



VORTEQ[®] M

TRAILER MOUNTED ATTENUATOR

PRODUCT MANUAL



PN 120051
SEPTEMBER 2022

VORTEQ[®] M

The Vorteq[®] M TMA has been tested pursuant to the AASHTO MASH 2016 standard

Product Manual



15601 Dallas Parkway
Suite 525
Addison, Texas 75001
www.valtir.com



WARNING: The local highway authority, distributors, owners, contractors, lessors, and lessees are **RESPONSIBLE** for the assembly, maintenance, and repair of the Vorteq[®] M. Failure to fulfill these **RESPONSIBILITIES** with respect to the assembly, maintenance, and repair of the Vorteq[®] M could result in serious injury or death.



These instructions are for standard assembly specified by the appropriate highway authority. In the event the specified system assembly, maintenance, or repair would require a deviation from standard assembly parameters, contact a Valtir representative.

This manual must be available to the worker overseeing and/or assembling the product at all times. For additional copies, contact Valtir at (888) 323-6374 or visit valtir.com.

The instructions contained in this manual supersede all previous information and manuals. All information, illustrations, and specifications in this manual are based on the latest Vorteq[®] M information available to Valtir at the time of printing. We reserve the right to make changes at any time. Please contact Valtir to confirm that you are referring to the most current instructions.

Vorteq[®] M is a registered trademark of Valtir, LLC.

TABLE OF CONTENTS

Customer Service Contacts	1
Abbreviations	1
Important Introductory Notes	1
Safety Symbols	2
Safety Rules for Assembly	2
Limitations and Warnings	2
System Overview	3
Towing the Trailer	4
Controlling Skid Distance	4
Truck Preparation	6
System Assembly	9
Assembly Checklist	13
Operation Checklist	13
Maintenance	14
Storage	16
Technical Specifications	16
Post Impact	17
Parts List	18
Notes	21

Customer Service Contacts

Valtir is committed to the highest level of customer service. Feedback regarding the Vorteq® M assembly procedures, supporting documentation, and performance is always welcome. Additional information can be obtained from the contact information below:

Valtir

Telephone:

(888) 323-6374 (USA)
+1 214 589 8140 (International)

Internet:

valtir.com/contact

Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
FHWA	Federal Highway Administration
MASH	Manual for Assessing Safety Hardware
MUTCD	Manual on Uniform Traffic Control Devices
PPE	Personal Protective Equipment

Important Introductory Notes

The performance of the Vorteq® M is dependent upon the proper assembly, deployment and future system maintenance. These instructions must be read in their entirety and understood before assembling the Vorteq® M. These instructions are to be used only in conjunction with the assembly of a Vorteq® M and are for standard assemblies only as specified by the applicable highway authority.

In the event your system assembly requires or involves deviation from standard parameters, or during the assembly process a question arises, please contact Valtir Customer Service. No person should be permitted to assist in the assembly, maintenance, or repair of this system that does not possess the unique knowledge described herein. These instructions are intended for an individual who is qualified to both read and accurately interpret them as written. They are intended for the individual who is experienced and skilled in the assembly of highway products which are specified and selected by the highway authority.

If additional information is required, please contact Valtir Customer Service. If there are deviations, alterations, or departures from the assembly protocol specified in this manual, the Vorteq® M may not perform as tested and accepted.

- 

It is the responsibility of the installer to maintain a safe work area including the use of standard work zone safety equipment & PPE: gloves, safety-toe shoes, and eye / ear protection.
- 

DO NOT use any component part that has not been specified and/or approved for this system during assembly or repair.

Safety Symbols

This section describes safety symbols that may appear in the Vorteq® M manual. Read the manual for complete safety, assembly, operating, maintenance, repair, and service information.



Indicates Danger or Warning. Failure to read and follow this warning could result in serious injury or death to the workers and/or bystanders.



Indicates Caution or High Importance. Failure to follow this warning can result in improper performance, failure of operation, to serious injury or death in the event of a vehicle impact with the system.



Indicates Notifications or Reference. These denote important items but will not cause system damage or serious injury.

Safety Rules for Assembly

This manual must be kept in a location where it is readily available to persons who are skilled and experienced in the assembly, maintenance, or repair of the Vorteq® M. Additional copies of this manual are available from Valtir by calling (888) 323-6374 or visiting valtir.com/contact. Please contact Valtir if you have any questions concerning the information in this manual or about the Vorteq® M.



It is the responsibility of the installer to use proper safety precautions when operating power equipment and when moving heavy equipment or Vorteq® M components. Hand, eye, foot, and back protection is recommended.



Safety measures incorporating traffic control devices specified by the highway authority must be used to provide safety for personnel while the Vorteq® M is in use. The traffic control plan established by the highway authority should be adhered to when deploying the Vorteq® M.



Do not assemble, maintain, or repair the Vorteq® M until you have read this manual thoroughly and completely understand it. Ensure that all warnings in this manual are followed. Please call Valtir if you do not understand these instructions.

Limitations and Warnings

Valtir contracts accredited testing facilities to perform crash tests, evaluation of tests, and reporting of results for submission to FHWA for review.

The Vorteq® M was tested to meet the impact criteria, requirements, and guidelines of MASH. These tests, specifically set forth by AASHTO, evaluate product performance by simulating those impacts outlined by MASH involving typical vehicles on our roadways, including lightweight cars (approx. 2420 lb. [1100kg]) and full size pickup trucks (approx. 5000 lb. [2270 kg]). A product can be tested to multiple Test Levels. The Vorteq® M is certified to the Test Level(s) as shown below:

Test Level 3: 62 mph [100 km/h]

These tests are not intended to represent the performance of systems when impacted by every vehicle type or every impact condition existing on the roadway. This system is tested to the test matrix criteria of MASH 2016.

Valtir expressly disclaims any warranty or liability for injury or damage to persons or property resulting from any impact, collision or harmful contact with products, other vehicles, or nearby hazards or objects by any vehicle, object or person, whether or not the products were assembled in consultation with Valtir or by third parties.

The Vorteq® M is intended to be assembled and maintained in accordance with specific State and Federal guidelines. Valtir offers a reflective delineator panel and has reflective tape for the Vorteq® M. However, the material is only intended to supplement delineation required by the US Department of Transportation's MUTCD or local jurisdiction. The appropriate highway authority approved engineer should be careful to properly select, assemble, and maintain the product. Careful evaluation of the host vehicle, vehicle population type, speed, traffic direction, and visibility are some of the elements that require evaluation in the proper selection of a safety

appurtenance by the appropriate specifying highway authority.

When a safety product is impacted, it is mandatory that the highway authority inspect all the components for damage.

System Overview

The Vorteq® M has been shown to reduce the risk of injury to passengers of an errant vehicle and to the driver of the truck to which the system is attached when it is impacted within the applicable MASH criteria. The system attaches to the rear of a truck and may be used in stationary applications (e.g. as a truck blocking a work zone) and mobile operations (e.g. striping, sweeping, plowing, etc.).

The Vorteq® M consists of the following main assemblies: Shaper Rails, Impact Head, Tongue, X-Brace, Torflex® Axle, Wheels and Tires.

Definitions:

A **BARRIER VEHICLE** is a truck on which a Vorteq® M is attached while positioned upstream (towards the direction that traffic is approaching) of a work zone.

A **SHADOW VEHICLE** is a truck on which a Vorteq® M is attached and is following behind a moving operation such as striping, spraying, etc.



Strict compliance with these instructions is critical to avoid danger to workers and others.

1. To ensure system performance, Valtir requires the use of a pintle hitch with a rating of 20 tons or greater. Operators are also required to check the pintle hitch and receiver as part of normal vehicle maintenance procedures.
2. The pintle hitch height above ground level must be in a range between 25" to 33" [635 to 838 mm]. The preferred pintle-hitch mounting height is 28" [533 mm]. See page 6 for details.
3. The Vorteq® M shall be securely fastened to the truck. On level ground, the bottom of the Impact Head shall be 14" +/- 2" [350 mm +/- 50 mm] from the ground.
4. The Vorteq® M is designed to safely absorb a crash and to support its own weight. Do not sit, stand or lean on any part of the system.



Do not drag the system or place anything on its top as damage may result.

5. Ballast and other heavy objects must be adequately anchored to the truck to prevent shifting during an impact. The tie-down straps should be strong enough to hold 20 times the weight of the ballast.
6. The agency responsible for the truck must inspect for adequate operator safety (ex. seat belts, head rests, etc.).
7. Inspect for damage or corrosion to ensure safety and performance of the Vorteq® M.
8. Regular maintenance of the Vorteq® M is important for safe use. Refer to the Maintenance section of this manual for additional information.
9. This system is a crash attenuator and is therefore used in high risk areas. Stay clear of traffic whenever possible. If an accident occurs, even under MASH conditions, there may be fragments from the truck or impacting vehicle that could cause injury.
10. Do not use any part of the system for towing or hauling a load.
11. Ensure an appropriate truck is used with the Vorteq® M.

Towing the Trailer

1. A jack is used to support the Vorteq® M off the truck and must be fully raised during operation.
2. The driver must use extra caution while backing up with the Vorteq® M so that injury and/or damage will not result.
3. Use a correctly rated pintle hitch (20 tons min). Confirm that the pintle hitch and pintle eye are connected and properly tightened/adjusted.
4. Verify all lights are operational.
5. Avoid sudden stops and starts that can cause loss of vehicle control.
6. Avoid sudden steering maneuvers that might create sway or undue side force on the Vorteq® M.
7. Reduce speed when traveling over bumpy roads, railroad crossings, and ditches.
8. Ensure adequate turn radius at curves and corners. The long wheel base of the Vorteq® M means it requires a larger turning radius. Make wider turns at curves and corners.
9. When uncoupling the Vorteq® M, place blocks or wheel chocks at the front and rear of the trailer tires to ensure it does not roll away when the hitch is released.
10. Periodically check bearings. Maintain per the axle manufacturer's schedule.
11. Always use safety chains when towing the Vorteq® M.
12. Cross safety chains under coupling to prevent tongue from dropping to ground in case of connection failure.
13. Allow only enough safety chain slack for tight turns.
14. Do not let safety chains drag on the ground. Twist safety chains equally from hook ends to remove excess slack.
15. The truck driver is completely responsible for monitoring the condition of the Vorteq® M system components as they relate to safe highway operation of their vehicle.
16. Ensure lighting harnesses are properly connected and not touching the road, but loose enough to make turns without disconnecting or damaging wires.
17. Do not modify, or change the Vorteq® M in any way.
18. Never weld, bolt or modify anything to the Vorteq® M.

