Solutions for the growing needs of today’s communications infrastructure

ENGINEERED DURABILITY

Solutions for the growing needs of today’s communications infrastructure
Modern consumers expect zero downtime which requires innovative solutions for communication structures.

The growing need for new wireless and broadband sites with reliable system infrastructure demands products with the lowest total ownership costs from initial purchase price through transportation, installation and maintenance. A commitment to the environment calls for poles that are eco-friendly while maintaining stringent technical specifications. Immediate response to storm related damage requires the exact inventory to restore communications. The convergence of these challenges establishes the need for a monopole that outperforms traditional poles on all levels.

Engineered Pole Technology
RS Technologies answers the growing demand for reliable telecom infrastructure products by providing a new monopole solution known as RStandard™. RStandard Composite Monopoles offer unique benefits when compared to traditional steel monopoles, lattice towers or wood and concrete poles for landline, wireless and Wi-Fi/WiMAX applications. RStandard poles have the highest strength-to-weight ratio of any material on the market and its modular design and advanced composite composition deliver exactly what telecommunication professionals require including:

- **Lowest Logistics Costs**
  including improved lead times, more efficient transportation, faster installations and more cost effective inventory management.

- **Lowest Liability**
  including lifetime guaranteed storm performance, improved safety for workers and the public, faster response times in emergencies and reduced environmental impact.

- **Longest Life**
  including a 41 year warranty, advanced protection against the elements and immunity to rot, corrosion and pests.

RStandard poles have been used by over 100 customers worldwide, including installations in North America, Australia, Europe, South America, Asia and the Caribbean.
COMPOSITE MATERIALS
The RStandard monopole is made from an advanced composite material that combines an ultra-strong polyurethane resin and E-glass fiber. These materials, in conjunction with filament winding technology, produce the longest lasting monopole available. RStandard poles are durable to the elements, non-conductive and extremely strong and light.

MODULAR DESIGN
Made from a series of light modular sections, RStandard monopoles possess a unique design that enables the modules to be nested in compact bundles allowing for maximized efficiencies in storage and transportation. The eight module system can be configured to build any pole up to 150 ft. [45.7 m], which lowers the lead time for deliveries, reduces inventory requirements, enhances design capabilities, allows future collocation expansion and simplifies transportation, handling and installation.

TECHNICAL ADVANTAGES
High Specific Strength:
Ultra-strong polyurethane resin and filament winding fiber placement technology results in the highest strength-to-weight ratio of any monopole on the market.

High Energy Absorption:
RStandard monopoles absorb considerably more elastic strain energy than traditional materials like steel for extra protection in storms and other high-load scenarios. The RStandard monopole has a lifetime performance guarantee.

Enhanced Safety:
Lightweight and non-conductive, RStandard monopoles offer greater safety for crews, wildlife and the public.

Integrated UV & Weathering Protection:
RStandard monopoles are resistant to rot and corrosion. Unlike competitive fiberglass reinforced polymer (FRP) poles, the UV stable aliphatic outer layers integrate UV protection right into the pole wall providing a permanent solution with a 41 year warranty.

Low Environmental Footprint:
RStandard monopoles save trees and the manufacturing process releases no volatile compounds (VOCs) or hazardous pollutants (HAPs). Unlike wood poles, the material is inert and does not leach any harmful chemical preservatives into the surrounding soil and water table.

Heat & Combustion Resistance:
RStandard poles are self extinguishing and meet the California Department of Forestry and Fire standard for fast moving brush fires.

Superior Temperature Performance:
The composite material performs well in both hot and cold environments. The established temperature range is -76 °F to +167 °F [-60 °C to +75 °C]. In addition, the material has a low coefficient of thermal expansion.
LOWEST LOGISTICS COST

RStandard's modular design offers the lowest cost of any monopole, from the time the order is placed to the time the pole is installed.

Reduced Storage Space

Drastic reductions in storage space are achieved with RStandard. The nested modules enable any length pole to be stored in less than 40 ft. [12.19 m]. A typical 75 ft. [22.9 m] RStandard monopole requires less than 20 ft. [6.10 m] of actual yard space. A 150 ft. [45.7 m] RStandard monopole only requires 37 ft. [11.3 m] of yard space.

Minimal Inventory

Because the interchangeable modular system can satisfy multiple pole strength and length requirements, only eight standard nested modules are stocked instead of custom, single application poles or lattice sections. This keeps minimal inventory on hand, quickens turnover cycles and reduces safety stock inventory costs while effectively meeting day-to-day and emergency requirements. Downtime from damage is significantly reduced because the modules can be quickly configured to build any pole up to 150 ft. [45.7 m]. Modularity means lead times for the RStandard are consistently the best in the industry.

