sure you don't go too far!

Then I file a smooth chamfer at 15 degrees to the outer edge. It needs to be 50% of the wall thickness.



The chamfer stops the cement or lube being pushed off the pipe when joining.

Solvent Cement Jointing

Ask the Iplex Tech Team for a copy of their solvent cement guidelines or follow these simple steps!



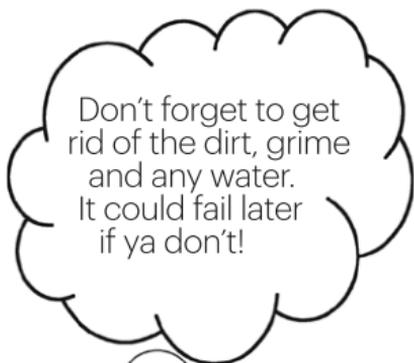
Rest the pipe socket on a piece of timber; get all the dirt and grime out of the socket.

Clean thoroughly, get rid of any water too!

Apply a thin layer of Novakey Cleaner/Primer to the socket and the pipe spigot. This will soften/prime the PVC.

Now for the solvent cement... Use gloves, I never get it on my hands. Use a big brush for big pipes.

Hurry, it dries fast!





I put one even thick coat inside the socket then a thicker coat on the spigot. I use the large brush I bought; my mate Willy helps me as well. Don't hang around – **move quickly...** If the cement looks dry before jointing – **give the dry parts another coat!** It must not dry before I get it together.

Then I line up the socket and spigot, I get Willy at the other end to keep the line right.

I grab my bar and a block of wood (to protect the pipe) then I give it a big heave! Willy checks the witness mark to make sure it is just visible.

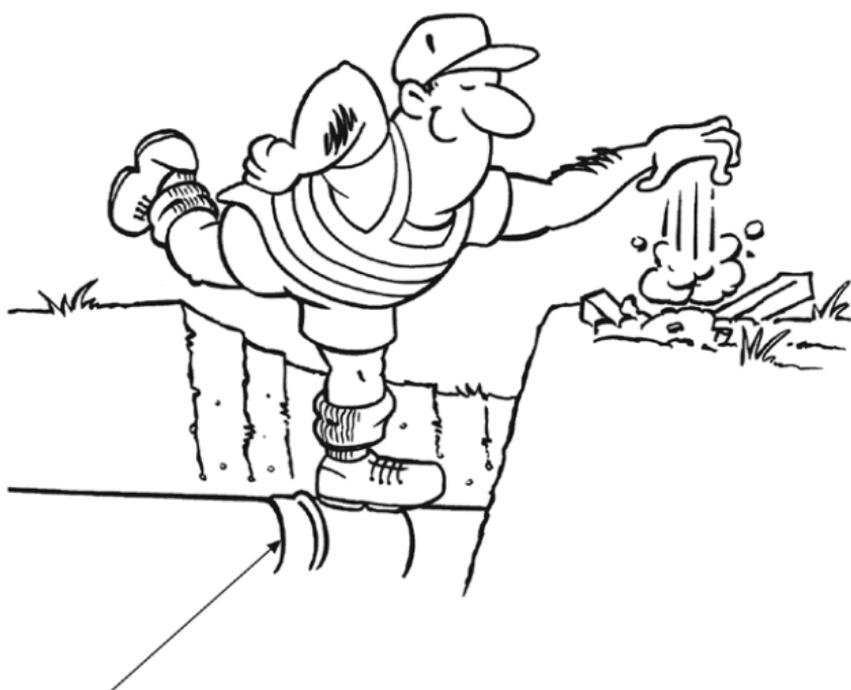
We **hold the joint firmly** for a few minutes.



I clean off the excess cement that has oozed out of the joint around the socket. Leave it for at least 30 minutes for the cement to set, before handling...and at least 24 hours before pressure testing.

BUT – in cold weather give it longer to set!

Finally – I clean out all the blocks of wood and any rubbish from the trench as they could damage my new pipe.



Around here...clean off excess cement, with paper or cloth.