Controlling Skid Distance

The use of a Vorteq® M on the back of a truck will not:

- Affect the skid (roll ahead) distance of an impacted truck. **KEEP WORK CREWS CLEAR!**

Controlling skid distance (roll ahead):

- Skid distance is significantly increased and is less predictable for lightweight shadow vehicles.
- Skid distance is reduced and is more consistent when heavier shadow vehicles are used.
- Required truck weight: 12,183 lbs [5,526 kg] or greater.

Roll-Ahead Distance for Shadow Vehicles

Weight of Shadow Vehicle (Moving)	Prevailing Speed mph [km/h]	Weight of Impacting Vehicle to be Contained*			
		4,500 lbs [2,040 kg]	10,000 lbs [4,536 kg]	15,000 lbs [6,804 kg]	24,000 lbs [10,886 kg]
10,000 lbs [4,536 kg]	60-65 [96-105]	100' [30 m]	175' [53 m]	225' [69 m]	275' [84 m]
	50-55 [80-88]	100' [30 m]	150' [46 m]	175' [53 m]	200' [60 m]
	45 [72]	75' [23 m]	100' [30 m]	125' [38 m]	150' [46 m]
15,000 lbs [6,804 kg]	60-65 [96-105]	75' [23 m]	150' [46 m]	175' [53 m]	225' [69 m]
	50-55 [80-88]	75' [23 m]	125' [38 m]	150' [46 m]	175' [53 m]
	45 [72]	50' [15 m]	100' [30 m]	100' [30 m]	100' [30 m]
24,000 lbs [10,886 kg]	60-65 [96-105]	75' [23 m]	100' [30 m]	150' [46 m]	175' [53 m]
	50-55 [80-88]	50' [15 m]	75' [23 m]	100' [30 m]	150' [46 m]
	45 [72]	50' [15 m]	75' [23 m]	75' [23 m]	100' [30 m]

Note: Distances are appropriate for shadow vehicle speeds up to 15 mph [25 km/h].

Roll-Ahead Distance for Barrier Vehicles

Weight of Barrier Vehicle (Stationary)	Prevailing Speed mph [km/h]	Weight of Impacting Vehicle to be Contained*			
		4,500 lbs [2,040 kg]	10,000 lbs [4,536 kg]	15,000 lbs [6,804 kg]	24,000 lbs [10,886 kg]
10,000 lbs [4,536 kg]	60-65 [96-105]	50' [15 m]	100' [30 m]	150' [46 m]	200' [60 m]
	50-55 [80-88]	25' [8 m]	75' [23 m]	100' [30 m]	150' [46 m]
	45 [72]	25' [8 m]	50' [15 m]	75' [23 m]	100' [30 m]
15,000 lbs [6,804 kg]	60-65 [96-105]	25' [8 m]	75' [23 m]	100' [30 m]	150' [46 m]
	50-55 [80-88]	25' [8 m]	50' [15 m]	75' [23 m]	100' [30 m]
	45 [72]	25' [8 m]	25' [8 m]	50' [15 m]	75' [23 m]
24,000 lbs [10,886 kg]	60-65 [96-105]	25' [8 m]	50' [15 m]	75' [23 m]	100' [30 m]
	50-55 [80-88]	25' [8 m]	25' [8 m]	50' [15 m]	75' [23 m]
	45 [72]	25' [8 m]	25' [8 m]	25' [8 m]	50' [15 m]

Shadow or Barrier Vehicle Recommended Weight

Recommended minimum Barrier/Shadow vehicle weight: 12,183 lbs [5,526 kg].

*Weights of Typical Vehicles:

- Midsize automobile - 2,250 lbs [1,020 kg]
- Full-size automobile - 3,500 lbs [1,500 kg]
- Loaded 3/4-ton pickup truck - 6,000 lbs [2,750 kg]
- Loaded 1-ton cargo truck - 10,000 lbs [4,500 kg]
- Loaded 4-yard dump truck - 24,000 lbs [11,000 kg]

Source: "Use of Truck Mounted Attenuators in Work Zones" by T. Darcy Sullivan, P.E and Jack B. Humphreys, P.E., University of Tennessee.

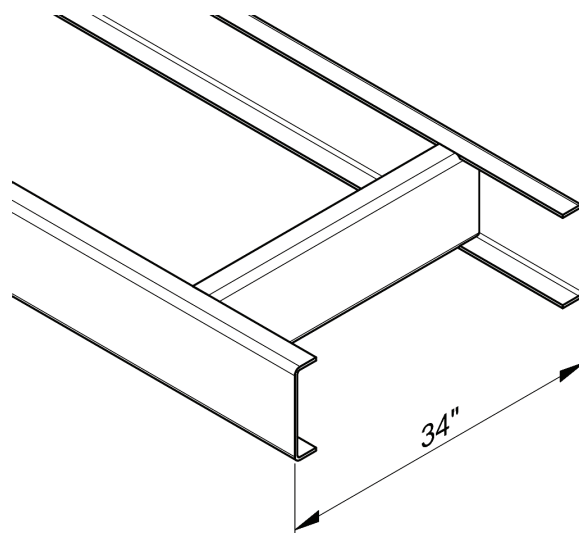
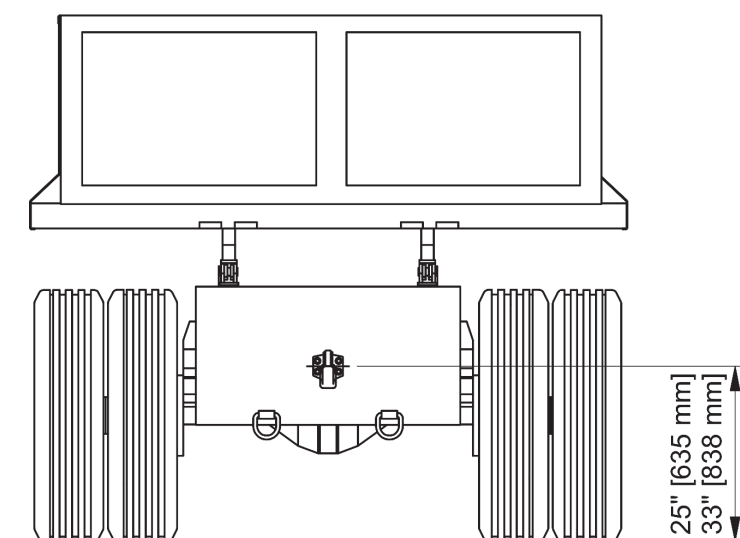
Truck Preparation

The truck frame must be structurally adequate for towing a Vorteq® M. Truck hitch and support structure must be capable of withstanding a 100,000 lb. [445 kN] impact force to the hitch. If there are any questions regarding truck suitability, contact the Valtir Customer Service Department.

The truck should be as close to the final driving weight as possible. Ideally, ballast should not be used; but if it is, it must be anchored in a way to hold 20 times the ballast weight in order to keep it in place during an impact. The manufacturer's recommended center-of-gravity zone should be adhered to as well.

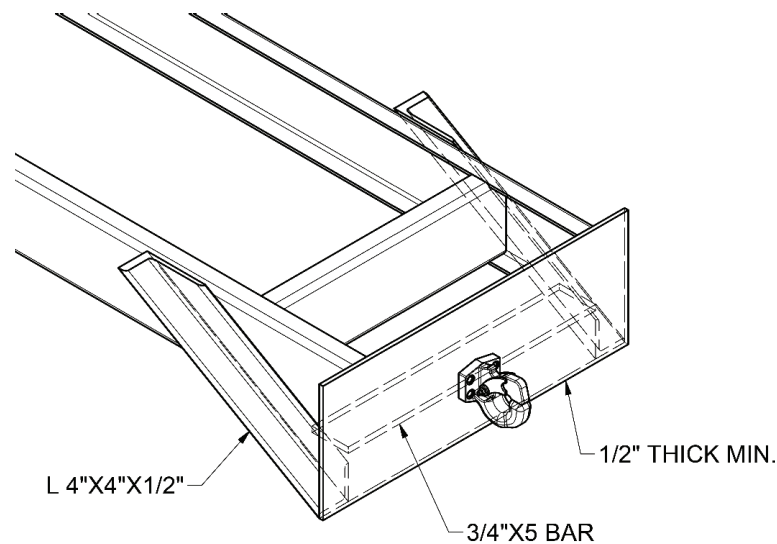
The pintle hitch centerline height above ground level must be between 25" to 33" [635 to 838 mm]. The preferred pintle mounting height is 28" [711 mm].

Prepare the truck for the pintle hitch. The truck frame is commonly built with C-channels spread 34" +/-1" apart. Most trucks have a 1/2" plate welded across the back frame members and a pintle hitch. If not, start by making sure the frame is square by measuring back from the spring shackles. Cut the frame square first if needed. Once the frame is squared, the plate can be properly welded or bolted on.



