

LiDAR Test Target Kits



Driverless car OEMs rely on the accuracy of multiple sensors including LiDAR technology to maintain order and avoid incidences on the road. Autonomous cars depend on these laser-based time of flight systems to measure the distance between the vehicle and any proximate object. The laser light is transmitted at the speed of light towards an object and the time taken for the laser to hit the target is recorded. Laser point clouds emitted and reflected back to the transmitter and the time taken for the reflected light to hit the transmitter is used to create a 3D mapping of the scene. To accurately assess short-range and long-range sensitivity over the dynamic range of LiDAR systems, large area dark, grey, and white reference targets are ideal.

Labsphere's standard LiDAR Test Target Kits include three reflectance levels; 10%, 50% and 80%, a robust case that holds all three Permafect® targets for storage and transport, and spectral reflectance and uniformity test reports. The kits come in a choice of three target sizes; 0.5 m x 0.5 m, 1.0 m x 1.0 m and 1.5 m x 1.5 m.

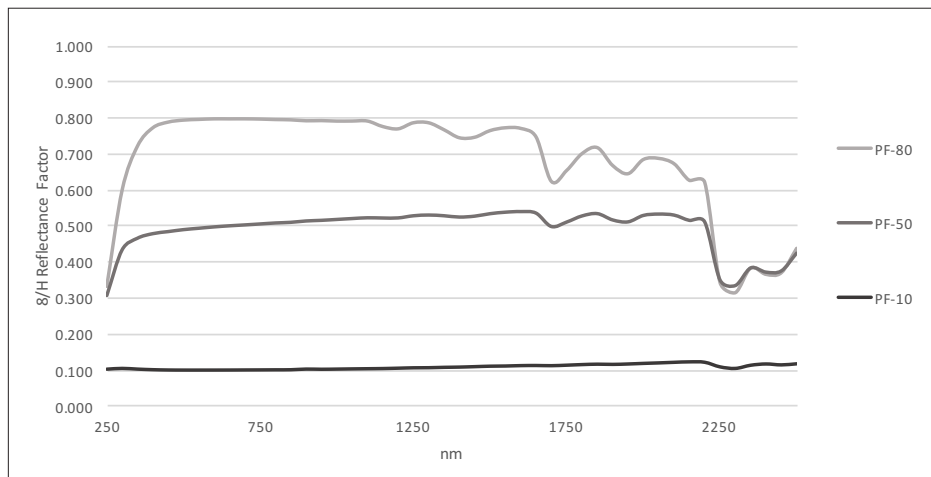
No other options compare

- Lightweight
- Uniform
- Durable
- Easy to Clean

Key performance factors

- Three grey scale levels (10%, 50% and 80%) for the dynamic range testing and distance sensitivity of LiDAR systems
- Reflectance levels in NIR laser wavelength 905 nm to 940 nm and 1550 nm
- Targets sizes (0.5 m, 1 m and 1.5 m square) are ideal for the operating distance
- Near Lambertian diffuse reflectance factor for incident angle independence
- Uniform reflectance over the entire reflecting surface
- Robust for production and field use
- Accommodates mounting of the frameless targets

Typical 8/H Reflectance Factors of Permaflect



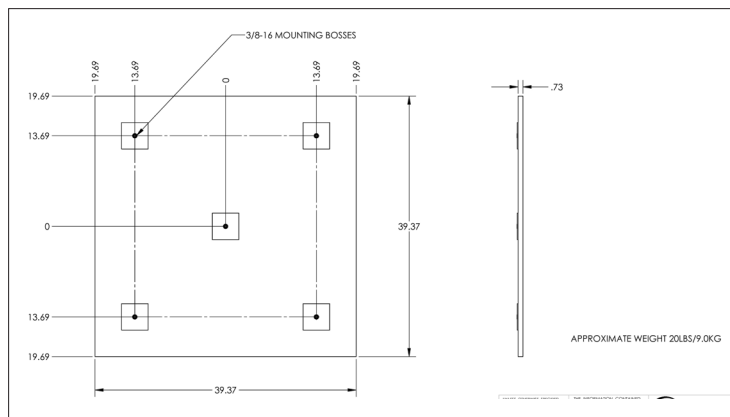
Measurement report includes:

- Spectral reflectance from 350 nm to 1000 nm every 10 nm
- Reflectance map of target at 600 nm and 905 nm
- Reflectance uniformity

Permaflect-X (%)	10%	50%	80%
Variance from Average in Absolute Reflectance:	+/- 1% (8.5% - 11.5%)	+/- 1.5% (48.0% - 52.0%)	+/- 1% (78.5% - 81.5%)
Typical Flatness: Peak to peak from 350 nm to 950 nm	0%	5%	8%
Uniformity:			
0.5 m x 0.5 m at 600 nm	+/- 1%	+/- 1.5%	+/- 1%
1.0 m x 1.0 m at 600 nm	+/- 1%	+/- 1.5%	+/- 1%
1.5 m x 1.5 m at 600 nm	+/- 1%	+/- 1.5%	+/- 1%



