

# Western Instruments

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## Weld Undercut Measurement

Some inspectors have difficulty visualizing the use of Western Instruments' Dial Indicator Pit Gauges for measuring Undercut on critical Welds.



The Picture to the left illustrates a Reaching Pit Gauge being used to measure undercut on a Fillet Weld. The Leg Length (and height) of this particular weld sample is approximately 9mm (0.35"), and provides about 1mm clearance between the end of the Pit Gauge Blade and the Web. The Web and the Flange, on this particular sample, have a nominal thickness of 7.7mm (0.23"). In this particular case, the Dial Indicator is oriented to the transverse position, to ensure enough clearance between the Web and the Dial Indicator.

For this particular picture, a Reaching Magnetic Pit Gauge (N88-5M) was used, so the Blade would sit upright without a hand in the field of view. However in some cases, Weld

Inspectors may prefer Pit Gauges without magnets. On this particular Gauge, the magnets will just hold the tool to the work piece in the vertical or inverted positions. If strong magnets are desired, then a Reaching Composite Magnetic (N88-5MC) or Reaching Plus Composite Magnetic Pit Gauge (N88-6MC) might be more appropriate.

A variation of the Reaching Pit Gauge is offered in the Tubing Inspection Gauge (N88-TI). The differences between the two Gauges are illustrated here to the right, with the *Tubing Inspection Gauge* on the Top and the *Reaching Pit Gauge* on the Bottom. The Blade on the *Tubing Inspection Gauge* is 60mm (2 3/8") long, while the Reaching Pit Gauge is 121mm (4 1/4"). The more significant differences between these two Gauges is the length of the 'Cut-Away' (Nose), immediately under the Dial indicator. In the case of the *Reaching Pit Gauge*, it is a large 37mm (1 1/2"), to allow it to be used on larger welds, while the Cut-Away on the *Tubing Inspection Gauge* it is just 14mm (0.550"), for tubing's smaller weld reinforcement.



The illustration to the right shows a Reaching Plus Composite Magnetic Pit Gauge (N88-6MC), reaching over a 16mm (0.63") wide Weld Reinforcement to measure Under Cut on the opposite side of the Weld. The large Cut Away on the Reaching Pit Gauges not only allows undercut measurement from one side of the Weld, but prior to welding inspectors can use this feature to measure edge alignment.

While the use of a Pit Gauge on Weld Measurement might be a little unusual, I've never hear of an auditor complain about 0.01mm (0.001") accuracy!