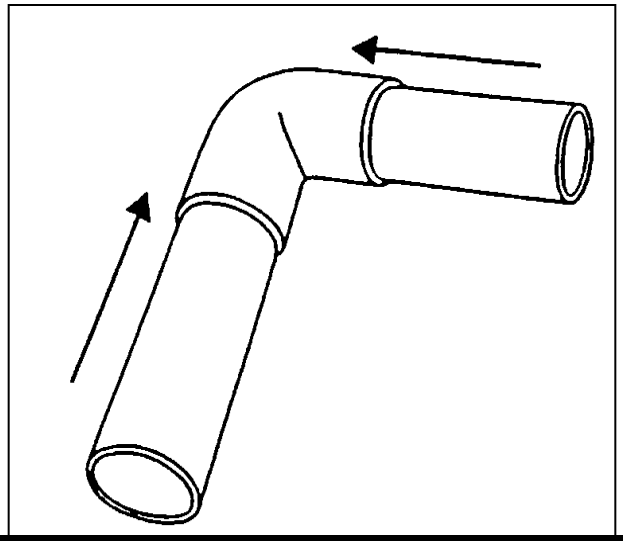
Griffon
Plastic Piping System
THE PERFECT JOINT

Date: 2018



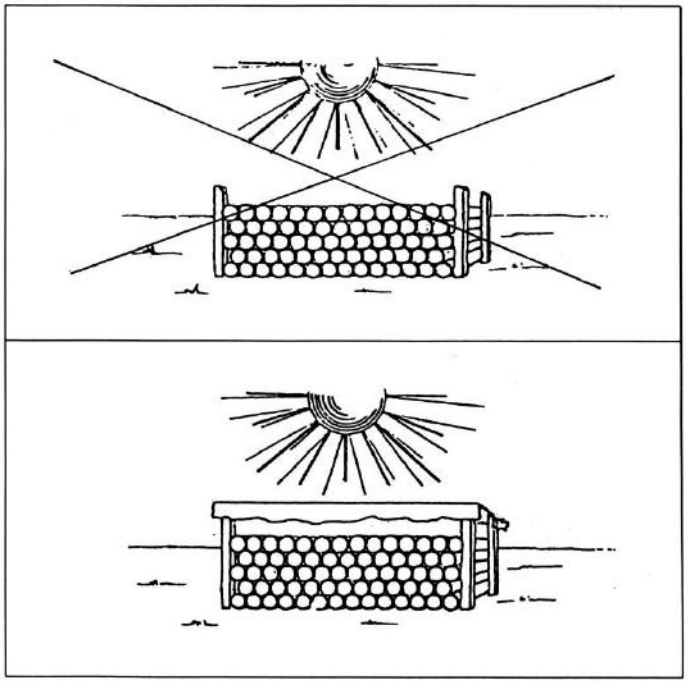
THE PERFECT JOINT

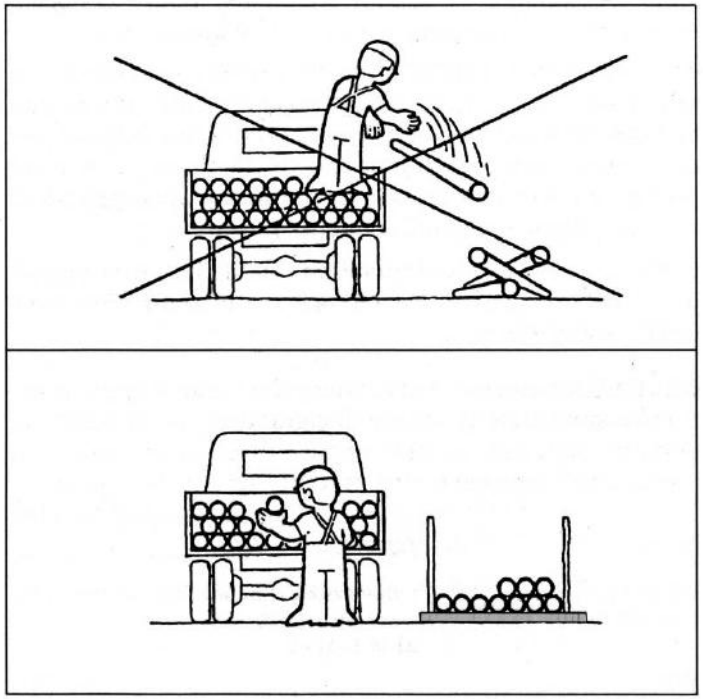
Solvent welding, the most easy and reliable way for joining pipe and fitting

