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RH-TRU 72-B Cask Uprighting Trailer Operation and Maintenance Manual

Cognizant Section: Packaging Integration

Approved by: Todd Sellmer

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1.0 INTRODUCTION

The RH-TRU 72-B Cask Uprighting Trailer is used to transport a single U.S. Department of Transportation (DOT) Type B RH-TRU 72-B containing radioactive materials without requiring special state or federal permits. The term “uprighting trailer” fits within the definition of “Center Pivot Trailer” as referenced in the RH 72-B SARP. The trailer complies with all DOT safety, identification, and regulatory requirements. In addition, this trailer has been designed, tested and certified to ANSI N14.30, *Semi-Trailers Employed in the Highway Transport of Weight-Concentrated Radioactive Loads*.

The tractor/trailer combination (including RH package and payload) is designed to meet existing state or federal requirements. These requirements cover the length, width, and/or weight of the tractor/trailer combination.

This document is intended to provide guidance for operators of the RH 72-B Cask Uprighting Trailer and associated components. Attachment 1, Maintenance and Inspection Responsibility, delineates responsibility by organization for the performance of inspections and maintenance as they apply to particular sections of this manual. Attachment 2, Troubleshooting and Recovery Guide, provides information for addressing hydraulic system malfunctions. The terms "carrier" or "driver" refer to the trucking contractors. The term "operator" refers to any user of the trailer. Sections pertaining to the general operation of the trailer, trailer loading, moving/parking, and tiedown assemblies are intended as guidance for Waste Handling Operations (WHO) and operators at the various generating sites. Individual operating procedures may be used by WHO in place of this document as long as the intent and the requirements of this document are met, and providing the trailer Cognizant Engineer (CE) has approval over the trailer loading/unloading procedure for the Waste Isolation Pilot Plant (WIPP).

1.1 Description

The RH 72-B Cask Uprighting Trailer is specially designed with onboard hydraulics to rotate the RH-TRU 72-B into the vertical position while on the trailer, with the hydraulic power unit outboard of the trailer. Another significant feature of the trailer design is it allows the trailer to work together with the specially designed RH mobile loading unit as a complete system capable of loading and shipping RH transuranic waste from small quantity generator sites with the RH-TRU 72-B on the trailer without requiring special equipment at the generator sites.

The trailer weighs approximately 16,300 lb with a drop-frame design and a trunnion tower to carry a maximum load of 45,000 lb at a maximum gross weight of 61,300 lb. The trailer is designed with an air ride load leveling suspension system, anti-lock braking system (ABS), two rear independent landing gear, and two front common landing gear. The trailer has a full-size spare tire and wheel (optional) mounted on the gooseneck of the trailer.

Major components of the trailer include these items:

- Chassis
- Tiedown System
- Axles and Suspension
- Tires and Wheels
- Brake System
- Lights
- Front and Rear Landing Gear
- Hydraulic System
- Electrical System

These components are briefly described in the following subsections.

1.2 Trailer Chassis

The trailer chassis is constructed of high strength (min.100 ksi) steel. The chassis carries a single RH-TRU 72-B in the horizontal position with the centerline of the package approximately 83 inches from the ground. The dual axle chassis is designed to support the fully loaded package weight under static and dynamic transportation loads for normal highway travel. The chassis gooseneck has a standard 2-inch diameter kingpin set 16-inches from the front of the trailer.

Aluminum diamond plate decking is installed on the outrigger portions of the trunnion supports to ensure safe footing. Placard holders are installed on each rail side and on the front and rear of the trailer. The placard assemblies have the identification symbols required by the DOT for transporting the RH packages.

1.3 Tiedown Assemblies

The RH-TRU 72-B is secured to the trailer by two main trunnion blocks consisting of a bronze-clad journal (lower half) and a bronze-clad cap (upper half), and two trunnion stabilizers commonly referred to as “tiedown assemblies” located on each side of the trailer to interface with and stabilize the upper handling trunnions of the RH-TRU 72-B during transport. The main trunnion blocks are for load securement and also serve as the pivot point on which the RH-TRU 72-B rotates. The rotating grapples interface with the lower handling trunnions of the RH-TRU 72-B, and are for RH-TRU 72-B rotation only. They are not a component of the load securement system.

1.4 Hydraulic Rotation System

The RH-TRU 72-B is rotated to either the horizontal (transport) or vertical (loading/unloading) positions by a pair of hydraulically-driven arms that attach to the lower handling trunnions of the RH-TRU 72-B. The arms pivot on a bushing attached to the end of the hydraulic cylinder ram. The hydraulic pressure to each of the hydraulic cylinders is maintained through an equalization valve. The maximum operating pressure for each hydraulic cylinder is 3,000 pounds per square inch (psi). The

hydraulic pump is outboard of the trailer and has a reservoir with a 10-gallon capacity on a separate Hydraulic Power Unit (HPU). The hydraulic pump is operated by a 220-volt, single phase alternating current motor, which is housed in a metal cabinet on a portable cart. The electrical enclosure/control box for the hydraulic system is mounted to the side of the metal enclosure and has a 220-volt recessed male receptacle rated for 50 amps, an externally accessible circuit breaker and start/stop controls for the motor. The hydraulic system actuator valve is located on top of the metal enclosure and consists of a 3-position lever. Refer to Subsection for hydraulic system operating instructions.

1.5 Axles and Suspension

The trailer is equipped with two Meritor suspension systems with a 10-foot 2-inch spread axle configuration. Each axle is equipped with oil seals, hub piloted cast brake drums, hub-piloted Meritor hubs and automatic slack adjusters.

The axles are mounted to the chassis using the suspension manufacturer's procedures. The air suspension uses air supplied by the tractor/trailer air system. This pressurizes a separate reservoir for the air springs. An air control system adjusts the ride height and the air pressure needed for varying loads. This suspension provides a cushioned ride throughout the range of loads and an excellent side-to-side and axle-to-axle load equalization.

1.6 Tires and Wheels

The trailer has eight 22.5 x 8.25-15° Drop-Center aluminum wheels fitted with 255/70R 22.5 tires. Standard 20 x 1572 (right-hand threaded) wheel studs and standard outer lug nuts are used to mount the dual wheels. A hub odometer is installed on the curb side front axle.

1.7 Brake System

Spring brake air chambers operate the brakes. A two-line air system mechanically actuates the brakes. The braking system has an emergency relay valve. It also is fitted with reservoir hoses and standard color coded "glad hand" air hose couplings.

The trailer is equipped with an ABS. The ABS works with the standard braking system. The ABS is an electronic, self-monitoring system that monitors and controls wheel speed during braking.

1.8 Lights

Each trailer's lights meet or exceed the requirements of state and federal regulations.

1.9 Landing Gear

Four manually-actuated (crank handle), synchronized landing gear supports with standard sand shoes are located on the trailer chassis. The two that are located toward the front of the trailer chassis are used when uncoupling the tractor from the trailer, and for leveling the trailer. The two that are located toward the rear of the trailer chassis are used to enhance stability, and for leveling the trailer. Each landing gear is approximately 12-inches above the ground during transportation and has approximately 16-inches of travel. The landing gear can support the trailer for long periods while fully-loaded. At no time shall the trailer tires be lifted off the ground using the landing gear while loaded with a RH-TRU 72-B.

There are two speeds of operation, low and high. The low speed is used for raising and lowering under heavy loads, such as when the trailer is loaded; the high speed is used for raising and lowering the landing gear under lighter loads, such as when the trailer is empty. The maximum capacity of each landing gear is 50,000 lb.

1.10 Special Tools and Equipment

The basic trailer operates without special equipment or tools. However, a hydraulic mechanism is employed to rotate the RH-TRU 72-B between horizontal and vertical positions. A 50A/250VDC/600VAC locking female connector is required for the operation of this trailer. Refer to Subsection for hydraulic rotating mechanism operating instructions, and Subsections and for precautions and special equipment requirements.

The trailer is designed to allow for storage of the RH-TRU 72-B impact limiters near the rear of the trailer during RH-TRU 72-B loading and unloading activities. The trailer is equipped with impact limiter cradles that are specially designed to prevent damage to the impact limiters during loading/unloading operations.

