CORE Press Fittings

Technical and System Guide

A safe, fast and effective solution for creating joints in metal piping systems. Straightforward to use and heat-free, press fittings are a modern alternative to traditional methods.

What are press fittings?

Press fittings are a type of fitting that can be used to join two pipes together without the need for soldering or compression. While both these traditional installation methods still have their place, press fittings offer you several benefits that make them a useful addition to your plumbing portfolio.

How do press fittings work?

Press fit plumbing fittings are easy to use, and once installed, create an effective watertight join in your pipework system.

Unlike soldering, there's no heat or solder needed to form the joint. Instead, a specially designed power tool is clamped around the press fitting, and once the pipework is inserted in place, this tool can be used to press the fitting around the pipe, creating a secure and durable assembly.

Features & Benefits	
Joining Method	Cold mechanical press with a power tool and jaw, compressing an O-ring seal.
Speed of Installation	Very Fast. A joint is completed in seconds.
Safety (Hot Works)	Heat-free. No open flame, no fire risk, no hot works permit required.
System Cleanliness	Internal bore, kept free of contamination/foreign bodies. No flux residue or carbon deposits. Reduced flushing time.
Skill Dependency	Low. The tool determines the quality of the joint, ensuring high consistency.

Why choose Core press fittings?

All CORE press fittings are M-Profile, manufactured to EN 1254 standards and come with a 30-year warranty, just like our heat-free system tubes. When used together, you create a market leading 30-year warranty installation.

The indicators on the outside of CORE press fittings makes it easy to see when the fitting has been joined correctly. Our water press fittings also come with a leak-before-press O-ring to ensure the installer knows if a joint has been pressed or not.

CORE plumbing press fittings also come with Reg4 and WRAS approval.

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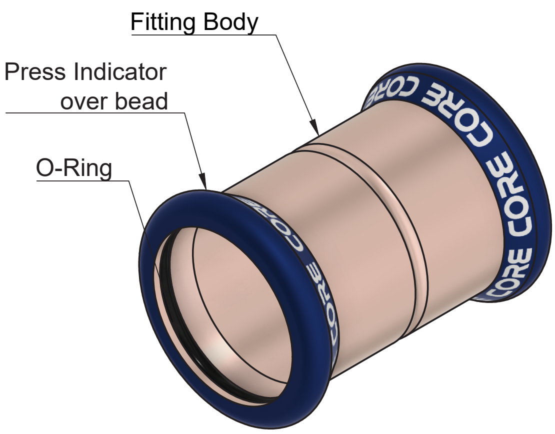
1.1 Product Range Overview

Product range		Material and application
CORE Press Plumbing Blue Press Indicator 15mm - 108mm		• Body - CW024A Copper • Threaded bodies - CW602N DZR Brass • O-Ring - Black EPDM • Temperature range: -20°C to +110°C • MOP (Liquid): 16bar • MOP (Vacuum): >0.2bar • Leak Before Press O-Ring - 15mm - 54mm • Leak Before Press Fitting Geometry - 66.7mm+ For use in potable water, heating, cooling, and oil-free compressed air in copper piping systems
CORE Press Gas Yellow Press Indicator 15mm - 54mm		• Body - CW024A Copper • Threaded bodies - CW602N DZR Brass • O-Ring - Yellow HNBR • Temperature range: -20°C to +70°C • MOP (Fuel Gas): 5 Bar Outdoors, 1 Bar Indoors • MOP (Vacuum): >0.2bar • For safety reasons - no Leak Before Press functionality For use in Family 2 and Family 3 Fuel Gas Systems in copper piping systems

For details regarding approved uses and media see **Section 1.3**

1.2 Press Fitting Components



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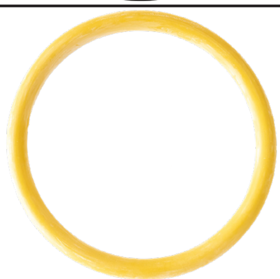
1.3 O-Rings