Seal Ring Jointing



These days there are a lot of different seal rings. The old ones were often supplied loose with the pipe. There are new ones out there now which come factory fitted so I will talk about the old ones first.

I remove the ring and clean out the socket removing any grit or grime along the way, if you don't your seal may not work correctly!

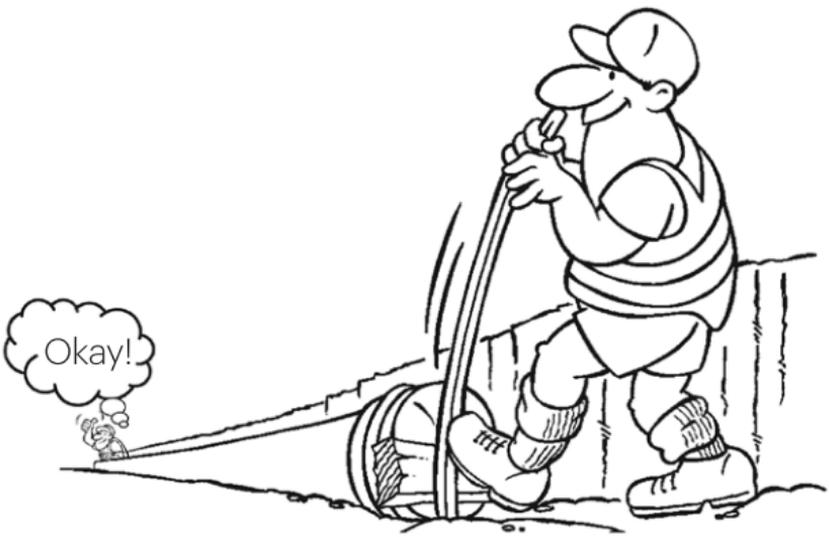
Now I insert the ring into the clean + dry socket groove, I make the ring into a "heart shape"; it goes in easier and sits tighter.



Medlube is good stuff! Some guys use their hands but I use a small Medlube container & brush. I drill a small hole through the lid and force a short 50mm paint brush through the hole. That gives me a spill free container that has a brush factory-fitted by me! I top it up when it empties; I never spill it in my truck anymore!

I use pieces of wood under the pipes again to prop them up and lube the inner part of the seal, then I lube the spigot (guys... **never** lube behind or under the seal).





I get Willy to line up the spigot into the socket. Willy never drops the lubed spigot onto the ground cos the bedding sticks to it which will make the seal leak if not cleaned properly...

And then I use another trusty bit of wood to protect the end of the pipe before I give it big push with my bar at the other end.

Willy keeps an eye on the **witness mark**...it must be **just visible** when pushed home. I then lever the pipe in, the pipe should not be forced hard up against the back of the pipe socket (no digger buckets guys) the joint needs room to expand and contract.

Before I move onto the next joint I remove all the wood and rubbish from the trench as this can cause damage to the pipe!



Now remember those new rings that I told you about earlier. The factory fits them when the pipe is made. They have a blue or yellow plastic retaining ring keeping them in place.

You should never remove them cos you don't need to!

When you get the pipe laid into the trench all you need to do is clean the seal in place. I use a hearth brush to flick out the crap from behind the seal. Then remove the grit 'n' grime from around the socket and spigot. Lube the seal face and spigot like normal...

You install these new pipes just like the old ones. For pipes up to 200mm you often won't need a bar and block as they push home real easy! I always ask the merchants to supply pipes with these factory fitted seals cos ya can't push out a seal on installation.