For tool storage, a tool box is installed on the gooseneck of the trailer. The box is supplied with a 12-ton hydraulic jack (optional), lug wrench and handle, ½-inch drive ratchet wrench, and 6-inch long ½-inch drive extension and sockets for trunnion cap and tiedown bolts, and may be used for storage of spare hitch pins, screws, etc. Flammable products in the tool box are prohibited.

2.0 REFERENCES

- Title 49 CFR Part 392, *Driving of Commercial* Motor Vehicles
- 49 CFR Part 396, *Inspection, Repair, and Maintenance*
- DOE/WIPP-02-3283, *RH Packaging Program Guidance*
- DOE/WIPP-02-3284, *RH Packaging Operations Manual*

- Material Safety Data Sheet (MSDS) WIPP #W3090 for Hydraulic Fluid, National Hydralube 32®
- MSDS WIPP #W1415.1 for Hydraulic Fluid, Shell Tellus Plus Oil 32®
- Drawings, Talbert Manufacturing, Inc. available from WTS Trailer Cognizant Engineer

3.0 GENERAL OPERATION

This manual is intended as general guidance only, and addresses only the basic requirements for operation and maintenance of the trailer.

3.1 Precautions and Limitations

NOTE

To prevent binding of the rotating mechanism, it is recommended to cycle the hydraulic control valve and hold the hydraulic control lever in the fully extended or fully retracted position, (whichever position the hydraulic rams are in upon start up) for five seconds, and repeat two or three times after ten seconds. This will flush the air from the hydraulic system, and synchronize the hydraulic cylinders. This technique is especially useful prior to operating the trailer without a cask, or if the trailer has not been operated for an extended period of time.

Potential operational hazards associated with the operation of this trailer, and the recommended mitigative action for each are described below:

- Fall hazard (elevated work surfaces) - use of properly rated roll-around ladders, stairs, or work platforms to prevent falls is recommended.
- Electrical shock hazard (220-volt system) - verify power source is de-energized prior to connecting/disconnecting power cable to the trailer electrical system receptacle. Use of 100% cotton long sleeve shirt and safety glasses when opening or closing circuit breakers is recommended.
- Pressurized fluid (hydraulic 3,000 max system pressure) - unexpected rupture of a hydraulic fitting or hose could expose personnel to high-pressure fluid that could result in skin or eye damage. Use of safety glasses and leather gloves is a requirement during operation of the hydraulic system.
- Pinch hazard (moving parts and pinch points) - use of leather gloves when performing mechanical functions is recommended.

Observe all warnings and caution statements of this manual during the operation and maintenance of the trailer.

Both the hydraulic system jumper hoses must be properly coupled to the trailer and the hydraulic power system control valve prior to starting the hydraulic pump.
A 50A/250VDC/600VAC locking female connector is required for supplying electrical power to the hydraulic system. Each generator site operating this trailer will be responsible for ensuring the female connector meets these requirements and that the connector is appropriately wired to facility's 220v/208v power source using the appropriate gauge of wire. Refer to Subsection for information on the locking female connector.

Temporary power (generators) shall not be used unless authorized by the Washington TRU Solutions LLC (WTS) Cognizant Engineer. Certain generators, including welders, do not supply adequate power for this application, and could damage the equipment.

Failure to allow the brake system air pressure to stabilize before moving the trailer can damage the trailer air suspension system, brake system, and tires. Prior to moving the trailer, the operator shall allow sufficient time (approximately two minutes) for the air pressure to stabilize after attaching the tractor air supply to the trailer. The air system must be fully charged and the air suspension fully inflated before picking up the trailer with a hydraulic fifth wheel, releasing the brakes or retracting the landing gear. The operator shall verify wheels are turning and brakes are not locked when first moving the trailer and there is adequate clearance between fenders and tires.

The operator shall verify the rear axle rating of the towing device is at least 27,000 lb for towing a fully loaded RH-TRU 72-B.

The operator shall verify the fifth wheel is securely latched prior to moving the trailer.

Pneumatic or electric powered impact tools may be used for the removal and installation of the bolts attaching the main trunnion journal caps and the tiedown caps, providing care is taken not to cross-thread the bolts.

All component replacements shall be like-for-like components or as authorized by the WTS Trailer CE.

3.1.1 Pre-Trip Inspections

Preoperational inspections shall be performed by the carrier/driver in accordance with (49 CFR §392.7, "Equipment, Inspection and Use," and 49 CFR §396.13, "Driver Inspection"). [5, 6]

Before using the trailer, the carrier/driver shall perform the basic driver vehicle inspection checks to include a review of the prior Post-Trip Inspection Report (49 CFR §396.11, "Driver Vehicle Inspection Report[s]").[1] Carriers shall perform the manufacturer's recommended equipment checks on brakes, lights and reflectors, suspension, landing gear, bearing lubrication levels, tires and wheels, and coupling devices. Carriers shall correct any signs of low bearing lubrication oil level, excessive wear, damage and/or malfunction before using the unit.

The operator shall perform a pre-use visual inspection of structural members of the chassis, kingpin and tiedown attachment points for signs of weld cracks, corroded metal, deflections, deformations, or other unusual conditions. The operator shall also inspect the joints between the primary and secondary structural members. Operators shall report any deficiencies to the WIPP Transportation Scheduler before using the trailer. Any accidents involving a trailer shall be reported immediately to the WIPP Central Monitoring Room (CMR). For notification purposes only, operators are to report any pre-use or en route deficiencies to the WIPP Transportation Scheduler. Any damage to a trailer must also be reported to Property Management within 24 hours. The operator shall inspect the hydraulic system for leaks, and shall remove any residual hydraulic oil using an absorbent cloth. Failure to do so could result in complications at the next inspection point.

3.1.2 Pre-Use Inspections

Prior to operating the hydraulic system, a pre-use inspection is required. At a minimum, the following hydraulic components shall be inspected:

- Verify the hydraulic fluid level in the hydraulic system reservoir is within the operating range (approximately 50% to 70% full as indicated by the fluid level sight glass). The hydraulic fluid level indicator and fluid temperature indicator are located on the front of the hydraulic system reservoir. If the hydraulic fluid level is not within the operating range then hydraulic fluid must be added prior to operating the hydraulic system. Refer to Subsection for hydraulic fluid requirements.

- Verify the hydraulic control valve returns to the center position when released from either the up or down positions.

- Inspect the rotating mechanism for cracks, deformation or signs of damage.

- Verify the roller rails are free of foreign objects that could inhibit travel of the rotating mechanism or cause damage.

- Visually inspect all hydraulic hoses and fitting terminals to verify they are free of hydraulic fluid leaks. If a hydraulic fluid leak is detected at a hose or fitting, attempt to tighten the connection using the appropriate sized wrench. DO NOT OVER TIGHTEN. If tightening the connection does not stop the fluid leakage, component replacement may be necessary prior to operation, depending on the severity of the leak. If a hydraulic fluid leak is detected, contact the WIPP Transportation Scheduler.

- Visually inspect each of the hydraulic cylinders to verify they are free of hydraulic fluid leaks, (a minor hydraulic fluid leak on a hydraulic cylinder may not render the hydraulic system unusable).

3.2 Hydraulic System

The hydraulic system operates from a 220-volt, single phase AC power source. A minimum of 40 amps is required to operate the electric motor. The motor can operate on 208-volts. The motor control box and the hydraulic actuator lever are mounted on a portable cart. The electric motor is rated at 10 horsepower and operates a 4.3-gallon-per-minute variable displacement hydraulic pump. The pump is equipped with a 1 gallon to 4.3-gallon per minute controller. The system has a hydraulic fluid reservoir with a capacity of 10 gallons, equipped with a breathable filler fitting and a temperature indicator. The maximum system pressure is 3,000 psi.

The hydraulic power units are designed to be separate from the trailer and are mounted on a portable cart with locking wheels. The cart is approximately two feet in width and four feet in length, with the mounting surface less than one foot high. The hydraulic power unit is enclosed in a metal cabinet measuring two feet in length and in width, and three feet in height. The combined weight of the portable hydraulic power unit and cart is approximately 450 lb. The electrical control box for the hydraulic power unit is mounted to the outside of the hydraulic power unit enclosure. The hydraulic control valve is attached to the top of the enclosure. Jumper hoses with quick-connect hydraulic couplings (FF-501-8FP) and rated for a minimum of 3,500 psi working pressure are used to connect the hydraulic power unit to the trailer. The trailer is equipped with two hydraulic nipples (FC-502-8FP) that are designed to couple under pressure up to 3,000 psi. The portable hydraulic power unit when not in use shall be stored in a manner that will prevent damage from the elements or external sources.

