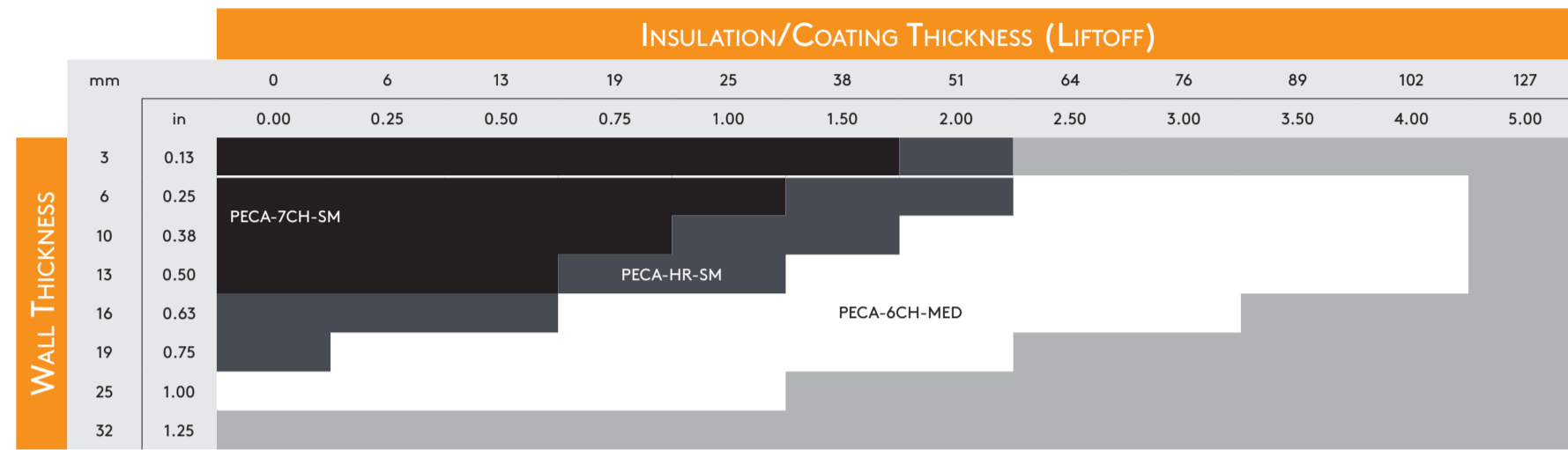


## Pulsed Eddy Current Array (PECA™) Probe Selection and Footprint—Carbon Steel

This reference document is designed to assist your selection of the right PECA probe for your application with Lyft software. Knowing the nominal thickness of the component being inspected and the nominal insulation/coating thickness in place will help you. The remaining information is intended to help you understand and determine the footprint of your probe, scan resolution, and circumferential grid spacing. This is especially useful in quantifying the performance of the Lyft solution under different conditions.

### PECA Probe Application Range



- Note 1: PECA-HR-SM is a dedicated probe used for scab inspections.
- Note 2: Estimated scab height should be considered as liftoff when validating the application range for the PECA-HR-SM probe.
- Note 3: Smallest configuration for PECA-6CH-MED probe: 102 mm (4 in) OD pipe, schedule 40, with 25 mm (1 in) insulation; total OD 152 mm (6 in).
- Note 4: PECA-7CH-SM-H05S is an application specific probe for ship deck inspection.

### Calculating the PECA Probe Footprint

Use the following formula to determine your probe's footprint (FP) and determine the axial grid resolution.

$$FP \approx 0.65 \times LO + FP_0$$

Where **LO** is the **liftoff** (insulation, jacket, coating thickness) and **FP<sub>0</sub>** is the footprint at a **liftoff of zero**.

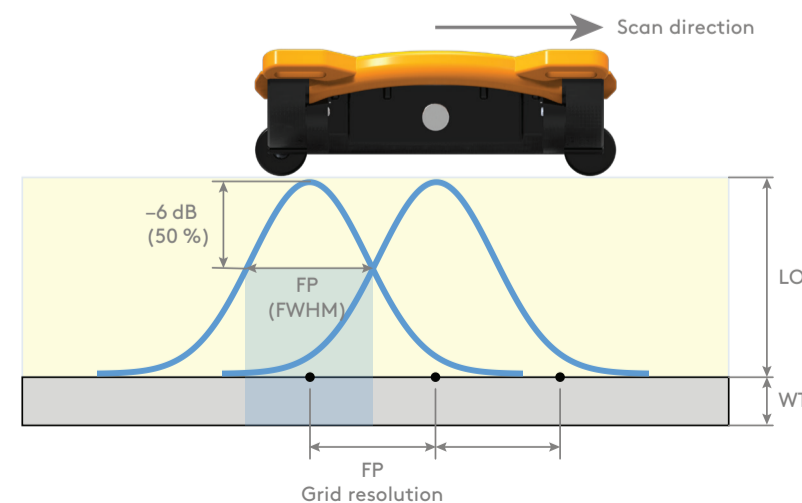
For the probe, **FP<sub>0</sub>** is:

<b>PECA-7CH-SM</b>	<b>PECA-HR-SM</b>	<b>PECA-6CH-MED</b>
FP <sub>0</sub> = 17 mm (0.67 in)	FP <sub>0</sub> = 22 mm (0.87 in)	FP <sub>0</sub> = 46 mm (1.80 in)

		INSULATION/COATING THICKNESS (LIFTOFF)											
		0	6	13	19	25	38	51	64	76	89	102	127
		in	0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	5.00
FOOTPRINT	PECA-7CH-SM	mm	17	21	25	29	33	42	-	-	-	-	-
		in	0.67	0.82	1.00	1.16	1.31	1.64	-	-	-	-	-
PECA-HR-SM		mm	22	26	30	34	38	47	55	-	-	-	-
		in	0.87	1.03	1.20	1.36	1.52	1.85	2.17	-	-	-	-
PECA-6CH-MED		mm	46	50	54	58	62	71	79	88	95	104	112
		in	1.80	1.96	2.13	2.29	2.45	2.78	3.10	3.43	3.75	4.08	4.40

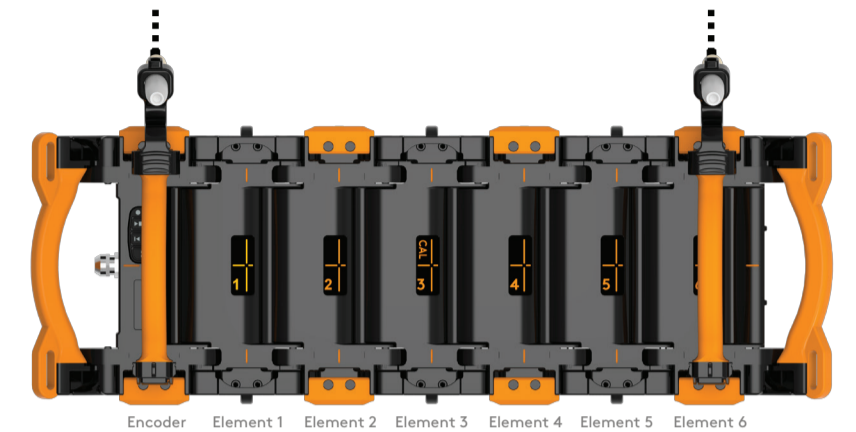
### Footprint

Use the footprint of the probe to determine the **optimal grid resolution** for proper detection. The FP is defined as the **full width at half maximum (FWHM)** of the response detected by the probe. This ensures a 50% signal overlap between each point on the grid map.



### Grid-As-U-Go™

Use the Grid-As-U-Go accessory to trace grid lines while scanning a component. Ensure full coverage and completely eliminate the need for surface preparation before the inspection.



### Minimum Detectable Defect Diameters at Specific Depths

		DEFECT DEPTH											
		10%		20%		30%		40%		50%		60%	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PECA-7CH-SM	0	41	1.6	29	1.1	24	0.9	21	0.8	18	0.7	17	0.7
	12.7	50	2	35	1.4	29	1.1	25	1	22	0.9	20	0.8

		DEFECT DEPTH											
		10%		20%		30%		40%		50%		60%	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PECA-HR-SM	0	31	1.2	22	0.9	18	0.7	16	0.6	14	0.6	13	0.5
	6	36	1.4	25	1.0	21	0.8	18	0.7	16	0.6	15	0.6
	12	39	1.5	28	1.1	23	0.9	20	0.8	18	0.7	16	0.6
	18	43	1.7	30	1.2	25	1.0	21	0.8	19	0.8	17	0.7
	24	46	1.8	32	1.3	26	1.0	23	0.9	21	0.8	19	0.7

