**DIVERSIFIED METAL FABRICATORS, INC.** 

# Parts & Service Manual RW-1019/1212 Chipper Railgear



May 2020

SERIAL NUMBER (FRONT)

SERIAL NUMBER (REAR)

NOTE: Please refer to the serial numbers when ordering parts or inquiring about warranty items.

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## Message from DMF

No matter what your job function is, Operation, Installation, Maintenance, or Repair, it is your responsibility to familiarize yourself with the entire manual. Once you have read the entire manual, there are some specific sections that you will want to pay special attention to, depending on your role.

If you find anything missing, incorrect or unclear in this manual, please contact us. We are always trying to improve our manuals.

Manuals, service bulletins and general information are available on our website listed below.

We reserve the right to update our manuals without notice. You can download a current manual at our website (http://www.dmfatlanta.com).

Thank you for choosing DMF Railgear. We make every effort to provide quality, safe and rugged products for the railroad. We hope you'll find our gear to be satisfactory in every way. We take product support very seriously, so if you have any questions, please contact us.

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## **1.1 GENERAL DESCRIPTION, WEIGHTS & CAPACITIES**

DMF's Chipper Railgear is designed for tow behind chippers. The Railgear completely lifts the chipper tires above rail when deployed. This allows for various tracked chippers to be used on the same gauge rail.

Two version of the Chipper Railgear are offered. The first version, RW-1019 Chipper Railgear uses a RW-1019 standard 10" wheel and axle assembly. The gear is actuated by two hydraulic cylinders per axle. RW-1019 Chipper Railgear is standard for most applications and tailored for lighter chippers. The second version, RW-1212 Chipper Railgear uses a RW-1212 standard 12" wheel and axle assembly. This gear uses four hydraulic cylinders per axle. The RW-1212 Chipper Railgear is used only in applications where the chipper is too heavy for standard RW-1019 Chipper Railgear.

### 1.1.1 Weights and Capacities

Chipper Railgear Capacity per Railgear Axle @ 20 MPH:

- RW-1019 Chipper Railgear: ~8,200 lbs.
- RW-1212 Chipper Railgear: ~12,300 lbs.

Chipper Railgear installed weights per axle, no brakes:

- RW-1019 Chipper Railgear: ~300 lbs.
- RW-1212 Chipper Railgear: ~540 lbs.

#### 1.1.2 Installation

The DMF Chipper Railgear assemblies were designed to minimize the mounting space needed with minimal modifications to the trailer. The Chipper Railgear is mounted just behind the rear axle where space is available. The Railgear can be ordered with a second axle, for mounting to the front of the frame. Spacing should be considered to balance the chipper when the Railgear is deployed. It should be noted that chippers requiring a second axle must be towed with a drawbar.

#### 1.1.3 Options

There are multiple options available when ordering a set of Chipper Railgear. The most commonly ordered options include rail wheel brakes for aided stopping on rail, insulated wheels to prevent crossing signal actuation and rail sweeps to clear the rail of potentially damaging materials.

#### 1.1.4 Brakes

#### NOTE:

Primary braking effort is provided from the towing vehicle when operating on rail. The rail wheel brake system is intended to <u>assist</u> the vehicle. If the existing vehicle brakes are not maintained in good working order, the rail wheel brakes are not capable of independently stopping the vehicle in reasonably short distances.

The optional brakes are hydraulically actuated from the supplied Railgear power unit. When enabled, the chipper brakes are applied when the brakes are applied in the tow vehicle. A timer is used to limit the run time of the pump to prevent overuse.

## **1.2 CHIPPER RAILGEAR**

### NOTE:

The orientation of brakes can be installed vertically or horizontally to improve brake clearances.

#### 1.2.1 RW-1019 Chipper Railgear Components

Figure 1.2.1 identifies the key components of the RW-1019 Chipper Railgear. Appearances will vary depending on the selected Railgear options. These item descriptions will be used throughout this manual.



Figure 1.2.1 RW-1019 Chipper Railgear Components

#### 1.2.2 RW-1212 Chipper Railgear Components

Figure 1.2.2 identifies the key components of the RW-1212 Chipper Railgear. Appearances will vary depending on the selected Railgear options. These item descriptions will be used throughout this manual.



Figure 1.2.2 RW-1212 Chipper Railgear Components

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## 2.1 BEFORE YOU OPERATE THE RAILGEAR

#### 2.1.1 Familiarization of Railgear

#### Clearances & Approach Angles

Installation of Railgear typically reduces ground clearance, with the rail wheels resting below the frame of the chipper. This must be taken into consideration by the operator when maneuvering on-road and positioning for Railgear deployment. To avoid equipment and property damage, operators should be familiar with the modified clearances and working envelope before towing.

