



LERC

VERTICAL SLEEVE MAST ADVANTAGES

1. DESCRIPTION OF LERC VERTICAL SLEEVE MASTS

The Vertical Sleeve Masts consist of the following elements:

- **cylindrical tubes** which quantity depends on the mast height. Those tubes are all identical and interchangeable (for the same mast series). The top section is usually specific according to the antenna fixation.
- **a barrel** in which the tubes are vertically sliding. Bubble levels are provided with the barrel to check the slope compensation.
- **a barrel support:** tripod for ground installations or vehicle/Shelter interface.
- **a guy kit** very different according to the mast reference. The very high masts or the ones supporting heavy loads are secured with 1 or 2 guy levels, kept in tension during deployment and retraction by a guy winch or a manual tensioning. Intermediate guy levels are sometime used to improve mast rigidity, wind resistance and pointing accuracy. Those intermediate levels are free during mast vertical movements, and tightened at the end of the deployment.
- **an anchoring system** made of 2 composite stakes for the tripod, and a assembly of 2 composite guy stakes linked with a metallic coupler for guy anchorage. This double guy stake system allows mast operation on soft soils (as sand desert, sand beaches, muddy fields, ...) by adding heavy loads (sand bags, big stones,...) on the coupler.
- **transport bags** or boxes. Each package weighs less than 45kg (100lbs), and can be transported by 1 or 2 operators.
- **an optional anti-twist** system, called STAR BAR, improving pointing accuracy for applications such as high frequency radio links, radar, cameras, ...
- **an optional motorization** of the lifting winch on masts reference MLV

LERC vertical sleeve masts are referenced:

- MLV (for heavy loads / height up to 40m) : pillar diameter of Ø125mm
- ULM (for loads up to 30kg at 20m) : pillar diameter of Ø64mm or Ø92mm

2. MAIN ADVANTAGES OF LERC VERTICAL SLEEVE MASTS

- Excellent resistance to environmental conditions : Sand, dirt, dust, snow, ice will not cause degradation of mast performance.
- Resistance to bullet impacts : a bullet impact on a pneumatic mast manufactured from light alloy will make a hole that will result in an air leak and in the mast collapse. It will also make a slight crack in the matrix likely to break the tube. In a LERC sleeve mast, a bullet impact will also make a hole but without affecting the mast height. Moreover, the woven and crossed structure of the composite material prevents any crack in the tube.
- Height maintained at constant level when the mast is in erection for an extended time : a pneumatic mast tends to go flat and therefore to retract, which can result in a cutting off of the link.
- Outstanding resistance to corrosion, chemical attacks and aging ;
- Undeforability : the tube sections show no permanent deformation even after extensive use (strength maintained, no ovalizing) ;
- Lightweight and outstanding mechanical resistance
- No maintenance other than wiping or brushing to clean
- Interchangeability of tubes. In case of damage on one or several tubes, the mast can still be deployed at a lower height. It is also possible to take some tubes from another mast of the same series.
- No air tightness to ensure
- Manipulation with naked hands, even under cold or hot temperature ;
- Adaptability to the customer's needs thanks to the computer designed (SAMCEF method) of the structure and the multiples combinations of materials and processes.
- LERC proven experience : More than 50 years in the field of composite materials, 35 years in the manufacturing of tactical masts and antennas.



MLV mast at 20m supporting a Band IV Line Of Sight (French Army, program CHF)

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3. MAIN REFERENCES

The MLV series has been produced in big quantities for Army needs. The references indicated below are only taking into account big programs or original applications:

- DAMP program, US Army, 1,400 masts, height 30m (100'), supporting 120kg - 265 lb. (\varnothing 1.2m dish antenna + positioning system)
- HCLOS program (valorization of MSE), US Army, height 30m (100')
- JITDS program, US Army, height of 34m
- CHF program, French Army, under delivery for 800 masts of 20m supporting up to 100kg
- RITA program, French Army, 1,500 masts, Height 17 and 24m (56' and 79') - SA-133
- ROYAL AUSTRALIAN NAVY, Height of 40m



MLV mast at 30m for US Army

The ULM series has been delivered in several programs of communications for the following Armies:

- Switzerland Army
- US Army
- French Army
- Belgian Army



ULM at 22m for US Army in Afghanistan

The MLV and ULM masts are known to be in duty in every country where US and French Armies are projected, such as : Irak, Afghanistan, Korea, Kosovo, Bosnia, Côte d'Ivoire, Cambodge, ...

4. LERC MASTS WIDTHSTAND TO ENVIRONMENTAL CONDITIONS

MLV, and by analogy ULM, masts have been qualified for most severe environmental conditions. A full qualification (First Article Test) has been conducted by the US Army prior to buy LERC MLV-30 mast (Reference AB-1373/TRC). The table below describes the test performed on MLV mast:

Temperature (MIL-STD-810D, methods 501.2 and 502.2): <ul style="list-style-type: none"> • Operation • Storage 	<ul style="list-style-type: none"> • -45° to +55°C • -56° to +71°C
Wind (reference Winds according to ANSI TIA/EIA-222-F): <ul style="list-style-type: none"> • For deployment/retraction • For operation (pointing accuracy) • For survival <p>A LERC document explaining wind calculations and tests is available upon request</p>	<ul style="list-style-type: none"> • 40km/h • 100km/h • 140km/h
Salt fog (MIL-STD-810D, Method 509.2 §I-3.2.d)	96 hours
Humidity (MIL-STD-810D, method 507.2, procedure III)	95+5% RH at 28°C
Rain (MIL-STD-810D, method 506.2, procedure I)	Heavy rain
Ice (MIL-STD-810D Method 521.0 and EIA/TIA-222-F)	1,2 cm
Sand and Dust (MIL-STD-810D, Method 510.2 Procedures I and II)	Remains operational
Vibration – Loose cargo transport (MIL-STD-810D Method 514.3 §I-3.2.3 Cat 3)	No damages
Shocks, transit drop (MIL-STD-810D Method 516.3 Procedure IV)	Test Level 516.3-II
Shocks, Bench Handling (MIL-STD-810D Method 516.3 Procedure VI Bench Handling)	Remains operational
Altitude (MIL-STD-810D, Method 500.2, Procedures I, II and III)	No incidence on mast capability
Fungus (MIL-STD-810D, Method 508.3)	No visual traces
Immersion (MIL-STD-810D, Method 4.12.2 Procedure I)	30 minutes

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