GE
Measurement & Control Solutions

*true*DGS® Angle Beam Probes

Ultrasonic Probes

A New Level of DGS Accuracy and Reliability for Single Element Angle Beam Probes and Ultrasonic Phased arrays

GE imagination at work

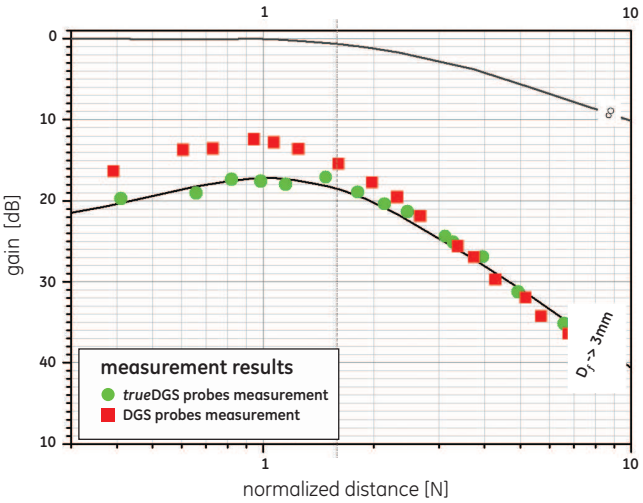
Providing Unrivalled Flaw Sizing Accuracy Using the DGS Technique

New, patent-pending *true*DGS technology from the Inspection Technologies business of GE Measurement & Control Solutions has allowed the company to develop and introduce a range of ultrasonic *true*DGS angle beam probes which:

- Offer increased accuracy in sizing of flaws using the DGS method.
- Provide the same accuracy as circular straight beam probes.
- Are available as single elements and phased array transducers.
- Ensure accurate, compliant ultrasonic inspection in a wide range of applications.
- Are accompanied by the associated software.

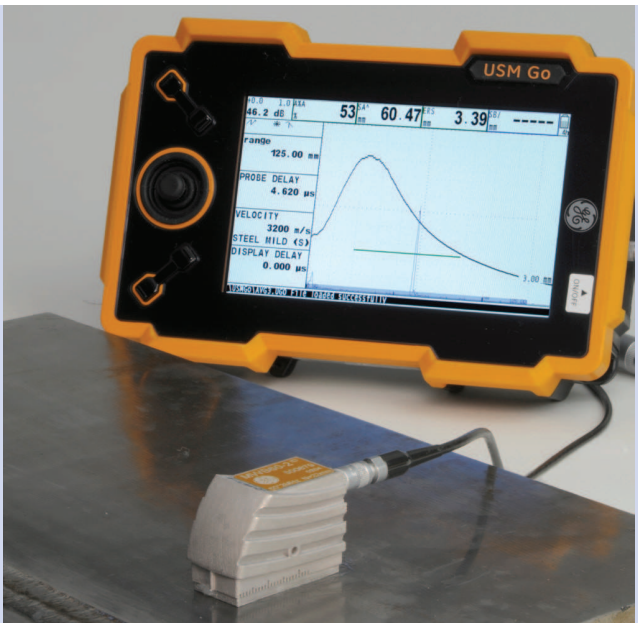
Recognizing the difference between DGS Angle Beam probes and DGS Straight Beam probes

The DGS method was originally developed for straight beam compression probes with flat circular transducers. Today's single element angle beam probes and ultrasonic phased arrays have different ultrasonic characteristics to straight beam compression probes because of the refraction at the material interface. This means that there can be deviations in DGS evaluations. This often results in flaw oversizing, which leads to unnecessary weld and workpiece scrap or reworking.



Example diagram showing the difference between trueDGS and current DGS probes measurement

trueDGS Angle Beam probes offer the same DGS accuracy as flat circular Straight Beam probes.



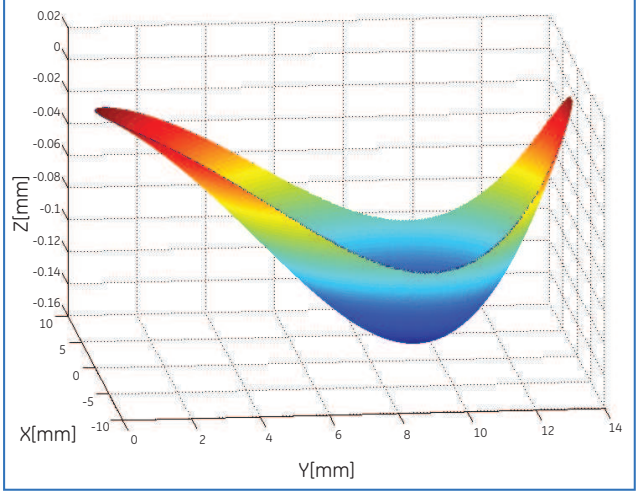
The importance of the DGS Flaw Sizing Method

The DGS ultrasonic flaw sizing method is widely used for sentencing welds and workpieces. It relies on an ultrasonic inspector fitting a displayed flaw indication to a DGS curve to determine the equivalent reflector size of the flaw. When used as a sentencing technique, flaws which demonstrate an equivalent reflector size falling above the respective DGS curve are rejected. DGS (Distance, Gain and equivalent reflector Size) diagrams are provided with angle beam probes by probe manufacturers. The DGS method is specified throughout Europe in standards such as EN 583-2 and is applied in many other countries throughout the world.