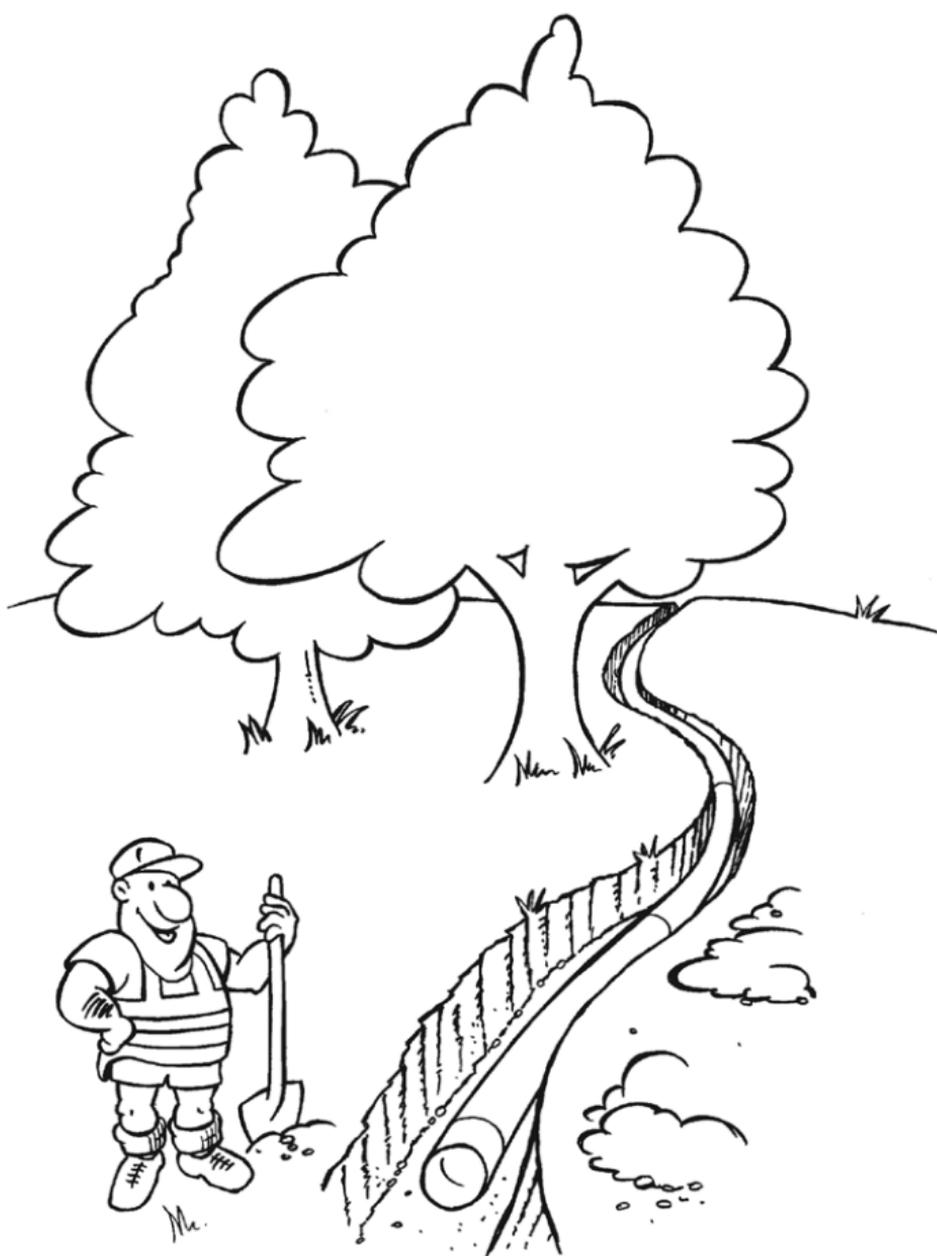
They are awesome!