#### Pin Off Systems and Locations

Walk around the chipper and identify the location and type of Railgear pin off system installed. Locking valves are provided for each cylinder. Pin Offs are installed on both sides of the Railgear assembly. It is required that the Pin Offs are used when the Railgear is in both the highway and rail positions.

#### **Operation Controls**

- Locate and be familiar with the location of the Railgear operating controls.
- Locate the Hydraulic Power Unit, its power source and power switch on the trailer.
- If the truck is equipped with Railgear brakes, locate the brake switch. This switch should only be enabled on rail to avoid continuously running the hydraulic Power Unit.

## 2.2 **HIGHWAY OPERATION**

Before towing a Railgear-equipped chipper on the highway ensure the following:

- 1. Verify Railgear is in highway position.
- 2. Verify that the pin offs for both sides of the axle(s) are properly engaged.
- 3. Verify that Railgear brakes have been disengaged and the switch has been turned off, if applicable.
- 4. Verify PTO has been disengaged and that the indicator light is OFF.

## 2.3 GETTING ON THE RAIL

#### NOTE:

The hydraulic power unit is turned on by pushing a momentary switch mounted next to each spool valve. Release the switch when not in use to avoid overheating the power unit.

#### 2.3.1 Getting Onto the Tracks

- 1. If at any time the chipper is unhitched from the tow vehicle the wheels/tires must be secured in place to prevent it from moving. The Railgear brakes will NOT hold the chipper in place.
- 2. At the track crossing, drive past the track and back the vehicle and trailer onto the rails. Align the rear Railgear of the chipper over the tracks.
- 3. Engage the truck's parking brake to prevent the truck from rolling.
- 4. Leave the truck running and the transmission in neutral gear.

#### 2.3.2 Lowering Guide Wheels – Single Axle

- 1. Disengage the Railgear pin offs on each side of the chipper. If a pin off is difficult to disengage, momentarily raise the Railgear to remove load from the pin off.
- 2. Hold the pump power button and use the valve to lower the guide wheels. The flanges of the wheels should be to the inboard sides of the railheads. It may be necessary to adjust truck position slightly.
- 3. Release the power button when finished using the hydraulics.
- 4. When both wheels are down and properly engaging the rail, re-engage the Railgear pin offs.
- 5. If the Railgear is equipped with auxiliary rail brakes, turn the brake switch on.
- 6. Follow owner's manual to operate tow vehicle's Railgear.

#### 2.3.3 Lowering Guide Wheels – Dual Axles

#### NOTE:

If the chipper is equipped with at second axle it must be towed on rail using a draw bar.

- 1. Disengage the Railgear pin offs on each side of the chipper for both axles. If a pin off is difficult to disengage, momentarily raise the Railgear to remove load from the pin off.
- 2. Push and hold the pump power button and use the valve to lower the rear rail wheels only. The flanges of the wheels should be to the inboard sides of the railheads. It may be necessary to adjust the truck position slightly.
- 3. Release the power button when finished using the hydraulics.
- 4. When the rear Railgear is deployed, re-engage the Railgear pin offs for that axle only.
- 5. Follow the owner's manual to deploy the tow vehicle's Railgear on rail.
- 6. Chock the chipper rear Railgear wheels to keep it stationary.
- 7. Push and hold the pump power button and deploy the front Railgear enough to lift the weight of the chipper off the trailer hitch. Release the power button. Detach the trailer from the tow vehicle.
- 8. Ensure all safety chains and electrical connections are disconnected between the chipper and tow vehicle.
- 9. Drive the tow vehicle forward and install the draw bar.
- 10. Reverse the tow vehicle and use the draw bar to reattach to the chipper.
- 11. Ensure all electrical connections and safety chains are secured.
- 12. Fully deploy the front Railgear and engage the pin offs.
- 13. Remove the chocks from the rear Railgear axle.

14. If the Railgear is equipped with auxiliary rail brakes, turn the brake switch on.

### 2.3.4 On the Tracks

- Do not exceed posted track speed limit, and at no time exceed 20 MPH while on the track.
- Be aware that some Railgear is insulated, and will not operate the crossing gate circuits. It is the operator's responsible to know if the Railgear equipped vehicle and trailer have insulated or non-insulated wheels. To assist in identifying insulated rail wheels, a grooved ring is machined around the inside of the front and rear driver's side wheels.
- All railroad rules and safety guidelines should be observed.
- Reduce speed while in reverse and/or at all crossings, curves, branch lines, switches and frogs. No more than a slow walking pace is recommended.
- Traction is reduced on the track, especially in wet conditions.
- Braking distance is increased on the track, especially in wet conditions.
- Do not exceed the maximum rated capacity of the equipment.

