

Operation and Maintenance Manual



10 North Sauber Road
Virgil, IL 60151-1000

SAUBERMFG.COM

Phone 800.323.9147

Fax 800.833.3264

Valued Customer:

Please review the following manual. If you have any questions or need assistance of any kind, please contact your account representative toll free:

Voice Communications..... (800) 323-9147

Fax Communications..... (800) 833-3264

We welcome feedback on your manuals and our marketing communications. We need, and are driven to constantly improve. If you have any suggestions, comments or criticisms we'd love to hear from you.



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Custom Engineered for Florida Power & Light

Preface

Thank you for choosing Sauber Mfg. Co.. You have purchased a trailer designed and built with care. With minimal maintenance and by understanding its operation, your new trailer will provide you with years of excellent service. We welcome your suggestions for improvement and stand willing to assist you if any questions arise during its operation. If we can help in any way, please contact your account representative toll free:

Website: SauberMfg.com
Voice Communications: (800) 323-9147
Fax Communications: (630) 365-6610

The following manual provides important safety information and instruction. Please read this manual before operating your new trailer. It is important to follow safety instructions and cautions.

We acknowledge that not every situation or combination of tow vehicle and trailer can be addressed, therefore we ask that you use sound judgment after reading the following outlines.

Some components may be produced by a third party. When available, separate service manuals and instructions may apply.

Serious Hazards

Loss of control of the tow vehicle/trailer combination could result in serious injury or death. The most common causes for loss of control include:

- **Failure to adjust driving behavior when towing a trailer**
- **Immoderate speed – Driving too fast for the conditions**

With ideal road conditions, the maximum recommended speed for safely towing a trailer is 60 mph. If you drive too fast, the trailer is more likely to sway, increasing the possibility for loss of control. In addition, it is possible that the tires may overheat, increasing the chance of a blow out.

Decrease your speed as road, weather, lighting, and other conditions decline.

- **Improper sizing of the tow vehicle for the trailer**

Trailers that weigh too much for the tow vehicle can cause unsafe stability issues which can lead to loss of control and a serious accident. Know your vehicle tow rating and Gross Combination Weight Rating (GCWR.) Vehicle manufacturers will provide you with maximum towing capacities, as well as the GCWR. The additional strain put on the engine and drive-train of the vehicle may also lead to serious maintenance problems. For these reasons, the maximum towing capacity of your towing vehicle should not be exceeded. The towing capacity of your vehicle can be found in the tow vehicle's Owner's Manual.

Use of a hitch with a load rating less than the load rating of the trailer can result in loss of control and may lead to a serious accident. Ensure that your hitch and tow vehicle are rated for the Gross Vehicle Weight Rating (GVWR) and tongue weight of your trailer.

- **Overloading and/or improper weight distribution**

The total weight of the load you put in or on the trailer, plus the empty weight of the trailer itself, must not exceed the trailer's Gross Vehicle Weight Rating (GVWR.) If you do not know the empty weight of the trailer plus the cargo weight, you must weigh the loaded trailer at a commercial scale. In addition, you must distribute the load in the trailer such that the load on any axle does not exceed the Gross Axle Weight Rating (GAWR.) The GVWR and GAWR are located on the OEM certification and VIN label attached to the front frame of the trailer.

Never exceed the trailer Gross Vehicle Weight Rating or the Gross Axle Weight Rating. Do not load a trailer so that the weight on any tire exceeds its rating.

Improper front/rear load distribution can lead to trailer sway and poor handling conditions. Undesirable trailer sway results from tongue weights that are too low, while tow vehicle instability results from tongue weights that are too high.

Uneven left/right load distribution can cause tire, wheel, axle or structural failure. To the extent possible, be sure your trailer is evenly loaded left/right. Towing stability also depends on keeping the center of gravity as low as possible.

Make certain the tongue weight is within the allowable range. Keep the center of gravity as low as possible.

- **Unsecured loads**

Your trailer may be designed for specific cargo, such as reels, or poles. If your trailer is designed for specific cargo, do not carry any other cargo such as people, hazardous substances or containers of flammable materials.

It is important to avoid shifting cargo. The trailer ride can be bumpy and rough. Securing cargo so that it does not shift or bounce out of the trailer is imperative. Tie down all loads with proper sized fasteners. Always secure doors or lids if present on your trailer by securing it's latch.