O-Ring		Material properties/mediums
Black EPDM 15mm - 108mm		• Temperature range: -20°C to +110°C • MOP (Liquid): 16bar • MOP (Vacuum): >0.2bar • Primary mediums: hot and cold water, oil-free compressed air • Secondary mediums[1]: ozone-rich liquids, dilute acids and alkalis, alcohols, chlorinated water
Yellow HNBR 15mm - 54mm		• Temperature range: -20°C to +70°C • MOP (Fuel Gas): 5 Bar Outdoors, 1 Bar Indoors • MOP (Vacuum): >0.2bar • Primary mediums: natural gas, LPG, biogases

1. For uses with secondary mediums particular care must be taken to ensure chemical compatibility with the specific fluid in the system

1.4 Leak Before Press

CORE Press water fittings supporting the EPDM O-Ring feature - a LBP system (for water only), where a deliberate leakage is facilitated on unpressed connections for easy identification of unpressed joints during a pressure test.

- On fittings sizes 15mm to 54mm, this is done via two nodules on the O-Ring, creating a leak path.

1.5 Thread Specification

- Male - ISO 7/EN10226-1
- Female - BS EN ISO 228

1.6 Electrical Continuity and Equipotential Bonding

CORE Press Fitting Range maintains electrical continuity if assembled in line with **Section 2.8.**

It shall be the electrical system installers duty to ensure all metallic pipework systems comply with the equipotential bonding requirements with the up to date edition of IEE electrical wiring regulations, which at the time of publishing is **BS 7671:2018+A3:2024.**

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2.1 Principle of Operation

The basic working principle of a press fitting is **mechanical cold deformation**. A powered or hand-operated pressing tool applies radial force to compress the fitting socket onto the inserted tube, permanently deforming both components together. This single pressing operation creates a joint with two functional planes:

- **Strength plane** - The fitting socket and tube wall are deformed into a defined profile (hexagonal for smaller diameters, oval for larger sizes). This plastic deformation mechanically locks the components together, providing resistance to longitudinal pull-out and axial rotation forces.
- **Seeling plane** - The fitting bead containing the elastomeric O-ring is compressed against the tube surface. The elastic resilience of the seel material maintains permanent water-tight or gas-tight contact between the fitting bore and tube outer diameter.

The connection requires no heat, flux, thread sealant, or adhesive - making it a clean, fast jointing method suitable for potable water, heating, gas, and compressed air applications.

2.2 System Design and Installation Considerations

While the benefits and upsides of press joints in comparison to other jointing methods are numerous, making it an attractive alternative, there are important considerations that must be addressed during the design and installation phases to ensure reliable system performance.

- **Tool access and space requirements** - Press tools require minimum clearances from walls, corners, and adjacent fittings to allow jaws or collars to engage correctly. These clearances vary by pipe diameter and tool used; for example, a 28mm fitting may require 60–75mm clearance from a wall surface. Cramped locations such as service ducts, ceiling voids, or boxing may restrict or prevent access. System layouts should be designed with pressing operations in mind, ensuring all joints remain accessible.
- **Lower resistance to axial loads** - While press fittings exhibit very high resistance to axial loads (pull-out) due to the mechanically deformed profile, resistance to torsional loads, i.e. rotational force around the longitudinal axis of the pipe, is lower due to reliance on friction between the compressed surfaces rather than a positive mechanical key. Systems should be designed to minimise torsional stress at press connections through proper fixing and support. Information about the support spacing requirements for the piping systems can be obtained from their datasheet.
- **Tube Compatibility -** Due to press fitting 'press tool' reliance on being able to achieve correct level of deformation in order to create a watertight joint tube compatibility must be strictly adhered to. See **Section 2.3** for tube compatibility table.
- **Fitting spacing** - See **Section 2.4** for diagrams and further information on spacing requirements between individual fittings in the assembly
- **Tool Compatibility** - See **Section 2.5** for details of tool compatibility
- **Storage and Handling** - See **Section 2.6**
- **Tube preparation** - Press fittings are less tolerant of poor tube preparation than some traditional methods. Tube ends must be cut square, fully de-burred, cleaned of oxidation and debris, and free from deep scratches within the insertion length. Damaged or oval tube ends can compromise seel integrity. Full information about the preparation procedure are covered in **Section 2.8**
- **Thermal expansion** - See **Section 2.7** for charts and formulas for accommodation of thermal expansion