## 2.4 GETTING OFF THE RAIL

#### NOTE:

The hydraulic power unit is turned on by pushing a momentary switch mounted next to each spool valve. Release the switch when not in use to avoid overheating the power unit.

### 2.4.1 Single Axle

- 1. Safely pull onto the track crossing, paying attention to traffic and other obstacles.
- 2. Set the parking brake, leave the truck running and the transmission in neutral.
- 3. Follow the necessary steps outlined in the provided operations manual for stowing the tow vehicle's Railgear.
- 4. Disengage the Railgear pin offs on both sides of the trailer.
- 5. Push and hold the pump power button and use the spool valve to lift the Railgear
- 6. Release the power button when the hydraulics are not in use.
- 7. Re-engage all pin offs for safe travel on the highway.
- 8. Turn off the switch controlling the Railgear brakes, if applicable.
- 9. Make sure the surrounding area is free and clear of any obstacles and vehicles before disengaging the parking brake and pulling onto the road.

### 2.4.2 Dual Axles

- 1. Safely pull onto the track crossing, paying attention to traffic and other obstacles.
- 2. Set the parking brake, leave the truck running and the transmission in neutral.
- 3. Chock the rear Railgear wheels.
- 4. Disengage the pin offs on both axles.
- 5. Remove the draw bar and secure it in an appropriate location.
- 6. Back the tow vehicle up to hitch to the chipper.
- 7. Stow and pin off the front Railgear and remove the wheel chocks.
- 8. Fully stow the rear Railgear and pin off.
- 9. Follow the necessary steps in the provided operations manual for stowing the tow vehicle's Railgear.
- 10. Always release the power button when the hydraulics are not in use.
- 11. Disengage the switch controlling the Railgear brakes, if applicable.
- 12. Make sure the surrounding area is free and clear of any obstacles and vehicles before disengaging the parking brake and pulling onto the road.

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## 3.1 INSPECTION AND MAINTENANCE

To assure safe and reliable operation, Diversified Metal Fabricators recommends the following inspection and maintenance guidelines detailed below.

Government or corporate regulations may require additional inspections not covered below. The operator is responsible for being aware of any additional recurring inspections that pertain to the Railgear, and to have them completed accordingly.

Vehicles operated in the following severe-duty conditions may need more frequent inspection and maintenance than suggested below:

- Extreme hot or cold temperatures
- Operation on steep grades
- Extended exposure to road salt
- High mileage use on track

#### 3.1.1 Daily Maintenance

- Visually inspect for hydraulic fluid leaks.
- Check and make sure that all threaded fasteners are secured.
- Visually inspect protective hose/wire wraps, and securing straps, near moving parts. Replace if cracked or worn.
- Inspect wheel flanges for excessive wear, primarily noting differences in wear between wheels on the same axle or diagonally, which may indicate and alignment issue.
- Inspect wheel "end-play": Placing one hand at the 9 o'clock position and your other hand at the 3 o'clock position firmly grab the wheel and push and pull it a few times. There should be no discernable movement in and out, and the wheel should rotate freely. If there is too much movement in and out, or if the wheel does not rotate freely, a detailed inspection should be performed. See Section 7 for appropriate axle assembly drawings.
- Throughout the day, inspect wheel temperature. If extremely hot, this could indicate bearing adjustment is too tight. For adjustment information, see Sections 7 for appropriate axle assembly drawings.

### **3.1.2 Weekly Maintenance**

- Perform standard daily inspection points as previously listed.
- Apply grease to inner tubes of tower assembly as needed.
- Check level of hydraulic oil.
- Check air pressure in tires and correct if necessary.
- Inspect brakes and adjust if necessary. Refer to Section 5.2.
- Test rail brakes on a test track.
  - With the Railgear brake switch "on", verify that pressing vehicle brake pedal, causes the rail brakes to slow, but not lock up the rail wheels.
  - Locking up the wheels on rail can lead to "flat spotting" of wheels. Rail brakes should properly release when the vehicle brake pedal is released.
  - Contact a Service Representative at DMF if additional assistance is needed.

#### 3.1.3 Bi-Annual Maintenance or as Required

- Perform standard daily and weekly inspection points as listed previously.
- Remove the hubcaps from the rail wheels and inspect for deterioration or loss of wheel bearing grease. Unless there is a problem, the cavity may be topped off with the

recommended grease without removing and/or re-packing the bearings, see Section 3.2. If parts appear worn or damaged, replace and repack as shown in Sections 7.