- **Improper braking and steering under sway conditions**

When towing a trailer, you will have decreased acceleration, increased stopping distance, and increased turning radius. The trailer will change the handling characteristics of your towing vehicle, making it more sensitive to steering inputs and more likely to be have its stability affected in windy conditions or when passed by large vehicles. You will also need to adjust driving accordingly, i.e. taking a longer distance to pass and allowing for increased braking distances, etc.

Common sense measures may be necessary, such as; being alert for slippery conditions, anticipate trailer sway and be ready to reduce speed, use small, trim-like steering adjustments to re-gain control, check rear view mirrors frequently to evaluate trailer towing and traffic conditions, use a lower gear when driving downhill or on long grades, be aware of your trailer height at all times, especially when approaching bridges and roofed areas.

- **Improper or incorrect coupling of the trailer to the hitch**

It is critical that the trailer be securely coupled to the hitch, and that the safety chains and emergency break-away cable (electric brakes) and air hoses (air brakes) are correctly attached. Uncoupling of the trailer during transit can lead to a serious accident or a fatality.

Ensure that the pintle hook capacity rating, including installation, is sufficient for the GVWR and the tongue weight of the trailer being towed. Make sure that the pintle hook is physically compatible with the trailer drawbar. Compatibility information is available from the pintle hook manufacturer.

Observe the drawbar and pintle hook for wear, corrosion and cracks before coupling. Replace worn, cracked or corroded components per the manufacturer's recommendations.

Ensure the hitch drawbar and pintle hook are installed with grade-8 fasteners and are properly torqued before coupling to the tow vehicle.



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Do not move the trailer if any of the following conditions appear:

- The drawbar is not secured and locked to the pintle hook.
- The safety chains are not secured to the tow vehicle. If your trailer detaches from the pintle hook for any reason, we have provided safety chains so that control of the trailer can still be maintained. Improper rigging of the safety chains could result in loss of control. Fasten chains to the frame of the towing vehicle. Do not fasten chains to any part of the hitch unless the hitch has special holes or loops specifically designed for that purpose. Cross chains underneath hitch and coupler with enough slack to permit turning and to suspend the trailer tongue should it become detached.
- The trailer jacks are not fully retracted.

Do not tow the trailer on the road until:

- The trailer breakaway system is operational

The breakaway switch must be connected and verified. If equipped with electric brakes, your trailer will be equipped with a breakaway system that can apply the brakes on your trailer if it becomes detached from the tow vehicle for any reason. The breakaway system, including the battery, must be in good condition and properly rigged to be effective. An inoperative breakaway can result in a runaway trailer. The breakaway cable must be attached to the towing vehicle and not to any part of the hitch. Before towing the trailer, test the system. If the system is not working, do not tow the trailer. Have it serviced or repaired.

- Tires and wheels are checked

Failure to maintain proper tire condition and pressure can lead to loss of control.

Just as with your tow vehicle tires, the trailer tires and wheels are important safety items. It is essential to inspect them before each tow.

If a tire is found to include defects such as a bald spot, bulge, cut, cracks or is showing any cords, replace before towing. Have the tires inspected by qualified persons. Check inflation pressure on all tires prior to towing.

Failure to keep lug nuts tightened properly may cause the wheels to be seated to the hub improperly. Before each tow, check to make sure they are properly torqued. The proper torque for lug nuts is listed in this manual and available from the manufacturer. Use a torque wrench to tighten the lug nuts, use a crisscross star pattern.

Lug nuts are also prone to loosen after first being assembled. When driving a new trailer (or after wheels have been remounted,) check to make sure they are tight after the first 10, 25, and 50 miles of use and before each tow thereafter.

- The trailer lights and brakes are connected and checked

Be sure the trailer brakes and all the lights on your trailer are functioning properly before towing your trailer. Brakes and lights on a trailer are controlled via a connection to the tow vehicle.

ABS Information

Anti-lock brakes greatly enhance trailer stability while braking. Because a sliding wheel always leads, a brake lockup situation under manual braking can cause loss of control as the trailer slides sideways. Anti-lock brakes provide the electronic and physical control to prevent wheel lockup and the ensuing control problems. Although Anti-lock brakes may not necessarily help you stop over shorter distances, it will help keep you in control while eliminating excessive tire wear and *flat spotting*.