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2.3 Tube Compatibility

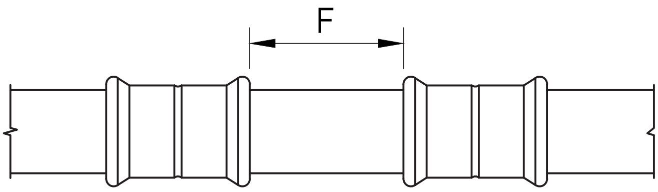
Copper Tube Compatibility

Copper Tube to BS EN 1057
Tempers:
R250 - Half-hard, bendable
R290 - Hard, unbendable

Outside diameter	Wall 0.7mm	0.9mm	1.0mm	1.2mm	1.5mm	2.0mm	2.5mm
15mm	R250 R290		R250 R290				
22mm		R250 R290		R250 R290			
28mm		R250 R290		R250 R290			
35mm			R290	R250 R290	R290		
42mm			R290	R250 R290	R290		
54mm			R290	R290	R290		
66.7mm				R290		R290	
76.1mm					R290	R290	
108mm					R290		R290

2.4 Fitting Spacing

It is required to maintain a minimum distance between each fitting in the installation to account for the deformation of the tube profile when fitting is pressed onto the tube.



Tube Size	Minimum Clearance F (mm)
15mm	13
22mm	13
28mm	13
35mm	13
42mm	16
54mm	20
66.7mm	30
76.1mm	40
108mm	50

2.5 Tool Compatibility

The chart below lists approved for use with CORE Press Fittings

It is imperative that matching tools, adaptors, pressing jaws and slings from a single manufacturer are used during installation.

Manufacturer	Model	Diameters (mm)	Pressing Jaws	Adaptors	Sling
Novopress	ACO103	15 - 28	PB1 M15 - M28	—	—
	ACO203	15 - 35 42 - 54	PB2 M15 - M35 —	— ZB203	— PSL M42 - M54
	ACO203XL	15 - 35 42 - 54 66.7 - 76.1 108	PB2 M15 - M35 — — —	— ZB203 ZB221 ZB221 + ZB222[1]	— PSL M42 - M54 PSL M67 - M76[2] PSL 108 Copper only PSL M108
Rothenberger	Compact TT	15 - 28	Compact M15 - M28	—	—
	Compact 3	15 - 35	Compact M15 - M35	—	—
	Romax 4000	15 - 35 42 - 54	Standard M15 - M35 —	— ZBS1	— M42 - M54
Rems	Mini-Press	15 - 28	M15 - M28	—	—
	Akku-Press	15 - 28	M15 - M28	—	—

- ZB221 and ZB222 act as the first and second stages respectively during the two-stage pressing process for M108 collar.

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2.6 Storage and Handling

Due to the nature of the method of creating a joint in a Press Fitting, it is susceptible to disruption in two main ways: unintended physical deformation and foreign body contamination.