But some knowledge / training is necessary

BEFORE STARTING

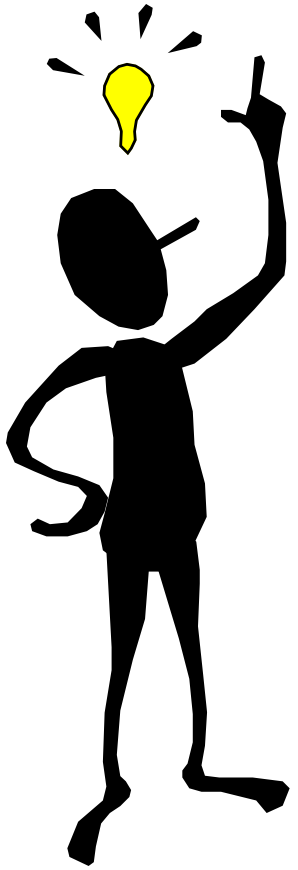
- Prevent pipes from breaking or turning oval
  - Transport pipes correctly
  - Store pipes correctly





PREPARATIONS

- Be ware of local circumstances
  - Weather temperature / sun light / rain / wind
  - Work place clean / ventilation
- Make sure you have everything you need
  - Pipes / fittings
  - Solvent cement / cleaner
  - Tools
- Check equipment before getting started
  - Do I have the right solvent cement? The right amount? Is the quality still OK?
  - Do pipes fit well into the fittings (are they not oval)



CIRCUMSTANCES

- Work preference at temperatures between +5°C and +25°C, if possible
- make sure to work in a clean and dry work place
- Work only in a well ventilated area
- Prevent risk of condensation

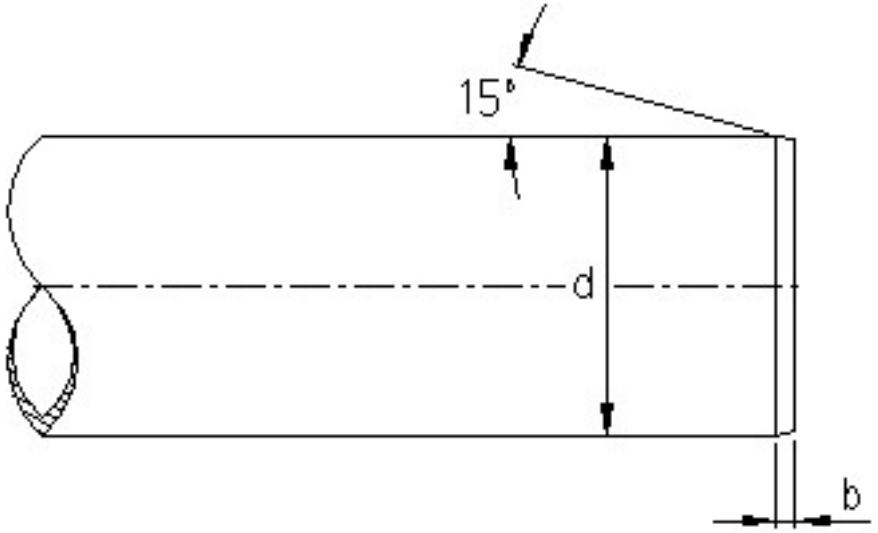
TOOLS

- (C)PVC saw / mitre-box or special pipe cutter
- Chamfer tool
- Permanent marker
- Brush
- Crêpe paper

PREPARATIONS

- Shorten pipe and remove burrs
  - Use a saw or special pipe cutter
- Chamfer pipe edges
- Check whether pipe and fitting fit well

CHAMFER PIPE EDGES



Pipe diameter (d)	Measures (b)
up to 16 mm	1 - 2 mm
20 - 50 mm	2 - 3 mm
63 - 225 mm	3 - 6 mm
250 - 400 mm	6 - 8 mm

dimensions chamfer pipe-edges

Use a special chamfer tool

WHY CHAMPFER THE PIPE ?