Anti-lock brakes use microprocessor technology to sense when the wheels are about to lock up under braking and then controls the brake pressure and timing to prevent it. Each wheel must be controlled independently, although only one axle of a multi-axle configuration needs to be equipped with sensors. An exciter ring (sometimes referred to as a tone ring) is installed on the inside of the hub. A sensor *reads* the level of magnetism present as the teeth of the exciter ring pass it. Since they don't touch, there is no wear or friction between them. The sensors provide wheel speed information to the Electronic Control Unit (the ECU or system brain). Input from the sensors is used to determine if a wheel is about to lock during braking. If so, the system can release and apply the brake up to six times per second through the modulator valve.

The system is powered by the stoplight circuit. This allows any of your trucks currently equipped to pull trailers to be used with a Sauber ABS equipped trailer. The system is off while the brakes are off and powers on and checks itself when the brakes are applied. It is so fast that it can test itself sixty times before air from the tow vehicle gets to the trailer brake valves. A warning light is provided on the trailer side and will illuminate if any component is not functioning. The system will continue to have normal brakes until the problem is resolved. Although there are no batteries in the system, the electronic control unit (ECU) has a special microprocessor that can remember up to ninety-nine problems and keep them stored until they're fixed. A number displayed on the hand held display unit (DDU) identifies one of sixty-three fault codes - providing accurate and quick troubleshooting. This unit is available from Sauber Mfg. Co. and should be kept at each garage location expecting to service ABS brakes. All cables are sealed, weatherproof and polarized to provide high reliability and mistake-free serviceability.

- **Proper Tongue Weight is established**

It is critical to have a portion of the trailer load carried by the tow vehicle. The trailer tongue should always exert a downward force on the hitch. Proper tongue weight is essential to good trailer tracking and safe operation. If too little weight is distributed to the tongue, towing will be erratic. Too much tongue weight may overload the towing vehicle's rear axle or the pintle hitch rating. Ten to twenty percent weight transfer is considered a normal range. Smaller, single axle trailers can transfer weight on the high side of this range. Larger, multiple axle trailers are designed to transfer less because of the limited capacity of the towing vehicle's rear axle.

When necessary, tongue weight can be controlled by distributing the load or by adjusting the pintle eye. Even loading is ideal, but when this is not possible, place more weight toward the trailer front to provide a safe tongue weight. Be aware that too much tongue weight from an uneven load can overload tow vehicle components. It is incumbent upon the operator to provide a safe, towable tongue weight without excessive hitch weight transfer that could place the tow vehicle in a non-compliant condition. If your trailer is equipped with an adjustable eye, lowering it will generally increase tongue weight while raising it will decrease tongue weight - especially on multi-axle models. Additional loading instructions may be included with your trailer, and should be followed.

Once the trailer pintle eye is secured in the towing vehicle hitch, cross the safety chains and connect them to the rings provided at the towing vehicle bumper. Insert the electrical connection cord and check trailer lighting. Connect the air glad hands if present and check brake operation. Ensure the trailer axle(s) do not exceed their GAWR and the entire trailer and load does not exceed the GVWR rating.

- **Grounding**

Your trailer is equipped with a bronze grounding lug. When the trailer is used near energized conductors the trailer must be grounded. A grounding lug is provided to help you follow your company's safety practices.

- **Wheel Chocks**

Set the chocks at each rear wheel in the direction of the expected load or grade.

- **Do not modify your trailer**

Your trailer is a custom engineered piece of equipment. Essential safety items can be damaged by altering your trailer. The simplest modifications, such as driving a screw or punching a hole to install a hanger can inadvertently damage an electrical wire or other hidden component. Before making any alteration to your trailer, contact Sauber Mfg. Co. at (800) 323-9147.

Pole Binders

Pole binders are provided at each bolster position. Where pole hubs are present, wrap the strap under the first binder hub, around the pole or poles, under the second binder hub and secure at the hook provided at the opposite end of the trailer. Tighten the binder strap at the EZ Torque winch with the winch handle provided. The EZ Torque winch does not lose strap tension when used with 2–4 wraps of strap on the winch shaft per the manufacturer's recommendations. Too many wraps on the winch shaft can cause a situation where the strap *can* lose tension depending on the level of tension in the strap. According to the manufacturer, but not verified with our testing, less than two wraps can also cause a situation where the strap can lose tension because there are not enough wraps to hold the end of the strap in place on the shaft.

Rear Light Bar Use

The integral rear light bar can be removed and fastened to the rearmost pole. By connecting the extension coil cord provided, approved lighting can be used regardless of the overhang present. Remove the retaining clips from the light bar in the rear channel. Fasten the light bar at the top of the rearmost pole and tighten the strap until the light bar is seated securely into the pole. Wrap the coil cord around the pole or poles and connect it into the rear socket provided.

