



RSI Tough Tower Systems

Summary: RSI Tough Tower Series: RSI-TT- SOW-BP-72 , RSI-TT- SOW-BP-89, RSI-TT- SOW-BP-106

- Trailer: A multi-terrain trailer with a standard 14,000lb capacity GVWR and **5,000 lbs** of available deck top payload; tandem **7,000lb capacity each**, heavy-duty axles, all-wheel electric or hydraulic brakes, telescopic outrigger stabilizing system, standard *12V arctic/desert wiring and LED lighting package*, tow compatibility with HD 3/4, standard 1-ton or larger tow vehicle (*please check individual vehicle ratings*); integrated tie down provisions, leveling devices, storage containment
- Tower: A **72'/22m or 89'/27m, or 106'/32m** heavy-duty, self-supporting and guy capable telescopic tower, fully automatic, galvanized steel lattice structure, redundant cabling for increased safety factor; keyed power panel access, integrated safety features
- Heavy-duty, direct drive, TEFC Wash Down rated motors and gearbox tower tilt and erection assemblies; tilt and telescopic functions designed for payloads up to 1,100 lbs **at 120VAC**, limit switch controlled tower-operating functions

The **RSI TT Series** models utilize a standard **14,000 lb capacity Gross Vehicle Weight Rating (GVWR)**, heavy-duty multi-terrain trailer and tower system designed to transport its integrated payload and support at site and/or customer-supplied equipment in an approximate **10'10"L x 6'8"W x 4' H** deck area. As designed, the trailer's skeletal frame is engineered with a minimum factor of safety of 2:1, with 4:1 in critical load areas. The lattice design, hot galvanized steel, telescopic tower, comprised of ~ 21'0" sections, is designed to transport horizontally over the trailer's forward deck, automatically tilt using a separate 1.5HP electric motor and raise the tower to its fully extended height, utilizing a separate, single stage, 1.5HP, electric winch motor/gearbox assembly. The **RSI TT Series** is capable of being deployed, elevated to its full-extended height by one person in under 30 minutes, and can be further secured by an available mechanical tower lock mechanism

RSI TT Models Trailer Specifications

- GVWR **14,000** Capacity; GAWR **7,000 lbs** Capacity Each Axle
- Dual 7,000 lb. HD Axles; 14,000 lb Suspension, Grease Hub
- Transport Length +32'0"; Transport Height +10'
- Trailer Length +22'9"; Trailer Width 7'6"; Deck Height 33"
- Customer Equipment Area – Approx. 10'10" x 6'8" x 4' to 7'H
- Solid Steel Construction – Min. 50Ksi Yield Strength
- C8.7@11.5 Steel Main Beams; C6 @8.2 Perimeter Steel
- Weight (w/o cust equip) ~8,900 lb/72', 9350 lb/89', 9700 lb/106'
- Customer Equip Capacity: 5100 lb/72', 4650 lb/89', 4300 lb/106'
- 1/8" Steel Diamond Plate Platform Decking; Welded Construction
- Four (4) HD Telescoping Outriggers; 8,000 lb. Static Load Jacks
- Electric Brakes (12V); ST235/80R16 LRE 10-ply Tires
- Full Sized Spare with 16" x 6k 8 hole Disc Wheel
- 15,000 lb. Static Load, Drop-leg, Adjustable Trailer Jack
- Deck-over-Axle Configuration; Underslung
- Arctic/desert Wiring-12V; Ground Lugs, Lift/Attach Rings
- Emergency Break-away Device; LED Lighting Package
- 2-5/16" Ball Coupler or Pintle Eye; P-70 Chains & Hooks
- 7-Blade Truck Connector, Operating/Maintenance Manual
- DOT Safety Decals; Reflectors; Multiple Trailer Levels
- Locking Storage Box & Jack Brackets
- Black Painted: *optional Impact/Weather Resistant Coating*

The **RSI TT Series** trailer is built to meet applicable DOT and United States Federal Vehicle Safety Standards at time of manufacture. The trailer is approximately 18'0" long, with a 7'7" wide rear deck, has an overall transport length of approximately 32'0" and a transport height of approximately 10'. The trailer has a single platform design, is constructed of solid steel with extra heavy-duty main and perimeter frames, and is engineered to support imposed loads as well as withstand all terrain applications (steel yield strength-minimum 50ksi). The trailer unit's structural frame, and under-



carriage are primed and painted black. The unit has a Gross Vehicle Weight Rating (GVWR) of 14,000lbs and an estimated base transport weight without installed accessories of 8,900lbs. When deployed, two (2) deck forward telescopic outriggers, approximately 5'7" each, coupled with two (2) 5/7" each, bumper extending, telescopic steel tube outriggers support and stabilize the tower trailer unit with the use of detachable 7,000lbs lift and 8,000lbs static capacity each drop-leg, leveling jacks.