3.3 Hydraulic Uprighting Mechanism Operation

WARNING

The hydraulic system is operated at approximately 2,200 psi with a maximum pressure of 3,000 psi. Wearing safety glasses and leather gloves is a requirement during the operation of the hydraulic system to mitigate the pressurized fluid hazard described in Subsection. To prevent slips and falls, spills or leaks of hydraulic fluid are to be cleaned up immediately.

WARNING

To prevent personnel injury and damage to the equipment, both the hydraulic system jumper hoses must be properly coupled to the trailer and the hydraulic power system control valve prior to starting the hydraulic pump.

CAUTION

Hydraulic fluid is combustible. To prevent combustion, all sources of ignition must be kept away from the hydraulic system.

CAUTION

To prevent damage to equipment the RH-TRU 72-B must not be rotated until the lifting trunnion tiedown caps have been opened. Uprighting of the RH-TRU 72-B must be performed in accordance with Subsection.

NOTE

A preoperational check on all valves, hoses and fittings must be performed in accordance with Subsection 3.1.2, Pre-Use Inspections before operating the hydraulic system.

NOTE

Guidance for troubleshooting hydraulic system malfunctions can be found in Attachment 2.

3.3.1 To operate the hydraulic system, perform the following:

3.3.1.1 Verify the 220-volt AC power source is de-energized.

3.3.1.2 Plug the 220-volt AC power source into the recessed male receptacle of the electrical enclosure.

3.3.1.3 Remove the dust caps from hydraulic couplings.

NOTE

The hose end hydraulic coupling (FF-501-8FP), and the hydraulic nipple (FC-502-8FP) on the trailer are marked with a tag to let the user know they are to be coupled together.

3.3.1.4 Couple the hydraulic hoses (and hydraulic control valve if not already coupled) to the trailer hydraulic by pushing the female onto the male coupler, and lock in place by turning the lock ring on the female coupler so that the indentation on the lock ring is no longer aligned with the alignment pin on the coupler.

3.3.1.5 Energize the 220-volt AC power source.

3.3.1.6 On the hydraulic system electrical enclosure, rotate the external circuit breaker from the "OFF/RESET" position clockwise to the "ON" position.

3.3.1.7 Verify the hydraulic system control lever is in the center position.

WARNING

To prevent personnel injury and damage to the equipment, the red button labeled "STOP" shall be pushed immediately if the hydraulic pump motor is bogging down or the pump is deadheaded after applying power to the motor.

3.3.1.8 On the hydraulic system electrical enclosure, push the green button labeled "START" to activate the hydraulic pump.

3.3.1.9 Allow the pump to run while verifying no hydraulic fluid leaks are present.

3.3.1.10 To extend the hydraulic rams, push the hydraulic system control valve lever upward. The rotating mechanism should move freely without binding.

3.3.1.11 To retract the hydraulic rams, pull the hydraulic system control valve lever downward. The rotating mechanism should move freely without binding.

3.3.1.12 To turn the hydraulic system off, push the red button labeled "STOP" to deactivate the hydraulic pump, and rotate the circuit breaker from the "ON" position counterclockwise to the "OFF/RESET" position.

3.3.1.13 Prior to disconnecting the power cord from the receptacle, de-energize the 220-volt AC power source.

3.3.1.14 Unplug the 220-volt AC power source from the recessed male receptacle of the electrical enclosure.

3.3.1.15 Decouple the hydraulic hoses (and hydraulic control valve if necessary) from the trailer by turning the lock ring on the female coupler to align the indentation with the pin and pushing the ring inward while pulling the hose out.

3.3.1.16 Install the dust caps on the hydraulic couplers.

4.0 TRAILER LOADING AND UNLOADING OPERATIONS

WARNING

The RH-TRU 72-B must not be loaded or unloaded with the trailer on soft or un-compacted ground. To prevent bodily injury or damage to equipment, the user of this trailer shall assume the responsibility for ensuring the bearing surface is adequate to support the trailer landing gear at the location where the trailer will be loaded or unloaded.

CAUTION

Loading the trailer on level ground is required for proper alignment of the RH-TRU 72-B and trailer interface points. The front and rear landing gear shall be used to level the trailer to the extent possible. Trailer tires MUST never be lifted off the ground using the leveling jacks.

CAUTION

The combined trailer and package gross weight shall NOT exceed the gross vehicle weight rating for the trailer. The total weight of the tractor, trailer, and payload shall not exceed 80,000 lb.

NOTE

The packaging loading operation shall be performed only by personnel qualified on the equipment associated with the handling of the RH-TRU 72-B, or in accordance with the applicable training criteria for the operation.

4.1 Recommended Equipment and Spare Parts:

- Calibrated torque wrench - capable of 200 ft-lb
- Electric or Pneumatic impact wrench (optional)
- ½-inch drive, 15/16-inch socket and ratchet wrench
- Clean, lint-free rags

- Nickel Never-Seize (LocTite® #767 Anti-seize or equivalent)
- Hydraulic thread sealant (LocTite® #569 or equivalent)
- Removable thread locker (LocTite® #242 or equivalent)
- Low-halogen dry lubricant (for V-groove rollers and roller tracks)
- Hydraulic fluid - Shell Tellus Plus Oil 32® (WIPP MSDS #W1415.1), available at site warehouse, or
- Hydraulic fluid - National Hydralube 32® (WIPP MSDS #W3090), or WTS Engineer approved equivalent

Spare Parts, Electrical (Kirby Risk part number):

- Relay Overload 19EEGE
- Contactor 100C60D10
- Transformer E100, Stock number TRU-II-02233
- Breaker GMCP050K2C, Stock number TRU-II-02232
- Starter Circuit Breaker 198H1
- Handle, external 190HS4E
- Shaft 194RR1
- Fuse KTK-1, Stock number TRU-II-02235
- Contact 800TA2A, Stock number TRU-II-02237
- Contact 800TA1A, Stock number TRU-II-02236
- Panel A20P20
- Enclosure, Hoffman A20H20BLP
- Receptacle, recessed male HBL3767

- 50A/250VDC/600VAC locking female connector (part # HBL3762C) - available from:

  - Hubble Wiring
    185 Plains Road Milford, CT 06461
    (203) 822-4800 or www.hubbell-wiring.com

Spare Parts, Hydraulic (Talbert part number):

- Hydraulic control valve TS1120TF1JB, Brand Hydraulics, Stock number

- Hydraulic fluid return line filter Hydro-craft RSE-30-10, Zinga® AE-10 or equivalent 10-micron filter, Stock number TRU-II-02231

- Hydraulic jumper hose assembly 606B030004, Stock number TRU-II-02237

Hoses and Fittings:

- 606B030002-65, ½-inch hose x 65 inches long w/female straight 37 degree JIC swivel ends, Stock number TRU-II-02238

- Elbow, male w/O-ring PH2503-8-8, Stock number TRU-II-02224

- 606B030002-80, ½-inch hose x 80-inches long w/female straight 37 degree JIC swivel ends, Stock number TRU-II-02239

- 606B030002-138, ½-inch hose x 138-inches long w/female straight 37 degree JIC swivel ends, Stock number TRU-II-02240

- 606B030002-72, ½-inch x 72-inches with female straight 37 degree JIC swivel end and female 90 degree x 37 degree JIC swivel end, Stock number TRU-II-02241

- Coupler, Parker, non-spill, ½”, FF-501-8FP

- Nipple, Parker, non-spill, ½”, FC-502-8FP

- ¼-inch Pilot line hose assembly 431-01-13-4-4-4-4, Stock number TRU-II-02230

Hydraulic hoses, valves, fittings and replacement parts are available from:

Talbert Manufacturing, Inc.
1628 W. State Road
Rensselaer, IN 47978
1-800-866-7141