- Makes mounting pipe in fitting more easy
- Give better distribution of the solvent cement inside the joint when pipe and fitting are stuck together. Gives therefore better joints.
- Prevents scraping away of adhesive
- prevent a excess of solvent cement inside the pipe system

PREPARATIONS

- Measure put-in depth and mark pipe
  - Indication of were to apply adhesive
  - Indication how far to push the pipe in the fitting
- Mark the right assembly positions
  - Prevents problems later on
- Clean parts to be bonded with Cleaner
  - Also a chemical preparation
  - Dissolves top layer (C)-PVC for better bonding
  - Use only clean crêpe paper
- Let parts dry well

DO WE NEED GRIFFON CLEANER ?

YES!

Use the special Griffon Cleaner to soften en cleaning the surfaces to be stuck together. Use always clean absorbent paper. Softening the PVC or ABS material optimises the cold welding process to give better bonding. Griffon solvent cement and Griffon Cleaner work together like a team. Testing / approvals are based on a combination of Griffon solvent cement and Cleaner. So do not use other kind of cleaners or solvents.

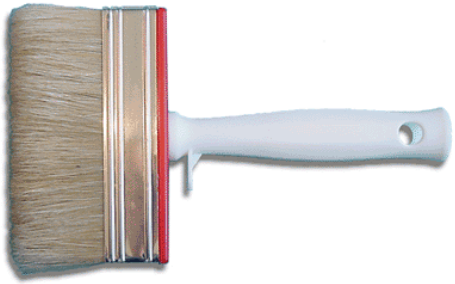
The use of Cleaner is even more important for:

- Dirty, greasy Pipes and Fittings
- Diameters ≥ 110 mm
- For Pipe Systems with chemicals

PIPE DIAMETER / SIZE BRUSH

Work fast , use a brush which fits to the pipe diameter

Pipe diameter	Packaging
16 - 63 mm	250 ml
40 - 90 mm	500 ml
50 -160 mm	1000 ml
> 160 mm,	Separate Brush ≥ 65 mm

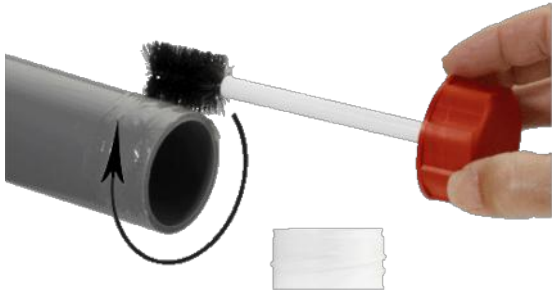


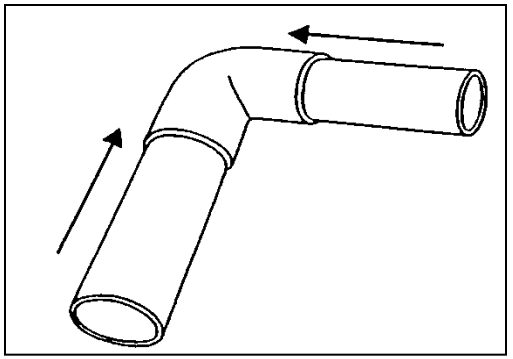
WRONG !!,

BRUSH TOO SMALL

SOLVENT CEMENT PROCESS

- Work fast (adhesive dries quickly)
  - Work with 2 men at Ø>110 mm
- Apply an even coat of solvent cement to pipe end and inside of fitting
  - Fitting thin coat, pipe more thicker coat
  - Prevent large surplus of cement
- Assemble immediately, **surfaces have to be wet,** and adjust the connection if necessary
  - In one smooth movement (turning)
  - Adjust 45° at the most





SOLVENT CEMENT PROCESS

- Remove any surplus cement
  - With clean crêpe paper
  - Residues may weaken pipe
- Respect drying times
  - Depending on temperature, pressure and pipe diameter
  - Do not load or stress joint for the first 10 minutes
- Check system on leakage
  - Visually (closed adhesive ring)
  - Pneumatically

DRYING TIME			
Diameter	Temp	10 bar	16 bar
16 - 63 mm	> 10° C	2 H	4 H
	5 - 10° C	4 H	8 H
75 - 110 mm	> 10° C	4 H	8 H
	5 - 10° C	8 H	16 H
125 - 315 mm	> 10° C	8 H	16 H
	5 - 10° C	16 H	32 H

Time before loading pressure systems

Drying Time UNI-100

SWIMMING POOL CONSTRUCTION

THE PERJECT JOINT

- **UNI-100 PVC**
- GOST, Sanitair, Kitemark, WRAS, KIWA
- EN 14680, EN 14814
- Suitable for pipe systems such as:
- EN1329, 1452, 1453, 1455 and ISO 15493 (PVC).