The **RSI TT Series** trailer utilizes tandem, heavy duty axles – **7,000 lb capacity each**, 14,000 lb. capacity, underslung spring suspension, electric brakes on all wheels, four (4) ST235/80R16 LR E 10-ply tires mounted on 16" 8-hole wheels, a deck or under-carriage installed spare tire mounted on an 8-hole wheel and a 15,000 lb. static capacity, drop-leg front jack. The trailer's rear platform is approximately 33" high. A minimum 14,000 lb capacity 2-5/16" adjustable ball coupler or 3" NATO pintle eye towing device may be utilized with two (2) 5/16" P-70 safety chains with hooks. Trailer units include a 12V arctic/desert wiring and LED lighting package, DOT compliant sealed wiring harness, a civilian SAE 7-way plug, multiple lift/attachment rings an emergency trailer breakaway device with battery and charger, a locking storage box, and perimeter grounding lugs.

RSI TT Series general trailer characteristics:

- **Equipment Install Area:** + 10'10" L x 6'8" W x 4' to 7' H
- **Overall Trailer Length:** + 22'9"
- **Overall Trailer Width:** + 7'7"
- **Overall Transport Length:** + 32'0" (includes tower extended off trailer rear)
- **Overall Transport Height:** + 10'
- **Overall Deployed Footprint:** + 20' W x 30' (includes extended outriggers)
- **GVWR:** 14,000 lb capacity
- **GAWR Each Axle:** 7,000 lb capacity
- **Axles:** 7,000 lbs each, Tandem axles, heavy-duty, hub grease
- **Brakes:** All Wheel Electric (12V); break-away with battery back-up
- **Tires:** Four (4) ST 235/80 R16 LRE 10-ply
- **Wheels:** 16" Steel Wheels, 8-hole
- **Suspension:** 14,000 lb spring capacity, underslung
- **Platform Length:** + 18' over axle area
- **Platform Width:** + 7.5" wide at rear
- **Platform Decking:** + 1/8" steel diamond plate drawbar and rear operating platform
- **Platform Height:** + 33" over axle area, ± 26" drawbar trailer deck
- **Outriggers:** Two (2) + 5'7" each forward deck mounted telescopic outriggers and two (2) rear deck, multi-stage, 5'7" telescopic, locking stabilizing outriggers ~ each with 8,000 lb static capacity adjustable jacks
- **Towing Device:** 2-5/16" ball coupler *Optional: NATO pintle eye or Gooseneck Trailer*
- **Landing Gear:** Single 15,000 lb static capacity, adjustable, drop-leg jack
- **Tow Safety Chains:** 5/16" P-70 style with hooks
- **Spare Tire Carrier:** Spare tire carrier mounted beneath or a top the deck platform
- **Lift/Attachment Rings:** Two (2) pair 1" minimum, "D-ring" style; 10,000 lb each rating
- **Jack Storage:** Stored in locking tool box
- **Lights/Wiring:** Arctic/desert wiring and LED lighting package (12V), modular harness wiring and connectors, civilian SAE 7-blade vehicular connector
- **Spare Tire:** Full size ST 235/80R16 LR E 10-ply mounted to 8-hole wheel



- **Storage Box:** Trailer deck mounted locking storage box
- **Bubble Levels:** Two (2) trailer mounted levels, one(1) on trailer perimeter and (1) at rear
- **Grounding Lugs:** Four (4) trailer-mounted grounding lugs
- **Trailer Finish:** Multi-part industrial primed and painted trailer structure - black. Optional: impact resistant and weather protecting rubberized coating sprayed over the trailer's deck-top operating platform

RSI TT Series Transport Capabilities

Air: C-17, C5

Land: All-wheel, 2 or 4-wheel drive truck or Long Haul Flatbed (*Height permit may be required for flatbed transport*)

- First class roads: To 70 mph
- Graded but unpaved roads: To 30 mph
- Un-graded roads: To 5 mph

Sea: As deck or hold cargo

Rail: Transportable by rail (*with carrying car is designated as special handling*)

In the **ground transport** configuration, the trailer-to-tower structure, all tie-down points, primary/ancillary equipment and their attachments to the trailer shall withstand the specified G-load factors utilizing AISC standards as a guideline with following Transport Acceleration Loadings:

- Vertical Down: 2.0 G's
- Vertical Up: 1.5 G's
- Aft/Longitudinal: 1.5 G's
- Secured Accessories: Above plus potential 4.5G Download (Primary Components)

Additional RSI TT Series Trailer Characteristics

- The trailer tongue weight is in accordance with industry practice for similarly loaded trailer configurations
- The trailer includes level indicators on two planes that are easily visible from the ground
- Leveling jacks are installed on the trailer to compensate for up to a 5-degree ground slope over the trailer length
- The height of the outriggers is adjustable by use of the leveling jacks to compensate for variations in terrain; outriggers include a locking mechanism and lanyards to insure their safe transport
- The trailer is equipped with a minimum four (4) ground lugs
- Adequate protection for metal-to-metal surfaces is provided; protective sand/marsh pads to prevent surface damage under varied environmental conditions is provided
- Lanyards and/or locking mechanisms are provided on equipment/components as necessary and are designed to minimize wear on adjacent surfaces
- The trailer includes a locking storage box providing adequate space for optional guy assemblies and related tools
- All trailer mounted equipment and accessories requiring periodic operation or maintenance is easily accessible
- All surfaces that may collect water shall have drain holes where necessary
- All non-metallic material shall be UV resistant

RSI TT Series are constructed from longitudinal monolithic structural steel members and shall be straight within +0.50"



or less when in a loaded road transport configuration. The trailer structure, axles and brake assembly shall withstand stresses encountered during the transport configurations described above. A structural safety factor of 2.0 times (up to 4 times for critical load areas) shall be applied to the design of the trailer.

[RSI TT Series Self-Supporting & Guy Capable Tower System](#)

The RSI TT Series is a self-supporting and guy capable, telescopic, lattice structure with fully erected height of approximately **72'/22m or 89'/27m or 106'/32m** above ground level (AGL). This is a self-supporting tower with no guy wires required for a given combination of payload (weight, sail area and mounting height) and wind velocity. Guying, to outriggers or to ground anchors, along with installation of tower locking mechanism, is always recommended when the tower is to be left in any location for an extended period of time, or if personnel will be climbing the structure. All anchors, guys and hardware are provided as part of the RSI TT Series standard equipment.

The towers are comprised of 21 foot each, heavy-duty, hot-dipped galvanized steel, telescoping lattice sections mounted to a welded and hot dipped galvanized square tube base support structure that is bolted to shear plates protruding from the trailer's structural platform. The tower is tilted to the vertical position by a **1.5HP** Totally Enclosed Fan Cooled (TEFC), Wash Down rated, direct drive stainless shaft winch motor and gearbox assembly utilizing **a 3/8" 7x19 GAC Galvanized Aircraft Cable** and automatically erected by a **1.5HP** Totally Enclosed Fan Cooled (TEFC), Wash Down rated, direct drive stainless shaft winch motor and gearbox assembly, utilizing a heavy duty winch drum with **a 3/8" GAC Galvanized Aircraft Cable and a 5/16" 7x19 GAC redundant safety cable**. In addition, the **redundancy of the tower cabling** configuration and a positive pull down system provide for the securing/supporting of each individual interior tower section by a series of three (3) independent cables. The engaging of an optional mechanical tower lock mechanism further ensures the safety and stability of the erected tower. **To help protect the tower from Operator attempts to elevate lower while in transport mode; potentially causing serious structural damage and/or personal injury, an electronic safety limit switch has been installed to help eliminate this possible occurrence. Additional limit switches prevent tower from being tilted when fully erected and to prevent over-extension of tower during erection.**

The tower's tilt and telescoping functions are automatically engaged and disengaged by the use of tower and base mounted electronic limit switches. Contained within a locking NEMA 4 enclosure, a proprietary control system utilizes a **120VAC or 240V/60Hz/1PH** power supply to operate the tower. **To protect the tower's electronics from exposure to the elements, control switches are accessible through an integrated weather protecting outside panel.**

[RSI TT Series Tower Control Panel and Enclosure: Standards and Compliance](#)

UL 50 and UL50E Types 1, 2, 3, 3R, 4, 4X, 12 and 13
CSA C22,2 No. 94, Types 1, 2, 3, 3R, 4, 4X, 12 and 13
Complies with:
-NEMA Types: 1, 2, 3, 3R, 4, 4X, 12 and 13
-IEC 60529 Type IP66



