# STAINLESS STEEL
# Threaded Fittings

For many years Stainless Steel low pressure threaded fittings have been generally manufactured to dimensions of cast (ANSI B16.3) Malleable Iron, and Wrought Steel (BS 17450) Fittings standards. These standards have governed the majority of regularly available Stainless Steel products in Australia. Castings have been largely supplied in accordance with ASTM A351 (CF8M usually).

High pressure fittings on the other hand, have been manufactured to Forged (ASME B16.11) standards covering both Socketweld and Threaded fittings.

The stainless steel industry, however, has recognised there are **problems with the supply of low pressure fittings**, particularly from substantial overseas manufacturing centres, where cast fittings are dimensionally manufactured to American standards (ANSI B16.3 and B16.14), designed to be threaded with National Pipe Taper (NPT) threads, in accordance with ANSI/ASME B1.20.1. These cast fittings are subsequently threaded to **"R" for male taper** and **"Rp" for female parallel**, as described in Australian Standard AS ISO 7.1, (commonly known as BSPT and BSPP respectively), or G series for female threads, in accordance with AS1722.2 Part 2, (commonly known as Gas threads).

In practice, R threaded male and Rp threaded female fittings which have been dimensionally manufactured to an American standard, have proven to seal, provided threads are cut to adequate lengths.

Male castings, however, produced to American standards, have insufficient length to produce a thread in full compliance with the R series specification. In addition, if female cast fittings are machined with a G series thread and connected to a male R threaded fitting, conflict will occur, and it is likely that inadequate sealing will result.

Problems with threaded fittings are not restricted to just low pressure fittings, as high pressure threaded fittings (Class 2000 to Class 6000), threaded in accordance with the NPT standard, have been found to be failing in two areas, namely:

*1. Non compliance to the thread standard by not meeting the essential elements of **thread form**.*

***2. Insufficient thread engagement** of mating male and female threads, although still remaining in accordance with the standard. This could lead to fitting blow-out at moderate to high pressure.*

## R SERIES (BSP) Threaded Fittings

The most common pipe threads produced on screwed fittings available in Australia are the R series which are used across a broad range of industries, the G series predominantly in the hydraulics industry and the NPT series which are extensively used in the petrochemical and offshore industries.

The R series and G series threads are commonly referred to in the industry as BSP (British Standard Pipe) threads. The use of such a common term as BSP, has given rise to the mismatching of the two thread standards.

R series are Sealing Pipe Threads of the Whitworth Form as in AS ISO 7.1. The basic thread form has a 55 degree flank angle (**see Figure 1**) and the number of pitch per inch, depends upon the size of pipe to be threaded. To effect a seal the threads are to be connected by either of the following two methods:

a. *An R (external male taper pipe thread) screwed together with an Rc (internal female taper pipe thread), **see Figure 2**. The cone tapers on both threads are 1 in 16 on diameter, which equates to 1 degree 47 minutes.*

b. *An R (external male taper pipe thread) screwed together with an Rp (internal female parallel pipe thread), **see Figure 3**.*

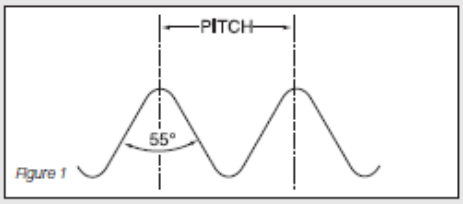

Figure 1

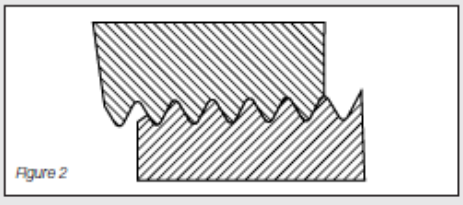
Figure 2

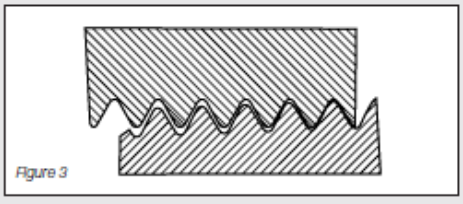
Figure 3