

**6.1 Case Study No. 1
Flanged Ball Valve
Adaptor**

Component name:	Flanged Ball Valve Adaptor
Forging Process:	Rolled ring (profiled) from hot press forged blank
Size, finished, mm (in.):	1015 (40.0) O.D. x 205 (8.0) high
Estimated weight, kg (lb)	650 (1430)
Alloy:	Carbon steel
Tensile strength, MPa (psi):	480 (70,000)
Yield strength, MPa (psi):	250 (36,000)
Hardness, BHN:	197
Elongation:	22%
Impact Toughness, J (ft-lb):	16.3-20.3 (12-15) @ -450C (-500F)
Secondary Operations:	Machining, hydrostatic testing
Heat treatment:	Normalizing
Alternate process:	Fabrication from open die (mandrel) forging, casting
Annual Production:	450

The flanged adaptor for a 610 mm (24 in.) ball valve, shown in Figure 6-1 A, is used in lines that transmit commodities such as oil, gas, chemicals and food. It connects the valve body to the flange line.

The forged design offered the possibility of reduced weight compared with a casting by the use of thinner walls. The integrity of the thinner walls was gained by developing circumferential grain flow and uniform grain size, and by eliminating porosity. The reduced wall design was verified by hydrostatic testing. Machining operations were improved by the elimination of hard spots. The weight reduction was approximately 20%, which is important in offshore applications. Forging engineers contributed to the design with the suggestion to increase the body flange O.D. to the same size as the line flange to produce a symmetrical section, reducing tooling set-up.

Two-piece construction from straight forged rings, shown in Figure 6-1 B, was considered. The one-piece construction was more economical due to a substantial reduction in machining operations and elimination of welding.