- **Unintended physical deformation** - Should the fittings original geometry be disrupted, creation of crumpling zones and other deviation from the intended deformation as created by the pressing jaws.
  Mitigation: Fittings shall be handled with care, avoiding damage to ensure the geometry can be preserved.
- **Foreign body contamination** - In order to facilitate the movement of the O-Ring inside the bead of the Press Fitting, and to ensure correct contact with the mating surfaces during pressing operation, the O-Rings must be capable of sliding semi-freely against them to avoid stretching or kinking. Also, proper contact with the mating surfaces is the principle behind creating a watertight joint. As such, any foreign body contamination, such as swarf or grit, can cause both excess friction preventing O-Ring movement, as well as potentially be packed in between the O-Ring and the mating surfaces, resulting to a leak.
  Mitigation: Fittings shall be kept in their original bags whenever not in active use, and whenever used in environments where contamination is abundant, care must be taken to ensure neither the O-Ring, the socket, the bead, nor the surface of the pipe are clean of any loose, foreign material.

2.7 Thermal Expansion

2.7.1 Definition

Thermal expansion is the tendency of materials to change dimension in response to temperature variation. When copper pipework is heated, the increased kinetic energy of its atoms causes the material to expand along its length; conversely, cooling causes contraction. This behaviour is predictable and governed by the material's coefficient of linear expansion.

The formula for linear thermal expansion is:

$$\Delta L = L_0 \times \alpha \times \Delta T$$

Where:
ΔL = change in length (mm)
L_0 = original length (mm)
α = coefficient of linear expansion (per °C or per K)
ΔT = change in temperature (°C or K)

The approximate coefficients (α) of linear expansion are as follows:

- **CW024A Copper:** 16.5×10^{-6} /°C
- **CW602N Brass:** 20.5×10^{-6} /°C

The temperature differential is calculated as the difference between the maximum operating temperature and the ambient temperature at the time of installation. For heating systems installed during winter months, this differential may be substantial.
For practical purposes, copper tube expands approximately 1.65 mm per metre per 100°C temperature rise.

Detailed breakdown of the expansion in a pipeline system can be found in the documentation for the pipe system.

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2.7.2 Indicators of System Stress

If pipework is rigidly fixed without allowance for dimensional change, expansion and contraction cycles generate cumulative stress within the system. This stress manifests in several ways:

- **Joint failure** - Axial forces transmitted through the pipework can exceed the pull-out resistance of fittings, particularly at branches and direction changes where stress concentrates. This results in separated connections, commonly termed "pulled joints."
- **Tube fatigue** - Repeated stress cycling from thermal fluctuation can cause work hardening and eventual cracking of the tube wall, particularly at points of constraint or where the tube bears against rigid supports.
- **Noise transmission** - Pipework bearing against structural elements during expansion generates audible creaking or ticking as surfaces slide under load.
- **Fitting stress** - Although brass fittings expand at a slightly higher rate than copper tube (approximately 24% greater), the press connection accommodates this differential. However, cumulative axial load from constrained pipe runs can stress the fitting body and compromise O-ring seating

These effects are most pronounced in systems with significant temperature differentials and long pipe runs, such as heating circuits, hot water services, and solar thermal installations. Domestic cold and hot water systems operating within a narrow temperature band typically require no special provision.

2.7.3 Design Considerations

The requirement for expansion compensation depends on the characteristics of the installation:

- **Pipe run length** - Straight runs exceeding 10 metres warrant specific provision for movement. Shorter runs, particularly those with multiple direction changes, generally accommodate expansion through natural flexibility.
- **Operating temperature range** - Systems with higher temperature differentials between ambient installation conditions and operating temperature require greater accommodation. A heating flow pipe installed at 15°C and operating at 75°C experiences a 60K differential.
- **Fixing arrangement** - The location and type of pipe supports determines where movement can occur. A combination of fixed anchor points and sliding guides directs expansion toward designated compensation points.
- **Concealment method** - Pipework buried in screed, cast into concrete, or enclosed in ducts has restricted movement capability. Such installations require careful planning to avoid locked-in stress.

2.7.4 Mitigation Methods

Several approaches exist for accommodating thermal movement in copper press-fit systems:

Changes of direction

The most practical method in typical building installations is to utilise the inherent flexibility of pipe runs that incorporate bends, offsets, and branches. Each change of direction introduces a flexible leg that can deflect slightly to absorb axial movement. In most domestic and light commercial installations, the natural layout of pipework provides sufficient accommodation without deliberate intervention.