Mathematically-derived probe surface contour ensures optimized DGS correlation

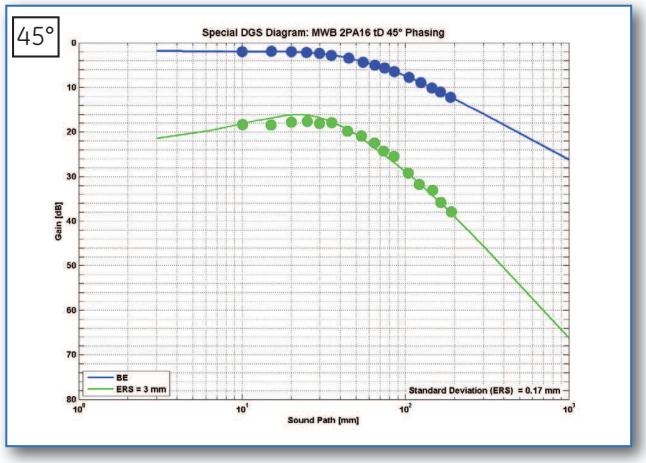
*true*DGS angle beam probes feature innovative, mathematically-determined surface contours. This shape is calculated by using a given circular, straight beam probe and transferring the properties of all sound beams of this probe to an angle beam probe with a given angle of incidence and a given delay line length. The resulting point cloud defines the 3D shape of the *true*DGS angle beam probe.

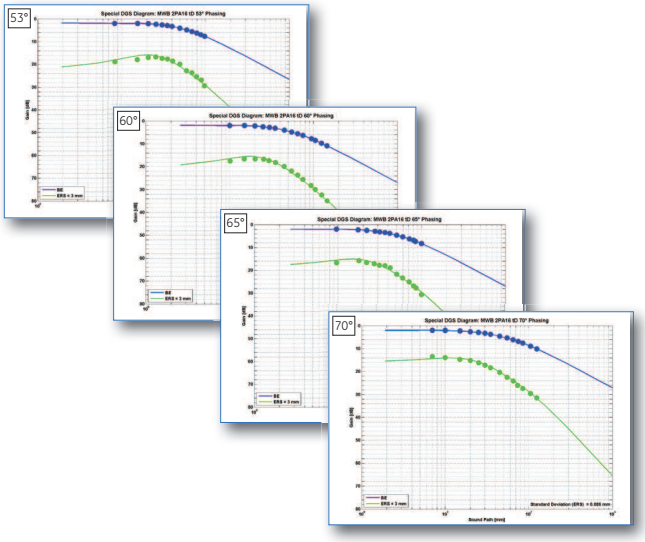
Transducer shape after coordinate transformation: MWB 70-4



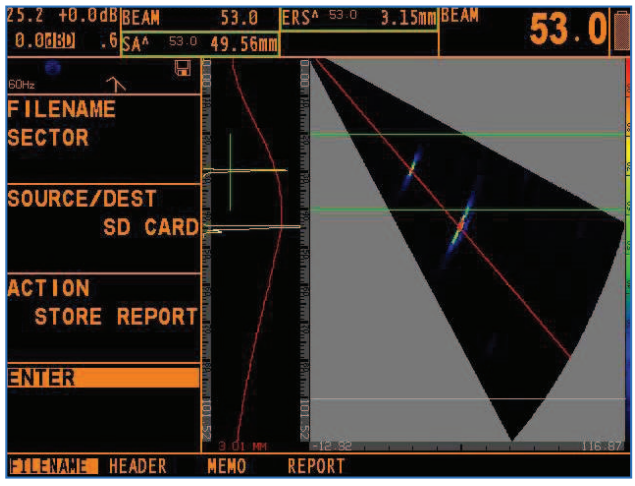
Creating *true*DGS Angle Beam Probes

Translating the point cloud into reality is a function of CAD modeling and *true*DGS angle beam probes can now be produced to provide a virtually perfect match with their associated DGS diagrams.





This same mathematical philosophy can also be extended to phased array probes which will shortly be available.



Technical Specifications - *true*DGS® Probes

Single Element

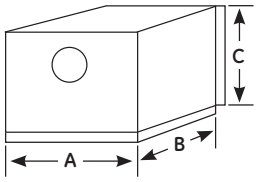
Type	Order Code	f (MHz)	β (steel)	N mm	Case
MWB 45-2tD	500678	2	45	18	Type 1
MWB 60-2tD	500679	2	60	16	Type 1
MWB 70-2tD	500680	2	70	18	Type 2
MWB 45-4tD	500681	4	45	44	Type 1
MWB 60-4tD	500682	4	60	43	Type 1
MWB 70-4tD	500683	4	70	31	Type 2

Phased Array

Type	Order Code	f (MHz)	Element count	pitch mm	sweep (steel)	N* mm	Case
MWB 2PA16tD	500684	2	16	0.89	45°-70°	30	Type 2
MWB 4PA16tD	500685	4	16	0.98	45°-70°	60	Type 2

Case	A mm	B mm	C mm
Type 1	20	36	26
Type 2	23	43	30

* at 56° / may vary at different stearing angles



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