“**One Set of Modules can build 42 Different poles**”

RStandard™ Modular Pole Combinations
### Monopole Capabilities From One Set of RStandard Modules

<table>
<thead>
<tr>
<th>Pole Length</th>
<th>20 ft.</th>
<th>30 ft.</th>
<th>40 ft.</th>
<th>50 ft.</th>
<th>60 ft.</th>
<th>70 ft.</th>
<th>80 ft.</th>
<th>90 ft.</th>
<th>100 ft.</th>
<th>110 ft.</th>
<th>120 ft.</th>
<th>130 ft.</th>
<th>140 ft.</th>
<th>150 ft.</th>
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<td>Heavy Duty</td>
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**Total Pole Capabilities = 42**
**Efficient Transportation**

RStandard’s modularity maximizes the use of standard length trailers and eliminates the need for slow and expensive oversized equipment and permits. See the Truckload Comparison chart below to review the significant shipping efficiencies that can be realized with the RStandard. Depending on pole size, RStandard modules can also be shipped and stored in 20 ft. (for monopoles up to 75 ft. [22.9 m]) or 40 ft. (for monopoles up to 150 ft. [45.7 m]) intermodal containers for international deliveries and quick deployment after natural disaster damage. Small helicopters can be used for challenging location drops.

"Maximized use of standard length trailers"
Installation Flexibility
RStandard monopoles are direct bury and do not require a costly, time consuming pour in place concrete foundation. This reduces installation time by up to 85%. The lightweight of the RStandard enables installation crews to utilize lighter duty machinery to set poles. In fact, most of the modules used for monopoles up to 75 ft. [22.9 m] can be carried by hand. When setting the pole, the modules allow for installation sequencing options. Unlike lattice sections, entire monopole can be assembled on the ground and then installed as a single unit. Alternatively, the base can be installed first and the completing top modules added at a later time either one at a time or as a preassembled piece. Design changes to pole height are easily accomplished by simply adding or removing the desired module. Pole modularity also provides for system expansion by adding top modules for future collocation opportunities (see graphic sequence below). RStandard monopoles are easily field drilled.

Case Study: Installation Advantage
“The standard sized, nesting modules allowed for quick lead time and cost effective transportation. Pole assembly and setting are very efficient with this system, which allowed us to expedite our build schedule. We also have the flexibility to deploy larger base modules today and add new top modules in the future to increase the pole height to accommodate future network upgrades or site sharing revenue opportunities. The RStandard is the only monopole system that offers this many solutions and is also maintenance free.”

Jeff St.Aubin
Project Manager
Morrison Hershfield Ltd.
LOWEST LIABILITY

RStandard's composite material and modular design reduce the risks and costs associated with managing communication infrastructure.

Guaranteed Storm Protection
RStandard’s ultra-strong composite material can absorb considerably more elastic strain energy in high-load storm situations than conventional materials like steel, providing excellent system resilience. RStandard monopoles are guaranteed for life against failure due to wind, ice, snow and lightning—see the RStandard™ Lifetime Guarantee for complete details. High fracture toughness protects against crack initiation and propagation. Additionally, the RStandard monopole is self-extinguishing and passes the California Department of Forestry and Fire fast moving brushfire test.

Increased Safety
RStandard monopoles are manufactured with a non-conductive and hydrophobic composite material. The lightweight modules decrease the probability of worker injury and equipment fatigue. The hollow RStandard monopole allows ground wires and transmission lines to be run internally.

Environmentally Responsible
RStandard poles are free of toxic preservatives common to wood poles. As a result, there is no leaching or soil remediation. Global use of the RStandard pole could save over 20 million trees annually, drastically reducing deforestation. These environmental advantages create opportunities for utilities to leverage the public relations benefits of using a green product.

Public Satisfaction
RStandard's controlled manufacturing process ensures a consistent lifetime aesthetic. The surface of the RStandard is easily cleaned of graffiti and poster glue and is resistant to staples which helps to reduce clutter on urban poles. Custom colors are available in addition to the standard grey or brown.

Case Study: Non-Conductivity
RStandard poles were proven by test lab Kinectrics in Ontario, Canada to pass the test for a hot stick making them one of the safest poles on the market.

Case Study: Environmental Advantage
“RStandard poles do not need to be coated with Penta, arsenic or creosote. As a result, these poles are the most environmentally friendly ones available in the market place.”
NWPPA Bulletin, January 2006

Specific Strength Comparison
- RStandard: 1,261.1 psi*ft/lb [542.8 kPa.m³/kg]
- Steel: 132.66 psi*ft/lb [57.1 kPa.m³/kg]
- Wood: 124.6 psi*ft/lb [53.4 kPa.m³/kg]
- Concrete: 46.7 psi*ft/lb [20.1 kPa.m³/kg]

Weight Comparison
- RStandard: 1,181 lbs [536 kg]
- Steel: 2,190 lbs [993 kg]
- Wood: 3,695 lbs [1,676 kg]
- Concrete: 8,500 lbs [3,856 kg]

75 ft. [22.8 m] Monopole
LONGEST LIFE

Manufactured with integrated UV protection and a durable composite material, RStandard monopoles provide a longer service life than any other structure alternative.

