

Comments on Branch Connection Pressure Design (June 2004)

In the summer of 2004 there was some discussion amongst B31.3 members regarding the branch connection pressure design rules in B31.3, Para. 304.3.3. It was noted that there appeared to be some differences between the rules (also referred to as the area replacement rules) as manifested in the then current equations in B31.3-2002 and Para. 104.3.1 of B31.1-2001 including the 2002 Addenda. The discussion ended in the conclusion that there should be no difference between the B31.1 and B31.3 equations except in the unique nomenclature used by each.

B31.1 had recently spent a considerable effort to try to make their area replacement equations correct and they could be assumed to be correct (unless the ASME editors had messed them up -- a situation all too often encountered).

A way to check branch connection pressure design rules is to review the equations so as to assure the designer that there is an adequate wall thickness at the end of plant life, i.e., from the run and branch piping remove the manufacturer's underthickness tolerance, remove the corrosion allowance (on the inside) and the remaining metal must satisfy the area replacement rules. That is, the amount of remaining metal removed that is required for pressure design must be at least replaced within the reinforcement zone. If one follows this concept the designer can always be assured of meeting the B31.1 or B31.3 requirements.

In addition, there should be no difference between the rules or equations for branch connection pressure design in any B31 book (or for nozzles in any ASME boiler and pressure vessel code), with the exception that some B31 books consider either manufacturer's underthickness tolerances or corrosion allowances or both as negligible, e.g., B31.4 and B31.8.