Weld-on Procedure

1. Grind chamfers on the inside and outside of the frame ends to prepare for the weld.
2. The plate needs to be a minimum of 1/2" thick and wider than 36".
3. Grind the plate in the locations where the frame is to be welded to remove any paint or rust.
4. Tack the plate into position and make sure that the rear plate is positioned correctly.
5. Continue welding the inside and outside frame to the plate.
6. Incorporate a 3/4" x 5" or larger reinforcement bar to make the 1/2" plate capable of withstanding a 100,000 lb. [445 kN] centered impact force.
7. If the pintle hitch and plate extend below the truck frame, add 4" x 4" x 1/2" or larger angle gussets.
8. Weld the 3/4" x 5" reinforcement bar in a horizontal position as shown to the Rear Plate using 3/8" fillet with 3" skip welds, 6" on center, top and bottom.
9. Weld the 4" x 4" x 1/2" angle gussets to truck frame with 3/8", 3-6 skip-welds, followed by welding to the ends of the 3/4" x 5" reinforcement bar and the back of the 1/2" plate.
10. Bolt or weld pintle hitch to rear plate, centering it vertically on the 3/4" x 5" reinforcement bar.
11. Prime and paint all welded areas



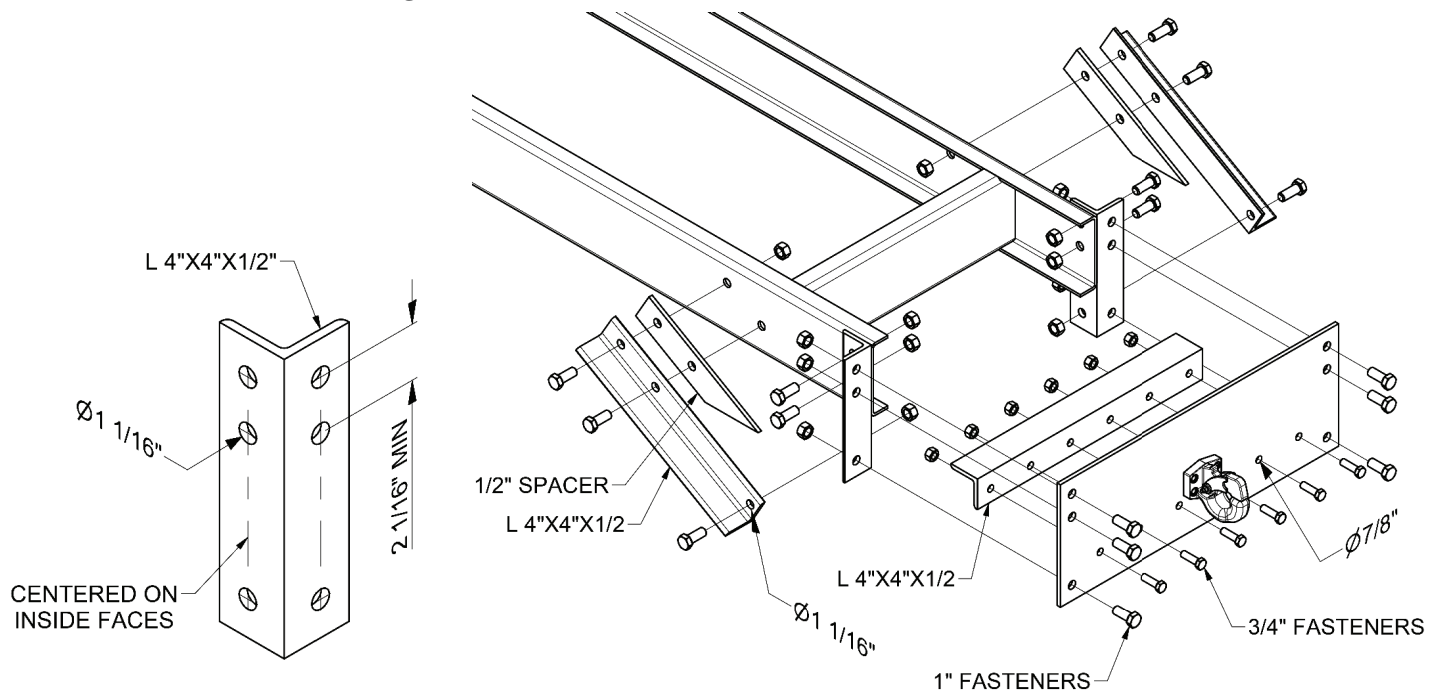
Welding to be performed only by a qualified welding technician.



The truck frame is high carbon steel. To avoid cracking, do not weld or apply excessive heat to bottom flange forward of rear-most leaf spring hangers.

Bolt-on Procedure

1. Cut two (2) 4" x 4" x 1/2" angles to the height of the rear plate.
2. Measure and mark the angles for six (6) 1-1/16" holes, as shown (three (3) on each side). Space top holes at least 2-1/16" apart.
3. Drill holes in the angle sections.
4. Use the angles as a template for marking and drilling holes in the truck frame.
5. Bolt the angle sections in place using two (2) 1" grade 5 bolts on each side.
6. The plate needs to be a minimum of 1/2" thick and match the width of the truck frame plus the width of the angles.
7. Drill two (2) matching holes in each end of the plate.
8. Fasten plate using four (4) 1" grade 5 bolts.
9. If the plate needs to extend below the truck frame, due to the height requirement of the pintle hitch, an angle gusset with additional fastener will be needed.
10. This angle gusset will overlap the vertical angle and a shim will be required between the angle gusset and the truck frame, as shown. Drill and fasten two (2) more 1" bolts to attach angle gusset to truck frame, as well as another 1" bolt to attach the angle gusset to each vertical angle.
11. If 1/2" plate extends below truck frame, incorporate a 4" x 4" x 1/2" or larger reinforcement angle behind existing hitch plate capable of withstanding a 100,000 lb. [445 kN] centered impact force. Attach with 3/4" x 3" Grade 5 bolts as shown. Bolt or weld pintle hitch to rear plate, centering it vertically on the 4" x 4" x 1/2" horizontal reinforcement angle.

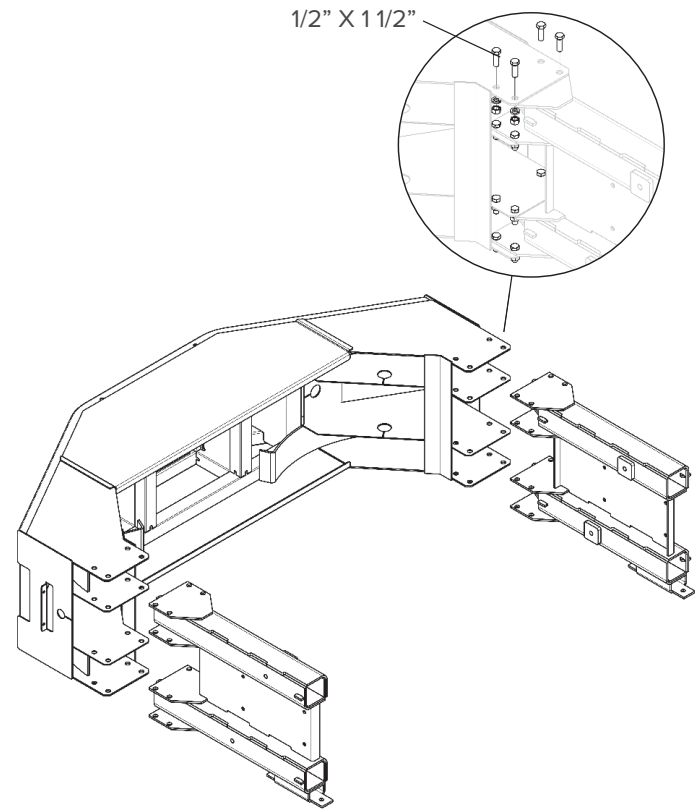


Truck bumper and hitch support must be capable of withstanding a 100,000 lb [445 kN] centered force to the hitch.

System Assembly

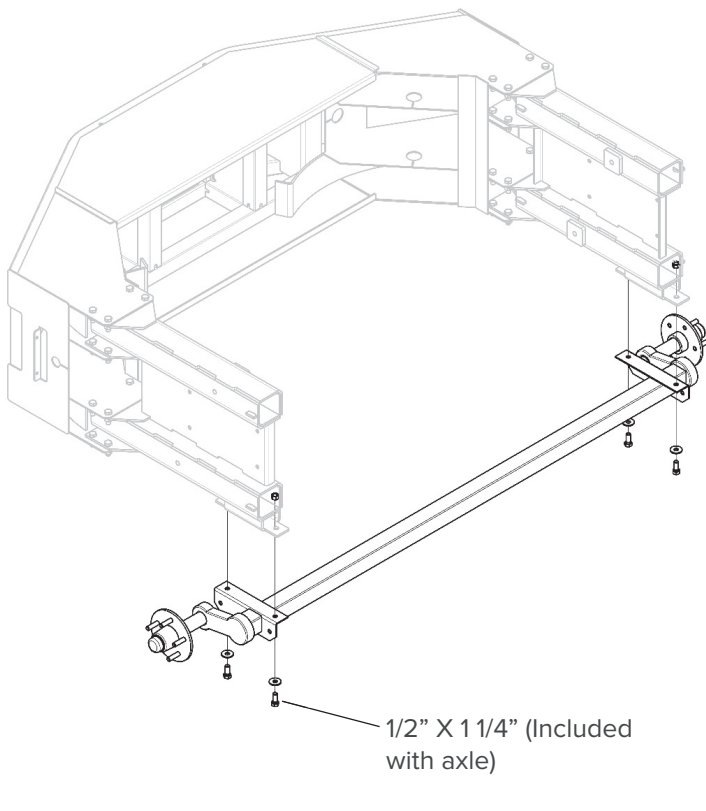
1. Impact Head

Leave fasteners loose until the axle is installed.