New Mexico Hydraulics
524 S. Canyon
Carlsbad, NM 88220
(575) 887-6624

Hardware:

- Tiedown wear plate, top, bronze 1-⅜ inches x 2-inches x ¼-inches, 602C130208, Stock number TRU-II-02219
- Tiedown wear plate, top, 1-inch x 2-inches x ¼-inches bronze, 602C130208-A, Stock number TRU-II-02220
- Tiedown wear plate, bottom, 1-inch x 4-inches x ¼-inches, bronze, TRU-II-02251
- Tiedown wear plate, bottom, 1-3/8 inch x 4-inches x ¼-inches, bronze, TRU-II-02250
- Screws, ¼-20 x ½-inch flat-head countersunk stainless steel, alloy Stock number TRU-II-02217
- Screws, 3/8-16 x ¾-inch, button head socket cap, zinc-plated alloy Stock number TRU-II-02252
- Main trunnion cap bolts, hex-head cap ⅝-11 x 3-½-inches SAE J429 GR 8 Plated, Stock number TRU-II-02216
- Tiedown cap bolts, hex-head cap ⅝-11 x 2-½-inches SAE J429 GR8 Plated, Stock number TRU-II-02215
- Bumper pad, Fabreeka, 1 inch x 29.5 inches x 1/8 to ¼-inch thick, Stock number TRU-II-02221
- ⅝-inch ASTM F436 Hardened Flat Washer Plated, Stock number TRU-II-02218

4.2 Trailer Loading

NOTE

All trailer loading and unloading operations shall be performed in accordance with the applicable section of DOE/WIPP-02-3284, RH Packaging Operations Manual, or other approved operating procedures.

NOTE

If the trailer was shipped with the hydraulic rams in the extended position, all dirt and debris must be removed from the rams using a dry cloth to prevent damage to the hydraulic cylinder seals.

4.2.1 Position trailer in designated loading area.

4.2.2 Perform the following:

- Install trailer stands on freestanding trailer.
- Install work platforms for access to the trunnion tower areas on each side of the trailer, if not already installed.
- Verify trailer wheels are chocked.
- Perform a visual inspection of the trailer to include the following inspection points. Report any deficiencies to the Transportation Scheduler and the Trailer CE. The Trailer CE shall recommend the required repairs, or determine if the trailer may remain in service until repairs can be made.
    - Retaining screws present on both upper and lower bronze wear plates in each tiedown. Replace screws or wear plates as necessary, in accordance with the approved work instruction.
    - Retaining screws present on both left and right side bumper pads. Replace screws or bumper pads as necessary, in accordance with the approved work instruction.
    - Landing gear handles are free of sharp edges
    - Loose bolts or screws in other locations on trailer
    - Visually inspect trailer to verify welds are free of cracks
- Lower the front and rear landing gear.

4.2.3 Adjust front and rear landing gear until trailer is adequately level for the installation/removal of the impact limiters. A carpenter's level or equivalent leveling device placed on the mainbeam of the trailer or the RH-TRU 72-B pillow block is acceptable.

4.2.4 Remove the ⅝-inch bolts from the tiedowns and the main trunnion journal caps.

4.2.5 Move the main trunnion journal cap to the holding shelf, and thread a ⅝-inch bolt into each of the nuts mounted on the under-side of the holding shelf. Repeat for the other main trunnion journal cap.

4.2.6 Open each of the tiedowns, allowing the tiedown cap to rest in the fully open position.

4.2.7 Retain other bolts out of the working area where they will not be lost or damaged. Segregate main trunnion cap bolts from tiedown cap bolts.

4.2.8 Verify trunnion journals and tiedowns are free of foreign matter. Clean as necessary.

4.2.9 Clean the bolts as necessary to adequately inspect them.

4.2.10 Inspect each bolt for damage, defects, and cleanliness.

4.2.11 Replace damaged or defective bolts with like-for-like parts, as indicated below:

- Main Trunnion cap bolt-screw, hex-head cap ⅝-11 x 3-½-inches GR8, Stock number TRU-II-02216
- Tiedown cap bolt-screw, hex-head cap ⅝-11 x 2-½-inches GR8, Stock number TRU-II-02215

4.2.12 Apply nickel Never-Seize (LocTite® #767 Antiseize or equivalent) to bolt threads.

4.2.13 Apply low-halogen lubricant to main trunnion saddles, V-groove rollers and V-groove roller tracks.

4.2.14 Verify 220-volt AC power source is de-energized.

4.2.15 Plug the 220-volt AC power source into the recessed male receptacle of the electrical enclosure.

4.2.16 Remove the dust caps from the trailer hydraulic couplers.

NOTE

The hose end hydraulic coupling (FF-501-8FP), and the hydraulic nipple (FC-502-8FP) on the trailer are marked with a tag to let the user know they are to be coupled together.

4.2.17 Couple the hydraulic hoses (and hydraulic control valve if not already coupled) to the trailer hydraulic by pushing the female onto the male coupler, and lock in place by turning the lock ring on the female coupler so that the indentation on the lock ring is no longer aligned with the alignment pin on the coupler.

4.2.18 Energize the 220-volt AC power source.

4.2.19 Verify the hydraulic system control lever is in the center (detent) position.

4.2.20 On the electrical enclosure, rotate the external circuit breaker from the "OFF/RESET" position clockwise to the "ON" position.

4.2.21 On the hydraulic system electrical enclosure, push the green button labeled "START" to activate the hydraulic pump.

4.2.22 Allow the hydraulic pump to run while verifying that there are no hydraulic fluid leaks present.

WARNING

To prevent personnel injury and damage to the equipment, the red button labeled "STOP" shall be pushed immediately if the hydraulic pump motor is bogging down or the pump is deadheaded after applying power to the motor in the following step.

WARNING

To prevent bodily injury, hands must be kept clear of moving parts.
All personnel must remain clear of load and load rotation path.

4.2.23 If not already extended, extend the hydraulic rotating mechanism by pushing the hydraulic system control lever upward. Release the lever when the hydraulic rotating mechanism reaches the extent of travel, and verify the lever returns to the center (detent) position.

4.2.24 On the hydraulic system electrical enclosure, push the red button labeled "STOP" to deactivate the hydraulic pump.

4.2.25 Remove the stainless steel clevis pin from each of the rotating grapples, and pivot the grapple journals open.

WARNING

To prevent bodily injury, hands must be kept clear of main trunnion saddles during performance of the following step.

NOTE

When loading the RH-TRU 72-B onto the trailer, accurate placement of the packaging is important for proper trailer loading operations. The RH-TRU 72-B can NOT be loaded straight down into the main trunnion saddles. It must be lowered forward of the trunnion tower until the lower handling trunnions clear the gussets directly below the main trunnion saddles. The RH-TRU 72-B main trunnions should be centered to the extent possible between the main trunnion saddles before lowering the RH-TRU 72-B into the saddles to prevent misalignment of the lifting trunnions in the tiedowns once the RH-TRU 72-B is rotated to the horizontal position. Adjustments may be made to the inboard and outboard positioning of each tiedown, however adjustability is limited. A spotter must be used when loading the RH-TRU 72-B onto the trailer.

NOTE

Before loading the RH-TRU 72-B onto the trailer, verify no obstructions or foreign material (screws, bolts, tools etc.) are present in the main trunnion pivot blocks or in the tiedown blocks.

4.2.26 Lower the RH-TRU 72-B until the main trunnions are seated in the main trunnion journals, and the RH-TRU 72-B is centered between the main trunnion journals.

4.2.27 With the RH-TRU 72-B fully seated in the main trunnion journals, install the main trunnion journal caps, and the ⅝-inch bolts. Torque each bolt to 150-160 ft-lb.

WARNING

Pinch points are present when closing the rotating grapples.

NOTE

A spotter must be used when rotating RH-TRU 72-B.

4.2.28 Position the rotating grapple journals onto each of the RH-TRU 72-B lower handling trunnions.

4.2.29 With the rotating grapple journals positioned on the RH-TRU 72-B, pivot the journal caps closed around the trunnions and install the clevis pin into each of the rotating grapple journals. It may be necessary to operate the hydraulics to make slight adjustments to the position of the rotating grapple journals in relation to the position of the RH-TRU 72-B trunnions. A pry bar may be used to assist in lifting the rotating grapples onto the trunnions.