Griffon PVC solvent cement joints **are tested** according to adhesive and pipe system standards like EN, ISO, DIN, KIWA and Britisch Standard **by Griffon and Pipe/Fitting manufacturers**. Therefore joints will have the same properties like PVC fittings and Pipes. For example the Griffon UNI-100 PVC adhesive is tested at pressures of **52 bar for 1000 hours at 20 °C.** It can be used therefore in PVC pressure systems up to working pressures of 25 bar at 20 °C . for PN16 systems (working pressure 16 bar), the expected life time at 20 °C will be more then 50 years.

INNOVATIVE

QUICK
- QUARTER-TURN -
RELEASE CAP

BIG CAP
WITH GOOD GRIP:
EASY TO HANDLE

CAP WITH
INTEGRATED
BRUSH

ALWAYS EASY
TO OPEN
AND CLOSE

NO
CORROSION

NO
DAMAGES
(e.g. DENTS)

DURABLE

INNOVATIVE

EASY, FAST & RELIAB

FAST APPLICATION OF CEMENT

EVEN DISTRIBUTION OF CEMENT

EASY APPLICATION OF CEMENT

APPLICATOR ENSURES RELIABLE PIPE CONNECTIONS

BRUSH INTEGRATED IN CAP

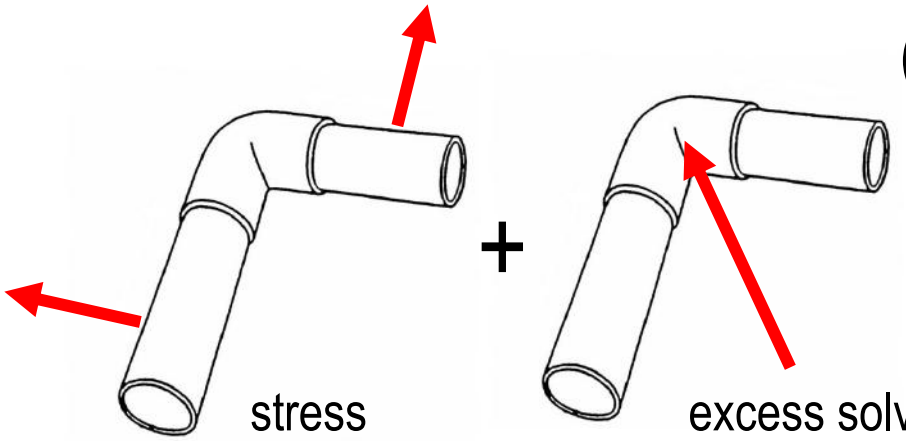
DIFFERENT SIZES FOR DIFFERENT DIAMETERS

LARGE CAP FOR COMFORTABLE GRIP

ENVIRONMENTAL STRESS CRACKING (ESC)

This is unexpected brittle failure of thermoplatics polymers like PVC and C-PVC
The action of either a tensile stress or a corrosive chemical alone would not be enough to cause failure in the plastic, but in **ESC** the initiation and growth of a crack is caused by the **combined action** of the **stress** and a **corrosive chemical**.

The solvents used for solvent cements are aggresive chemicals for PVC and C-PVC. That is good because the solvents are essential for good solving / cold welding between the pipe and fitting. **But it is not good when we have to much of excess of the solvent cement inside of the pipe system on places where tensile stress is.**



(Small) Risk !!