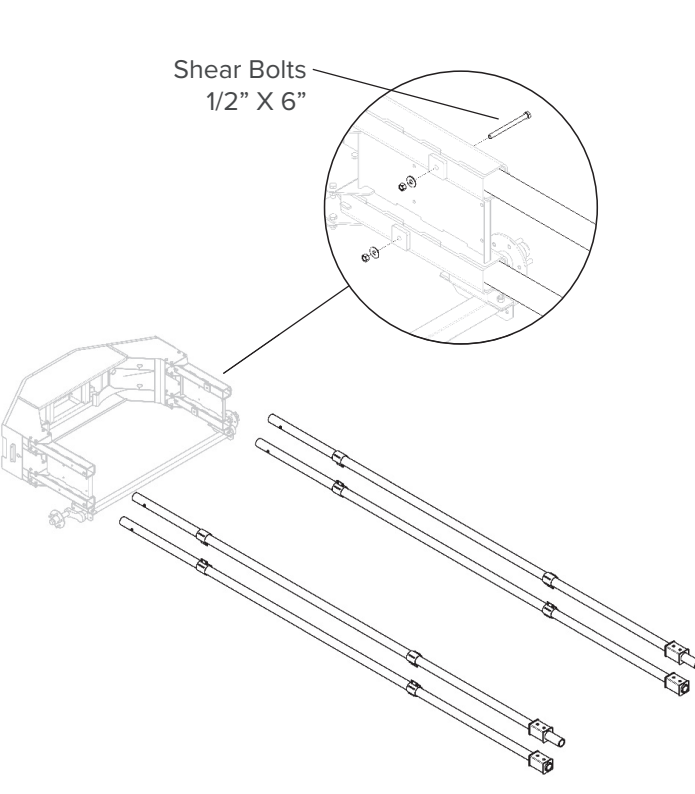
2. Axle

Torque fasteners to 85 lb-ft [115 Nm].



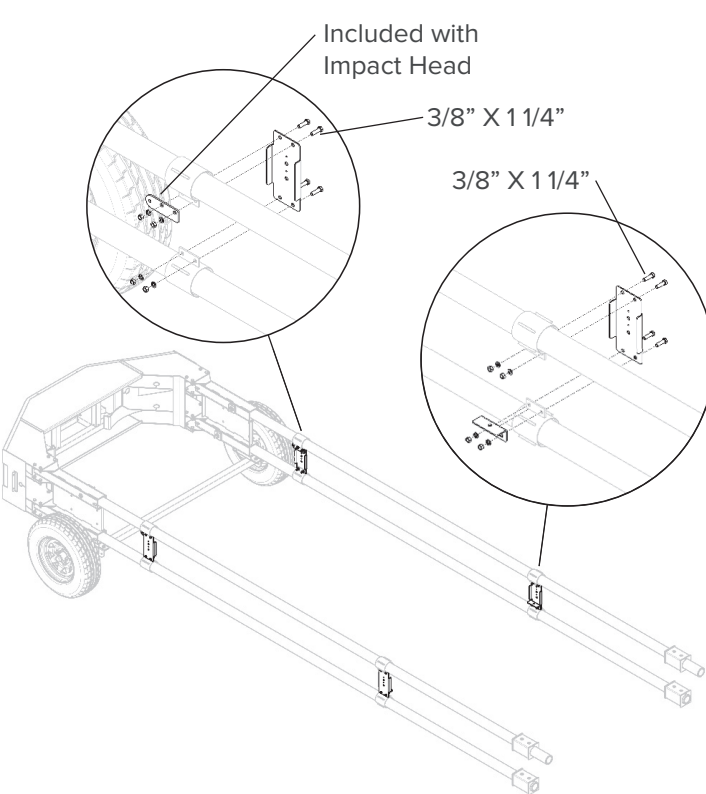
3. Shaper Rails

Note differences between upper and lower rails.



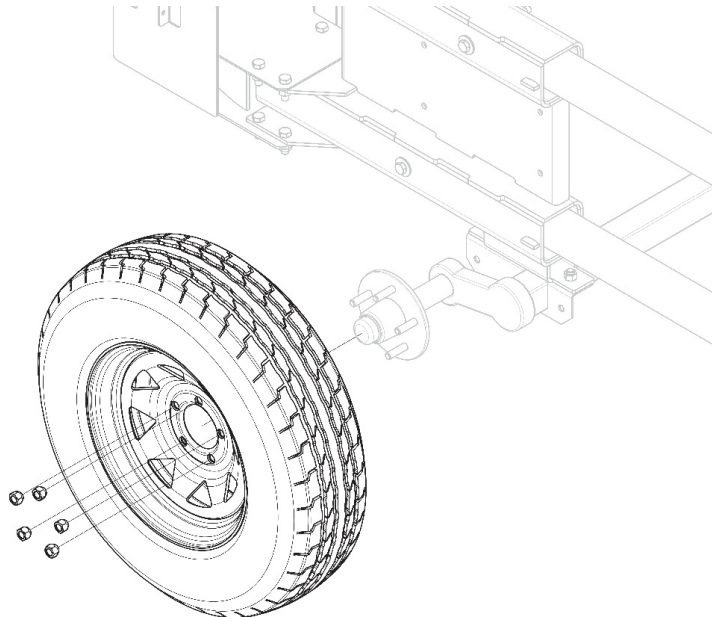
4. Shaper Rail Brackets

Leave fasteners loose until the x-brace is installed.



5. Wheels

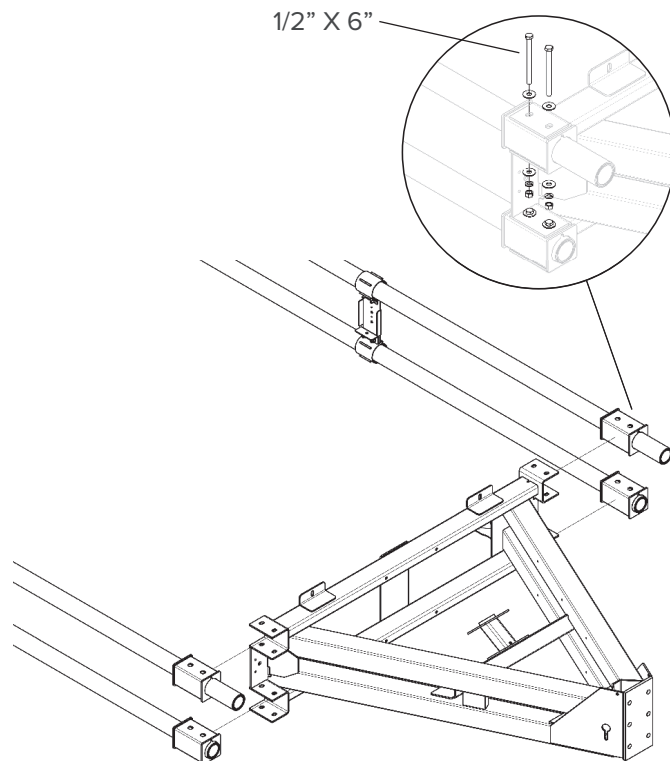
Tighten lug nuts in a star pattern.
Torque nuts to 100-120 lb-ft [136-163 Nm].



Refer to the Dexter Axle “Operation Maintenance Service Manual” (LIT-001-00) at dexteraxle.com/products/torsion-axles/Torflex-light-duty for complete Torflex axle and brake servicing information.

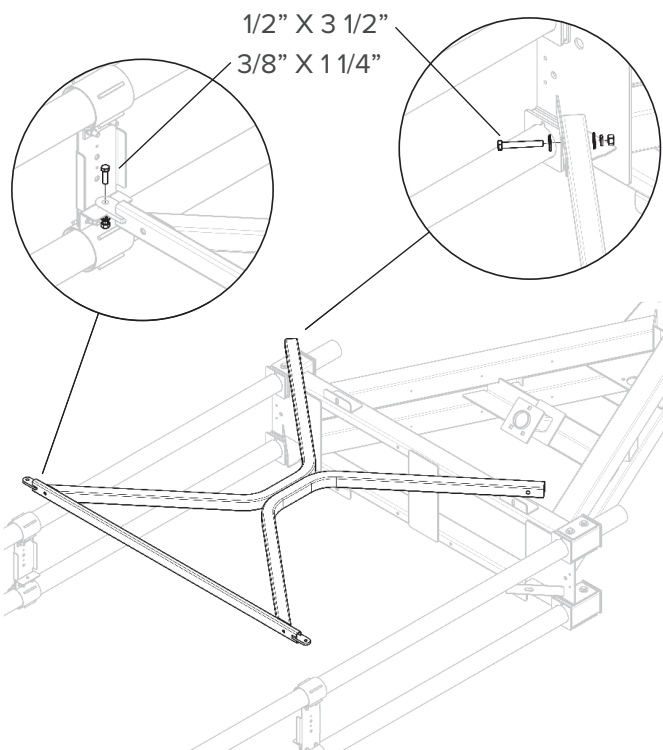
6. Tongue

Spread the shaper rails enough to fit in the tongue brackets. Apply threadlock and torque impact head shear bolts to 33 lb-ft [45 Nm].



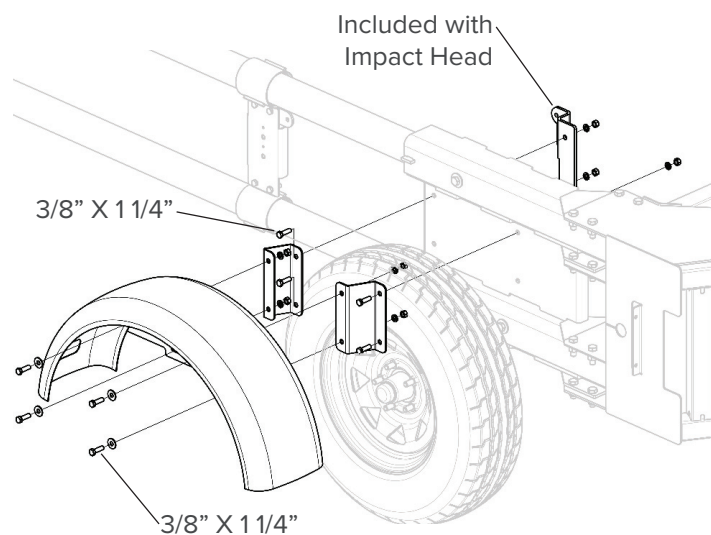
7. X-Brace

Tighten fasteners in shaper rail brackets.

