SENSORSCAN® Wedges

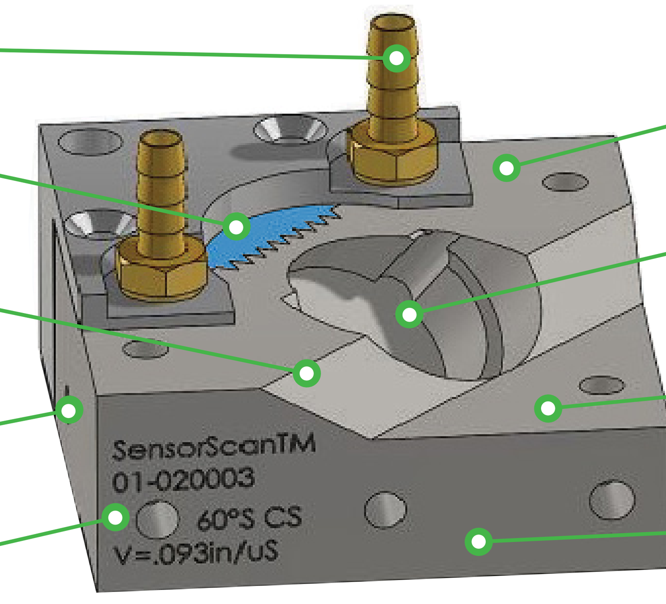
*The wedge, much like the transducer, can **enable** and **optimize** the UT exam.*

Precision Design & Fabrication

Superior Performance

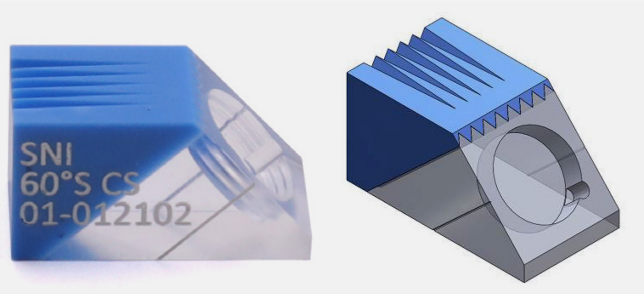
Fast Delivery

ANATOMY OF A PRECISION-ENGINEERED UT WEDGE

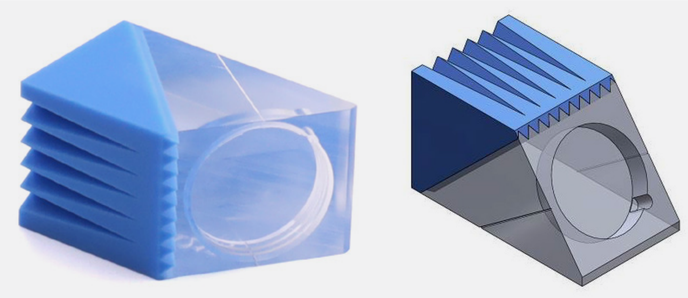


- Couplant Irrigation Ports
- Low-Noise-Blue™ Dampening Material
- Refracted-Angle Spec in 0.25-Degree Increments
- Gimbal Mount Points
- Certifications of Conformity Available Upon Request
- Noise-Reduction Design with CIVA
- For Any Transducer Size from SNI or Other Manufacturer
- Accuracy in CAD/CAM: Dimensional and Angular Tolerances
- Various Wedge Materials Available

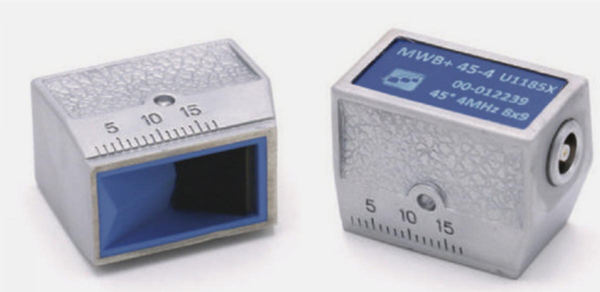
Standard Shearwave
Normal Inspections



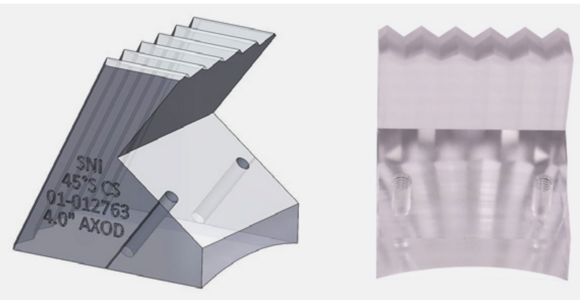
Short Index
Allows closer inspection proximity to a joint, seam or weld crown



