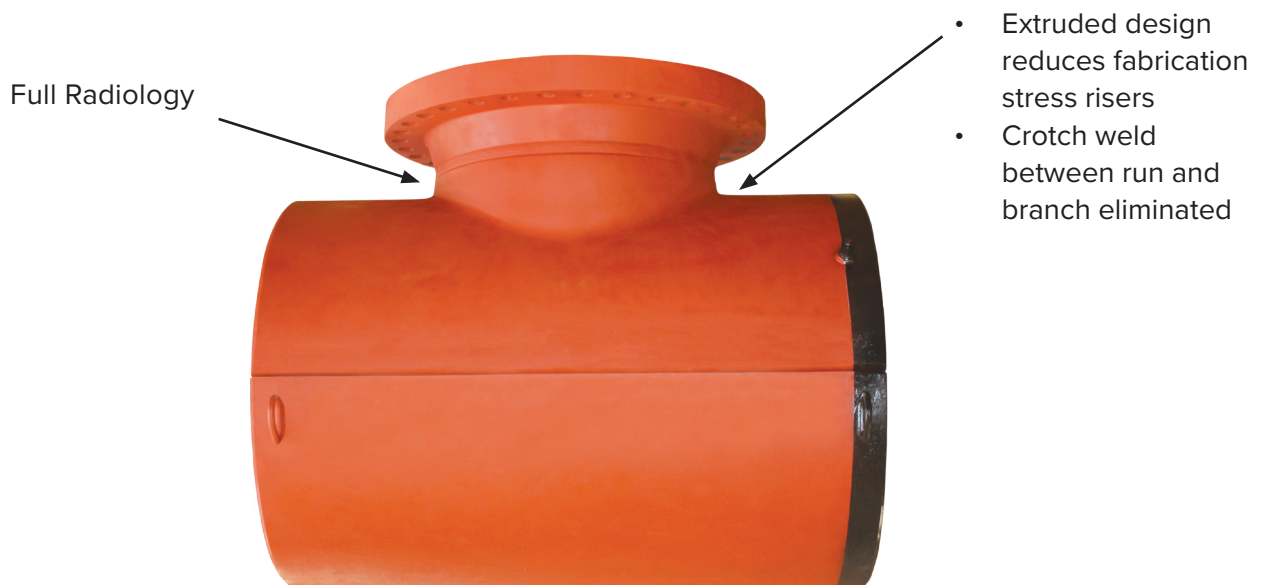


ADVANTAGES OF EXTRUDED OUTLETS FOR HOT TAP AND LINE STOP FITTINGS

ASME B31.3, B31.4, and B31.8, as well as most other piping codes, allow the piping engineer to use extruded or welded branch tees in the design of piping systems. While the codes do not advocate either method, there are intrinsic advantages to the extruded design particularly for hot tap and line stop fittings. Typically, extruded fittings have a simpler and more flexible design; which is easier to inspect, is capable of withstanding greater external loading and eliminates the need for external reinforcement.



DESIGN

In many applications, 100% radiographic examination is required for all welded connections. However, the run-to-branch weld of welded fittings is difficult to examine using radiography because of the geometry of the weld. Often the results of such examinations are difficult to interpret, even by the most experienced NDE technicians. Extruded tees do not require radiographic examination of the run-to-branch connection, because the weld has been eliminated.

From an engineering design standpoint, the smoothly contoured intersection of extruded tees is superior to the welded connection, because it minimizes discontinuities in the crotch area of the fitting.

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The welded fitting has a highly stressed region at the juncture of the run and branch cylinders, precisely where the two pieces are welded together. Since the welded connection is already highly stressed, it is not capable of withstanding high levels of external loading. Conversely, an extruded fitting minimizes the highly-stressed connection and completely eliminates the run-to-branch weld. Therefore, the extruded fitting is superior to the welded fitting in a situation where external loading is a concern, such as during a hot tap or line stop.

Welded branch fittings are often designed with reinforcement pads to compensate for the lack of sufficient wall thickness in the branch or run cylinders. The need for a reinforcement pad adds significant weight to the fitting and requires additional manufacturing time. The control of the wall thicknesses is more flexible for extruded connections than for welded connections. By modifying the input variables, the branch and run thicknesses can be carefully controlled ensuring the fitting satisfies reinforcement requirements without the need for an external reinforcement pad.

Confidential and Proprietary Information

SUMMARY

Extruded Branch Fitting:

- Allowed by ASME B31.3, B31.4 and B31.8 design codes
- No run-to-branch (crotch) weld
- No in-shop rework or field rejection due to crotch weld
- Need for radiographic examination at run-to-branch juncture eliminated
- Fabrication stress risers eliminated
- More capable of withstanding external loads
- Integral reinforcement designed into fitting

Welded Branch Fitting:

- Allowed by ASME B31.3, B31.4 and B31.8 design codes
- Difficult crotch weld required
- Possibility of in-shop rework or field rejection due to crotch weld
- Difficult to perform 100% radiographic examination
- Highly stressed region at juncture of run and branch
- Less capable of withstanding external loads
- External reinforcement pad may be required



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