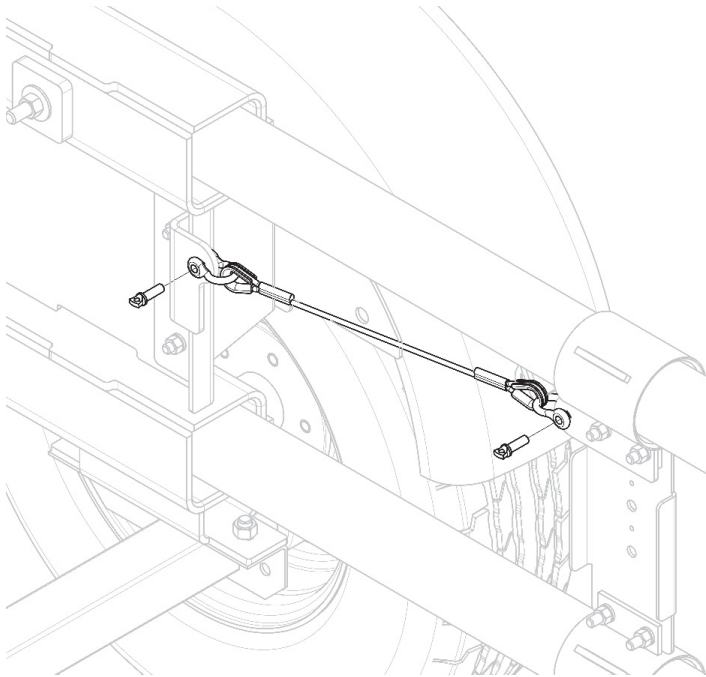


8. Fenders

Note orientation of brackets. Ensure there is sufficient tire clearance.



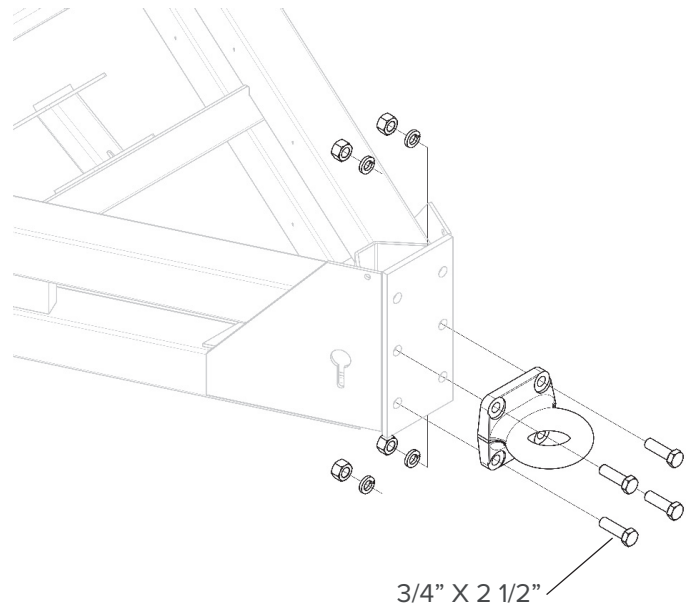
9. Safety Cables



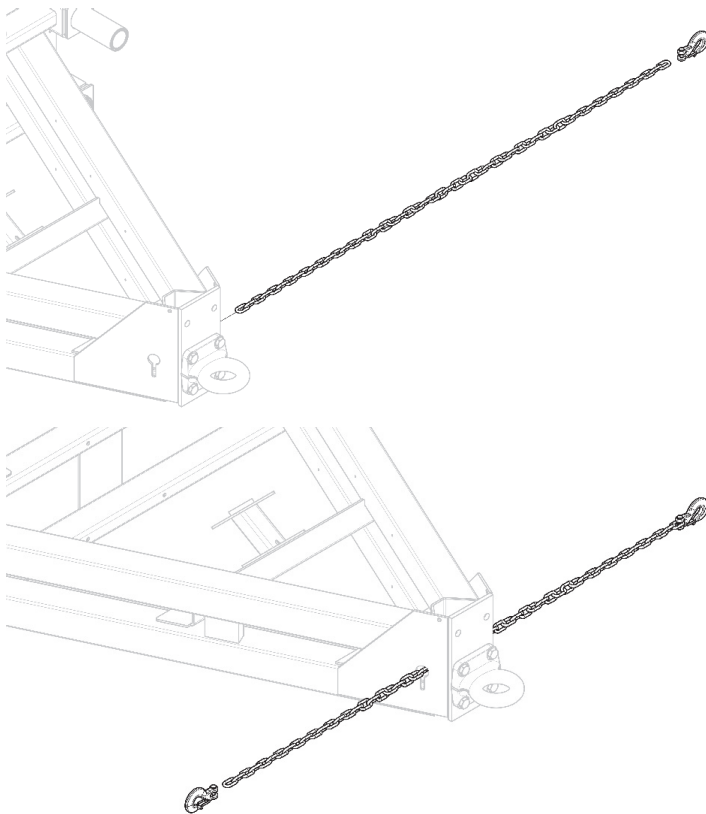
10. Pintle Ring

Locate the pintle ring as required based on truck hitch height.

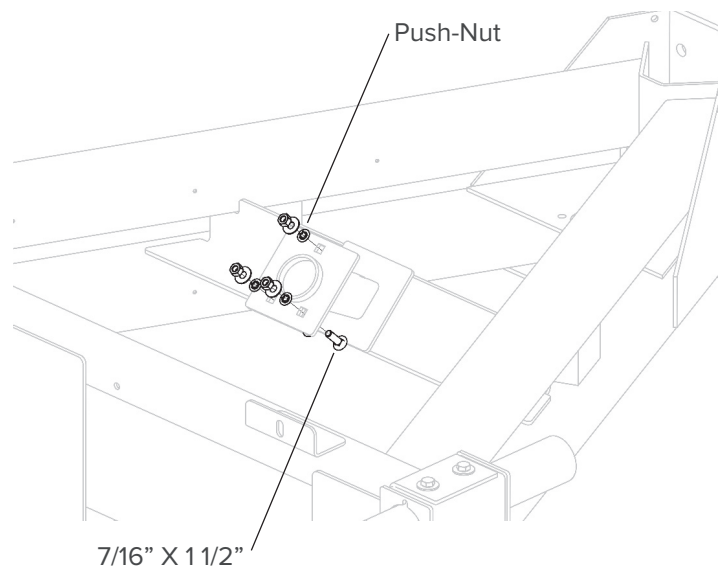
Torque fasteners to 150 lb-ft [203 Nm].



11. Safety Chain

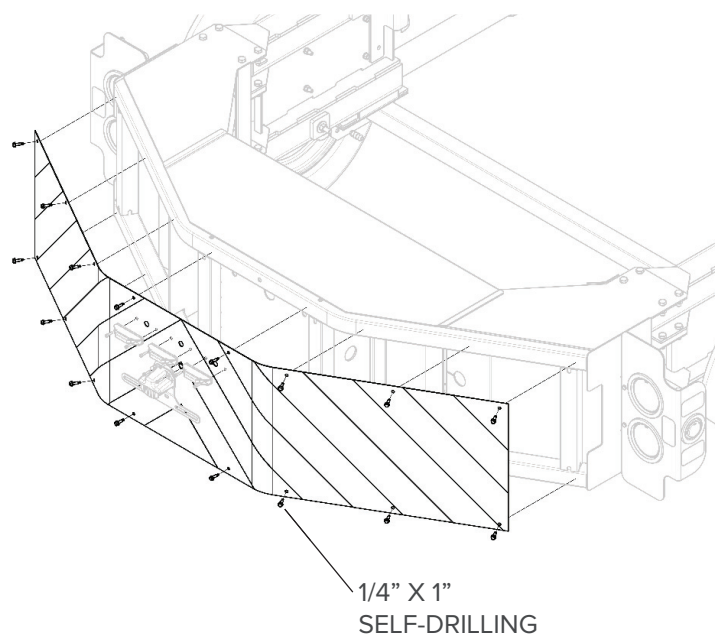


12. Spare Tire Hardware

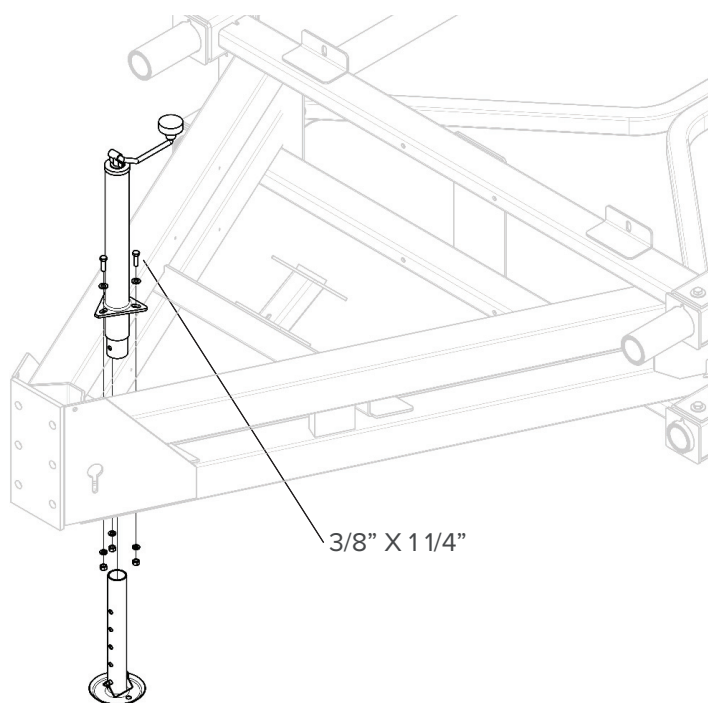


13. Impact Face

Lighting assembly must be installed before the impact face is installed. See instructions provided with lighting assembly.