Curved Trenches

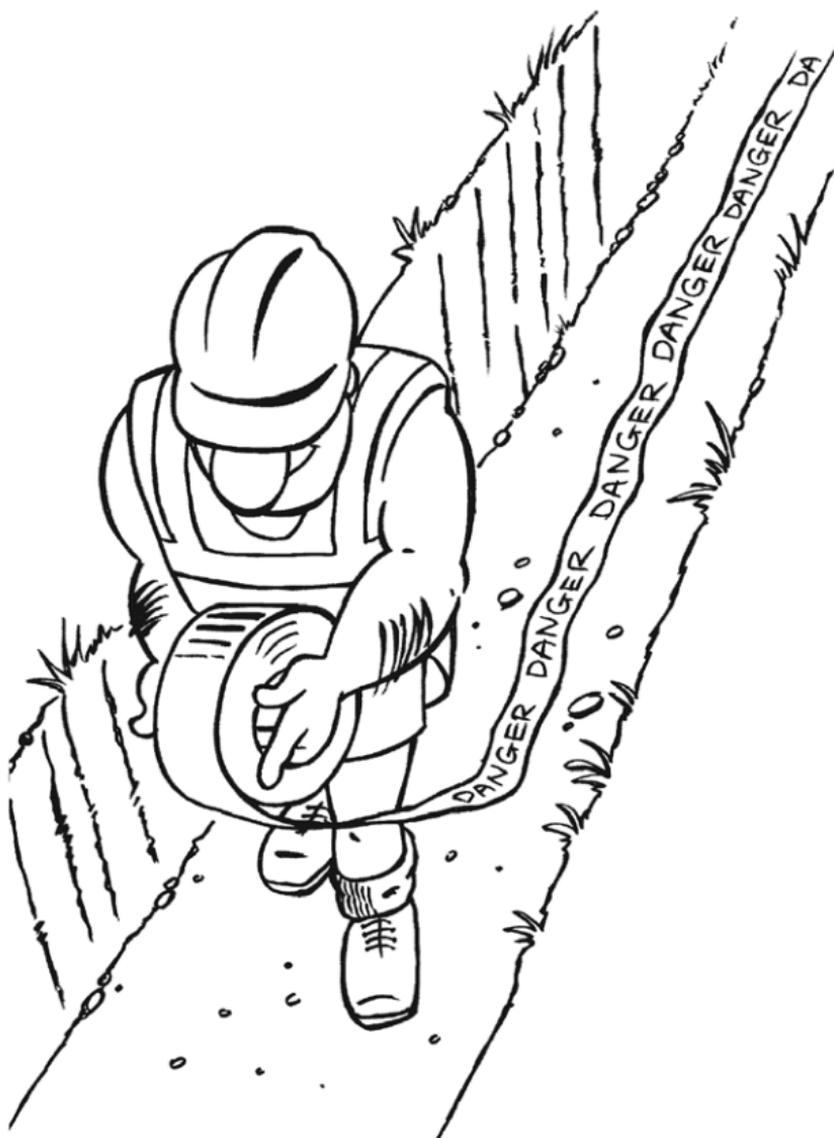
PVC pipe becomes more flexible once joined into a pipe-string. For curved trenches, join the pipe above ground in a straight line then lower it in - 'snaking' it in carefully as you go. The larger the pipe diameter the larger the curve, the rule of thumb for a radius of curvature is 300 times the outside diameter of the pipe!

By the way...never use mechanical aid to force the curve, just pick the pipe up and move sideways until it starts to resist you!



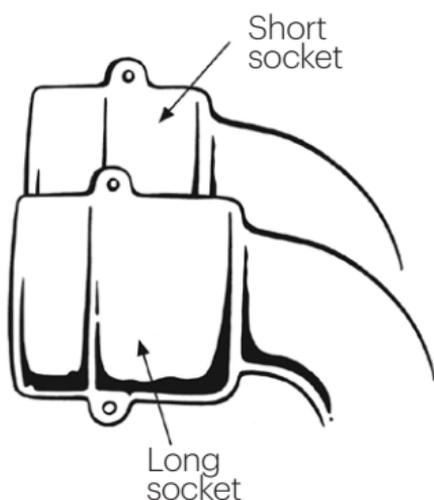
Detector Tape & Tracer Wires

Those radio detection devices for pipes require an electrical wire to be laid in the trench so they'll work... sometimes the engineer will want you to lay a wire with the pipe. Detector tape is also used most of the time; just lay it 100mm above the pipe!