Pole Carrying

Your pole trailer is equipped with a telescoping tongue section which allows the operator to regulate rear pole overhang and tongue weight. Optimal tongue weight is between ten and twenty percent of the total load. (4) adjustments are provided at 31.5" to help you achieve a safe weight distribution. A "cat-track" system is provided inside the telescoping section which eliminates cumbersome front extension cords. Technical pole carrying recommendations follow:

General

Sauber Mfg. Co. builds standard extendible tongue pole trailers w/ multiple adjustment positions. This bulletin serves as a guide in recommending what size poles should be carried in various positions. It is always assumed that the pole will be carried with the butt end (heavy end) towards the front and that the pole front will be within 1' of the hitch front. The calculations below assume 20% total weight transfer to the trailer tongue and are based on standard minimum butt and top circumference measurements for the class pole indicated. The pole trailer length required for Sauber Extendible Tongue Pole and Combination Trailers can be calculated by the formula:

$$(TC / (TC + BC)) * 1.20 * PL + UB + 1 = \text{Pole Trailer Length Required}$$

Where:

TC = Top Circumference (IN)

BC = Butt Circumference (IN)

PL = Pole Length (FT)

UB = Undercarriage to Rear Bolster (FT)

UB = 4' For Standard Pole Trailers

UB = 5' For Model 1521-PRC Combination Trailers

Exceptions

If customer requirements include carrying larger poles within the confines of the extendible tongue, we have three options. One option is increasing the overall length of the trailer and extension. A second option is relocating the undercarriage rearward a maximum of 2'. The third option simply lowers the target tongue weight. If 10% or 15% tongue weight transfer is desired, substitute 1.10 or 1.15 respectively for 1.20 in the equation. Tongue weight is an important consideration. Too much can raise rear truck axle weights to unacceptable levels and de-load the front axle, causing steering and control problems. Too little tongue weight will result in reduced trailer control while towing.

Adjusting the tongue length

Set the chocks at the front of the tires

With both jacks in the down position, raise and store the front jack in the stored position while leaving the mid-frame jack down. The trailer should be near level. Remove the stainless steel insertion pin. The trailer is now ready to be expanded to one of the marked extension points, or to the final stop position (fully extended), Keep the trailer at near level.

Utilizing mechanized equipment such as a truck or forklift attached to the pintle eye, slowly pull out the tongue - stopping at the desired marked position, or the final stop. Re-insert the stainless steel pin at the indexed position and swivel to the locked position. Lower the front jack. To retract the tongue, reverse the location of the chocks to the rear of the tires, remove the pin, push the tongue to the desired position and re-insert the pin.

Components Sourcing Information

Item.....	Source.....	Description/Specification
Tires.....	Major Brand.....	215/75R17.5, LR H - 125 PSI
Wheels.....	Dexter.....	6.75 x 17.5 8 on 6.5"
Axles.....	Dexter.....	15K/Slipper Springs Dual & ABS/Air Axle- 260 ft-lbs
Brake Kit.....	Blue-Dot.....	# 1927-001 Air Brake Kit
Installation Manual.....	HalDEX.....	# L30027 Full Function Mod 1
ABS Components.....	HalDEX.....	# 400211 2-Port Valve # 400210-BA Wire Loom # 201186-JD Power Cable 16753 12' Coiled Air Line Set Red/Blue # AQ15463 2" Light w/ Grommet & Pigtail 10469 ABS Air Brake Aux Kit 18470 Select Full Function 2-P Valve 18471 3-Meter Extension Cable
Valve Extension.....	Sauber.....	17342 Bracket & 17333 9.5" Extension
Safety Chain.....	Sauber.....	8142ST 1/2" Grade 43 Chain Group w/ 8251ST Crucifix Chain Traps – 27600# Breaking Strength
Clevis Slip Hook.....	Sauber.....	17141, 1/2" -GR43 w/Latch
Chain.....	Sauber.....	17139 1/2" -GR43 High Test Chain – Galv -43"L w/Hitch Extension
Pintle Eye.....	Sauber.....	11144 3"
Trailer Jack.....	Sauber.....	17201 Spring Loaded Drop-Leg
Electrical Connector.....	Sauber.....	11122 – 7-Way RV-Style
Jumper Cord.....	Sauber.....	18808 52" 7-Way SAE Plugs
Socket Housing.....	Sauber.....	13802, 11118 6-Way SAE Socket
Wheel Chock Holders.....	Sauber.....	Z1352 Custom
Lighting.....	Brand.....	2-Lite LED Sealed Beam/Sealed Wiring Group S/T/TFPL 4 / Red / 6:00