14. Jack



Assembly Checklist

Performed by: _____

Date: _____

Location: _____

- ☐ Shear bolts are properly installed.
- ☐ Cold tire pressure is between 35 and 50 PSI.
- ☐ Lug nuts properly torqued
- ☐ Pintle hitch is installed at the proper height.
- ☐ Tow vehicle is properly reinforced to withstand impact.
- ☐ License plate is installed.
- ☐ Lighting is fully installed and operational (see lighting installation instruction).



Use only Valtir parts that are specified herein for assembling, maintaining, or repairing the Vorteq® M. Do not utilize or otherwise commingle parts from other systems even if those systems are other Valtir systems. Such configurations have not been tested, nor have they been deemed eligible for use. Assembly, maintenance, or repairs using unspecified parts or accessories is strictly prohibited.

Operation Checklist

1. Check pintle hitch and trailer eye.
2. Check tire pressure (35 – 50 psi).
3. Check operation of all lights.
4. Safety chains are properly installed and attached to the truck.
5. Jack is fully raised.
6. Check trailer height, measured from bottom of Impact Head to ground, when truck is level: 14" ± 2" [350 mm ± 50 mm].
7. Be careful of trailer corner-cutting around corners or next to objects such as guardrails.



When backing up the Vorteq® M, ensure the area behind the system is clear of all objects before proceeding.

Maintenance

Before performing any maintenance on the Vorteq® M, thoroughly read and understand the Maintenance Section and the Safety Section of this manual.

Appropriate service methods and proper repair procedures are essential for the safe and reliable operation of the Vorteq® M. This manual provides general directions for performing service and repair work. Following these guidelines will help ensure reliability.

There are numerous variations in procedures, techniques, tools, parts for servicing, as well as in skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions to each situation. Anyone who departs from the instructions provided in this manual must first establish that they neither compromise their personal safety nor the Vorteq® M integrity by their choice of methods, tools, or parts.

General Maintenance

- Always replace any fastener with one specified by Valtir.
- Check nuts, bolts, and other fasteners to ensure that the hitch remains secured to the truck and the coupler remains secured to the trailer.

Maintenance Schedule						
Item		First use	Each Use	1 Month	3 Months	1 year
Trailer	Check frame rails for damage	•	•			
	System height 350 ± 50 mm [14" ± 2"]	•	•			
	Check shear bolts for damage	•	•			
	Check all fasteners tightness and proper grade			•		
Tires	Check tire pressure (35 – 50 psi) (include spare tire)	•	•			
	Check tires for wear				•	
	Check tires for tread and sidewall damage		•			
Wheels	Check and repack wheel bearings					•
	Check seals for damage					•
	Inspect hub for damage					•
	Check lug nut torque				•	
Trailer	Check pintle bolts, hitch & eye for wear	•	•			
	Check condition of Jack			•		
	Lubrication (jack grease fittings)			•		
	Inspect suspension parts for damage		•			
Electrical	Check and replace lights as required	•	•			

Tires & Wheels

1. Always replace trailer tires with ST (Special Trailer) tires.
2. Tire pressure (35 – 50 psi) should be checked cold before operation.
3. Inspect tires for damage.
4. Check inflation pressure before each use to ensure the maximum tire life and tread wear.

5. Valtir recommends balancing replacement tires.



Tire wear should be checked frequently because once a wear pattern becomes firmly established in a tire; it is difficult to stop, even if the underlying cause is corrected.



Replace tires every three to five years, regardless of appearance. Trailer tires lose about 1/3 of their strength in that time period.

6. Maintain proper lug nut torque.

7. Lug nuts should be torqued after each wheel removal, re-torque after 50 miles [80 km] and approximately every 3,000 miles [4830 km] thereafter.

8. The standard Vorteq® M tire size is ST21575D14*. The bias ply tire provides stiffer side walls and more resistance to sway. *Size may vary

9. All trailer tires have a maximum speed rating of 65 mph [105 km/h].

10. Wheel and tire offset is the distance from the mounting surface to the centerline of the tire. The Vorteq® M axle bearing sets are designed for wheels with 0 to 1/2" [13 mm] offset. Modifying this offset will shorten bearing life and may lead to bearing failure.

11. The mileage expectation of a trailer tire is 12,000 miles [19,300 km].

12. Use the frame when jacking up the trailer. Do not jack up trailer from suspension components.

13. Wheels and tires must be matching pairs.



Never weld to the Torflex® axle. The Torflex® axle contains rubber cords for the suspension system and will be damaged by heat generated from welding directly on the bracket or tube

Wear Pattern		Cause	Action
	Center Wear	Over inflation	Adjust pressure to particular load per tire catalog.
	Edge Wear	Under inflation	Adjust pressure to particular load per tire catalog.
	Side Wear	Loss of camber or overloading	Align at alignment shop.
	Toe Wear	Incorrect toe-in	Align at alignment shop.
	Cupping	Out of balance	Check bearing adjustment and balance tires.

Storage

Storage Instructions

- The ideal storage is in a cool, dark garage.
- Put trailer on jack stands to take the weight off the tires, lower the air pressure, and cover tires to protect from the direct sunlight.

After Prolonged Storage

- Remove wheels.
- Inspect hubs.
- Reinstall wheels.

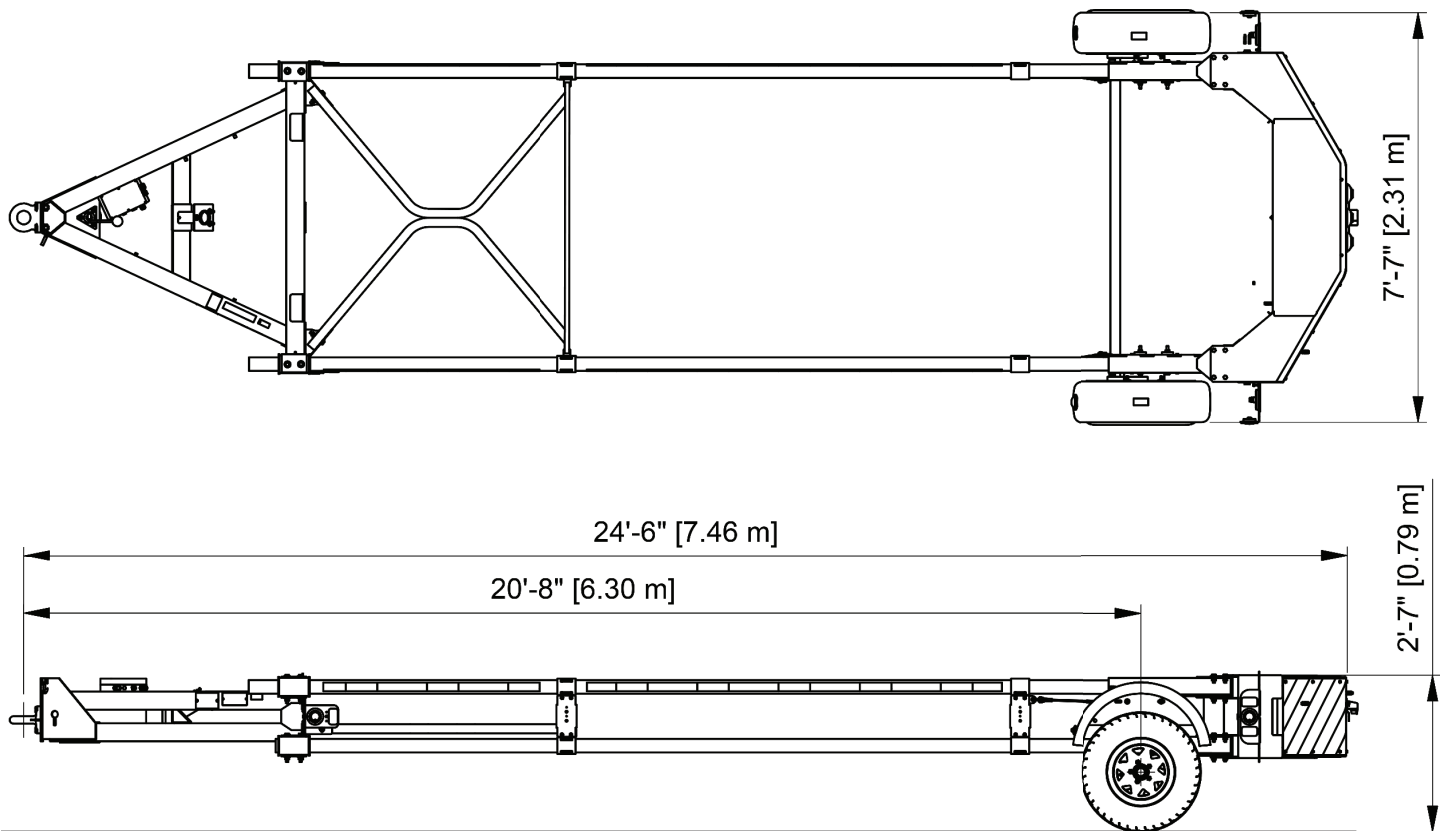
Technical Specifications

Weight (nominal)

Trailer	1690 lbs [767 kg]
Tongue Weight	540 lbs [245 kg]

Dimensions (nominal)

Width	7'-7" [2.31 m]
Length (tongue to wheel)	20'-8" [6.30 m]
Length (overall)	24'-6" [7.46 m]
Height	2'-7" [0.79 m]



Post Impact



Only the specified parts provided by Valtir shall be used to repair a damaged system. Failure to comply could result in reduced safety or damage to the system.