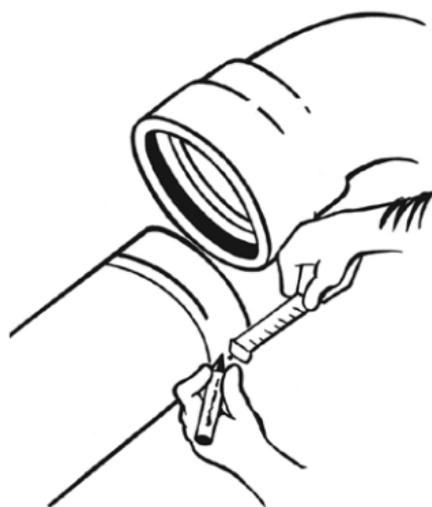


Ductile Iron Fittings

Now for cast metal socket fittings... they're all Ductile Iron (DI) these days – stronger and lighter than the old Cast Iron. Always use deep-socket DI fittings. **Never** use ones with short sockets! They are for Ductile Iron Pipe, PVC pipe needs more expansion room to move when in service.



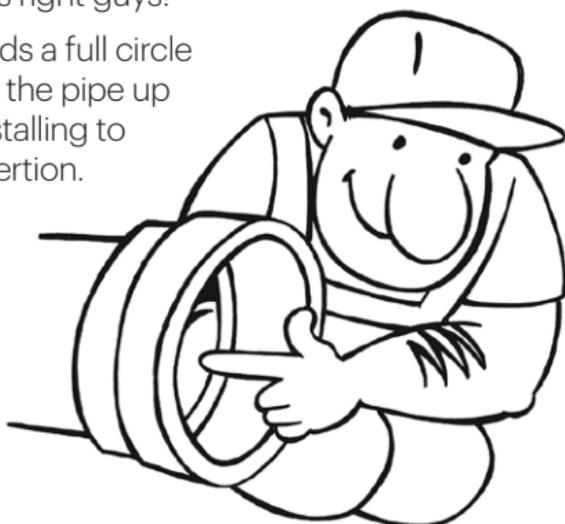
Gee...there are a lot of imported fittings out there so always witness mark the pipe to match your fitting before you install pipe into a socket. Measure from the socket of the fitting you are using each day. Every man and his dog makes these fittings, the socket depths vary from one brand to another. Remember don't use those short socket DI fittings.



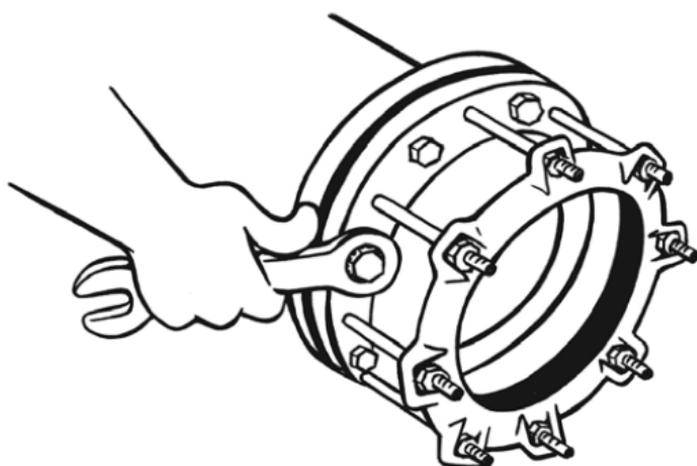
Don't use em!

You must get this right guys!

All PVC pipe needs a full circle pipe-stop to rest the pipe up against when installing to prevent over-insertion.