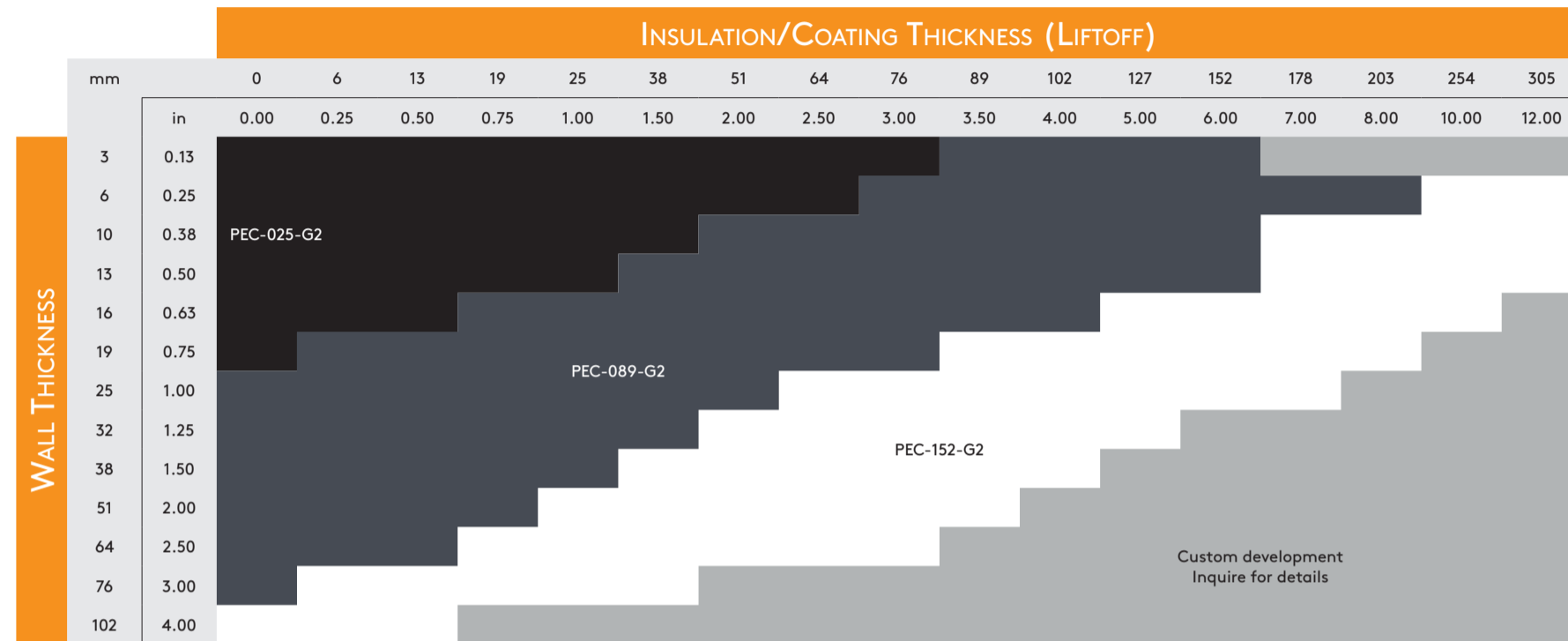
		DEFECT DEPTH											
		10%		20%		30%		40%		50%		60%	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PECA-6CH-MED	0	76	3.0	54	2.1	44	1.7	38	1.5	34	1.3	31	1.2
	12	92	3.6	65	2.6	53	2.1	46	1.8	41	1.6	38	1.5
	25	107	4.2	76	3.0	62	2.4	53	2.1	48	1.9	44	1.7
	38	120	4.7	85	3.3	69	2.7	60	2.4	54	2.1	49	1.9
	50	131	5.1	92	3.6	75	3.0	65	2.6	58	2.3	53	2.1
	64	142	5.6	101	4.0	82	3.2	71	2.8	64	2.5	58	2.3
	75	151	5.9	107	4.2	87	3.4	75	3.0	67	2.7	62	2.4
	90	162	6.4	114	4.5	93	3.7	81	3.2	72	2.8	66	2.6
	102	170	6.7	120	4.7	98	3.9	85	3.3	76	3.0	69	2.7

- Note 1: Requires a minimum resolution of half the footprint on the scan axis.
- Note 2: Impossible to detect through-hole defects (100% wall loss).
- Note 3: For the PECA-6CH-MED, tests were performed over 200 different configurations, using mixed liftoff values, types of weather jackets, flat and round-bottom holes.
- Note 4: For the PECA-6CH-MED, the use of double-index resolution for liftoff values between 0 and 25 mm (1 in) is required.