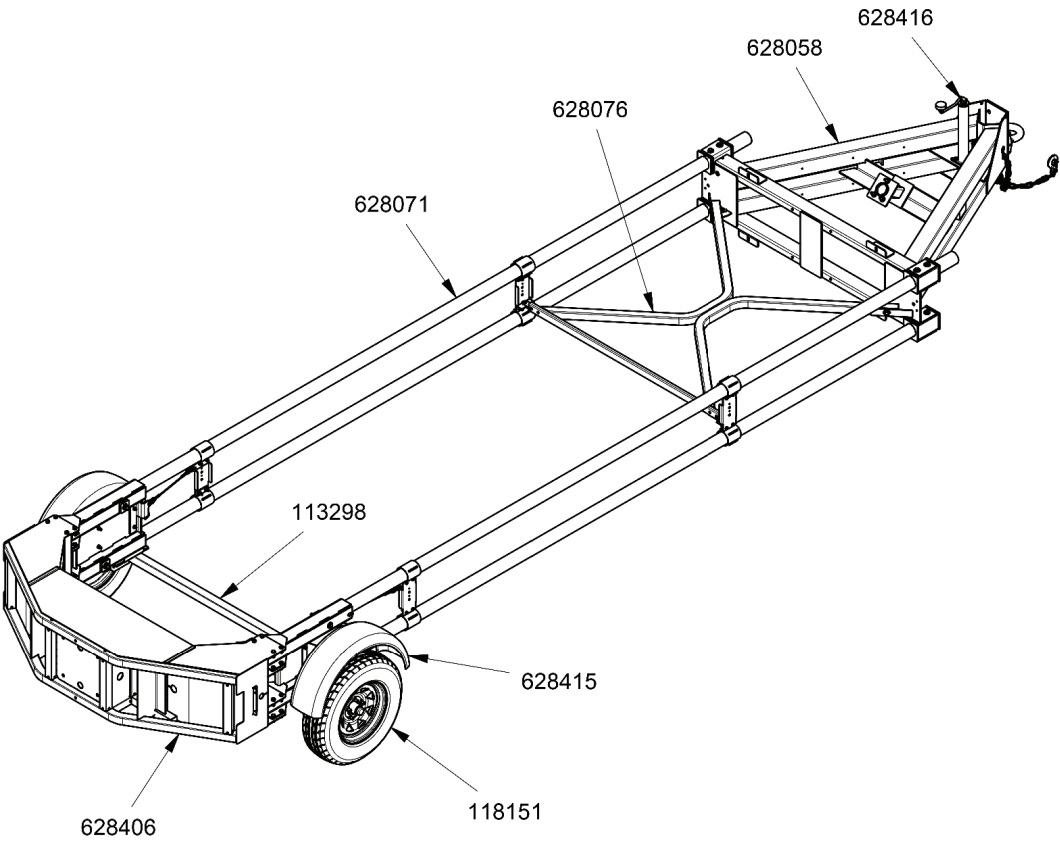
1. Inspect the frame for bent parts. Replace any frame members that have been damaged. Do not attempt to weld or straighten parts. Refer to the system drawings for the part numbers and descriptions of the parts.
2. Inspect bolts for damage. Replace all bolts that have been damaged. Refer to the system drawings for the part numbers and descriptions of the parts.
3. Replace damaged components.
4. Replace all four (4) shear bolts.



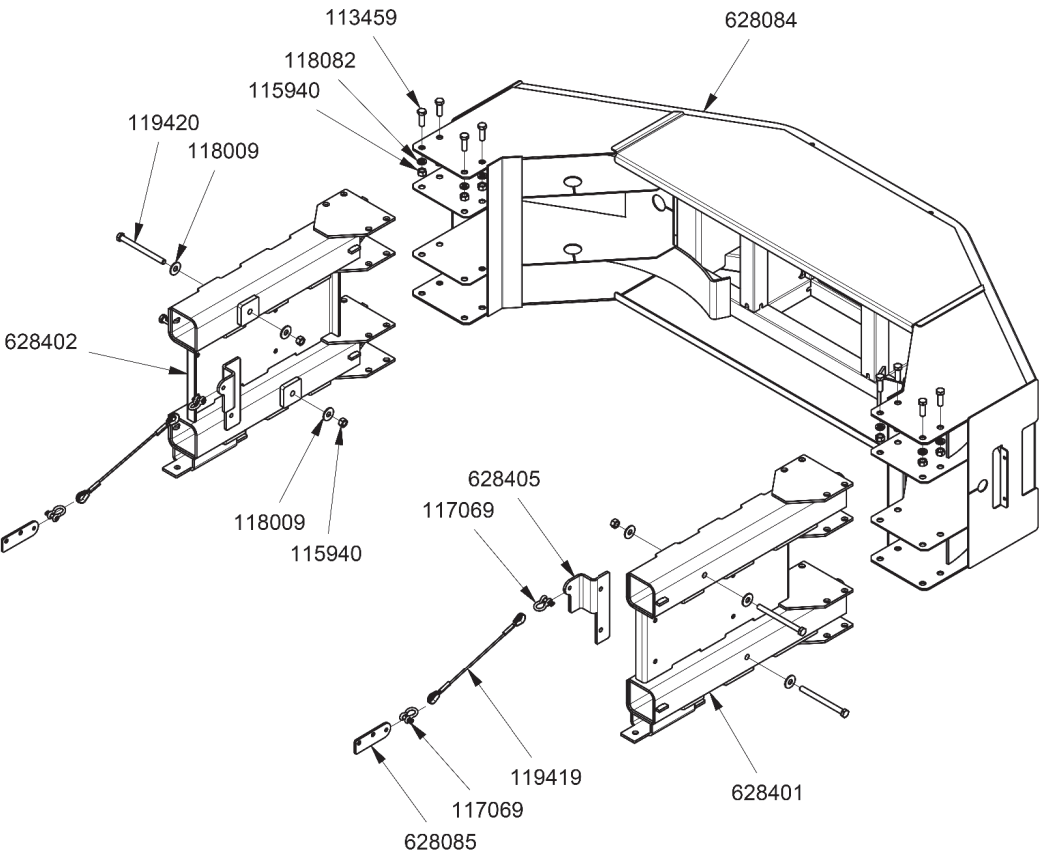
Do not attempt to repair a damaged Shaper Rail. For full impact capacity all Shaper Rails will need to be replaced even if only bent slightly.