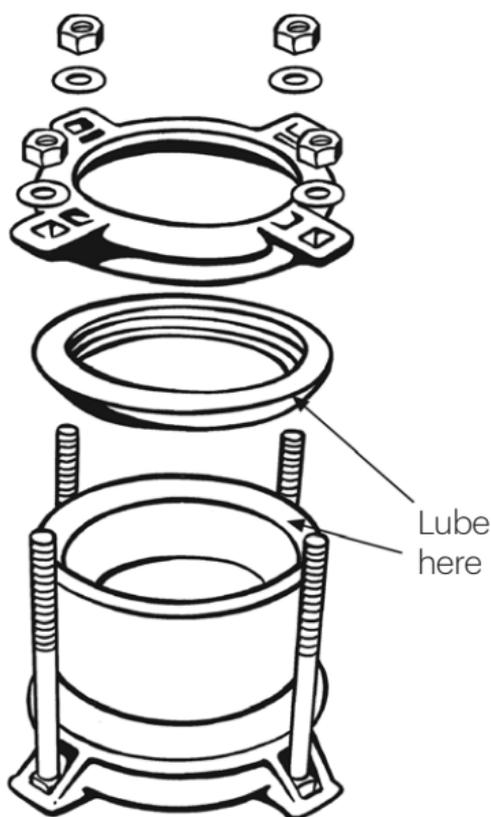
Mechanical Couplings

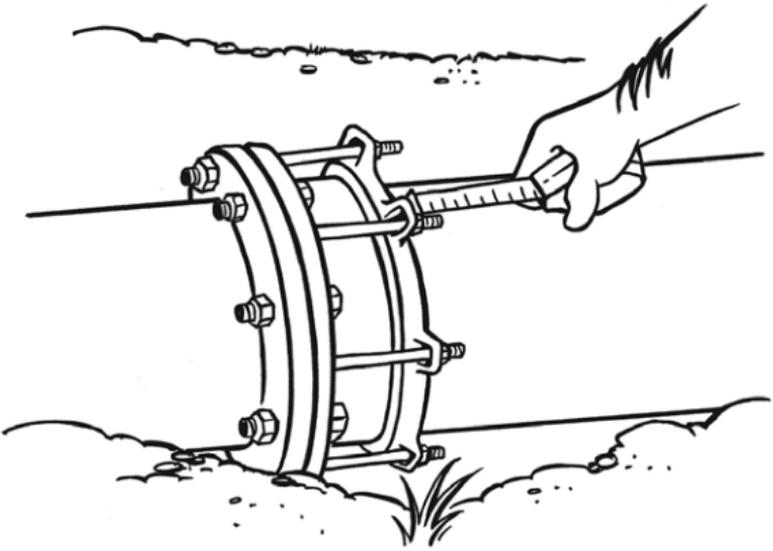


In the ol'days I used Gibault couplings with "O" rings to join my PVC pipe to Cast Iron fittings. A lot has changed... now there are fancy new universal **one size fits all** mechanical couplings – they're often all you can buy. I had to learn a new way of installing them, 'cos they have big meaty wedge shaped seals not like the old "O" ring style.

I found out these "wedge" seals need lubing – the people who make 'em print it on their instructions.

So, I recommend you pull 'em to bits, to clean and lube the seals thoroughly. Then re-assemble and fit. I found out that you needed to torque the damn bolts up... and in sequence too!





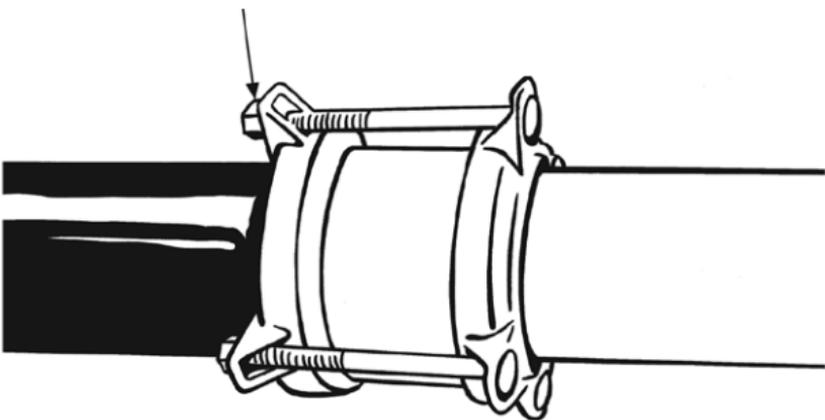
Some fitting brands have the sequence printed on them. What I found is a torque wrench is a pain in the butt to use amongst dirt 'n mud in the trench. So, I got used to the torque settings by doing some tests in the workshop one wet day. I use the same spanner every time now then measure the thread length hanging out the coupling's end rings to make sure they measure the same all way round the coupler.

