



Metal Space Frame (MSF) Protective Structures with Dyneema® Crystal Technology

L-3 ESSCO's Durashed Radome™ with Dyneema® Crystal Technology is the latest innovation in Metal Space Frame (MSF) protective structures. It offers superior protection and performance increases for advanced SATCOM, surveillance and tracking applications, and we anticipate it will become the new go-to standard for the industry.

KEY FEATURES

- High tensile strength and low density make Dyneema one of the world's strongest materials — while remaining very lightweight
- Exceptional water-shedding performance, critical in wet environments
- Superior RF transparency over a wide range of frequencies
- Reduced lead times and lifetime costs compared to existing solutions
- Better overall price and performance

CONSTRUCTION AND MATERIALS

L-3's Durashed Radome, developed under an exclusive arrangement with DSM Dyneema, incorporates the latest innovation in ultrahigh molecular weight polyethylene (UHMWPE) material, a patent-pending membrane branded as Dyneema® Crystal Technology.

One standard fiber consists of 780 filaments and has a total diameter of approximately 650 µm (only 575 µm thicker than the average human hair). The fiber is lighter and 50 percent stronger than standard membrane fibers. It provides increased structural integrity to the radome and protects sensitive equipment by keeping the elements outside where they belong.

Standard Durashed Radome skins can withstand wind speeds up to 150 mph (240 kph). Optional enhanced designs able to withstand wind speeds up to 250 mph (400 kph) are also available.

APPLICATIONS

Advanced antenna, radar, radio astronomy and communications systems for military, civil and telecom organizations.

Other Applications:

- Intelligence gathering
- Weather radar
- 2-D and 3-D surveillance radar
- C-, X-, Ku-, K- and Ka-frequency bands

Individual radome panels are created by mechanically fastening the material to a metal aluminum extrusion frame. The panels are then bolted together to form a geodesic dome. Reduced manufacturing cycle times translate into orders that can be delivered in two-thirds the time of conventional products.



Military vehicle image courtesy of Thales; shipboard radome image courtesy of Harris Corporation.





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HYDROPHOBICITY

The new material offers more than 90-degree hydrophobicity (water bead contact angle) and instantly sheds water, which is critical for certain operating frequency bands in wet environments. Normally, this water-shedding property is provided by a resin-based coating that must be reapplied every few years for maximum effectiveness. With L-3 ESSCO's new solution, hydrophobic properties are inherent in the membrane itself, virtually eliminating the need for regular maintenance.



ELECTROMAGNETIC PERFORMANCE

RF transparency is the key attribute in any radome being used for advanced radar, radio astronomy or communications systems. The new material provides a dielectric constant and loss tangent significantly better than the standard MSF material for increased RF transparency.

STANDARD SIZES

The Dyneema Crystal Technology can easily be sized to fit all existing L-3 ESSCO MSF panel truncations. Typical sizes range from 6 ft. to 200 ft. (1.8 m to 60.9 m) in diameter. Please contact us for more detailed size information.

MEMBRANE PARAMETER	STANDARD MSF	DURASHED RADOME
Loss Tangent:	.014	.003
Dielectric Constant:	3.0	2.3
Fatigue Test:	> 1,000,000 cycles	> 2,000,000 cycles
Tensile Strength Warp Direction*:	22,000 psi	46,000 psi
Tensile Strength Weft Direction*:	17,000 psi	40,000 psi
UV Transmission:	0%	0%
Weight:	0.24 lb./ft. ²	0.12 lb./ft. ²
Hydrophobicity (bead angle):	75°	> 90°
Membrane Field-Replaceable:	No	Yes
Limited Warranty:	3 years	10 years
Standard Delivery Time (ARO):	180 days	120 days

L-3 ESSCO's Durashed Radome performance is compared to the standard MSF design in the table to the left. A review of the data will demonstrate that in every case, the performance of the Durashed Radome membrane is far superior to the standard skin – except for UV transmission, which is equivalent.



*ASTM D638-77

All performance attributes are subject to change without notice.

Let L-3 ESSCO's innovation in radomes drive superior performance for your advanced radar, radio astronomy or communications system. Contact us today by phone at 978-568-5100 or by emailing us at Info,ESSCO@L-3com.com.



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