AVOID STRESS CRACKING

- **Avoid a excess of solvent cement** inside the pipe systems,
  - Chamfer pipe
  - Apply not to much solvent cement in the fitting (thin coat)
  - Do not use large brushes for small fittings

- **Avoid tensile stress** in the pipe system . Esspecially Elbows and T-Junctions can be sensitive if not free of stress installed. Be aware of stress because of temperature differences in pipe system. Be aware heat formed fittings already have stress in the material

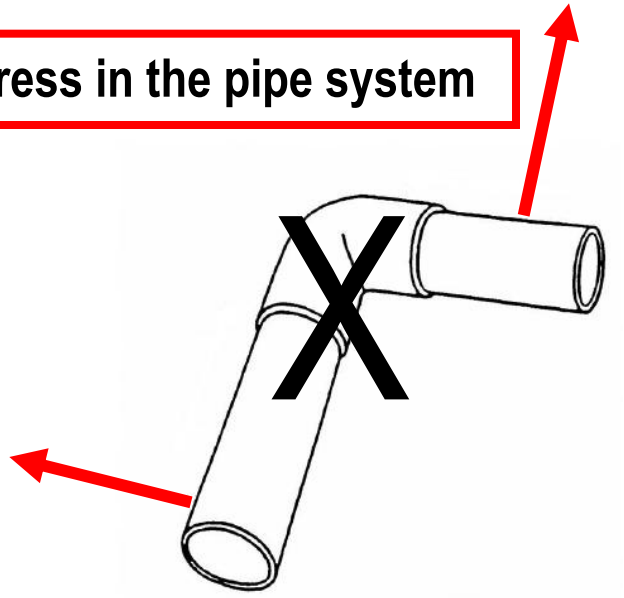
- Be aware (C)-PVC is getting more sensitive (more brittle) at lower temperatures (< 5 ^{o}C) for environmental stress cracking.

- When pipe systems are not yet in operation do not close them but allow to ventilate or fill them with water.

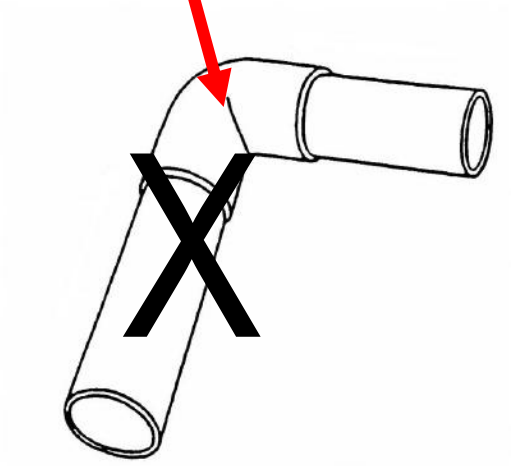
- Risk decreases with increasing pipe diameter

AVOID STRESS CRACKING

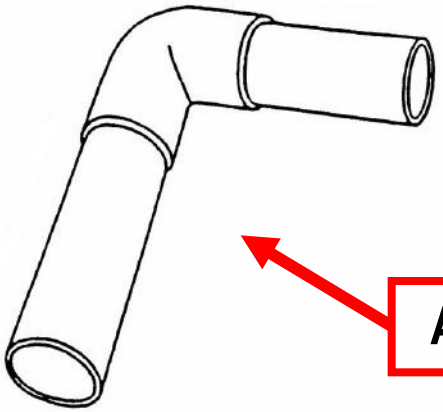
Avoid stress in the pipe system



Avoid a excess of solvent cement **inside** the pipe systems,



< 5°C



Avoid low temperatures during installing

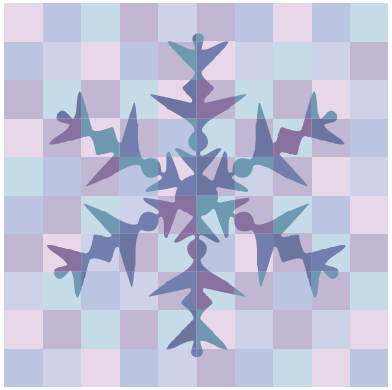
EXTREME CONDITIONS

High temperatures / tropical conditions (>+30°C)

- Actions have to be executed (even) faster
- Work with more men at the same time

Low temperatures (<+0°C)

- Reckon with extended drying times (solvent evaporates slower)
- Higher risk for ‘stress-cracking’ because (C)PVC gets more friable
- Warm up parts to be bonded (temperature preferably around +20°C)



