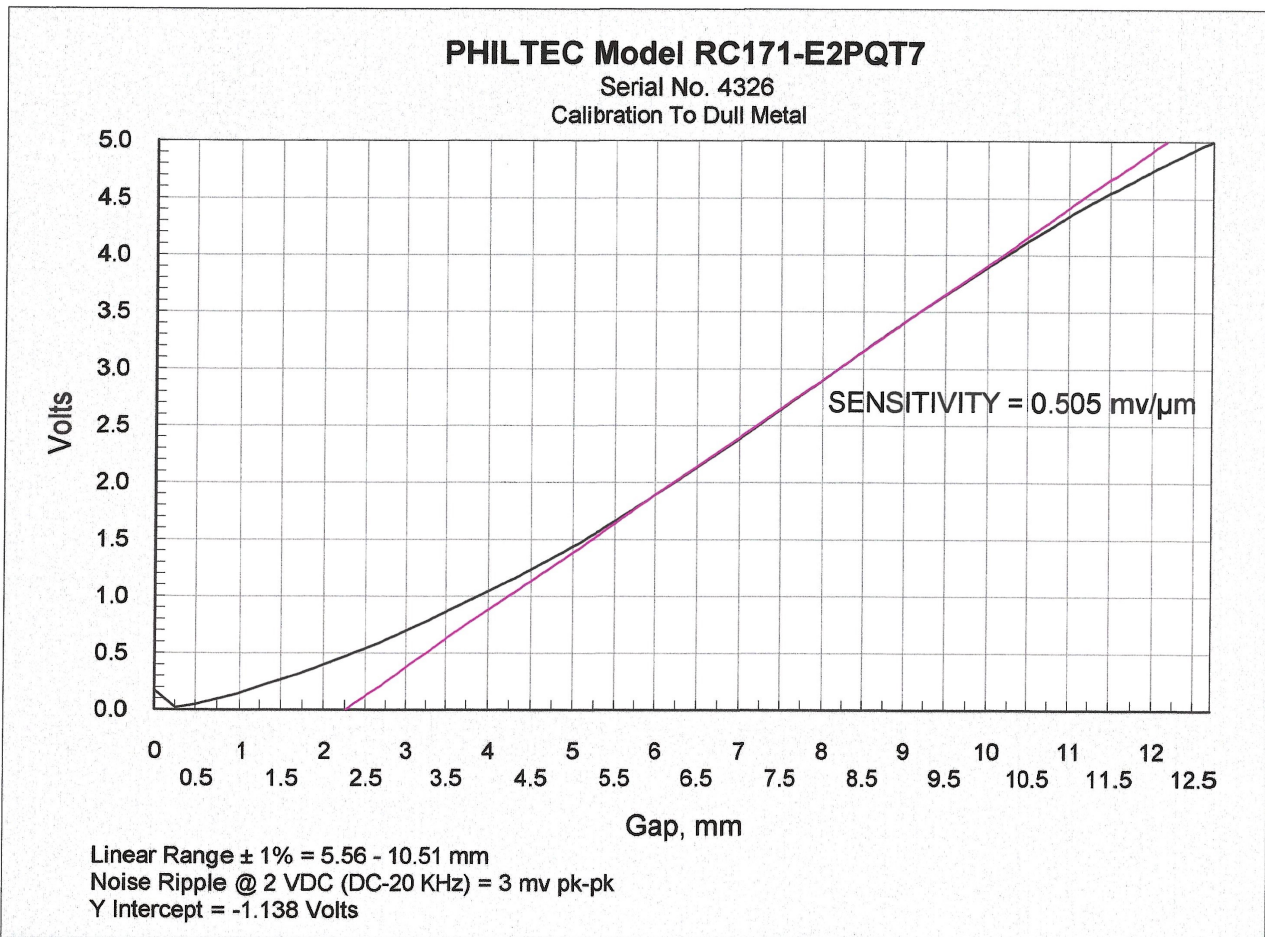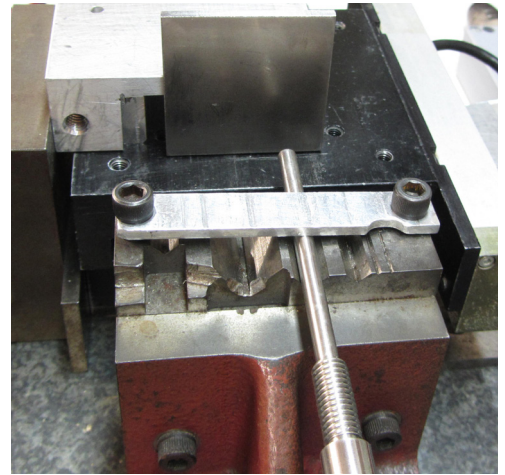