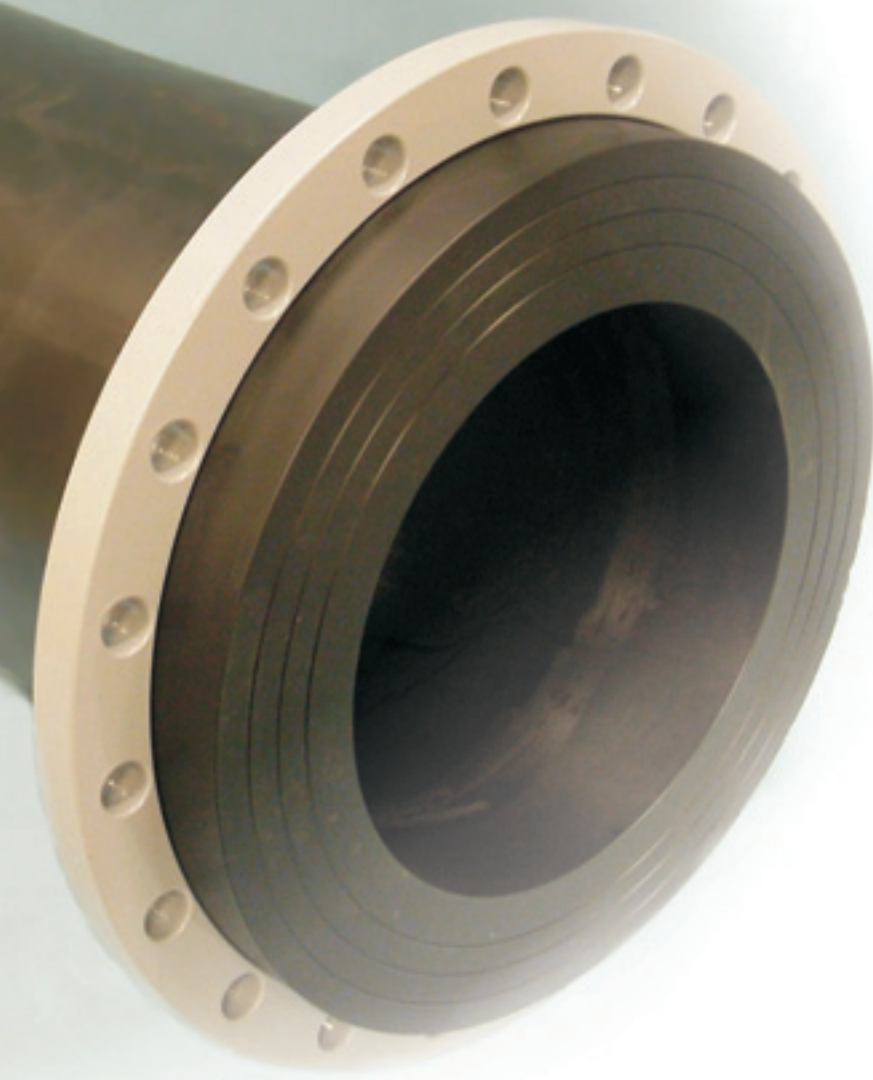




WATER SYSTEMS

**POLYETHYLENE FLANGE
CONNECTIONS**



High Performance and Special
Flanges for Metal to Polyethylene
Connections

Radius Systems - The smart choice for plastic pipe solutions

Strategic pipelines tend to be some of the most challenging in terms of the engineering, the most demanding in terms of reliability and usually represent significant investment for the new owner. To get the most from your new investment we understand that it is vitally important the design is optimised, that a full system easily installed is available and, should the need arise, that the means to adapt or repair it in the future are available. Here at Radius Systems, we have the experience, the skills and the resources to work alongside you at each stage of the process to ensure that you get the best value from your investment and that the journey from design to commissioning is straightforward and above all, predictable.

Our heritage and our experience in the manufacture of plastic pipe systems goes back over 40 years from our time as pioneers, introducing the first polyethylene pipes for natural gas distribution. This pioneering spirit has stayed with us ever since, as we have evolved the technology, expanding the use of plastic pipe systems to the water and wastewater industry, bringing state of the art products for trouble free and reliable performance.



High Performance & Special Flanges

When jointing Polyethylene pipe systems to metal or other pipe materials, it is the practice to use a “Flange Adapter” or “Stub Flange Assembly”. These special fittings are specifically designed with a polyethylene section at one end of the fitting to allow fusion to a polyethylene pipe string, and a drilled flange assembly at the other end, to allow connection to a similar non-plastic flanged pipe construction such as valves for instance. The new **Radius Systems High Performance (HP) and Special (SP) Flanges** are easy to install and provide full end load performance up to 16 bar across the size range 250mm to 630mm. The SP flange has been machined with bolt holes directly through the flange face and is fitted with a backing ring to provide additional structural support, whereas the HP flange uses a standard rotating metallic backing ring found in more traditional flange options.