4.2.30 Remove the lifting yoke from the RH-TRU 72-B.

4.2.31 Verify the hydraulic system control lever is in the center (detent) position.

4.2.32 On the hydraulic system electrical enclosure, push the green button labeled "START" to activate the hydraulic pump.

WARNING

To prevent bodily injury, hands must be kept clear of moving parts.
All personnel must remain clear of load and load rotation path.

4.2.33 Rotate the RH-TRU 72-B to the horizontal position by pulling the hydraulic system control lever downward. Refer to Subsection 3.1.2 for hydraulic system operating instructions.

4.2.34 When the RH-TRU 72-B is in the horizontal position, release the hydraulic system control lever, and verify the lever returns to the center (detent) position.

4.2.35 **IF** the RH-TRU 72-B handling trunnions do not seat in the tiedowns due to misalignment,
THEN adjust the tiedown positioning as follows:

A. Determine the direction in which the tiedown(s) need to be adjusted for proper seating.

B. Rotate RH-TRU 72-B to the vertical position.

C. Using a rubber mallet, strike the base of the tiedown(s) in the direction required to achieve the proper clearance.
IF the adjustment cannot be made by striking the tiedown with a rubber mallet,
THEN perform the following:

C.1 Loosen the lock nut and retaining nut on the tiedown mounting studs enough to allow movement of the applicable tiedown.

C.2 Position the tiedown(s) as needed. The inside to inside distance between the tiedowns should be between 43-1/2 and 43-3/4-inches. Adjust the distance between the tiedowns as necessary.

C.3 Tighten each tiedown retaining nut to each stud until the rubber disks are compressed approximately 1/4-inch. The torque required to achieve this amount of rubber compression is approximately
25 to 30 ft-lb.

C.4 Using an open-end backup wrench on the retaining nut, torque the lock nut against the retaining nut 75-90 ft-lbs.

C.5 Rotate the RH-TRU 72-B to the horizontal position, and verify the hydraulic system control lever returns to the center (detent) position when released.

4.2.36 On the hydraulic system electrical enclosure, push the red button labeled "STOP" to deactivate the hydraulic pump.

4.2.37 On the hydraulic system electrical enclosure, rotate the external circuit breaker from the "ON" position counterclockwise to the "OFF/RESET" position.

4.2.38 Pivot the tiedown caps to the closed position on each of the tiedowns.

4.2.39 Install the tiedown closure bolt and torque to 150-160 ft-lb on each of the tiedowns.

4.2.40 Verify the jam nut is present on the tiedown pivot bolt.

4.2.41 De-energize the 220-volt AC power source.

4.2.42 Unplug the 220-volt power cable from the hydraulic system electrical enclosure.

4.2.43 Decouple the hydraulic hoses (and hydraulic control valve, if necessary) from the trailer by aligning the indentation and pin on the lock ring of the female coupler, and pushing the ring inward. It may be necessary to toggle the control valve to relieve hydraulic pressure in the hoses before uncoupling.

4.2.44 Install the dust caps on the trailer hydraulic couplers.

NOTE

Work platforms, both front and rear may be removed or installed as necessary to accommodate impact limiter installation and removal.

4.2.45 Install work platforms, as applicable for installation of impact limiters.

4.2.46 Install impact limiters.

4.2.47 Prior to moving the trailer, verify all tools, trailer stands and any other objects are removed from the trailer, and that all landing gear has been raised completely.

4.3 Trailer Unloading Operations

CAUTION

Unloading the trailer on level ground is required for proper alignment of the RH-TRU 72-B and trailer interface points. The front and rear landing gear shall be used to level the trailer to the extent possible. Trailer tires MUST never be lifted off the ground using the leveling jacks.

NOTE

The packaging unloading operation shall be performed only by personnel qualified on the equipment associated with the handling of the RH-TRU 72-B, or in accordance with the applicable training criteria for the operation.

4.3.1 Position transport trailer in designated unloading area.

4.3.2 Perform the following:

- Install trailer stands on freestanding trailers.
- Install work platforms for access to the trunnion tower areas on each side of the trailer, if not already installed.

- Verify trailer wheels are chocked.
- Perform a visual inspection to verify the landing gear handles are free of sharp edges.
- Lower the front and rear landing gear.
- Verify 220-volt AC power source is de-energized.

4.3.3 Adjust front and rear landing gear until trailer is adequately level for the installation/removal of the impact limiters. A carpenter's level or equivalent leveling device placed on the mainbeam of the trailer or the RH-TRU 72-B pillow block is acceptable.

4.3.4 Install rear work platform to access the rear impact limiter.

NOTE

Work platforms, both front and rear may be removed or installed as necessary to accommodate impact limiter installation and removal.

4.3.5 Remove impact limiters.

4.3.6 Remove the tiedown closure bolt from each tiedown, and open the tiedowns, allowing the tiedown cap to rest in the fully open position.

4.3.7 Plug the 220-volt AC power source into the recessed male receptacle of the electrical enclosure on the front, roadside of the trailer.

NOTE

The hose end hydraulic coupling (FF-501-8FP), and the hydraulic nipple (FC-502-8FP) on the trailer are marked with a tag to let the user know they are to be coupled together.

4.3.8 Couple the hydraulic hoses (and hydraulic control valve if not already coupled) to the trailer hydraulic by pushing the female onto the male coupler, and lock in place by turning the lock ring on the female coupler so that the indentation on the lock ring is no longer aligned with the alignment pin on the coupler.

4.3.9 Energize the 220-volt AC power source.

4.3.10 On the electrical enclosure, rotate the external circuit breaker from the "OFF/RESET" position clockwise to the "ON" position.

4.3.11 Verify the hydraulic system actuator lever is in the center position.

4.3.12 On the hydraulic system electrical enclosure, push the green button labeled "START" to activate the hydraulic pump.

WARNING

To prevent bodily injury, hands must be kept clear of moving parts.
All personnel must remain clear of load and load rotation path.

4.3.13 Rotate the RH-TRU 72-B to the vertical position by pushing the hydraulic system control lever upward.

4.3.14 When the RH-TRU 72-B is in the vertical position, release the hydraulic system control lever, and verify the lever returns to the center (detent) position.

4.3.15 On the hydraulic system electrical enclosure, push the red button labeled "STOP" to deactivate the hydraulic pump.

NOTE

The hydraulic pressure will remain on the cylinders preventing movement of the RH-TRU 72-B while attaching the lifting yoke.

4.3.16 **IF** the RH-TRU 72-B is to be removed from the trailer,
THEN proceed to Subsection 4.3.18.

4.3.17 **IF** the RH-TRU 72-B IS NOT to be removed from the trailer,
THEN no further action in this section is required.

4.3.18 Attach the lifting yoke to the RH-TRU 72-B.

WARNING

Pinch points are present when handling the rotating grapples.

4.3.19 Remove the stainless steel clevis pin at the end of each of the rotating grapples, and open the grapple journals by pivoting the top cap away from the RH-TRU 72-B rotating trunnions. It may be necessary to operate the hydraulics in order to free the rotating grapple from the RH-TRU 72-B trunnions.

4.3.20 Remove the main trunnion journal cap bolts.

4.3.21 Move the main trunnion journal caps to the holding shelf, and thread a ⅝-inch bolt into each of the nuts mounted on the under-side of the holding shelf. Repeat for the other main trunnion journal cap.

CAUTION

Crane must be centered on RH-TRU 72-B before attempting to lift the RH-TRU 72-B off the trailer to prevent damage to the RH-TRU 72-B or trailer.

NOTE

The RH-TRU 72-B can NOT be unloaded straight up from the main trunnion saddles. It must be moved forward of the trunnion tower until the lower handling trunnions clear the gussets directly below the main trunnion saddles before it can be raised upward. A spotter must be used when rotating the RH-TRU 72-B.

4.3.22 Remove the RH-TRU 72-B from the trailer.

NOTE

If the trailer is being prepared for shipment without a RH-TRU 72-B, the rotating mechanism must be positioned in accordance with Subsection 4.4, Empty Trailer Shipment prior to securing the power to the hydraulic system.