Oh...The sequence... treat them like your ol' cylinder head bolts do 'em up going from opposite to opposite in stages. If ya don't you may get leaks later on!

That's not all guys... I learnt another wee trick when coupling PVC to a DI spigot end fitting.

The nut end of the bolt must always be on the DI casting cos the nut end takes up the load first. If you don't you may damage the pipe.

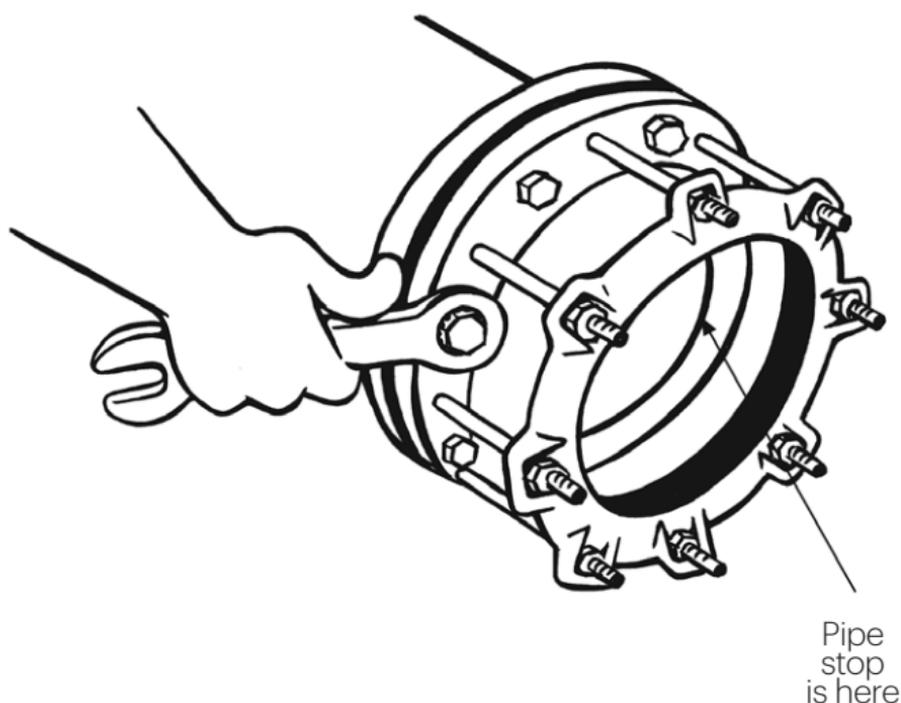
Nut end on DI spigot!



By placing the nut on the casting it tends to spread the compression evenly!

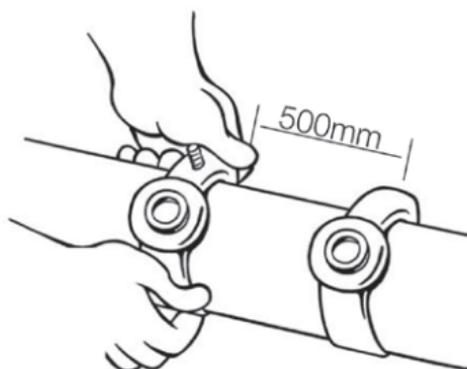
One last thing... when you need a flanged coupling use the ones with a full circle pipe-stop in the back of the fitting.

The pipe-stop prevents the PVC pipe from being shoved right through the fitting. Yeah, Willie shoved one right through a hydrant tee once. It took us days to find out why the hydrant wasn't working! Here I will draw a wee sketch to show you...



Service Connections

Always use full-circle tapping bands, they support the pipe better!
No less than half a metre between Tapping Bands on any PVC pipe...



Never ever use a flat/spade bit or twist drill bit on PVC pipe! That got ya didn't it... Yeh it got me too! I found out the hard way. I now use a **sharp** fine tooth hole saw - it never lets me down! (Make sure it stays sharp!)