Benefits

- Full end load bearing performance up to 16 bar pressure
- Reduced installation costs - No requirement for thrust blocks
- Improved long term security against leaks as the fittings provide a larger face than other flange options

Approvals

- EN 12201 Part 3
- WIS 4-32-15
- WIS 4-24-01 **Type One** for pipe sizes 250 – 630mm

in wall thicknesses SDR 11 and 17

Note on resistance performance of flanges

Type One

The end-load resistance of the joint is greater than the longitudinal strength of the pipe

Type Two

The end-load resistance of the joint is greater than the maximum axial forces assumed to be acting on the joint in a below ground environment

Type Three

The end-load resistance of the joint is less than that required for Type 2 fittings. Anchor blocks or other end restraint means will normally be required with fittings of this type



High Performance & Special Flanges

SPECIAL (SP) FLANGE

The SP flange provides size-for-size through bore connection to corresponding NP 16 metal fittings without temporary pipe bore reduction, using standard industry bolt sizes. The flange has been specifically designed with a drilled sealing face to coincide with the supporting backing ring. In order to carry out a connection to another flange, the SP flange needs to be in position and aligned to the other flange before fusing the assembly to the polyethylene pipe.



Product range

SP Flange SDR 11

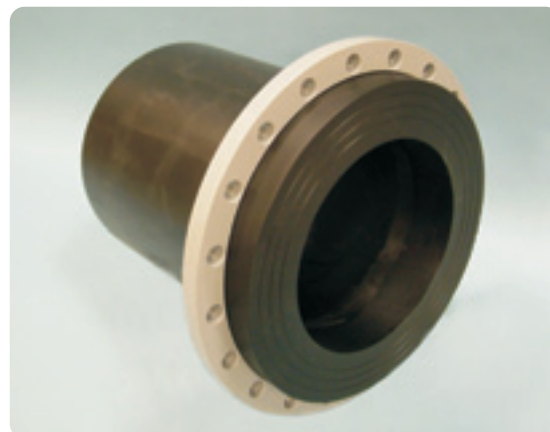
Size mm	Pressure Rating bar	Flange Face Thickness mm	Standard Bolt Length to Metal Faced Component mm	PE 100 Black Product Code	PE 100 Dark Blue Product Code	PE 100 ProFuse Product Code
250 x DN200	16	64	120	250N81	250H81	250PR81
315 x DN250	16	71	130	315N82	315H82	315PR82
355 x DN300	16	74	130	355N83	355H83	355PR83
400 x DN350	16	98	160	400N84	400H84	400PR84
450 x DN400	16	101	170	450N85	450H85	450PR85
500 x DN450	16	108	180	500N86	500H86	500PR86
560 x DN500	16	108	180	560N87	560H87	560PR87

SP Flange SDR 17

Size mm	Pressure Rating bar	Flange Face Thickness mm	Standard Bolt Length to Metal Faced Component mm	PE 100 Black Product Code	PE 100 Dark Blue Product Code	PE 100 ProFuse Product Code
250 x DN200	10	64	120	250N781	250H781	250PR781
315 x DN250	10	71	130	315N782	315H782	315PR782
355 x DN300	10	74	130	355N783	355H783	355PR783
400 x DN350	10	98	160	400N784	400H784	400PR784
450 x DN400	10	101	170	450N785	450H785	450PR785
500 x DN450	10	108	180	500N786	500H786	500PR786
560 x DN500	10	108	180	560N787	560H787	560PR787

HIGH PERFORMANCE (HP) FLANGE

The Radius Systems HP flange follows the conventional size range of traditional polyethylene flange options and is available in sizes 400mm to 630mm. Simple to install, the HP flange has been designed with a rotating backing ring, which allows easy adjustments to the flange position once it has been fused to the polyethylene pipeline.



Product range

HP Flange SDR 11

Size	Pressure Rating	Flange Face Thickness	Standard Bolt Length to Metal Faced Component	PE 100 Black	PE 100 Dark Blue	PE 100 ProFUSE
mm	bar	mm	mm	Product Code	Product Code	Product Code
400 x DN400	16	74	140	400N80P	400H80P	400PR84
450 x DN450	16	77	150	450N80P	450H80P	450PR85
500 x DN500	16	90	160	500N80P	500H80P	500PR86
560 x DN600	16	98	180	560N80P	560H80P	560PR88
630 x DN600	16	98	180	630N80P	630H80P	630PR88