CONDENSATION

- **Consequence: adhesive failure!!**

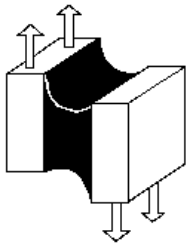
- Evaporation of solvents (cleaner / cement) cools surfaces to be bonded
  - Causing a higher risk for condensation
  - Even higher risk at high relative humidity

- Prevent risk for condensation!!:
  - Work fast (the longer the parts are exposed, the higher the risk)
  - If needed dry surfaces well after cleaning (with cleaner)

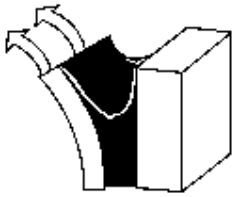
- For the best results cement should be applied on the dry surfaces. However when these conditions can't be avoided, **WDF 05** is the recommended product to use under humid conditions. WDF 05 can't be used if surfaces are completely wet (under water).

FLEXIBLE PVC TUBES / HOSES

• A flexible PVC tube is **more difficult** to join in a rigid PVC fitting by solvent cement compared with a rigid PVC pipe.



Shear-force



Peel-force

- **Joints have lower strength**
- **Quality depends also on Quality PVC Hose.**

- **Avoid peel-forces**. Therefore it is important the the gap (diametrical clearance) between the flexible tube and fitting is very narrow. Advice : gap (diameter fitting – diameter tube) < 0,3 mm.

- We advice to use drying times of at least 24 hours for flexible PVC tubes / PVC fittings

FLEXIBLE PVC TUBES / HOSES

For a common thick-walled flexible PVC tubes WDF-05 can be used. UNI-100 is a good alternative

Good joint with Griffon WDF-05

Failing joint with traditional solvent cement

ø	16 – 50 mm			63 – 110 mm			125 – 160 mm		
℃	5 BAR	10 BAR	16 BAR	5 BAR	10 BAR	16 BAR	5 BAR	10 BAR	16 B AR
5℃ - 15℃	30 min	1 hour	4 hours	1 hour	2 hours	8 hours	4 hours	16 hours	32 hours
>15℃	15 min	30 min	2 hours	30 min	1 hour	4 hours	2 hours	8 hours	16 hours
Flexible tubes 24 hours / ABS (max 5 bar) double setting times									

SAFETY

- Solvent cements and cleaners contain solvents
- Unfortunately these are necessary for a good result
  - Read the safety instructions on the label of the product and consult the safety data sheet (MSDS)
  - Respect these safety instructions
- Minimize the risk of getting exposed to solvents
  - Ventilate well, at the lowest place possible (solvents are heavier than air)
  - Immediate close packaging after use en deposit cleaning-rags etc. in a closed container
- Use appropriate personal protection if necessary
  - Prevent skin contact: use a barrier crème, wear safety gloves
  - Prevent respiration: in closed areas use appropriate respiratory equipment
- Work under normal hygienic conditions
  - Do not smoke, eat or drink during work
  - Before breaks (eat, drink) take off work clothes and wash hands with water and soap

INSTRUCTIONS FOR USE
pvc solvent cement

Step 1: Mark the pipe

Step 2: Measure put in depth

Step 3: Chamfer the pipe

And cut the pipe at right angles to its axis

And mark pipe

Cleaner / Solvent Cement

INSTRUCTIONS FOR USE
pvc solvent cements

And remove burrs

Step 5: Clean the fitting

Step 6: Apply in a thin and even coat into the fitting, stroking the cement circular(4-6x)on the surface

Step 4: Mark the right assembly position

Clean the pipe end

Cleaner / Solvent Cement

INSTRUCTIONS FOR USE
pvc solvent cement

Apply evenly a thicker coat on the pipe end, stroking the cement circular (4-6x) on the surface

Step 8: Push the pipe completely in the fitting, up to the marking. Remove excess of solvent cement

Cleaner / Solvent Cement

Step 7: Immediately, surfaces have to be wet, push the joint together up to the marking

Pipe diameter	16 - 63 mm		75 - 110 mm		125 – 315 mm	
Temp.	Up to 10 bar	Up to 16 bar	Up to 10 bar	Up to 16 bar	Up to 10 bar	Up to 16 bar
> 10°C	2 h.	4 h.	4 h.	8 h.	8 h.	16 h.
5°C- 10°C	4 h.	8 h.	8 h.	16 h.	16 h.	32 h

QUESTIONS