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Light Bar.....	Sauber.....	Model 8840-2 LED
Flag Holders.....	Sauber.....	Z1337 1' ID x 4"L
Pogo Stick.....	Sauber.....	10300 w/coupling holder
Pole Chocks.....	Sauber.....	17812
Pole Stanchions.....	Sauber.....	Full width bolster w/special stanchions Z1010
Registration Container.....	Betts.....	13980
Winch Strap Only.....	Sauber.....	10868 4 "x20'L w/D-Ring
Winch	Sauber.....	18233 Boa EZ Torque Winch w/ 16675 Handle
J-Hook.....	Sauber.....	12955
Winch Binder.....	Sauber.....	14147 4 "x20'L w/ 1026 D-Ring
Tool Box.....	Sauber.....	10544

Note: Most items listed here are in stock at Sauber Mfg. Co.
Additional parts manuals are available on our website

Maintenance

Operation.....	Interval
Torque Wheel Nuts - See Components Sourcing - Axle.....	After 1st 50 Miles
Torque Wheel Nuts	Monthly
Check Trailer Lighting.....	Every Use
Check Tire Wear & Inflation Pressure.....	Monthly
Adjust and Inspect Trailer Brakes.....	Monthly
Check Trailer Suspension.....	Monthly
Check Pintle Eye Wear.....	Yearly
Check Lubricant in Axle Hubs.....	Monthly
Check Binder Condition.....	Every Use
Check Slide Block Condition.....	Yearly



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Sauber Mfg. Co. Standard Wiring Code for Trailers

Function	From ABS/ECU (as applicable)	7-Way SAE ABS Socket Terminal ID / Color / Pos	7-Way SAE Socket Terminal ID / Color / Pos	6-Way SAE Socket Terminal ID / Color / Pos
LT	n/a	3 / Yellow / 4:00	3 / Yellow / 4:00	LT / Yellow / 4:00
RT	n/a	5 / Green / 8:00	5 / Green / 8:00	RT / Green / 7:00
Ground	White	1 / White / 12:00	1 / White / 12:00	GD / White / 2:00
Brakes	Blue	7 / Blue / Center	7 / Blue / Center	A / Blue / Center
Clearance/Tail	n/a	6 / Brown / 10:00	6 / Brown / 10:00	™ / Brown / 12:00
Stop	Red	4 / Red / 6:00	4 / Red / 6:00	S / Red / 10:00
Breakaway	n/a	n/a	Black / To Battery	Black / To Battery

Notes:

Clock positions are as viewed from male pin side

Center pin on chassis is expected to be wired hot on ABS

4-Lite systems will be wired in parallel unless otherwise noted

If clearance and tail need to be run on separate circuit, breakaway wire (orange) must be run outside 7/C Cable.

Breakaway may be wired directly to battery or through the 7/C cable depending on proximity to battery box.

7/C Cable - (6) 12 Gauge; (1) 10 Gauge - White

All Primary & Brake Feed Wire: 12 gauge

All Secondary Feed Wire: 14 gauge

Maintenance

Operation..... Interval

Torque Wheel Nuts - See Components Sourcing - Axle.....After 1st 50 Miles

Torque Wheel NutsMonthly

Check Trailer Lighting.....Every Use

Check Tire Wear & Inflation Pressure.....Monthly

Adjust and Inspect Trailer Brakes.....Monthly

Check Trailer Suspension.....Monthly

Check Pintle Eye Wear.....Yearly

Check Battery Condition.....Every Use

Check Trailer Breakaway.....Every Use

Check Oil Bath Level in Axle Hubs.....Monthly

Grease Hub Bearings.....Monthly



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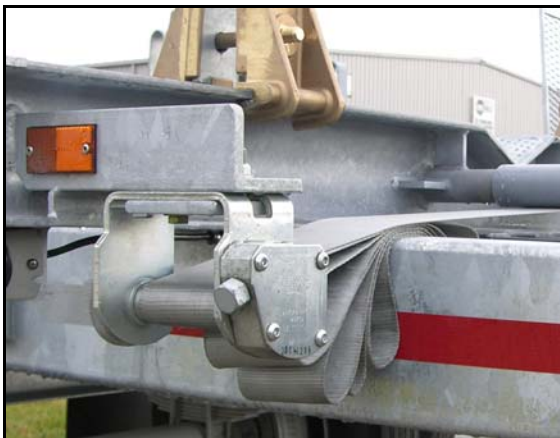
Care and Use of BOA Winches