1.0 m x 1.0 m Informational Drawing



Carry and stow case features

- Protects surface and corners from being scratched and dinged
 - Hard sided hinged case with reinforced corners
 - Foam lined fitted inserts
 - Can be used to stack targets in constrained spaces
- Grab and go with recessed handles and latch
- Grab and drag larger targets with EZ Haul wheels options
- Can be used for shipment, storage and transport

Ordering Information

MODEL NUMBER	DESCRIPTION	ORDER NUMBER
PFTK-05M-UF-WM	Permaflect LiDAR Kit, 10%, 50% and 80%, 0.5 m x 0.5 m Unframed w/mounting and Carry Case Weight: 30 lbs (14 kg)	AA-01564-050
PFTK-1M-UF-WM	Permaflect LiDAR Kit, 10%, 50% and 80%, 1 m x 1 m Unframed w/mounting and Wheeled Carry Case Weight: 95 lbs (43 kg)	AA-01564-100
PFTK-15M-UF-WM	Permaflect LiDAR Kit, 10%, 50% and 80%, 1.5 m x 1.5 m Unframed w/mounting and Wheeled Carry Case Weight: 160 lbs (72 kg)	AA-01564-150



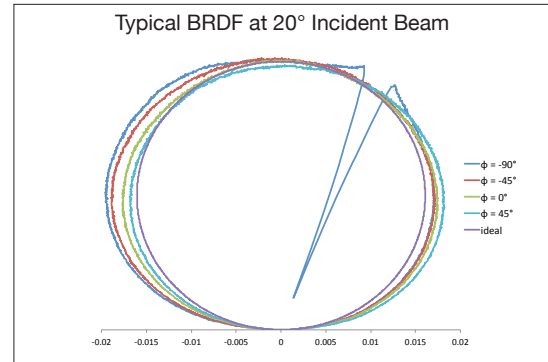
Wavelength (nm)	Typical 8/H Reflectance Factor		
	10%	50%	80%
250	0.10	0.30	0.33
300	0.10	0.43	0.60
350	0.10	0.46	0.72
400	0.10	0.48	0.77
450	0.10	0.48	0.79
500	0.10	0.49	0.79
550	0.10	0.49	0.79
600	0.10	0.50	0.80
650	0.10	0.50	0.80
700	0.10	0.50	0.80
750	0.10	0.50	0.79
800	0.10	0.51	0.79
850	0.10	0.51	0.79
900	0.10	0.51	0.79
950	0.10	0.51	0.79
1000	0.10	0.52	0.79
1050	0.10	0.52	0.79
1100	0.10	0.52	0.79
1150	0.10	0.52	0.77
1200	0.10	0.52	0.77
1250	0.10	0.53	0.78
1300	0.10	0.53	0.78
1350	0.10	0.53	0.77
1400	0.10	0.52	0.74
1450	0.11	0.53	0.74
1500	0.11	0.53	0.76
1550	0.11	0.54	0.77
1600	0.11	0.54	0.77
1650	0.11	0.53	0.75
1700	0.11	0.50	0.62
1750	0.11	0.51	0.65
1800	0.11	0.53	0.70
1850	0.11	0.53	0.72
1900	0.11	0.51	0.67
1950	0.11	0.51	0.64
2000	0.12	0.53	0.68
2050	0.12	0.53	0.69
2100	0.12	0.53	0.67
2150	0.12	0.51	0.62
2200	0.12	0.51	0.62
2250	0.11	0.35	0.34
2300	0.10	0.33	0.31
2350	0.11	0.38	0.38
2400	0.11	0.37	0.36
2450	0.11	0.37	0.37
2500	0.12	0.42	0.44

Bidirectional Reflectance Distribution Function (BRDF)

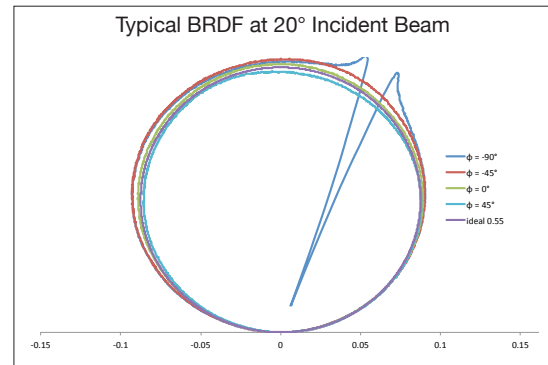
The BRDF data key are:

- θ lighting is the incident beam angle of illumination
- $\Phi = 0^\circ$ is cross-plane data collection
- $\Phi = -90^\circ$ is in-plane data collection
- $\Phi = -45^\circ$ is a plane halfway in-between 0° and -90°
- The backscatter direction in-plane is where the sensor obscures the light source (section with no data)

Permaflect - 10



Permaflect - 50



Permaflect - 80