Thrust-Blocks & Backfilling



Thrust-blocks are needed at all changes of direction including at all tees! The size of each Anchor block varies – the engineer usually designs these so talk to him before you build it. It must be poured against freshly dug solid trench walls. If it goes around more than half the pipe I wrap the pipe, with Denso tape or thick black plastic wrap to separate the concrete from the PVC pipe. I have used timber to make my boxing before, but prefer to use layered sand bags to create my shape as they make my life simple. Thrust-blocks must be in and cured **before** testing (Cement takes 28 days to cure). Then I completely backfill the trench.

Compacted granular bedding/aggregate surrounds the pipe and up to a minimum 100mm above the pipe. Then I use selected ordinary backfill. I compact with my machine below, beside and above the pipe in layers of 300mm until I get to the top surface.

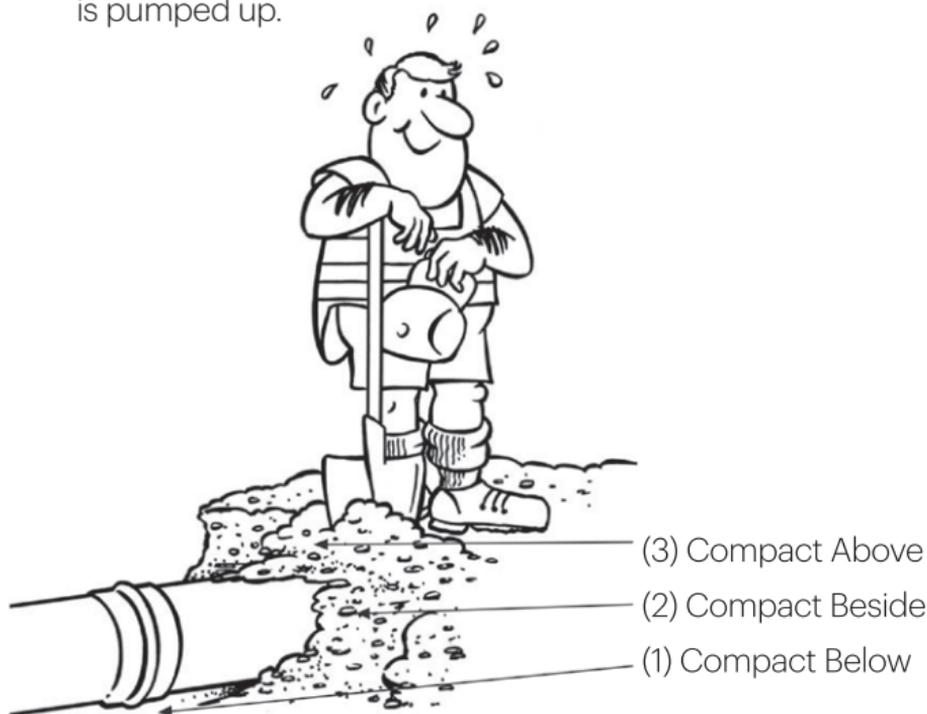


If I do the compaction correctly I never need to be called back to the job to correct slumped trenches. I never get paid for doing a job twice... any call backs are on me!

I do it once and I do it right....First time...then shout myself a cold beer for doing a good job!

Compaction & Testing

Before testing I back fill properly... no short cuts here! I compact below, beside and above the pipe, for deep pipes you need to compact in layers of 300mm. This stops the pipe from being forced apart, when the main is pumped up.



I backfill with solid material like sand, mixed sized crushed pea metal or scoria which has no large (over 20mm) stones in it. I must fill all the gaps and spaces in between the pipe & trench.

Once the metal is placed I haunch the bottom of the side support zone by shuffling my shovel along the pipe. This shuffles metal under and beneath + into the 5 o'clock to 7 o'clock zones.

For a water main the test pressure varies so **call Iplex 0800 800 262** and ask for them to send you their pressure test guide! Once pumped up I usually hold pressure for an hour. All my concrete thrust blocks are fully cured (up to 28 days) before testing. If I have solvent cement joints in my line I need to allow for them to cure for at least 24 hours!

Well that's it! It's easy when you know how! Always do it right the first time – keep on diggin!

Pipeline Percy

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