NOTE

To retain the proper hydraulic fluid level in the hydraulic systems, the rotating mechanism must be retracted prior to disconnecting the hydraulic hoses from the trailer.

4.3.23 On the hydraulic system electrical enclosure, rotate the external circuit breaker from the "ON" position counterclockwise to the "OFF/RESET" position.

4.3.24 Verify 220-volt AC power source is de-energized.

4.3.25 Disconnect the 220-volt AC power source from the electrical box.

4.3.26 Decouple the hydraulic hoses from the trailer (and hydraulic control valve if necessary) by aligning the indentation and pin on the lock ring of the female coupler, and pushing the ring inward. It may be necessary to toggle the control valve to relieve hydraulic pressure in the hoses before uncoupling.

4.3.27 Install the dust caps on the trailer hydraulic couplers.

4.3.28 Perform a visual inspection of the trailer to include the following inspection points, and report any deficiencies to the Transportation Scheduler and the Trailer CE. The Trailer CE shall recommend the required repairs, or determine if the trailer may remain in service until repairs can be made. Visual inspection shall include the following:

- Retaining screws present on both upper and lower bronze wear plates in each tiedown. Replace screws or wear plates as necessary, in accordance with the approved work instruction.
- Retaining screws present on both left and right side bumper pads. Replace screws or bumper pads as necessary, in accordance with the approved work instruction.
- Loose bolts or screws in other locations on trailer.
- Visually inspect trailer to verify welds are free of cracks.

4.4 Empty Trailer Shipment

4.4.1 When the trailer is to be transported without a RH-TRU 72-B, prepare the trailer as follows:

4.4.1.1 Install all trunnion journal caps in the appropriate positions on the trailer.

4.4.1.2 Verify the jam nut is installed on each of the tiedown pivot bolts.

4.4.1.3 Torque all trunnion journal cap bolts to 150-160 ft-lb.

WARNING

Moving parts and pinch points are present when handling the rotating grapples.

NOTE

To retain the proper hydraulic fluid level in the hydraulic systems, the rotating mechanism must be retracted prior to disconnecting the hydraulic hoses from the trailer if the trailer is to be shipped or stored without a RH-TRU 72-B.

4.4.1.4 Fully retract the rotating mechanism allowing the concentric roller stud to travel on the guide rail. The trailer is equipped with guards to protect the hydraulic components from the rotating mechanism, however during retraction it may be necessary to manually assist the travel of the rotating mechanism in order to keep the concentric roller studs on the guide rails.

The rotating mechanism must be extended and positioned such that the rotating grapples and the flanged concentric roller studs will not cause damage the hydraulic components during transit.

4.4.2 Secure or remove all work platforms and other accessories prior to transporting the trailer.

4.4.3 Verify that hydraulic hoses and power cord are disconnected, and all tools are removed and placed away from the trailer.

5.0 OVER-THE-ROAD OPERATION

Operation of the combined tractor/trailer should be done with approved procedures for using over-the-road vehicles (49 CFR §396.7, "Unsafe Operations Forbidden").[5]

When the RH-TRU 72-B package is in place, the trailer has a high profile. Therefore, it should not be towed when load and road conditions might cause a rollover.

The trailer has an 84-inch gooseneck clearance. To get the best braking and handling capabilities of the tractor/trailer and reduce equipment damage, DO NOT operate the trailer with the fifth wheel positioned further than 12 inches forward of the centerline of the tractor tandem axles.

6.0 POST-TRIP INSPECTIONS

When the trailer is in use, the carrier/driver shall complete a post-trip inspection for the items discussed in Subsection at the end of each day. Inspection and reporting shall be according to 49 CFR (49 CFR §396.11, "Driver Vehicle Inspection Report[s]").[1]

7.0 PREVENTIVE MAINTENANCE

This section supplements the manufacturer's maintenance manuals and does not replace them. It describes the preventive maintenance that shall be done by a trucking contractor, a trailer service center, or by automotive maintenance personnel. More information may be found in the service manuals for each component.

7.1 Chassis

The trailer chassis does not require routine maintenance. However, the frame shall be inspected for weld cracks, evidence of corrosion, and/or damage on a regular basis during the performance of pre-and post-trip inspections (Subsection 3.1.1 and Section 6.0). The carrier/driver shall report any evidence of weld cracks or other abnormalities to the WIPP Transportation Scheduler before using the trailer. If areas on the chassis show signs of significant corrosion and/or paint chipping, these shall be re-primed and repainted by the carrier.

7.2 Tiedown Assemblies - General

Tiedowns shall be inspected and serviced to ensure safe and reliable operation. If tiedown components need repair or replacement, verify the new parts have been approved by WTS Trailer CE before use. Perform the following as needed to service the tiedowns.

7.2.1 Disassemble the unit.

7.2.2 Inspect the parts visually.

7.2.3 Remove foreign material. Use a low chloride solvent.

7.2.4 Inspect the bolts visually for defects (i.e., cracks, deformation of threads).

7.2.5 Replace damaged bolts with like-for-like parts, as indicated below:

- Main Trunnion cap bolt, hex-head cap screw, ⅝-11 x 3-½-inches GR8 Stock number TRU-II-02216
- Tiedown cap bolt, hex-head cap screw, ⅝-11 x 2-½-inches GR8, Stock number TRU-II-02215

7.2.6 Replace damaged screws, wear plates or bumper pads with like-for-like parts, as indicated below:

- Tiedown upper wear plate retaining screw - ¼-20 x ½-inch flat-head countersunk stainless steel, alloy or brass, Stock number TRU-II-02217
- Tiedown upper wear plate, 1-⅜-inches x 2-inches x ¼-inch, bronze trailers RH-002, RH-003, and RH-004), Stock number TRU-II-02219
- Tiedown upper wear plate, 1-inch x 2-inches x ¼-inch, bronze (upper or lower-trailers RH-005 through RH-011), Stock number TRU-II-02220
- Tiedown wear plate, bottom, 1-inch x 4-inches x ¼-inches, bronze, TRU-II-02251
- Tiedown wear plate, bottom, 1-3/8-inch x 4-inches x ¼-inches, bronze, TRU-II-02250
- Bumper pad, Fabreeka, 1 inch x 29.5 inches x 1/8 to ¼-inch thick, Stock number TRU-II-02221
- Screws, 3/8-16 x ¾-inch, button head socket cap, zinc-plated alloy Stock number TRU-II-02252

7.3 Axles/Brakes

Comply with the service instructions carefully when working on the axles and brakes.

The trailer's axle/brake assemblies are standard, commercial components. Comply with the manufacturer's recommended procedure for maintaining these components. A schedule for the periodic adjustment, cleaning, inspection, and lubrication of the axle and brake equipment shall be prepared based on experience and the type of operation. Brakes shall be adjusted as often as needed for correct operation and safety. Brake adjustments shall give correct clearance between the lining and drum, correct push rod travel, and balance between the brakes. Brakes shall be cleaned, inspected, lubricated, and adjusted each time the wheel hubs are removed (49 CFR §396.25, "Qualifications of Brake Inspectors"). [2]

Debris entering the brake system air lines can clog the relay valves. To prevent debris from entering the brake system air lines when a trailer is disconnected from the tractor, "glad-hand" covers shall be used on all trailers that are equipped with them.

7.4 Suspension

WARNING

If the trailer is to be lifted with jacks, the trailer must be properly supported with appropriately rated blocking or jack stands prior to beginning work under a raised trailer. Jacks can fail, resulting in death, or tip over and cause serious bodily injury.

The suspension has a specific ride height. The height is controlled by a height control valve. This maintains an even trailer height. Perform a maintenance check by inspecting the unit. Verify the suspension is fully operational daily (or before each trip).

NOTE

Grease is not to be applied to the height control valves. No external lubrication is required.

The height control valve on each side controls all air springs on its respective side. The height control valves shall be inspected regularly. Look for proper clearance around, or damage to, the valve control arms or adjusting blocks.

The carrier shall drain the air tank periodically to remove water from the air system tank.

7.5 Tires/Wheels

Routine tire maintenance is to verify the cold air pressure is at the manufacturer's recommended pressure. The tires shall be routinely checked for excessive wear, bulges, cracks, cuts, or penetrations.