MAINTENANCE:

- The gear mechanism requires periodic lubrication to maintain proper function. It is important to use premium grade 2 lithium based bearing grease with molydisulfide.
- The grease fitting is located on the back of the gear housing and mates with a standard zerk adapter on a grease gun.
- Inject grease until it comes out either the main shaft bushing or the input hex drive shaft bushing.

OPERATION:

- Turn the input hex drive counterclockwise to disengage from the main gear. The hex drive shaft will move outward from the gear housing.
- With the gears disengaged, the main shaft can be turned by hand using the hand crank.
- Before tensioning, pull excess webbing through mandrel slot. When the tie down is fully tensioned, two (2) to four (4) wraps of webbing shall be on the mandrel (4 to 8 layers of webbing). Additional wraps can cause damage to the winch due to excessive torque, or make it difficult to apply or release tension.
- Turn the hex drive clockwise to engage the gears and continue to turn clockwise to apply tension to the binder. Applying 40 to 60 lb to the end of the torque crank will result in approximately 1500 lb of strap tension. By increasing the applied force to the torque crank to 100 to 140 lb, strap tension of approximately 2200 lb can be achieved. Additional strap tension is not needed to adequately secure typical cargo.
- When tensioning or releasing the winch in rain, snow, or other slippery conditions, carefully position your feet and body to prevent a fall.
- Winches should never be loaded in excess of their working load limit (WLL).
- Winches should be used in accordance with all applicable federal, state, local, and industry regulations applicable to cargo securement.
- A training program for operators is recommended for the correct and safe use of cargo securement systems.



BINDERS:

- BOA winches are designed for use with webbing strap binders only.
- Do not use cable binders with BOA winches.
- Do not use damaged, deteriorated or cut web binders. See CVSA guidelines for out-of-service criteria.
- Check binders periodically during transit and re-tighten as required.

MODIFICATION OR MISUSE:

- Any modification or misuse of the BOA Winch will result in voiding the warranty and liability responsibility of the manufacturer.
- Do not use as a lifting or pulling device.
- Do not use tensioning bars other than the provided crank handle, which is designed specifically to work with the BOA winch.

SHIPPING FROM SAUBER MFG. CO.

In preparation for shipping, nearly the entire length of the strap is wrapped on the BOA winch mandrel. However, the operator needs to ensure that 4-8 layers of webbing are on the winch mandrel when the winch is fully tensioned per the manufacturer's recommendation. Test results confirm that too few *or* too many wraps can result in the release of strap tension which will create a dangerous condition..

This document lists the most commonly encountered considerations for the proper maintenance and operation of BOA winch tie-down assemblies, but it is not an all-inclusive list.

We Guarantee

Sauber Manufacturing Company guarantees satisfactory operation of its products and will refund the full purchase price to utility customers who are not fully satisfied.

We Warranty

We specifically warranty that our products will be free from any defective materials or workmanship when purchased. We will repair or replace, at our option, any part(s) that prove to be defective within the warranty period specified below. This warranty is voided only by evidence of misuse, and does not include shipping charges.

Sauber Manufacturing offers the industry's only 10-year, comprehensive, trailer warranty. This warranty comes at no charge to our customers, yet covers parts and labor on all Sauber manufactured components.

As a leader in the utility industry, we have the financial strength and have demonstrated the integrity necessary to honor our commitments. This expanded warranty is a clear extension of who we are, what type of equipment we build, and how we are investing in our future and yours.

- 10 Year Structural, Parts & Labor on all Sauber Manufactured components
- 10 Year Galvanized Finish Warranty
- 3 Year total Parts & Labor Coverage
- Retroactive total parts & labor coverage includes all trailers built after 04/01/2006
- All warranty support will be provided directly from Sauber Mfg. Co.
- Customer Labor Reimbursement @ \$65/hour
- A credit memo will be issued for claims under \$400 and can be applied to a credit card

For additional details about our warranties, contact your sales professional, and thank you for investing in Sauber Manufacturing equipment.