This unparalleled longevity enables telecom companies to allocate operational capital to other areas, minimizing impacts from expensive infrastructure replacement and maximize shareholder value. A reliable monopole is a valuable monopole.

Excellent Weathering and UV Protection

RStandard poles are designed for a minimum 65 year service life in South Florida and as much as 125 years in other climates. The design life is established in two peer reviewed and published papers: “Design of Polyurethane-based Composite Poles for 80 Years and Beyond” and “Lifecycle Predictions of Filament Wound, Polyurethane Poles”. This extended life expectancy is achieved from an imbedded layer of aliphatic UV protection that cannot be scratched or flaked off. RStandard monopoles are covered by a 41 year warranty against manufacturer’s defects – see the RStandard Warranty for complete details.

Corrosion, Rot and Pest Resistant

The RStandard will not rot or corrode because the surface is hydrophobic. This allows for excellent wet area and coastal performance as well as resistance to salt and chemicals. The RStandard monopole is impervious to termites, woodpeckers and other pests. These performance advantages eliminate maintenance and replacement requirements and reduce the need for a regular inspection schedule to dramatically extend the life of your infrastructure.

Case Study: Longevity Advantage

An island based company plagued by termite damage on wood poles has increased the life of their sites 8-fold by using RStandard monopoles.

LOWEST TOTAL OWNERSHIP COST

Expected Service Life

<table>
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<tr>
<th></th>
<th>Steel*</th>
<th>Concrete*</th>
<th>Wood*</th>
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<tbody>
<tr>
<td>Years</td>
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<td></td>
<td>80</td>
<td>100</td>
<td>120</td>
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</tbody>
</table>

*: Infrastructure replaced at 2.5% annually
(100/2.5 = 40 year typical service life for traditional monopole materials)
WORLD CLASS SUPPORT
RS is a trusted leader in composite pole technology. Our dedicated and qualified team of experienced engineers work with you from preliminary planning to job completion.

Design Support
The RS technical department is involved throughout the entire process to ensure you chose the right RStandard monopole for your application. Our design support includes full structural analysis in PLS-POLE™ where your loading and twist and tilt requirements are reviewed and a full report is generated detailing the performance of the RStandard in your application.

Technical Binder
We have compiled all of our technical information into a single package specific to either ANSI-EIA/TIA or CSA S37-01 standards. The technical binder contains:
- Comprehensive RStandard Data Sheets
- Structural Design and Hardware Guide
- Technical Specification
- Testing Overview
- Assembly and Installation Guide
- Frequently Asked Questions

Application and Installation
Our engineers can assist with project planning and assessment and are available to answer questions and provide support. Prior to commencing a project, we can complete a full hardware review and provide the necessary recommendations to ensure a long lasting, successful installation.

LAB TESTED, FIELD PROVEN
Our controlled manufacturing environment produces consistent modules each and every time that deliver measured, reliable infrastructure performance. You can count on it.

Quality Control
RS maintains a stringent quality control focus throughout the entire manufacturing process. From material inputs to formulation to final production, each step is carefully monitored to ensure you receive the best product on the market.

Testing
RStandard monopoles have been thoroughly tested and verified to all ASTM, ANSI-EIA/TIA and CSA S37-01 standards. Current installations are subject to extreme temperatures, corrosive environments, pest attacks, heavy loading and severe weather. All monopoles continue to deliver superior, predictable performance.
Rural Broadband Application

“We are involved with construction of one of the world’s largest wireless broadband networks to date. Our early construction efforts last year confirmed the many advantages of using the RStandard monopole. At the time this was a relatively new application of the product, but RS worked with us to quickly develop the specific telecom and safety hardware we required.

The logistics advantages of the RStandard allowed us to keep ahead of a very tight build schedule. The modular concept also allows us tremendous inventory flexibility with our installations ranging from 20 to 40 meters [65.6 to 131.3 ft.] in above ground height, all constructed from standard modules. We are continuing to find new applications for this versatile product and the RS engineering team has always been there to support us.

In the end, the RStandard modular concept allowed for quick lead times, fast, economical and permit-free transportation from our central yard to the sites and very efficient pole assembly and setting.”

Mac Fuller
Regional Manager
Seaside Wireless Communications
RECOGNIZED INNOVATION

The RStandard composite monopole won the 2005 Award for Composite Excellence from the American Composites Manufacturers Association for the most creative application and innovative use of composites materials.

Resin System Inc.’s filament winding process won the 2005 Innovation in Manufacturing Process Award.

"RStandard" and “Infrastructure For Life” are registered trademarks of Resin Systems Inc. “PLS-POLE” is a trademark of Power Line Systems Inc.

*Disclaimer - The following contained herein is offered only as a guide for RStandard monopoles and has been prepared in good faith by technically knowledgeable personnel. This brochure is for information only and could be modified without notice.