## Second-Generation PEC Probes (G2) Single-Element PEC Probe Selection and Footprint—Carbon Steel

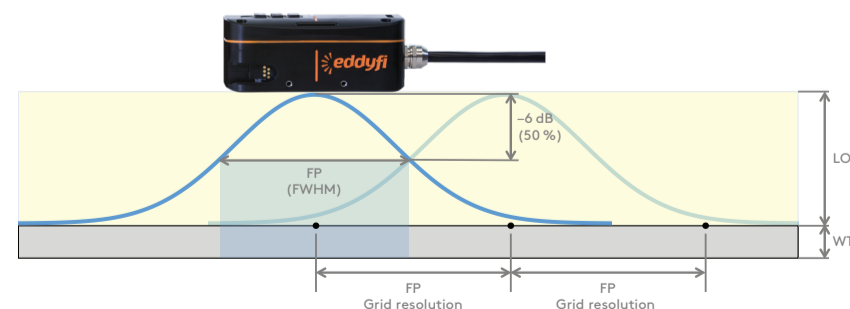
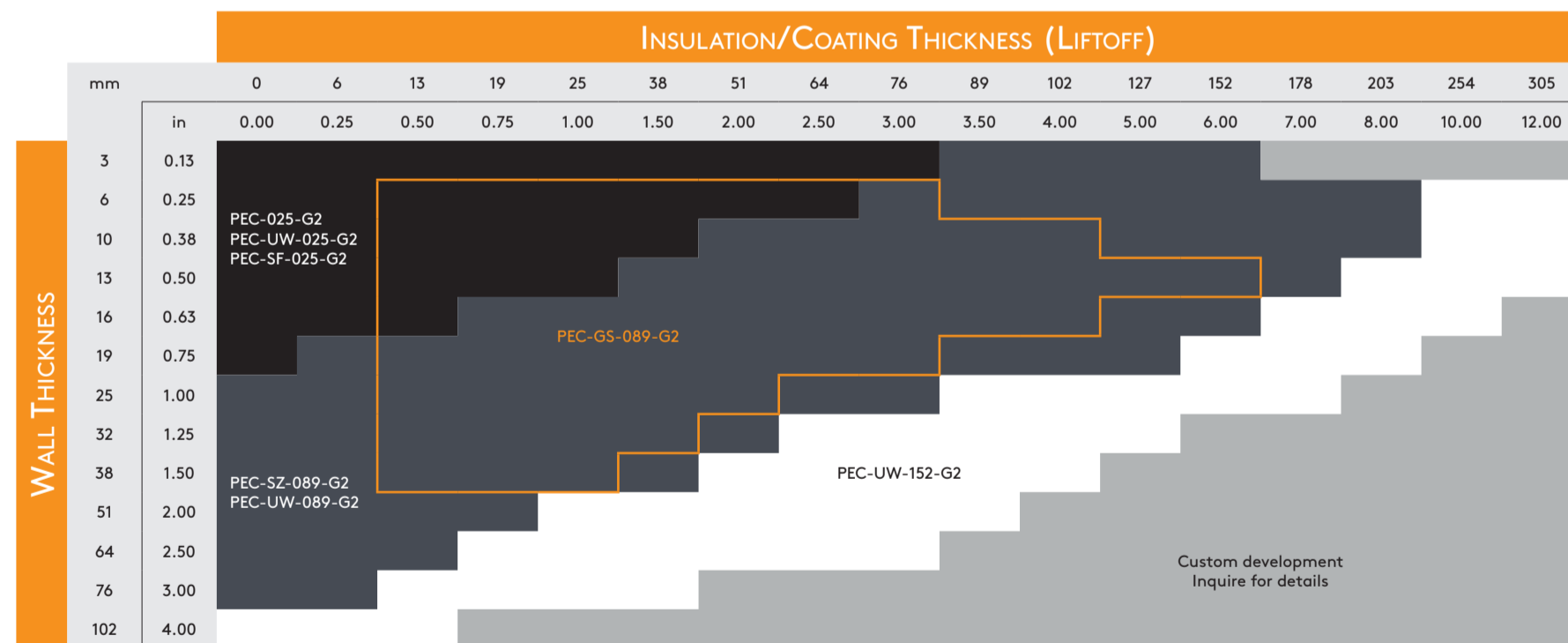
This reference document is designed to assist you in selecting the right PEC probes for your application with Lyft software. Knowing the nominal thickness of the component to be inspected and the nominal insulation/coating thickness in place, the selection tables below suggest the adequate probes. The remaining information is intended to help you understand and determine the footprint of selected probes. This is especially useful in quantifying the performance of the Lyft solution in a variety of conditions.

### Selecting the Right PEC Probe



We recommend using the PEC-GS-089-G2 in applications on galvanized steel (GS) weather jackets. If you use other standard probes over GS weather jackets, add 40 mm (1.5 in) liftoff for every 0.5 mm (0.020 in) of GS.