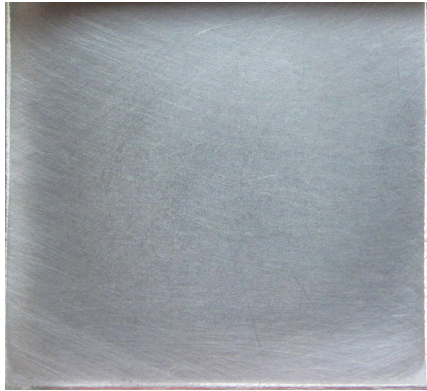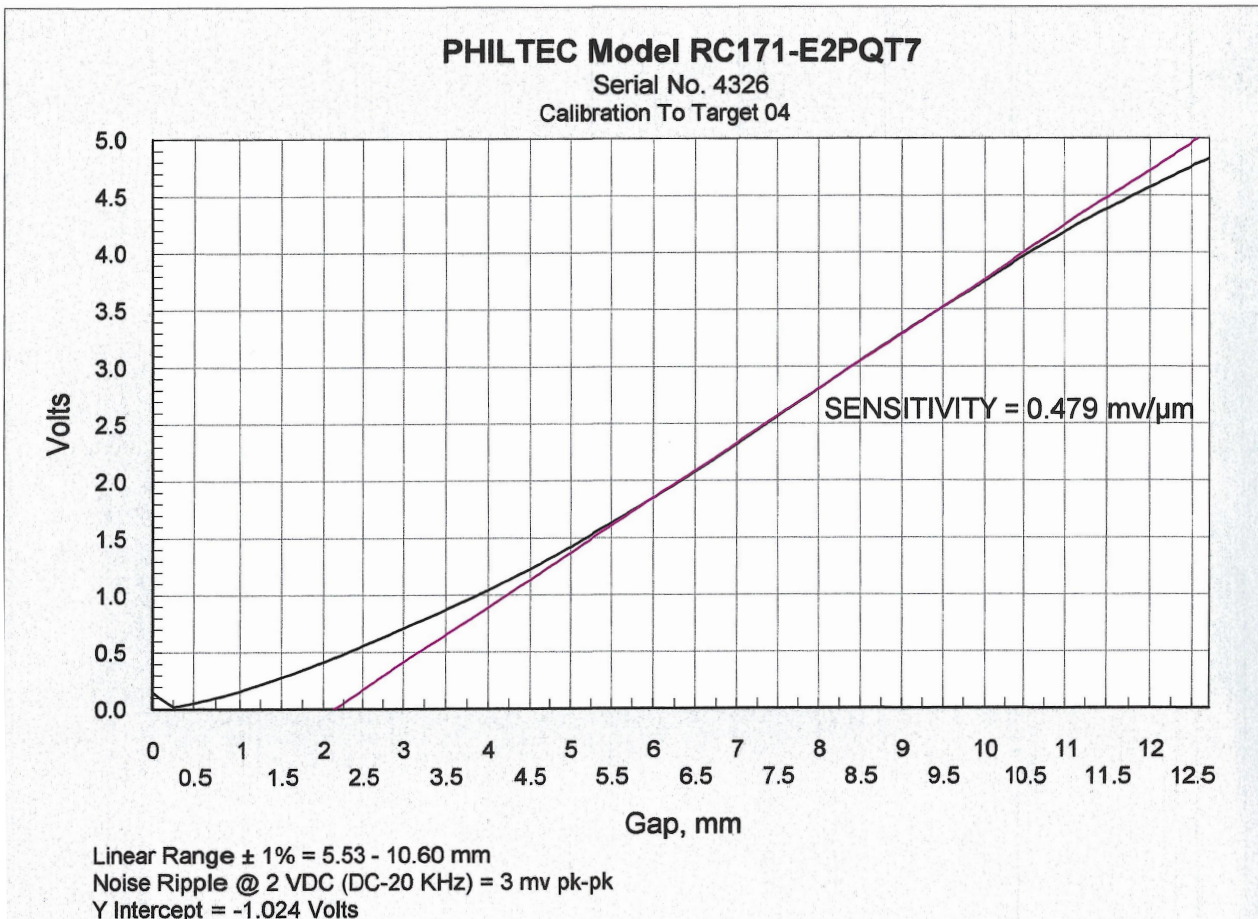# RC SENSOR CALIBRATIONS

