

Second-Generation PEC Probe Selection and Footprint (Lyft 1.3)

This reference document is designed to assist you in selecting the second-generation PEC probes that are best suited to your application with Lyft software version 1.3. 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, the averaging area, and the edge effect. This is especially useful in quantifying the performance of the Lyft solution in a variety of conditions.

Selecting the Right Standard PEC Probes

WALL THICKNESS		INSULATION / COATING THICKNESS (LIFTOFF)																
		0	6	13	19	25	38	51	64	76	89	102	127	152	178	203	254	305
mm	in	0.00	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
3	0.13																	
6	0.25																	
10	0.38																	
13	0.50																	
16	0.63																	
19	0.75																	
25	1.00																	
32	1.25																	
38	1.50																	
51	2.00																	
64	2.50																	
76	3.00																	
102	4.00																	

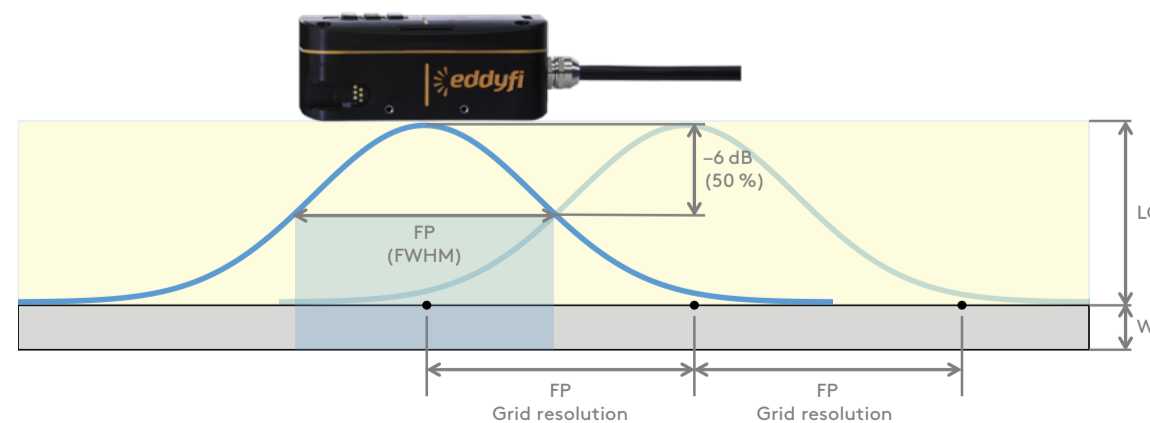
We recommend using the PEC-GS-089-G2 in applications on galvanized steel (GS) weather jackets. If you use other standard probes over GS weather jackets, add 40 mm (1.5 in) liftoff for every 0.5 mm (0.020 in) of GS.

Selecting the Right Specialized PEC Probes

WALL THICKNESS		INSULATION / COATING THICKNESS (LIFTOFF)																
		0	6	13	19	25	38	51	64	76	89	102	127	152	178	203	254	305
mm	in	0.00	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
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Footprint

The footprint (FP) of a probe is used to determine the **best grid resolution** for proper CUI detection. FP is defined as the **full width at half maximum (FWHM)** of the response detected by the probe. So doing, ensuring 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.

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

Where *LO* is the **liftoff** (insulation, jacket, coating thickness) and *FP₀* is the footprint at a **liftoff of zero**.

For each probe, *FP₀* is:

PEC-025-G2

FP₀ = 35 mm (1.38 in)

PEC-089-G2 / SZ / UW

FP₀ = 62 mm (2.44 in)

PEC-152-G2 / UW

FP₀ = 100 mm (3.94 in)

FOOTPRINT		INSULATION / COATING THICKNESS (LIFTOFF)																
		0	6	13	19	25	38	51	64	76	89	102	127	152	178	203	254	305
mm	in	0.00	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
PEC-025-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-089-G2 PEC-SZ-089-G2 PEC-089-UW-G2	mm	62	66	70	74	79	87	95	103	112	120	128	145	161	178	194	-	-
	in	2.44	2.60	2.77	2.93	3.09	3.42	3.74	4.07	4.39	4.72	5.04	5.69	6.34	7.00	7.64	-	-
PEC-GS-089-G2	mm	-	-	70	74	79	87	95	103	112	120	128	145	161	178	194	-	-
	in	-	-	2.77	2.93	3.09	3.42	3.74	4.07	4.39	4.72	5.04	5.69	6.34	7.00	7.64	-	-
PEC-152-G2 PEC-152-UW-G2	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

