

Pr11090 - Screw on Flanges

Technical Note

Document Owner	Head of Asset Management
Document Contact	Infrastructure Standards Engineer
References this technical note complements or modifies	AS/NZS – 2280:2014 Ductile iron pipes and fittings Pr9904 - Specification for Pressure Pipeline Construction SEQ Design and Construction Code (SEQ Code) SEQ Code Civil IPAM List (A7795998) Screw-on flange manufacturers recommendations

1. Purpose

This technical note has been prepared to provide supporting guidance for designers, contractors and service providers using screw-on flanges on ductile iron pipes as a method of connecting pipes to flanged fittings. Screw-on flanges are used commonly to join pipes to fittings (such as valves, tees, bends etc.) in Ductile Iron pipeline systems in Unitywater's water and sewer infrastructure.

2. Scope

The scope of this technical note covers the use and design of pipework using screw-on ductile iron flanges, where and under what circumstances they may be used and details of alternatives for flanged connections where screw-on flanges are not considered appropriate.

3. Definitions/Acronyms

Term	Meaning
DICL	Ductile Iron Cement Lined
FL	Flanged (fitting type)
Shall	States a mandatory requirement
Should	States a recommendation
SO	Socket (fitting type)
SP	Spigot (fitting type)

4. Background

The following section provides background information on screw-on and cast-on (integral) ductile iron flanges.

Flanges on ductile iron pipes provide a flanged connection for fittings such as valves, flanged tees, flanged bends etc.). Ductile iron pipes can be ordered in various end configurations such as flanged-flanged (FL-FL), flanged-socketed (FL-SO) and spigot-socket (SP-SO).

Spigot-socket (SP-SO) ductile iron pipes come in standard lengths of 5.5m-6m depending on the manufacturer. For these connection types, the pipes are cut to suit the required lengths on site. Where flanged pipe ends are required to connect to flanged fittings, the pipes can be ordered with flanges. They will either have cast-on (integral) flanges or screw-on flanges. There are however limitations to the pipe lengths for cast-on flanges and as such screw-on flanges are often used to achieve the required pipe length.

Pr11090 - Screw on Flanges Technical Note

4.1 Screw-on Flanges vs Cast flanges

Screw-on flanges on ductile iron pipes are installed in factory by pipe suppliers by threading the end of a plain end (spigot) pipe and screwing on the flange. A leak proof sealant is applied to the threads. Corrosion protection is applied to the entire pipe and flange.

Alternatively, integral flanges are cast-on to the pipe however, only specific lengths are available depending on the pipe diameter. This may be a limitation for the design and installation of the cast-on flanged pipes depending on the spacing/position required in the completed pipe assembly.

The cast-on flanges are cast together with the pipe, so a single element is created with no joints, eliminating any limitations/risks relating to screw-on flanges.

Cast-on flanges are the preferred option when flanges are required on ductile iron pipes.

4.2 Screw-on Flanges Subject to Forces

A screw-on flanged joint should not be subjected to a moment. A moment is a force that causes a rotational motion around an axis. When a screw-on flanged joint is subjected to a moment, it can result in failure of the threaded connection.

Screw-on flanged joints are designed to withstand axial forces. These are forces that act along the axis of the pipe only.

To avoid subjecting a screw-on flanged joint to a moment, it is important to ensure that the piping assembly is properly designed and installed in accordance with the standards. The joint should be oriented in a way that avoids any twisting or bending forces, and the piping system should be properly supported to prevent non axial loads on the joint. Adjacent fittings such as valves or bends should be secured to prevent rotational forces from being transferred onto the screw-on flange.

5. Requirements

The requirements for use of screw-on flanges are as follows:

1. Screw-on flanges that are factory fitted are acceptable to Unitywater. Screw-on flanges shall not be fitted on site.
2. Ductile iron pipes cast with integral flanges should be used where possible instead of screw-on flanges.
3. Adjacent fittings such as valves or bends should be secured to prevent rotational forces from being transferred onto the screw-on flange.
4. Alternative jointing methods for flanged fittings may be used where screw-on flanges may not be used. Examples of these are mechanical couplings (non-restrained flange adaptors or dismantling joints) or SP-SO connections to fittings supported by thrust blocks.
5. Underground installation is not preferred for screw-on flanges unless special provisions are made to fully support the associated adjacent fitting/s and where flexible joints are provided to accommodate loading or settlement along the trench line.
6. Screw-on flanges shall have the same design life as the Ductile Iron pipe it is attached to and stated by the manufacturer.
7. All screw-on flanges shall have corrosion protection that matches the corrosion protection of the ductile iron pipe they are attached to.
8. There is no specific pressure testing methodology for screw-on flanges installed by a pipe manufacturer. Pressure testing shall be in accordance with SEQ Code.