Model RC171 Calibrations were made to 4 different metal targets without adjusting the gain output control. Only the SNR control was varied to 3-4 volts max to optimize the signal for each target

#1 - Dull Metal- A dull metal target was used first, and the sensor output was set to 5.0 volts at 12.5 mm (max range).

PHILTEC Model RC171-E2PQT7
Serial No. 4326
Calibration To Dull Metal

SENSITIVITY = 0.505 mv/µm

Volts

Gap, mm

Linear Range ± 1% = 5.56 - 10.51 mm
Noise Ripple @ 2 VDC (DC-20 KHz) = 3 mv pk-pk
Y Intercept = -1.138 Volts

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Precision Dynamic Measurements

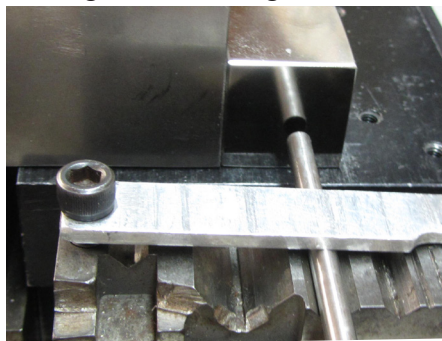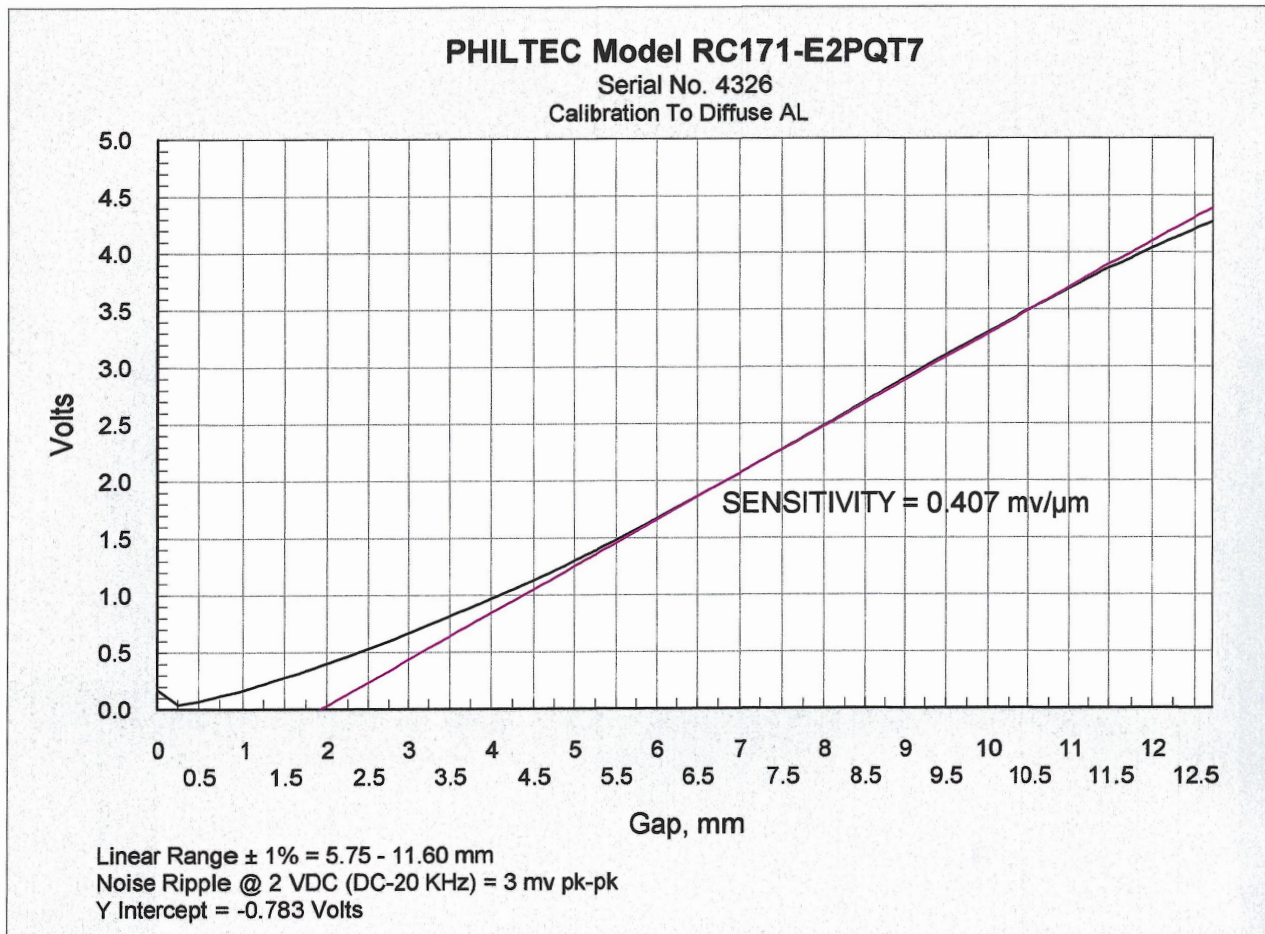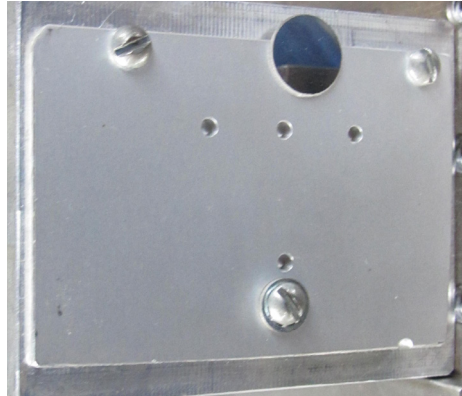**#2 - Target 04**- A round machined target was supplied by a customer and calibrated next. It was found to have a very silimilar output sensitivity, about 5% lower than target #1.