HP Flange SDR 17

Size	Pressure Rating	Flange Face Thickness	Standard Bolt Length to Metal Faced Component	PE 100 Black	PE 100 Dark Blue	PE 100 ProFUSE
mm	bar	mm	mm	Product Code	Product Code	Product Code
400 x DN400	10	74	140	400N780P	400H780P	400PR784
450 x DN450	10	77	150	450N780P	450H780P	450PR785
500 x DN500	10	90	160	500N780P	500H780P	500PR786
560 x DN600	10	98	180	560N780P	560H780P	560PR788
630 x DN600	10	98	180	630N780P	630H780P	630PR788

High Performance & Special Flanges

DESIGN CONSIDERATIONS & RECOMMENDATIONS

When designing large diameter PE pipe systems, careful consideration should be given to the transition points of the pipeline as polyethylene pipes are sized on the outside diameter and metallic systems are sized on the bore diameters. The consequence of these sizing differences is that there could be steps in the bores of differing pipe systems, as shown in Figure 2.

In an attempt to reduce the degree of internal mismatch, whilst also using smaller and easier to handle valves and fittings, it is common to see reduced larger diameter flange assemblies used in pipeline constructions. These reducing flanges consist of a section of pipe followed by one or more PE reducers joined to a smaller diameter flange face. However, using these constructions reduces the end load resistance of the assembly and the assembly is therefore regarded as a Type Three fitting (unless the supplier can provide documentary evidence of end load resistance).

When the HP flanges are used and diameter reductions are required, we recommend the use of a metal double-flanged taper (Figure 3) which preserves the full end load resistance of the assembly and maintains a smooth bore between the different pipe materials.

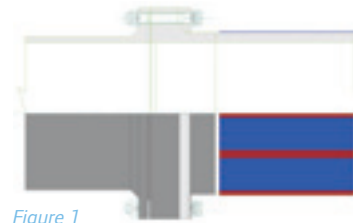


Figure 1

Figure 1
400mm x DN350
SP flange
connection to a
350mm metal
flange without loss
of nominal bore

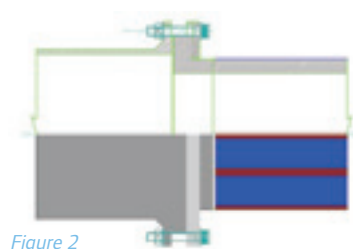


Figure 2

Figure 2
560mm x DN600
HP flange
connection to a
600mm metal
flange

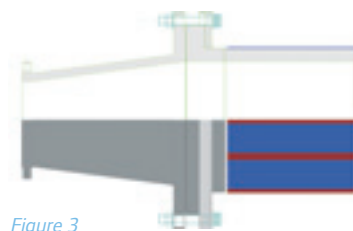


Figure 3

Figure 3
560mm x DN600
HP flange
connection to a
double flanged
taper



ASSEMBLY OF FLANGED COMPONENT

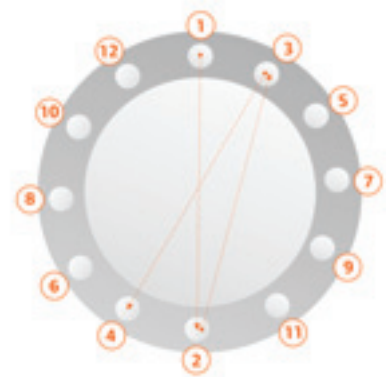
Flanges are usually joined together with hexagon bolts or threaded studs and hexagon nuts with flat faced washers. The bolts are constructed of corrosion resistant materials or are coated with a corrosion resistant layer. The bolts or studs must span the entire width of the flange joint and provide sufficient thread length to fully engage the nut. Guidance for the required bolt lengths for the HP and SP flanges is provided in the previous tables.

Flange bolting

Mating flanges must be aligned before starting the joining procedure. The integrity and the performance of the flanges can be affected if misalignment occurs. When bolting PE flanges to metallic flanges, the bolts should first be hand tightened around the assembly. Starting with the top dead centre position (1), the bolts should be tightened to 50% of the final torque setting found in the table below. The bolt

diametrically opposite should be tightened next (2), followed by the next clockwise bolt from the top dead centre bolt (3) and then its' diametrical opposite (4). Continue tightening the bolts following the bolting sequence below until all the bolts are in place around the flange. The process should be repeated by further tightening the flange bolts to 75% of the final torque, followed by the full stated value. The final torque procedure should be repeated after the assembly has been allowed to relax for approximately 1 hour.

Note: Flange connections to heavy pipeline components such as valves, require support during installation.



Flange Nominal Ø mm	Flange OD mm	PCD	Nº Holes	Hole Ø	Bolt	Bolt Torque Nm
200	340	295	12	22	M20	80
250	405	355	12	26	M24	100
300	460	410	12	26	M24	120
350	520	470	16	26	M24	150
400	580	525	16	30	M27	200
450	640	585	20	30	M27	225
500	715	650	20	33	M30	300
600	840	770	20	36	M30	350

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