Standard Features

- 72'/89'/106' **Self-supporting/Guy Capable** Structure
- 1,100 lb. Standard Tower Tilt & Lift Capacity (no cranes)
- **Multiple Limit Switch Controls:** Tilt, Erection & Retraction
- Hot Dipped Galvanized Lattice Tower Sections
- **5/16" & 3/8" 7x19 Galvanized Aircraft Quality** Cables
- Motor Protection Devices
- Solid State Control Box Circuitry; Locking NEMA Box
- Min. 1.5HP Motor/Gearbox Assemblies; All Weather Rated
- **Direct Drive** Winch/Motor Assemblies – **No Belts, No Chains**
- Three (3) Coax/Cable Rings
- Positive Pull Down and **Redundant Cabling Systems**
- Standard 120V 60 Hz/1PH Power Supply Requirement (240v Opt.)
- **Mechanical Lock** for additional tower safety (option)
- 3-Arm "T"-Bar Style 120° Antenna Mount Assembly (4- Arm Opt)
- Multi-level/3-point Guy Cable and Ground Anchor Kit
- Heavy-duty Galvanized Tower Base Structure

GENERAL TOWER SPECIFICATIONS			
Tower Height Nested	+ 28'0" Vertical Nesting	+10'5" Horizontal Nesting	
Guyed Antenna Area – Max Wind	Contingent on Client Load	Max. Est. To 125 MPH	Actual Rating Per Client-specific Load
Self-Support Area – Max Wind	Contingent on Client Load	Max. Est. To 75 MPH	Actual Rating Per Client-specific Load
Maximum Wind Speed at Erection	----	----	Max to 30 Mph
Payload Weight at Top of Tower	----	----	Max to 1200lbs
Payload Weight on Tower During Tilt	----	----	Max to 1000lbs
Erection / Retraction Speed	----	Single Stage Process	Direct Drive +7.9 Min. @ 120VAC/60Hz
Tilt Speed	----	1.5HP Cable Winch	Direct Drive +5 Min.
Power Requirement to Operate Tower	----	Electric Drive System	120V/60Hz/1PH (or 240V)
Erection / Retraction Motor HP	----	Direct Drive–12 0V/60Hz	1.5-HP, 1-Phase ~ Single Stage Config.
Scope/Motor & Gear Box Ratio	----	----	Direct Drive (Min. 900:1)

Standard Material Specifications	
Legs – Mechanical, Tubing, Seamless and Welded (NOT PIPE)	HSS ASTM DOM 1026 Alloy/A513 ~ 70-95 Ksi Yield Strength
Structural Shapes Solid Rod, Bars, Angle, Etc	ASTM A-36 ~ 36 Ksi Yield Strength
Structural Steel Square Tube	ASTM A-500 ~ 50 Ksi Yield Strength
Horizontals – Flat Bar	ASTM A-36~ 36 Ksi Yield Strength
Welded E70 Electrode	AWS D1.1 Latest Rev.
Hot Dipped Galvanize All Steel – ASTM A-123	ASTM A513 Mechanical Tubing
Hardware/Bolts	ASTM F1941 SAE Grade 8

- All work shall be in conformance with the requirements of the Uniform Building Code (UBC), and structural requirements of the Telecommunications Industries Association (TIA) - Electronic Industries Assoc. -TIA-EIA 222-G
- Steel fabrication shall conform to the requirements of AISC Manual of Steel Construction/Electronic Industries
- All tower tilt/lift/support cables shall be minimum 5/16" & 3/8" 7 x 19 galvanized steel aircraft quality

Structural and Engineering Analysis / Methodology for PE Report - If Authorized by Client

A rigorous Finite Element Analysis program may be utilized to perform a stress analysis review to determine tower member design in conformance to the **ANSI/TIA/EIA 222-G** Standard requirements for a client's specific payload configuration (weight and sail area). PE certifications are performed, upon customer request, by the unaffiliated Engineering and Consulting Firm:

ROSSProfessionals, LLC, Rapidly Optimized Structural Solutions, 1001 Bellevue w Street, Ste.308, Dallas, TX 75215



RSI TT Series: Additional Tower Characteristics and Features

- The RSI Tough Tower models presented herein are standard RSI products
- The tower includes mechanical section guides to ensure minimum friction and play between tower sections during deployment and operation
- A complete guy package (anchors, guy cables, hardware) is provided as part of the standard RSI Tower
- A “3 Arm”, 120°-rotatable antenna mast is provided as part of the standard RSI TT Series(4-Arm optional)
- Tower lift, pull-down and section support cables shall be comprise of both 5/16” and 3/8” 7x19 galvanized steel aircraft quality cables.
- In case of a loss of power, the tower comes equipped with a manual method for lowering the tower from the full or partially raised state to the stowed and transport configuration
- A minimum of three (3) guide rings shall be provided on the tower for client’s cables

RSI TT Series – Environment Condition Guidelines

The RSI TT Series uses electric motors for both tilt and lift functions. This avoids any potential operational problems due to heat or cold, and any environmental issues due to leaking hydraulic fluids.