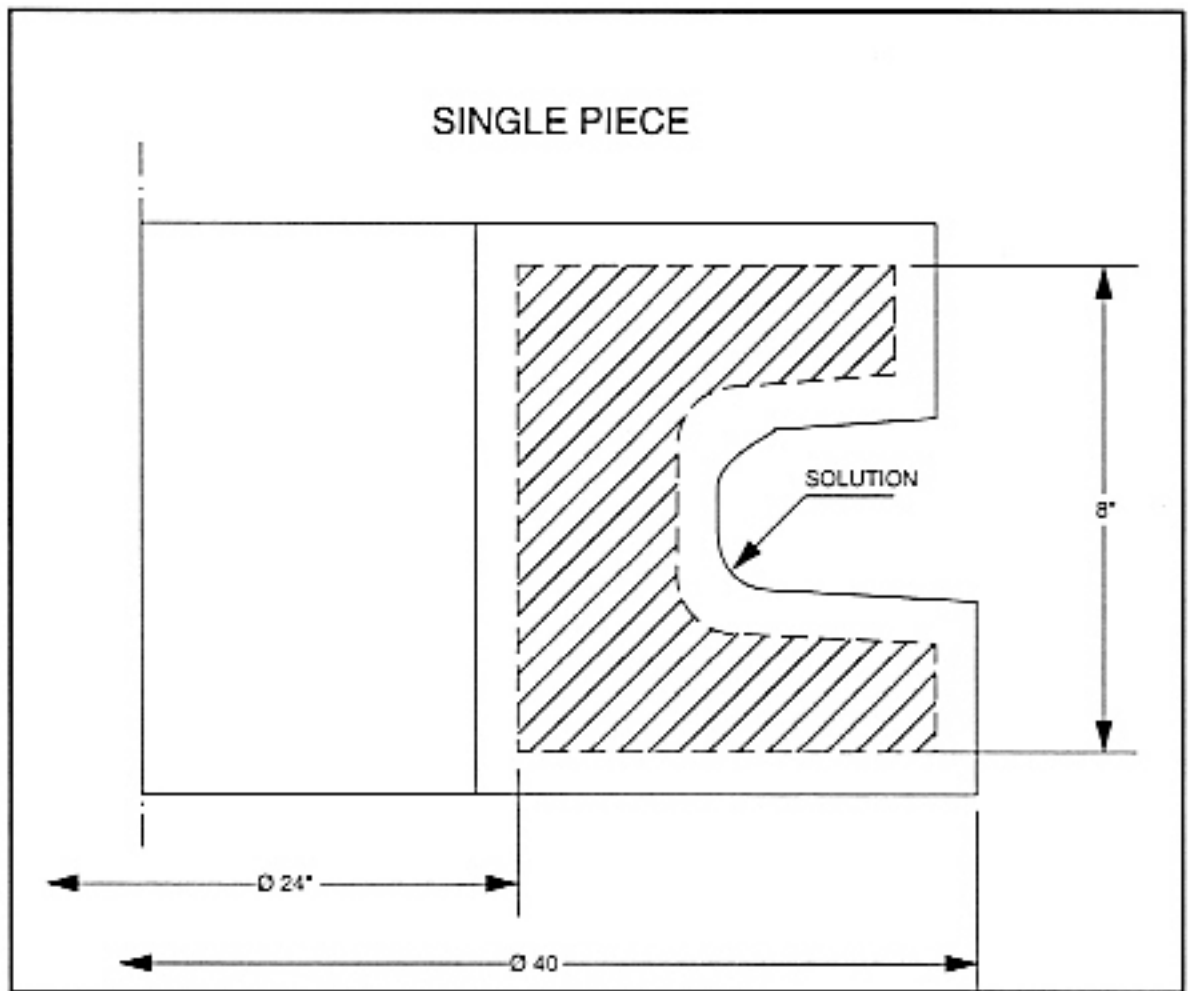


Figure 6-1A

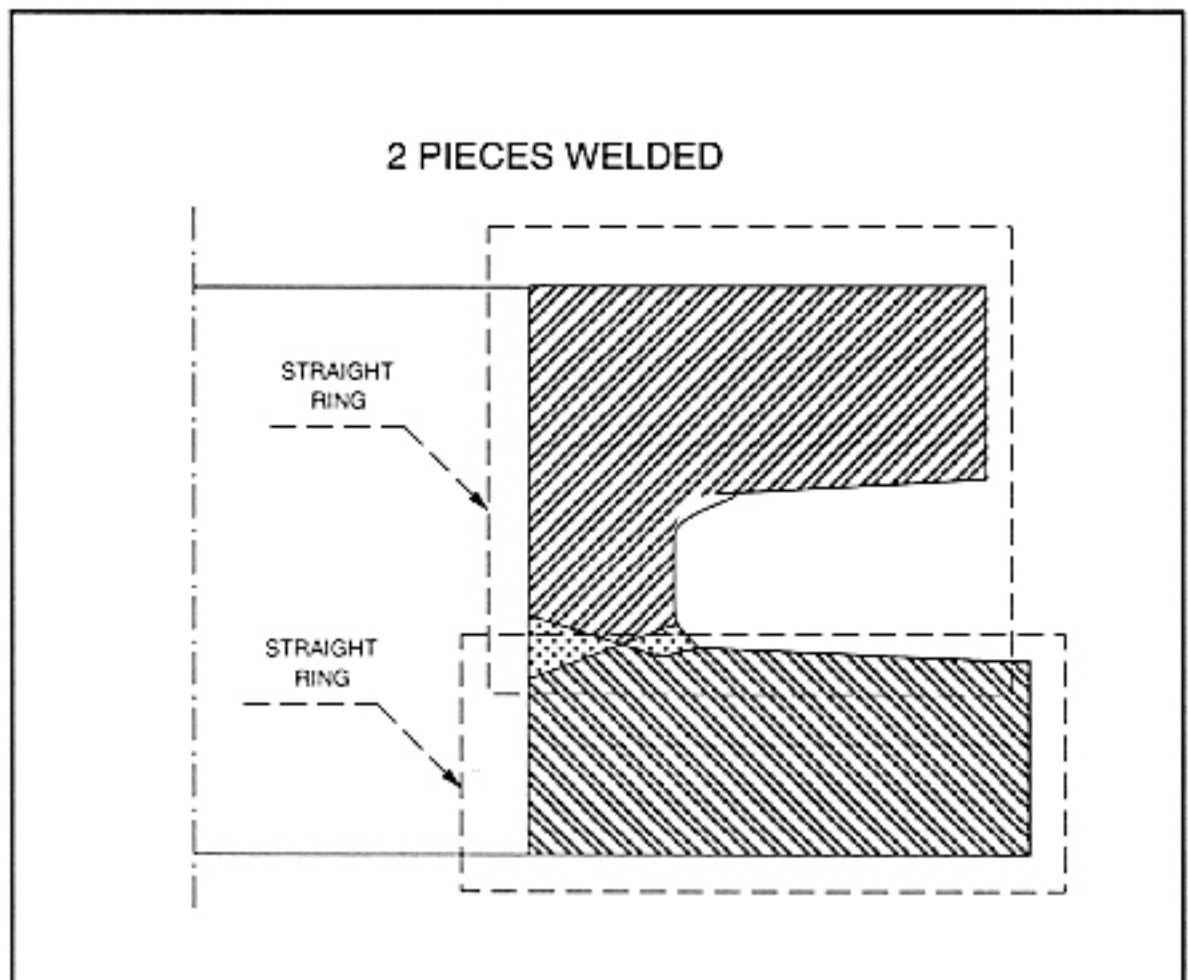


Figure 6-1B