PHILTEC Model RC171-E2PQT7
Serial No. 4326
Calibration To Target 04

SENSITIVITY = 0.479 mv/μm

Volts

Gap, mm

Linear Range ± 1% = 5.53 - 10.60 mm
Noise Ripple @ 2 VDC (DC-20 KHz) = 3 mv pk-pk
Y Intercept = -1.024 Volts

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#3 - Polished Metal - A highly polished metal target was calibrated next. It was found to have an output sensitivity, about 17% higher than target #1.

PHILTEC Model RC171-E2PQT7
Serial No. 4326
Calibration To Polished Metal Cube

SENSITIVITY = 0.589 mv/µm

Linear Range ± 1% = 5.71 - 10.76 mm
Noise Ripple @ 2 VDC (DC-20 KHz) = 3 mv pk-pk
Y Intercept = -1.390 Volts
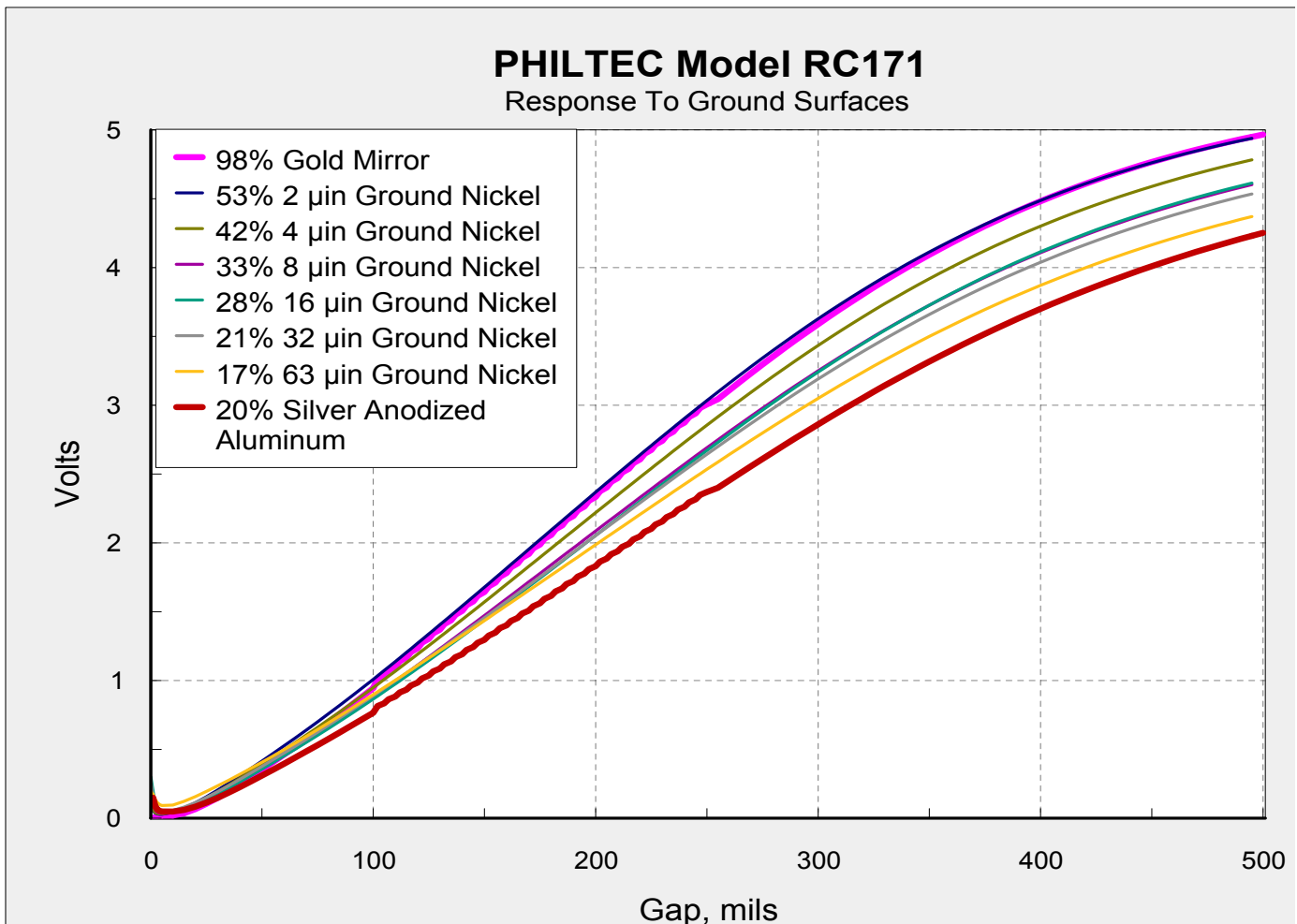
PHILTEC®
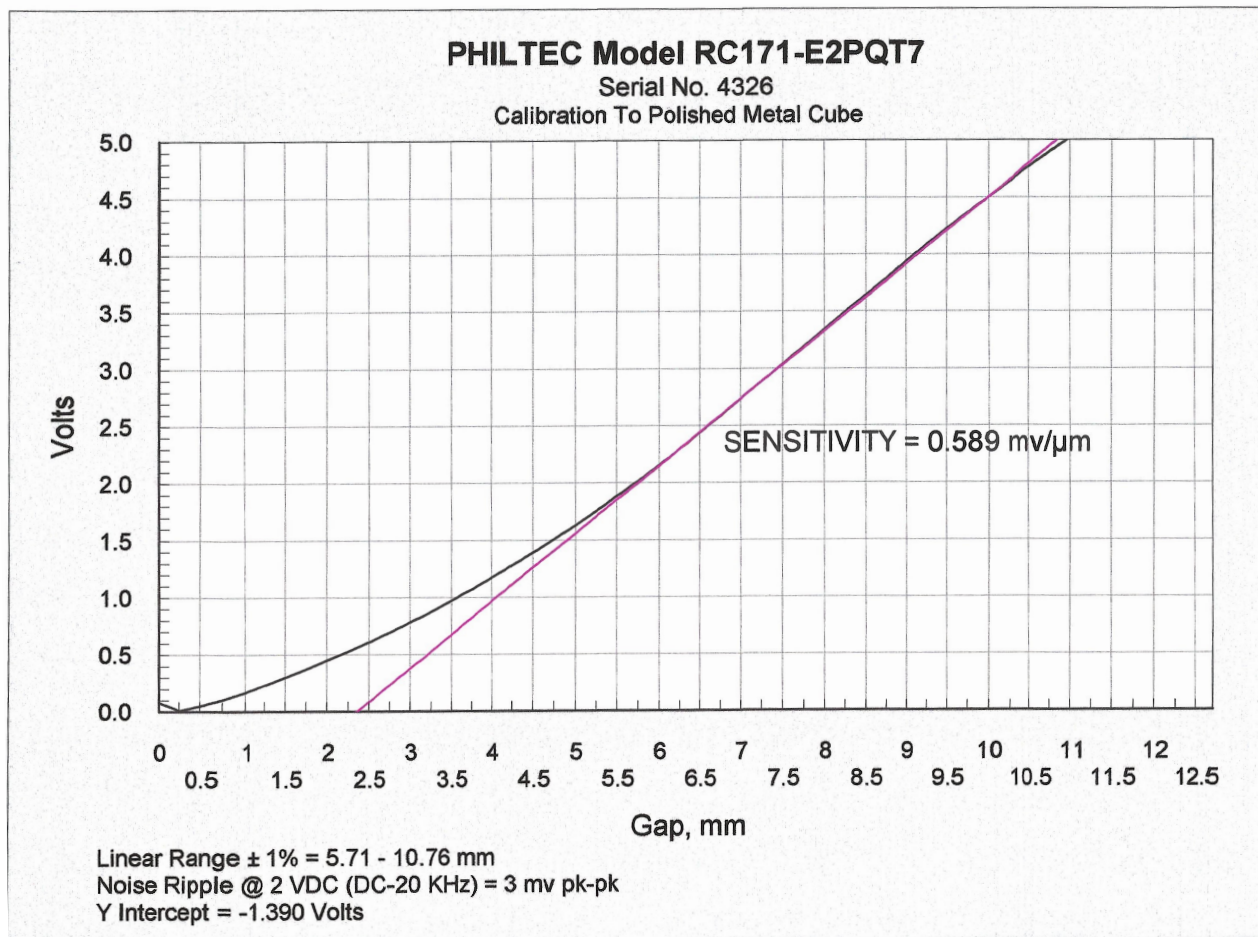
#4 - *Diffuse Aluminum* - An anodized diffuse metal target was calibrated next. It was found to have an output sensitivity, 20% lower than target #1.