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Rev 1

Expansion loops
Where long straight runs are unavoidable, a U-shaped loop formed from the pipe itself can be introduced. The loop legs flex to absorb movement from both directions.

Offset compensator
Similar to expansion loops, an offset or dogleg in the pipe run provides a flexible section capable of deflection. This approach requires less space than a full loop and suits installations where headroom or lateral clearance is limited.

Proprietary expansion devices
Bellows-type axial compensators provide controlled movement absorption in a compact format. These devices suit applications where space constraints preclude formed loops, or where movement exceeds the practical limits of pipe flexibility. Selection must account for the pressure rating, movement capacity, and end-load characteristics of the device.

2.7.5 Fixing Strategy

Effective expansion management requires a coordinated approach to pipe support:

- **Anchor points** - Fixed brackets that lock the pipe position, dividing the system into controlled expansion sections. Placed at strategic locations such as adjacent to equipment connections or at mid-points of long runs.
- **Guide points -** Supports that constrain lateral movement while permitting axial sliding. Positioned between anchors to maintain alignment during expansion.

Branches from main pipe runs should not be rigidly fixed close to the junction, as this converts the branch into an unintended anchor point and concentrates stress at the tee fitting.

2.7.6 Installation Notes

When installing CORE Press systems in applications subject to thermal cycling:

- Calculate anticipated movement for each distinct pipe section between anchor points.
- Position expansion compensation devices or flexible pipe sections to accommodate calculated movement.
- Ensure all press connections remain accessible and are not embedded in rigid materials
  Allow a minimum of one metre of free pipe length from any branch tee before introducing fixed supports.
- Verify that sliding supports permit the full range of anticipated movement without binding
- Consider the installation temperature when setting initial pipe positions; pipework installed during cold weather will expand on commissioning.

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2.8 Assembly Procedure

2.8.1. Preparation

- Ensure the O-ring is present and is sealed correctly (not loose in the fitting).
- Cut the tube square

2.8.2 Tube Preparation

- Check the tube ends are not damaged.
- De-burr the end of the tube. (Please note, you must ensure the de-burring tool is clean and free from contamination).
- Ensure no sharp edges or swarf are present.

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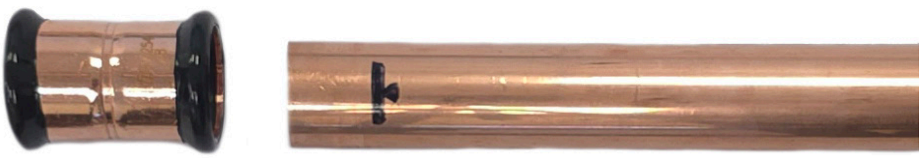
2.8.3 Insertion and Depth Marking

- Insert the tube into the fitting using a twisting motion.
- Using a permanent pen, place a mark on the tube to indicate that the fitting is fully engaged.
- When all tubes are inserted, double check the depth marks are in the correct position.
- (Please ensure that no pen marks breach the O-ring location - to ensure that no contamination can enter the system).



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2.8.4.1 Press the Joint (15mm - 35mm)

- Ensure the correct tool and jaws are selected.
- Place the jaw around the bead of the fitting.
- When correctly located, press the trigger button to commence the pressing process.
- The tool will automatically stop when this is complete.
- Remove the pressed assembly from the jaw.

2.8.4.2 Press the Joint (42mm - 108mm)

For sizes 42mm and above a separate pressing sling with an adapter connected to the head of the pressing tool is used to press the fitting

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2.8.5 Inspection

- Check everything is correct.
- The depth marks should still be in the same place.
- No damage should be present.

2.8.6 Post Processing

- Remove the black pressing indicator.
- You now have a fully functional pressed assembly!