Clean the wheels often with a high-pressure washer and a mild detergent. Check the metal surfaces of the wheels thoroughly for excessive corrosion buildup, metal cracks, bent or broken flanges, etc. This includes the areas between the dual wheels. Report abnormalities to the WIPP Transportation Scheduler before using the trailer.

7.6 Landing Gear

Check the landing gear routinely for bolt tightness and for lubrication. The specific maintenance items are listed in the manufacturer's service manual.

8.0 SPECIALIZED MAINTENANCE

Due to the design of the trailer, some maintenance activities must be done by authorized service representatives. This section lists the responsibility for maintenance of trailer components.

8.1 Chassis

The chassis main-rails and trunnion tower are made of heat-treated steel. This material shall NOT be welded or drilled by unauthorized personnel. If welding or drilling is needed to repair/replace a part or repair a weld, the chassis shall be sent to a Department of Energy (DOE)-approved maintenance facility.

EPDM DURO 60 rubber sheeting for impact limiter cushioning is to be tightly bound to the trailer chassis, and show no signs of wear or separation. If the material shows signs of separation, it shall be re-attached to the chassis with an approved rubberized contact cement. Rubber sheeting material showing signs of excessive wear shall be replaced.

8.2 Tiedown Assemblies

If tiedown components need repair or replacement, verify the new parts have been approved by WTS Trailer CE before use. Screws that are damaged or missing from the bronze inserts of the main trunnion saddles and caps, the rotating grapples and the tiedowns shall be replaced with flat-head ¼-inch-20 x ½-inches long flat-head countersunk stainless steel, alloy or brass screws.

8.3 Hydraulic System

WARNING

Prior to performing work on the electrical system or the hydraulic system the electrical system must be completely de-energized with the external circuit breaker in the "OFF/RESET" position AND the 220-volt power cord disconnected from the electrical enclosure, and in accordance with applicable site Lock-out/Tag-out procedures. Verify hydraulic pressure is relieved from hydraulic system prior to opening system.

The hydraulic system shall be maintained to preclude hydraulic fluid leaks at the fittings and seals that could result in inspection point violations and faulty operation of the hydraulic rotating system. The responsibility of maintaining a leak-free hydraulic system is shared by all operators of the trailer, commensurate on individual capabilities and circumstances. Hydraulic cylinder seals shall be replaced in accordance with the manufacturer's recommended procedures. All hydraulic fittings shall be installed using hydraulic thread sealant (LocTite® #569 or equivalent).

All electrical components of the hydraulic system comply with the National Electric Code (NEC). Replacement of electrical components must be authorized by the WTS Cognizant Trailer Engineer.

8.3.1 Hydraulic System Maintenance

The hydraulic system has been filled to operating capacity by the manufacturer. It is recommended the hydraulic oil and oil filter are changed every 2 years, or after 2,500 hours of service under normal operating conditions in a low dust environment. The hydraulic oil is suitable for operating at ambient temperatures as low as -25 degrees F.

Each hydraulic power unit shall be labeled with a service tag indicating when the unit is to be serviced. The user of the hydraulic system shall notify the WTS Trailer CE, 60 days before the system is to be serviced. The WTS Trailer CE shall coordinate the service with a hydraulic system service shop located near the site at which the unit is used. The user of the hydraulic system shall coordinate the transport of the hydraulic system to and from the service shop.

The hydraulic service shop shall:

- Drain the used hydraulic fluid from the reservoir.
- Flush the reservoir with clean fluid.

- Inspect the system and make any repairs deemed necessary.
- Replace the return line oil filter with Hydro-craft® RSE-30-10 Zinga AE-10® or equivalent 10-micron filter.
- Refill the reservoir to 70% capacity with Shell Tellus Plus Oil 32® hydraulic oil (WIPP MSDS #W1415.1), National Hydralube 32® (WIPP MSDS #W3090), or as approved by WTS Trailer CE. Reservoir capacity is 10 gallons.
- Affix a service tag to the hydraulic system enclosure which indicates service performed and next service date (two years from date of service).

Hydraulic services in the Pocatello, ID area include, but are not limited to:

Western States Equipment
2405 Garrett Way
Pocatello, ID 83201
(208) 232-2640

Idaho Hydraulics, Inc.
315 Hiway Ave.
Chubbuck, ID 83202
(208) 237-0123

Hydraulic services in the Carlsbad, NM area include:

New Mexico Hydraulics
524 S. Canyon
Carlsbad, NM 88220
(575) 887-6624

Hall Machine
102 W. Mermod
Carlsbad, NM 88220
(575) 887-1143

9.0 INSPECTIONS

In the trailer preventive maintenance program, regularly scheduled inspections shall be performed to comply with DOT requirements.

9.1 Interval Inspections

The trailer preventive maintenance program, regularly scheduled checks shall be performed. These checks are needed to comply with DOT requirements. The carrier's

contractual agreement and/or regulatory agencies may require more frequent and/or additional checks to those stated in Subsection 3.1.1.

9.2 Annual Inspections/DOT Requirements

To comply with the DOT requirements, the trailer shall be inspected annually. This annual inspection includes (at a minimum) all points covered in the vehicle inspection report [1] (49 CFR §396.11, "Driver Vehicle Inspection Report[s]"). It also requires an inspection of the critical weld areas. Carry proof of a satisfactory inspection either in the vehicle, or on an affixed decal (49 CFR §396.17, "Periodic Inspection").[3]

9.3 Record Keeping

Reports shall be prepared and kept by the carrier using the record keeping requirements of 49 CFR Part 396 and in accordance with the individual carrier's contractual agreement:

- Pre-trip inspection
- Post-trip inspection
- Annual inspection (49 CFR §396.21, "Periodic Inspection Recordkeeping Requirements") [4]

NOTE

The front or rear landing gear shall not be used to raise the trailer tires off the ground.

10.0 EXTENDED STORAGE

If a trailer is to be unused for a long period of time (i.e., six months or more), the trailer is to be raised and adequately supported with the tires off the ground to prevent damage to the tires, whether the trailer is stored inside or outside.

Checks and maintenance according to 49 CFR shall be done before using a trailer from storage (49 CFR §392.7, "Equipment, Inspection and Use").[5]

Attachment 1 - Maintenance and Inspection Responsibility

Maintenance/Inspection	(Reference Section)	Responsible Organization		
		Carrier	WTS	Generator Site/User
Pre-Trip Inspections	3.1.1	X		
Pre-Use Inspections	3.1.2		X	X
Hydraulic Uprighting Mechanism Operation	3.3		X	X
Over-the-Road Operation	5.0	X		
Post-Trip Inspections	6.0	X		
Preventive Maintenance	7.0	X		
Chassis	7.1 and 8.1	X		
Tiedown Assemblies	7.2 and 8.2	X	X	X
Axles/Brakes	7.3	X		
Suspension	7.4	X		
Tires/Wheels	7.5	X		
Landing Gear	7.6	X		
Hydraulic System Leaks	8.3	X	X	X
Hydraulic System Maintenance	8.3.1	X	X	X
Inspections	9.0	X		
Interval Inspections	9.1	X		
Annual Checks/DOT Requirements	9.2	X		
Record Keeping	9.3	X		
Extended Storage	10.0	X		