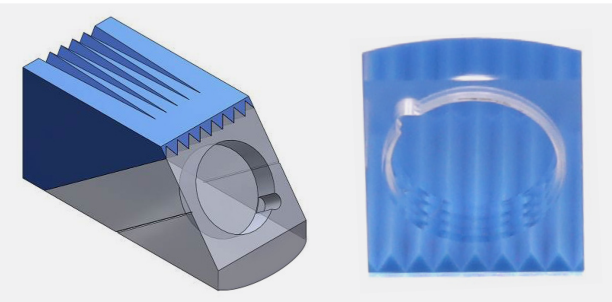
Integral-Wedge Transducer
Specialty transducer-wedge combined for tight-area weld or other applications



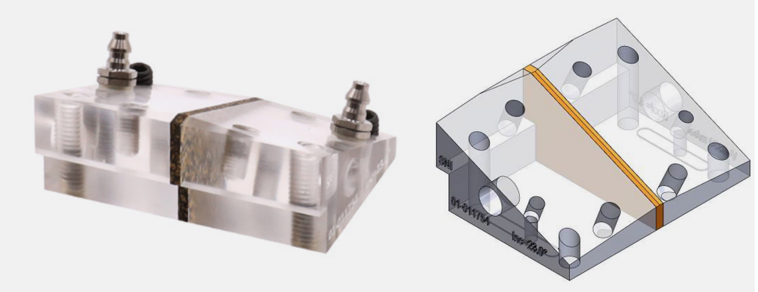
Axial OD
Inspecting circumferential features from the pipe's OD



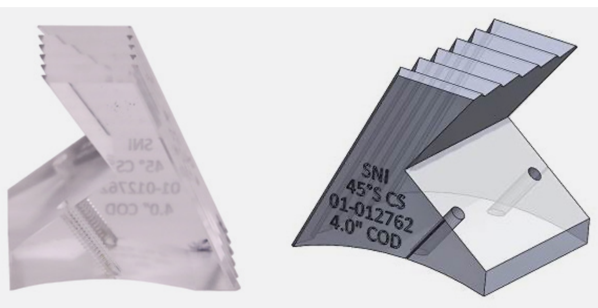
Axial ID
Inspecting circumferential features from the pipe's ID



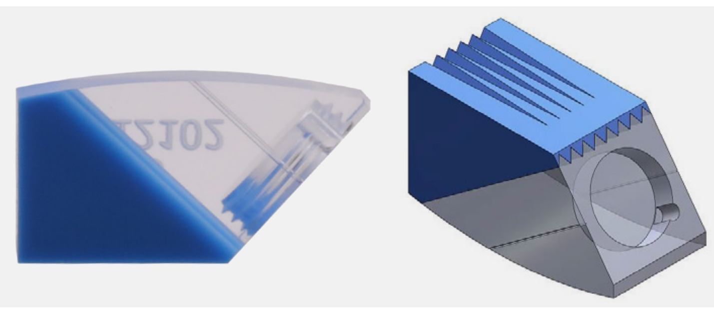
Dual Wedge
Wedges designed for dual-element transducers



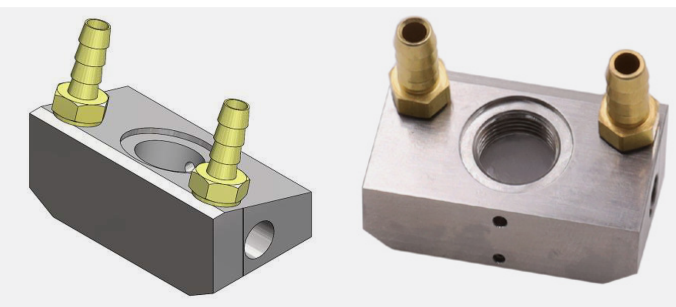
Circumferential OD
Inspecting axial features from the pipe's OD