Given the environmental characteristics in which the equipment may be deployed, the **tower and trailer** are manufactured for survival/storage without excessive degradation (renders the equipment inoperable) utilizing the following environmental parameters as guides:

- **Temperature/ Humidity:**
 - Operational: to -23°C (ambient); to -35°C temperature may be achieved to +55°C / 98% Humidity @ 25°C (intermittent duty); to +40°C (continuous duty)
 - Storage: to -35°C to +60°C / Humidity @ 20% to 60%
 - Solar radiation of 1100 watts/meter²
- **Altitude:**
 - Operational mode to 3,500 meters; non-operational and storage to 12,000 meters
- **Sand/Dust:**
 - Operational in desert environment ~ meet 0.95g/m³ with wind speeds up to 40 km/hr at a height of 3m. Particle size from 74 micrometers to 1000 micrometers, with the average size ranging from 74 to 350.
- **Salt Spray/Fog:**
 - Storage, exposure and operation during or after exposure to salt atmosphere: requires prescribed regular maintenance
- **Fungus/Insects:**
 - Storage and exposure to insect /fungus conditions ~ utilization of non-nutrient materials where practical
- **Rain:**
 - Precluded from leakage to sensitive parts, exposure to rain rates of 5cm/hr with wind levels of 80 km/hr
- **Sun:**
 - Exposed surfaces and materials resistant to long-term exposure to sunshine ~ surface finishes, gaskets and cables ~ solar radiation of 1100 watts/meter²



- **Corrosion:**

- All components and materials protected against excessive corrosion. All surfaces to be painted and/or chemically treated for corrosion resistance. Avoidance of galvanic corrosion due to contact of dissimilar metals. All galvanized steel members hot dipped per ASTM-A-123 at time of fabrication: requires prescribed regular maintenance

RSI TT Series Design and Construction Standards

The above described portable tower systems (***tower and trailer***) shall be manufactured using all applicable U.S. military handbooks, Federal, ANSI, EIA-TIA, UBC, NHTSA and other standards as guides. Tower components and sections are fabricated, welded and galvanized in compliance with the requirements of ISO 9001:2008.

- **Material, Process and Parts:**

- All material used in the construction of *our* trailers, shelters and towers shall be of good commercial quality; processes used in all construction shall conform to best commercial practices.

- **Environmental Standards:**

- The proposed model configuration and associated accessories shall be capable of operating in the specified environment; the equipment shall survive normal and customary operating and storage conditions without excessive degradation
- The proposed model configuration and associated accessories shall be resistant to the following: Temperature/Humidity; Altitude; Sand Dust; Moderate Ice Accumulation; Salt Fog; Fungus and Insects; Rain; Sun and Excessive Corrosion

- **Signs, Labeling and Markings:**

- Nameplates and product markings shall be in accordance with best commercial practice; labels shall be of a UV resistant vinyl finish

- **Safety:**

- Equipment and design is engineered to incorporate safety features wherever appropriate which shall reduce the likelihood of hazards to operating personnel. The objective is to minimize the possibility of personal injury during installation, operation and maintenance.

- **Workmanship:**

- Workmanship shall be in accordance with good commercial practice; special attention shall always be given to neatness and thoroughness of items such as soldering, markings of parts and assemblies, wiring, welding, brazing, plating, riveting, finishes, machine operations and screw assemblies as applicable to construction. All best efforts shall be used to reduce or eliminate all burrs, sharp edges or any other manufacturing defect that could make the part or equipment unsafe to the operating personnel.

- **Human Performance/Engineering:**

- Equipment shall be designed and engineered to enhance the operator's ability to perform his role in the operation and maintenance of the equipment; all controls for normal operation shall be readily accessible and functionally grouped, insofar as practicable, to improve operator efficiency.

- **Quality Assurance:**

- Multi-part verification shall be used for compliance process for all its manufactured products; compliance verification includes Inspection, Analysis, Demonstration and Qualification.