FOOTPRINT		DEFECT DEPTH											
		10%		20%		30%		40%		50%		60%	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
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

* Impossible to detect through-hole defects (100% wall loss)



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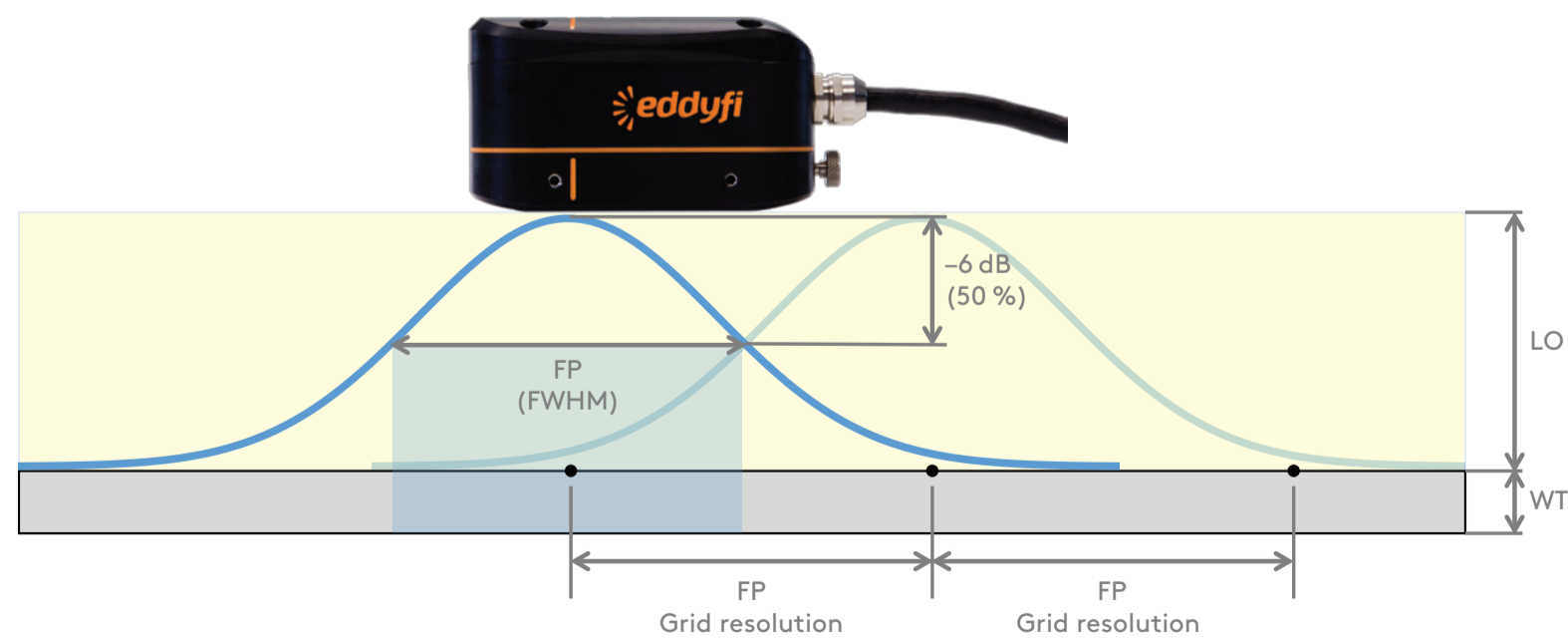
Selecting the Right PEC Probe

Reference the chart to choose a probe.

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For each probe, FP_0 is:

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PEC-089 / PEC-SZ-089

$FP_0 = 62 \text{ mm (2.44 in)}$

PEC-152

$FP_0 = 100 \text{ mm (3.94 in)}$

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PEC-089 / PEC-SZ-089	mm	62	66	70	74	79	87	95	103	112	120	128	145	161	-	-
	in	2.44	2.61	2.77	2.93	3.09	3.42	3.74	4.07	4.39	4.72	5.04	5.69	6.34	-	-
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Averaging Area

This is the **surface viewed by the probe** on the component. The wall thickness determined by Lyft is the **average wall thickness** within the **averaging area**. As a result, **corrosion flaws smaller than the averaging area are underestimated**. The averaging area diameter is **1.8 times** the probe footprint ($AvgA_{\phi} = 1.8 \times FP$).

Edge Effect

The edge effect impacts PEC measurements when a probe **nears geometry variations** such as nozzles, flanges, or the end of a structure. Measurements begin to **vary from a distance of one FP** from the center of a probe's coils.