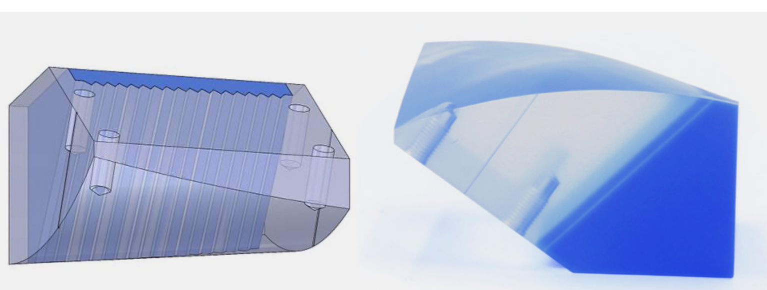
Circumferential ID
Inspecting axial features from the pipe's ID



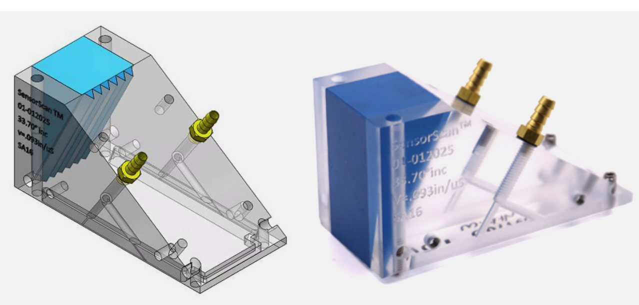
TOFD
Time-of-flight diffraction inspections



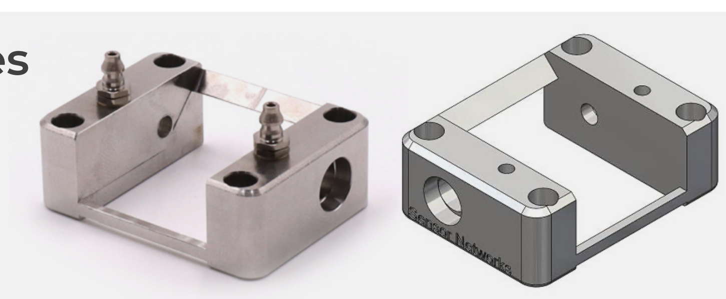
Skew
Twist or rotate a radiused wedge on a radiused surface



PAUT Standard Wedge
For phased-array transducers with any of the above-listed features