PHILTEC Model RC171-E2PQT7
Serial No. 4326
Calibration To Diffuse AL

SENSITIVITY = 0.407 mv/µm

Linear Range ± 1% = 5.75 - 11.60 mm
Noise Ripple @ 2 VDC (DC-20 KHz) = 3 mv pk-pk
Y Intercept = -0.783 Volts

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Machined Surfaces

Machined surfaces can span the range from diffuse to specular reflectors. Rough machined surfaces are diffuse reflectors. Ground finishes can fall in between totally diffuse and totally specular. This is illustrated in the chart here: a 2 microinch ground finish reflects essentially as a mirrored surface; a 63 microinch ground surface is essentially a diffuse reflector. For best results, it is always good practice to calibrate a sensor to the same machined surface to be measured.

PHILTEC Model RC171
Response To Ground Surfaces

Legend:
- 98% Gold Mirror
- 53% 2 µin Ground Nickel
- 42% 4 µin Ground Nickel
- 33% 8 µin Ground Nickel
- 28% 16 µin Ground Nickel
- 21% 32 µin Ground Nickel
- 17% 63 µin Ground Nickel
- 20% Silver Anodized Aluminum

X-axis: Gap, mils
Y-axis: Volts

Read more at:

https://philtec.com/wp-content/uploads/2019/06/V6N25_ReflectanceCompensated.pdf

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