Attachment 2 - Troubleshooting and Recovery Guide

Off-Normal Condition	Loss of Electrical Power to Hydraulic System
Consequence	In the event electrical power is lost during rotation of the RH-TRU 72-B, the hydraulic system pressure will remain on the cylinders, regardless of which position the hydraulic actuator lever is in. These failure conditions have been verified by actual tests. The consequence of electrical power loss during operation is a delay in RH-TRU 72-B loading/unloading operations. Personnel safety will not be impacted as a result of this mode of failure.
Recovery	Restore electrical power. If the electrical power system for the hydraulic system has malfunctioned, then the system must be de-energized before being evaluated by a qualified electrician. An auxiliary hydraulic power unit or manual hydraulic pump may be connected to the trailer using the quick connect fittings.
Spare Parts	Electrical components (Kirby Risk part number) Relay Overload 193EEGE Contactor 100C60D10 Transformer E100 Hammer Breaker GMCP050K2C Starter Circuit Breaker 198H1 Handle, external 190HS4E Shaft 194RR1F use KTK-1 Contact 800TA2A Contact 800TA1A Red Boot 800HN5A Green Boot 800HN5B Panel A20P20Enclosure Hoffman A20H20BLP Inlet, recessed male HBL3767 Connector Plug HBL3762C Auxiliary hydraulic power unit or manual hydraulic pump.
Off-Normal Condition	Burst Hydraulic Hose
Consequence	All hydraulic hoses valves and components were designed with a safety factor rated higher than the hydraulic system maximum operating pressure (3,000 psi). Hoses have a burst pressure rating greater than 3,000 psi. In-line check valves have been installed in the hydraulic system as a safety feature in the event a hydraulic hose were to burst. The consequences of a burst hydraulic hose are delayed RH-TRU 72-B loading/unloading operations and hydraulic fluid spill/cleanup. Use of safety glasses and leather gloves is a requirement during operation of the hydraulic system to mitigate the pressurized fluid hazard described in Subsection.
Recovery	Replace faulty hose(s) with like-for-like replacement parts, or as approved by the Trailer Cognizant Engineer.
Spare Parts	Refer to Subsection
Off-Normal Condition	Hydraulic Fluid Leak
Consequence	A hydraulic fluid leak from either of the two cylinder main seals will require seal replacement. The consequence of a hydraulic fluid leak will depend on the severity of the leak. A major leak may result in a delay in RH-TRU 72-B loading/unloading operations until the leak is repaired. Personnel safety is not likely to be impacted as a result of this mode of failure.
Recovery	Hydraulic fluid leaks at fittings may be corrected by tightening the fitting(s) on an as-needed basis. Reassemble hydraulic system connections using LocTite® #569 or equivalent. Remove hydraulic fluid from surfaces of trailer using oil absorbent cloth. Absorb hydraulic fluid from floor surfaces to mitigate the potential for slip and fall hazards using oil absorbent material or cloth. Fill hydraulic fluid level to operating range in accordance with Subsection, as applicable.
Spare Parts	Hydraulic cylinder seal kit, 3-1/4 HSPK-3, 2 inch rod.
Off-Normal Condition	Hydraulic System Malfunction (nonelectrical)

Attachment 2 - Troubleshooting and Recovery Guide

Consequence	Loss of hydraulic system pressure will prevent the RH-TRU 72-B rotating mechanism from operating. The consequence of this mode of failure is delayed RH-TRU 72-B loading/unloading operations. Personnel safety is not likely to be impacted as a result of this mode of failure.
Recovery	If hydraulic pump motor is operating, but there is no system pressure, verify hydraulic system is free of fluid leaks. If no hydraulic fluid leaks are present, the motor shaft may have disengaged from the hydraulic fluid pump. An auxiliary hydraulic power unit or manual hydraulic pump may be connected to the trailer using the quick connect fittings.
Spare Parts	Required spare parts to be determined following disassembly of system. Auxiliary hydraulic power unit or manual hydraulic pump.
Off-Normal Condition	RH-TRU 72-B Rotating Mechanism Binding or Not Extending Properly When No RH-TRU 72-B Is Loaded on Trailer
Consequence	A proportioning valve to equalize hydraulic fluid pressure on the cylinders has been incorporated into the design to prevent this condition from occurring. The consequence of the RH-TRU 72-B rotating mechanism binding is delayed RH-TRU 72-B loading/unloading operations. Personnel safety is not likely to be impacted as a result of this mode of failure.
Recovery	Verify hydraulic system is free of fluid leaks. If no hydraulic fluid leaks are present, operate the rotating mechanism to determine if the binding is caused by a mechanical obstruction, broken part or other interference. If none of these conditions exist, replace the proportioning valve.
Spare Parts	Refer to Subsection
Off-Normal Condition	Removal of RH-TRU 72-B from Trailer If Rotating Mechanism is Not Functioning
Consequence	If the hydraulic system malfunctions, the RH-TRU 72-B can NOT be rotated. The consequence of this mode of failure is delayed RH-TRU 72-B loading/unloading operations. Personnel safety is not likely to be impacted as a result of this mode of failure.
Recovery	Use auxiliary hydraulic system to restore hydraulic pressure or remove RH-TRU 72-B mechanically using rigging and an appropriately rated spreader beam.
Spare Parts	Auxiliary hydraulic power unit.

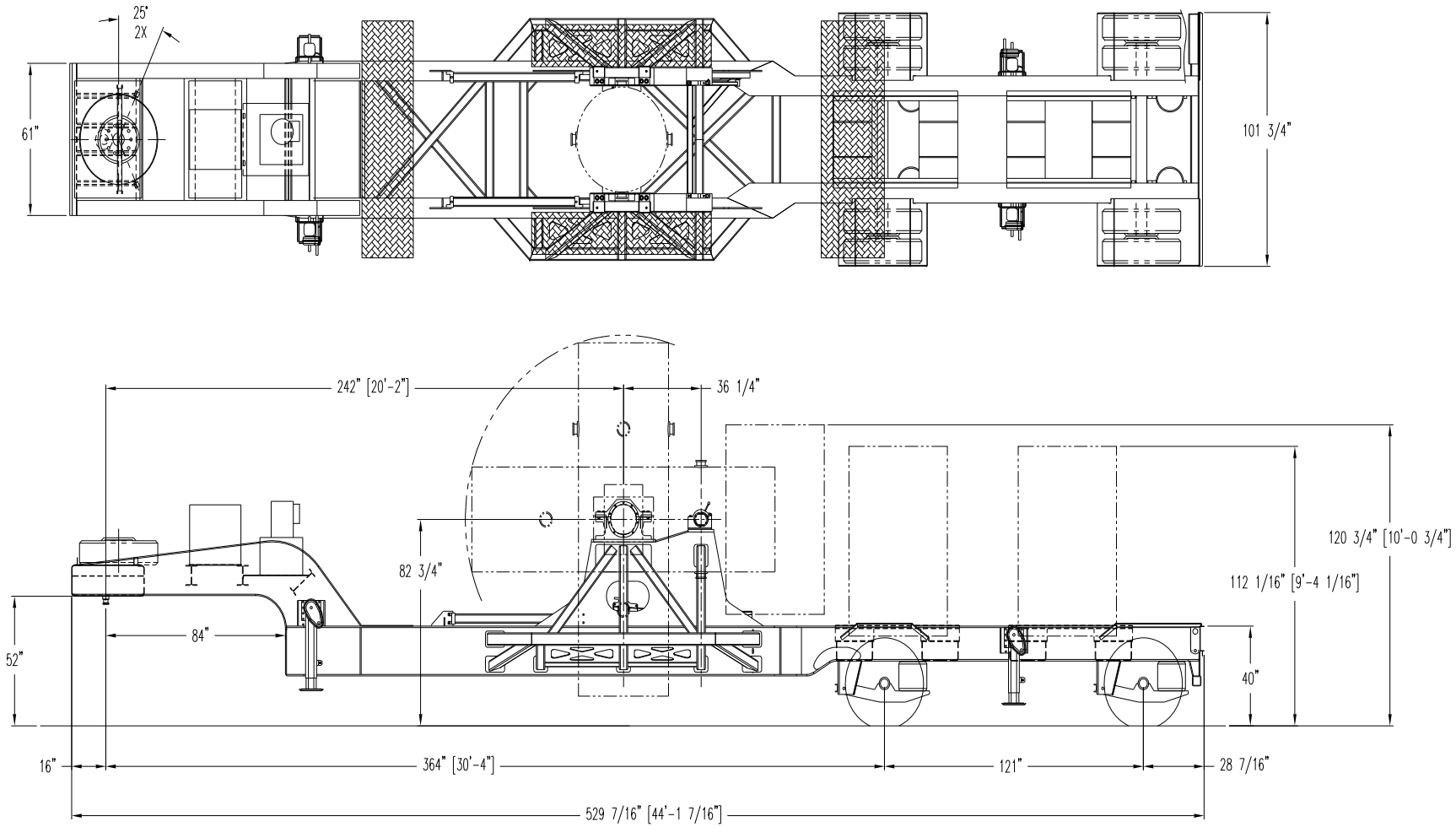

Figure 1 - RH 72-B Cask Uprighting Trailer