Enhanced Features
- *Irrigation Ports*
- *Gimbal Mounts*
- *Hardened Wear Pins*



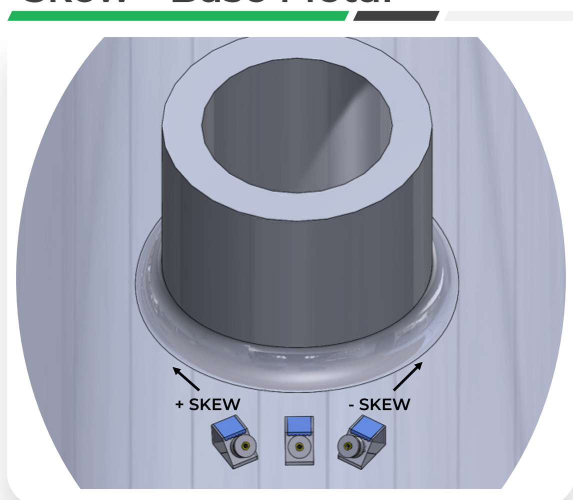
Axial OD

Circumferential OD

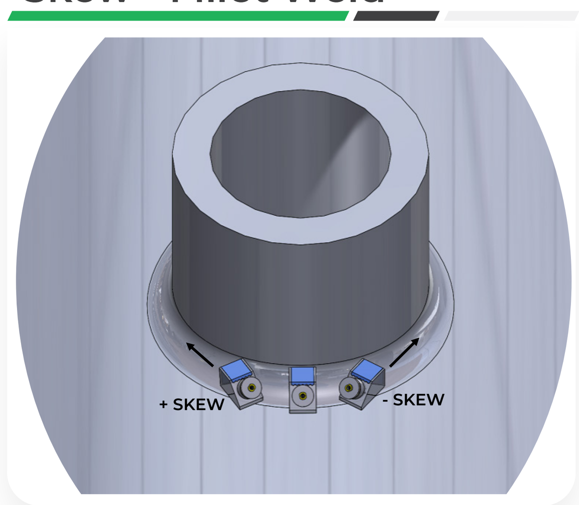
Axial ID

Circumferential ID

Skew - Base Metal



Skew - Fillet Weld

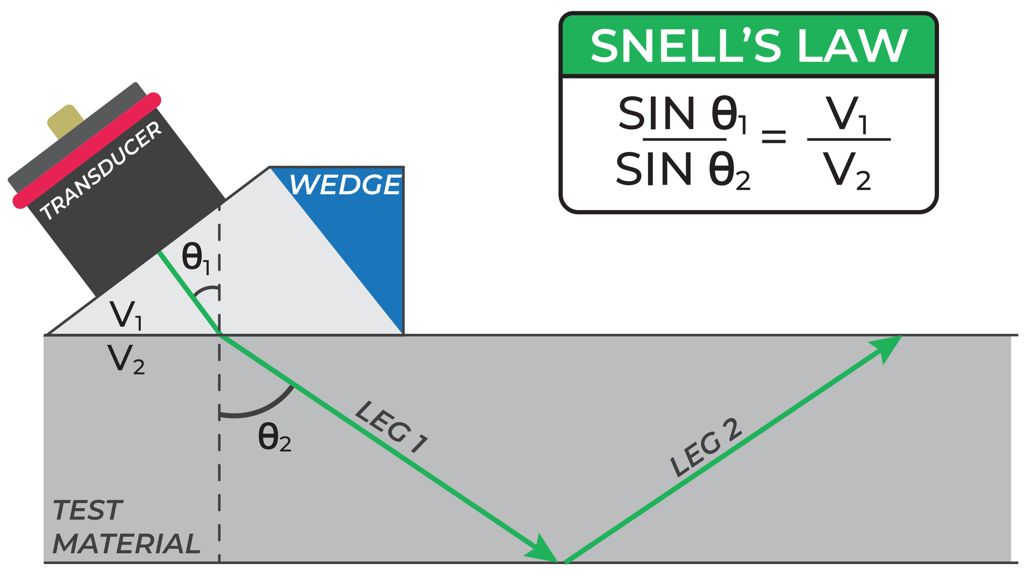


WEDGES, REFRACTION, AND SNELL'S LAW

Snell's Law: In 1621, the Dutch astronomer Willebrord Snellius (1580–1626)— Snell—derived a mathematically equivalent form, that remained unpublished during his lifetime. Snell's law (the law of refraction) is a formula used to describe the relationship between the angles of incidence and refraction, when referring to light, sound or other waves passing through a boundary between two different isotropic media, such as water, glass, or air. It is the law which is used in ray tracing to compute the angles of incidence or refraction. Snell's law states that the ratio of the sines of the angles of incidence and refraction is equivalent to the ratio of phase velocities in the two media, or equivalent to the reciprocal of the ratio of the indices of refraction:

SNELL'S LAW

$$\frac{\sin \theta_1}{\sin \theta_2} = \frac{V_1}{V_2}$$



The Wedge *- UT wedges are used in industrial NDT inspections to introduce the transducer's acoustic energy at a non-perpendicular angle thereby allowing the sound beam to be transmitted at a more-optimized angle within the test part. The wave mode and angle is selected to maximize the ability to identify and size defects based on the test part's material, defect type, and orientation.*

Surface or Rayleigh Waves *travel the surface of test material penetrating to a depth of one wavelength. Surface waves are generated when a longitudinal wave intersects a surface near the second critical angle and they travel at a velocity between .87 and .95 of a shear wave. Rayleigh waves are useful because they are very sensitive to surface defects and they follow the surface around curves. Because of this, Rayleigh waves can be used to inspect areas that other waves might have difficulty reaching.*

Longitudinal or L-waves *can be created exclusively by using incident angles greater than 0-degrees from surface but less than the first critical angle. Acoustic velocity of the ultrasound, in the test material is a constant and independent of frequency and is referred as the longitudinal velocity.*

Shear or S-Waves *are created when the first critical angle is exceeded. Shear waves travel at ~ 60% of the speed of L-waves and can co-exist with L-Waves. When the 2nd critical angle is reached, L-waves will no longer be generated and only shear waves will propagate in the test material.*

Radiused wedges address new code requirement:* ***ASME BPV Section V Article 4, T-432.2* *for curved surfaces <14" (350 mm) diameter.*

SENSOR® NETWORKS, INC
Inspection, Testing & Asset-Integrity Solutions

366 Walker Drive - Suite 200
State College, PA, 16801
+1 (814) 466-7207
www.sensornetworksinc.com
customercare@sensornetworksinc.com