### Selecting the Right Specialized PEC Probe



### Footprint

The footprint (FP) of a probe is used to determine the **optimal grid resolution** for proper detection. FP is defined as the **full width at half maximum (FWHM)** of the response detected by the probe. Doing so ensures a 50% signal overlap between each point on the grid map.

### Calculating the PEC Probe Footprint

Use the following formula to determine your probe's footprint (FP) and determine the **axial grid resolution**.

$$FP \approx 0.65 \times LO + FP_0$$

Where **LO** is the **liftoff** (insulation, jacket, coating thickness) and **FP<sub>0</sub>** is the footprint at a liftoff of zero.

For the probe, **FP<sub>0</sub>** is:

**PEC-025-G2/UW/SF**

FP<sub>0</sub> = 35 mm (1.38 in)

**PEC-089-G2/SZ/UW**

FP<sub>0</sub> = 62 mm (2.44 in)

**PEC-152-G2/UW**

FP<sub>0</sub> = 100 mm (3.94 in)

		INSULATION/COATING THICKNESS (LIFTOFF)																																	
		0		6		13		19		25		38		51		64		76		89		102		127		152		178		203		254		305	
		in		0.25		0.50		0.75		1.00		1.50		2.00		2.50		3.00		3.50		4.00		5.00		6.00		7.00		8.00		10.00		12.00	
FOOTPRINT	PEC-025-G2	mm																																	
	PEC-UW-025-G2	mm																																	
	PEC-SF-025-G2	mm																																	
	PEC-089-G2	mm																																	
	PEC-SZ-89-G2	mm																																	
	PEC-UW-089-G2	mm																																	
PEC-GS-089-G2	mm	35	39	43	47	52	60	68	76	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	in	1.38	1.54	1.70	1.87	2.03	2.36	2.68	3.00	3.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PEC-152-G2	mm																																	
	PEC-UW-152-G2	mm																																	
	mm	100	104	108	112	117	125	133	141	150	158	166	183	199	216	232	265	298	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	in	3.94	4.10	4.26	4.41	4.59	4.91	5.24	5.56	5.89	6.21	6.54	7.19	7.84	8.49	9.14	10.43	11.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

We recommend using the PEC-GS-089-G2 in applications on galvanized steel (GS) weather jackets. If you use other standard probes over GS weather jackets, add 40 mm (1.5 in) liftoff for every 0.5 mm (0.020 in) of GS.

### Minimum Detectable Defect Diameters at Specific Depths

		DEFECT DEPTH												
		10%		20%		30%		40%		50%		60%		
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
FOOTPRINT	40	1.6	49	1.9	35	1.4	28	1.1	24	1.0	22	0.9	20	0.8
	50	2.0	61	2.4	43	1.7	35	1.4	31	1.2	27	1.1	25	1.0
	60	2.4	73	2.9	52	2.0	42	1.7	37	1.4	33	1.3	30	1.2
	70	2.8	86	3.4	61	2.4	49	1.9	43	1.7	38	1.5	35	1.4
	80	3.1	98	3.9	69	2.7	57	2.2	49	1.9	44	1.7	40	1.6
	90	3.5	110	4.3	78	3.1	64	2.5	55	2.2	49	1.9	45	1.8
	100	3.9	122	4.8	87	3.4	71	2.8	61	2.4	55	2.2	50	2.0
	110	4.3	135	5.3	95	3.8	78	3.1	67	2.7	60	2.4	55	2.2
	120	4.7	147	5.8	104	4.1	85	3.3	73	2.9	66	2.6	60	2.4
	130	5.1	159	6.3	113	4.4	92	3.6	80	3.1	71	2.8	65	2.6
	140	5.5	171	6.8	121	4.8	99	3.9	86	3.4	77	3.0	70	2.8
	150	5.9	184	7.2	130	5.1	106	4.2	92	3.6	82	3.2	75	3.0
160	6.3	196	7.7	139	5.5	113	4.5	98	3.9	88	3.5	80	3.2	
170	6.7	208	8.2	147	5.8	120	4.7	104	4.1	93	3.7	85	3.4	
180	7.1	220	8.7	156	6.1	127	5.0	110	4.3	99	3.9	90	3.5	
190	7.5	233	9.2	165	6.5	134	5.3	116	4.6	104	4.1	95	3.7	
200	7.9	245	9.6	173	6.8	141	5.6	122	4.8	110	4.3	100	3.9	

Note 1: Impossible to detect through-hole defects (100% wall loss).

Note 2: Requires a minimum resolution of half the footprint of the selected probe.

Note 3: Above defect sizes were determined using flat-bottom holes.