Parts List

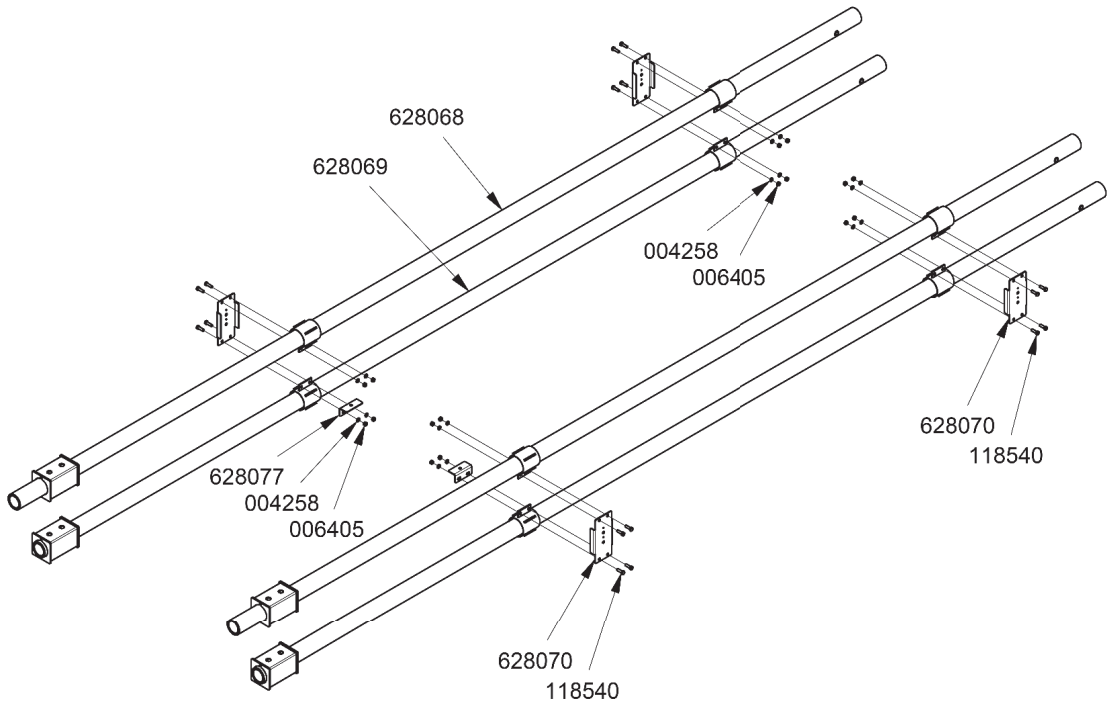
System Assembly



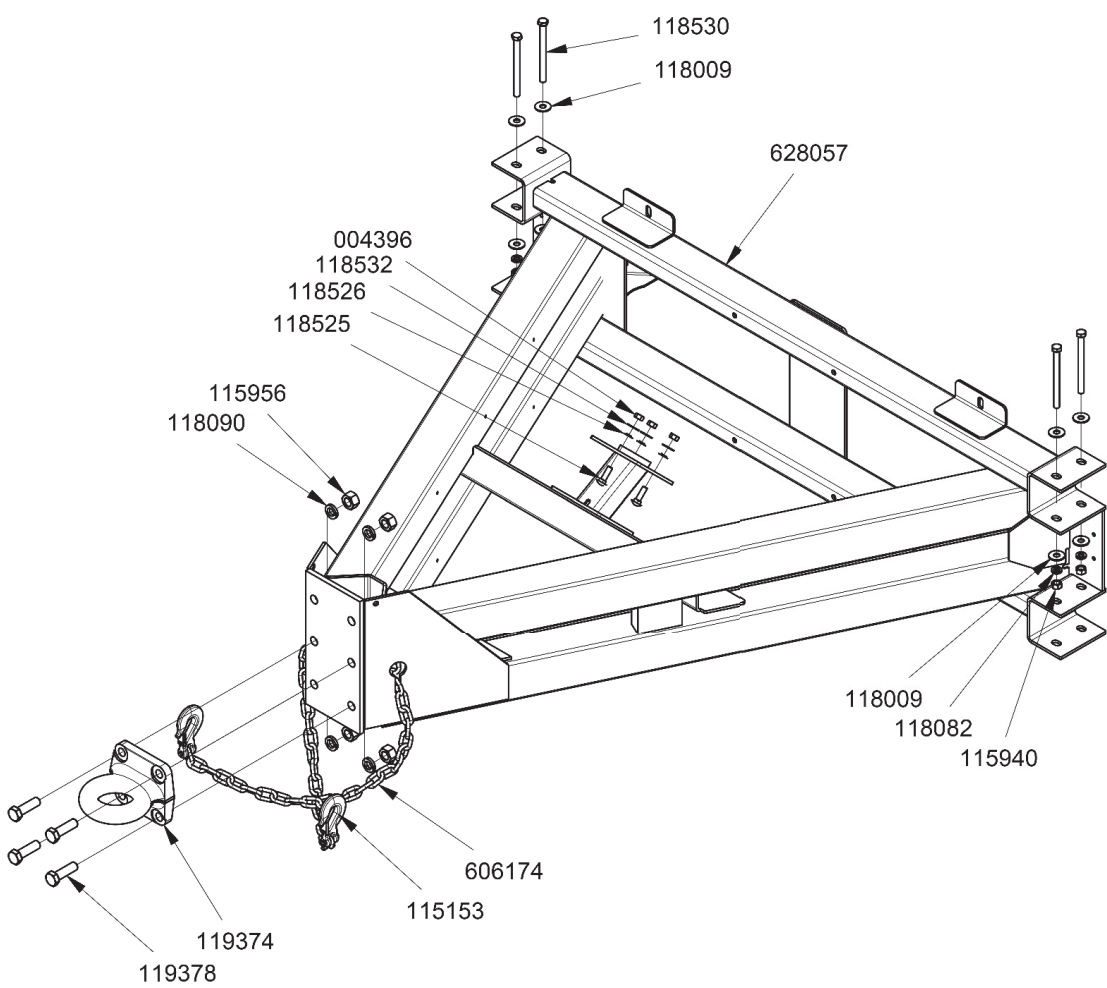
Impact Head - 628406



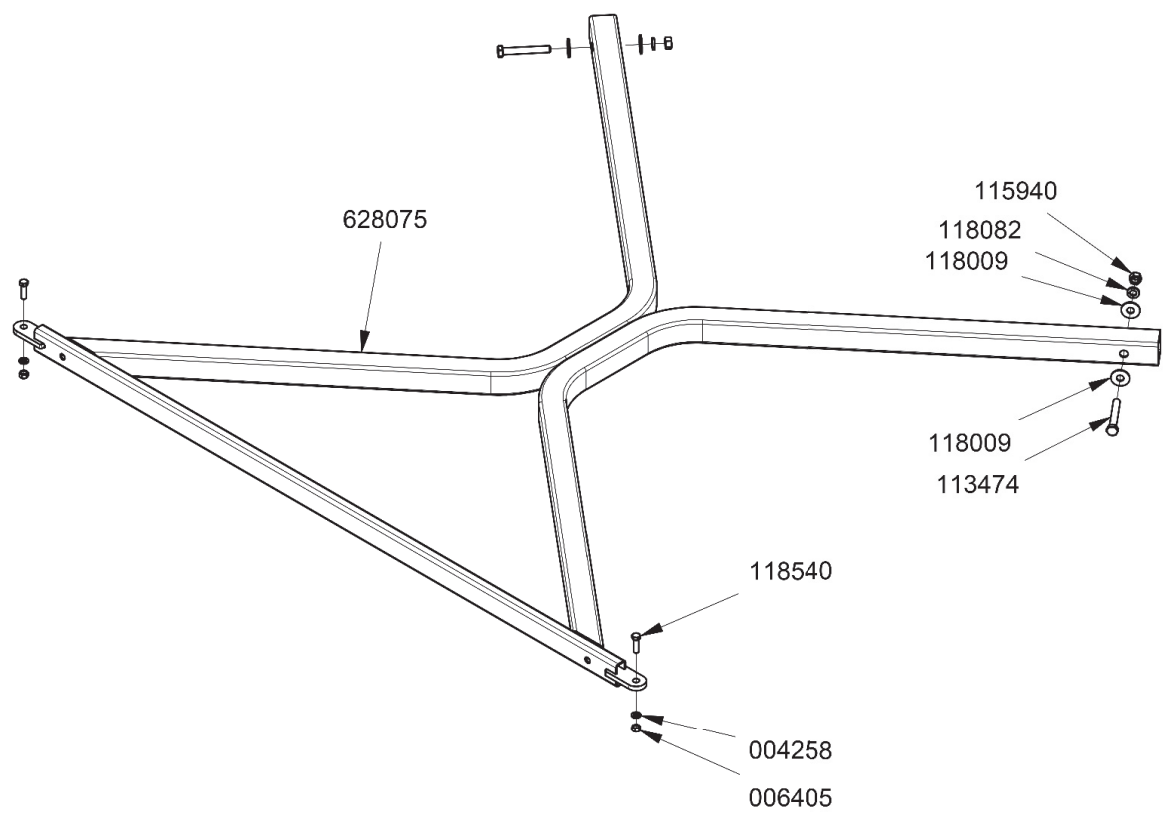
Shaper Rails - 628071



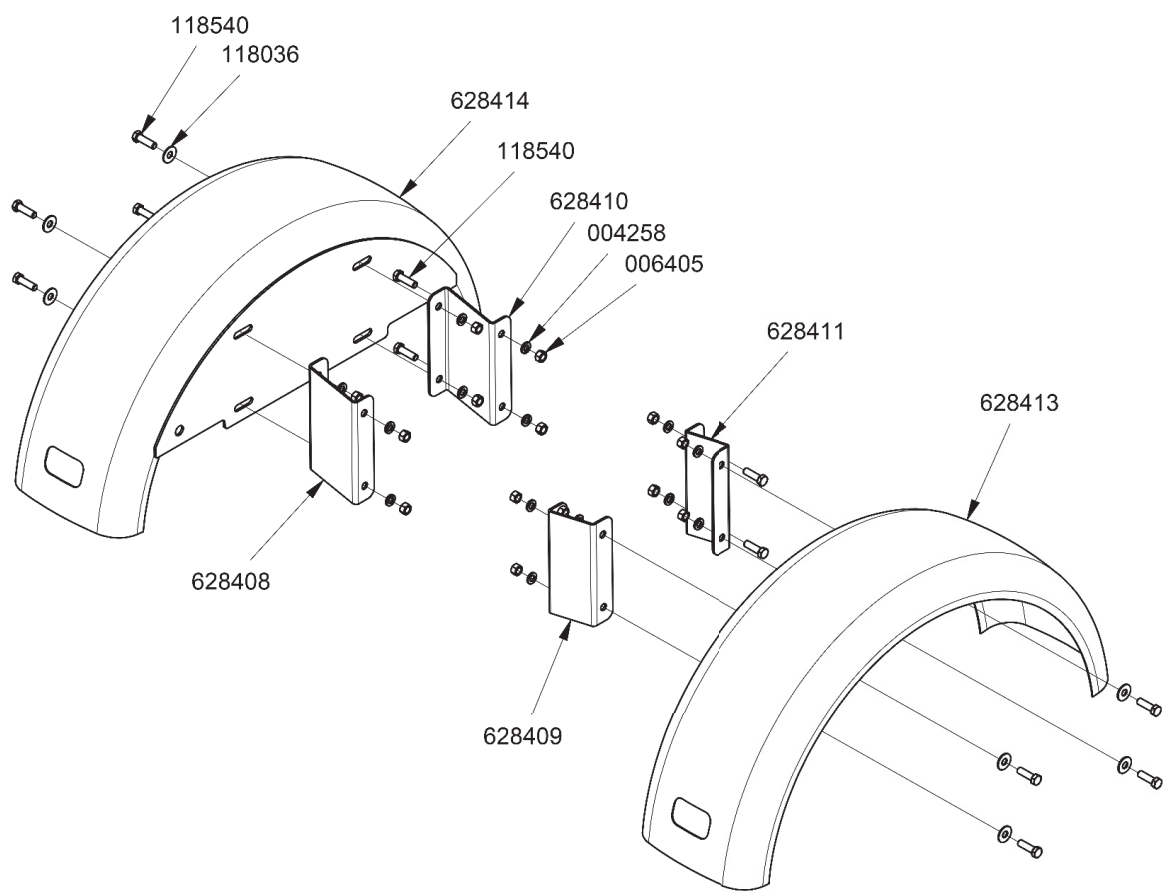
Tongue - 628058



X-Brace - 628076



Fenders - 628415



[illegible]



For more complete information on Valtir products and services, visit us on the web at www.valtir.com. Materials and specifications are subject to change without notice. Please contact Valtir to confirm that you are referring to the most current instructions.

WWW.VALTIR.COM
1.888.323.6374