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2.9 Pressure Testing and Commissioning

2.9.1 General Requirements

All **CORE Press** installations must be pressure tested prior to concealment or commissioning. Testing serves two purposes: verification of joint integrity and identification of unpressed fittings via the Leak Before Press feature.
Testing shall be performed in accordance with **BS EN 806-4** (potable water), **BS EN 14336** (heating), or **BS 6891/IGE UP/2** (gas) as applicable. The guidance below represents manufacturer recommendations.

Pre-test checklist:

- All joints pressed and visually inspected per **Section 2.8.5**
- System isolated from supply
- All open ends capped or plugged
- Air release points identified at high points
- Drain points accessible at low points
- Pressure gauge readable to **0.2 bar** minimum
- Test equipment calibrated and within service date

2.9.2 Plumbing Systems (EPDM O-Ring)

Test medium: Water or dry, oil-free compressed air for pre-installation verification only.

Procedure:

1. Fill system slowly from lowest point, venting air progressively through high-point vents until water flows without air bubbles.
2. Raise pressure to **3 bar** and hold for **60 minutes** to allow temperature stabilisation. Visually inspect all joints during this period.
3. If no leaks detected, increase pressure to test pressure per table below. Maintain for minimum **30 minutes**.

Phase	Pressure	Duration	Pass Criteria
Temperature stabilisation	3 bar	60 minutes	Visual inspection, no leaks
Leak Test	3 bar	30 minutes	Pressure ≥2.75 bar at end
Strength Test	1.5x MOP	30 minutes	≤3 bar drop from start

4. If leak test passes, relieve pressure (do not drain). Raise to **1.5x** maximum operating pressure. Hold for **30 minutes**.
5. Record start and end pressures. Pass criteria: end pressure ≥**12.5 bar**.

Procedure (air) — pre-commissioning only:

Phase	Pressure	Duration	Pass Criteria
Leak test	110 mbar	30 minutes	No perceptible drop
Strength test (≤54mm)	1 bar	10 minutes	No perceptible drop

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2.9.3 Heating and Cooling Systems (EPDM O-Ring)

Test medium: Water or dry, oil-free compressed air for pre-installation verification only.

Procedure:

1. Fill system slowly from lowest point, venting air progressively through high-point vents until water flows without air bubbles.
2. Raise pressure to 1.5 x maximum operating pressure.
3. Hold for 10 minutes with temperature differential <10K. If temperature differential >10K, allow 30 minutes stabilisation before commencing 10-minute test.

Condition	Pressure	Stabilisation	Hold Time
$\Delta T < 10K$	1.5x MOP	-	10 minutes
$\Delta T > 10K$	1.5x MOP	30 minutes	10 minutes

4. No pressure drop permitted. Following cold test, heat system to maximum design temperature and verify tightness is maintained.

Procedure (air) — pre-commissioning only:

Phase	Pressure	Duration	Pass Criteria
Leak test	150 mbar	60 minutes	No perceptible drop
Strength test (≤54mm)	1 bar	10 minutes	No perceptible drop

2.9.4 Gas Systems (HNBR O-Ring)

Gas installations shall be tested in accordance with **BS 6891** (domestic) or **IGE/UP/2** (non-domestic). Never test with fuel gas.

Test medium: Air or inert gas (nitrogen).

Low pressure installations (≤100 mbar operating):

Phase	Pressure	Duration	Equipment
Strength test	1 bar	10 minutes	Gauge resolution ≥100 mbar
Tightness test	150 mbar	Per BS 6891 formula	Gauge readable to 0.25 mbar

Medium pressure installations (>100 mbar to 1 bar operating):

Phase	Pressure	Duration	Equipment
Combined Strength/ Tightness test	3 bar	2 hours (after 3-hour stabilisation)	Class 1 recorder + Class 0.6 manometer

No pressure drop permitted during test duration

Purging: Following successful test, purge with fuel gas per IGE/UP/1B before energising appliances.

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