- Clean the hubcap and mating surfaces and apply a bead of silicone gasket and re-attach securely.
- Clean the strainer / filter in the hydraulic power unit tank.
- Rail test for proper braking and adjust as appropriate, see Section 5.2.
- Check Railgear alignment if multiple axles are in use.

#### 3.1.4 Annual Maintenance or as Required

- Perform standard daily, weekly, and bi-annual inspection points as listed above. In addition:
- Disassemble, inspect, repack and reassemble Rail Wheel Bearings as shown in Section 7.

## 3.2 FLUIDS AND LUBRICATION

- Hydraulic Oil: Dexron III ATF for DMF supplied electric/hydraulic power units
- Wheel Bearing Grease / Grease Fittings:
  - **Factory Standard**: Citgo Syndurance Premium Synthetic 460 #2
  - Warm Climates: Mystik JT-6 Hi-Temp Multi-Purpose Grease #2, or equivalent

## 3.3 WHEEL WEAR GAUGE

A metal wheel wear gauge, DMF part number 800115, is available to aid in inspecting worn wheels. The drawing on the next page illustrates how to use the gauge and also lists specifications for minimum wall thickness on the wheel tread and tolerance on wheel back-to-back spacing.



## 3.4 DERAILMENT

The following are instructions for derailment inspection recommended by Diversified Metal Fabricators. In some circumstances, government or corporate regulations may require additional inspections to be performed. The operator must be aware of any inspection requirements that pertain to the Railgear and must abide by all local and national laws regarding Railgear maintenance and safety.

In the case of a minor derailment, the cause of the derailment should be determined and corrective steps taken. The vehicle should be inspected to determine if repairs or adjustments are required. This inspection should include, but should not be limited to, the following:

- Visually inspect Railgear for hydraulic leaks.
- Ensure all lines and hoses are still secured and out of the way of any moving parts.
- Ensure all hydraulic hose connections and fittings are securely in place and not broken.
- Verify that all threaded fasteners are secure, and that cotter pins are not broken.
- Visually inspect the wheels to ensure that the tread and flange are not severely damaged.
- Spin all rail wheels, noting any bearing noise, resistance, and end play.

Any items noted should be repaired using Section 4, to ensure they are repaired to initial install standards.

In case of a major derailment, a complete inspection should be performed, including but not limited to the following:

- Perform all inspection items as listed above in the Minor Derailment Section.
- Inspect all frame brackets, core structures, and subframe to ensure they are not bent, cracked, or broken.
- Inspect and test rail brake system if applicable, see Section 5.
- Ensure all welds are intact and show no signs of cracking or breaking.
- Ensure all mounting hardware and brackets are securely fastened and are not bent, cracked or damaged in any way.
- A full alignment check should be performed if multiple axles are being used.
- Wheels should be removed and the bore, bearing, races, and insulation, if applicable should be inspected for any damage. For further wheel details, see Sections 7 for appropriate wheel and axle assembly drawings.
- Ensure axle threads are not stripped or damaged.

Any items noted should be repaired using Section 4, to ensure they are repaired to initial install standards.

Please contact DMF for any assistance you may require.

# **SECTION 4.0** RAILGEAR INSTALLATION

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## 4.1 PRE-INSTALL

#### NOTE:

The proper installation of this equipment is solely the responsibility of the installer. When in doubt, contact DMF for assistance.

#### WARNING:

Railgear alignment is crucial to ensure safe and reliable operation. Do not attempt to tow chipper on rail until these steps have been completed. See Section 4.5 for detailed instructions.

#### 4.1.1 Safety Statements

- Always block up Railgear before getting underneath chipper.
- Always use jack stands when jacking up the trailer.
- Use personal protective equipment and clothing.

#### 4.1.2 Installation Order

This manual presents the installation information in the order that DMF finds to work best. The installer's shop, tools, personnel or other factors may dictate a different order. This is acceptable as long as the Overall Alignment, Rail Test, Road Test, and Final Inspection are performed at the end.

#### 4.1.3 Required Tools & Materials

Required:

- General shop tools and safety equipment
- Arc or MIG Welder
- Surge Protector (Protects ECM from damage during welding)
- Cutting Torch
- Hand Grinder
- Frame Drill
- Air Saw
- Angle Finder

Recommended:

- Transmission Jack, Motorcycle Lift, Pallet Jack or Forklift
- Overhead Crane
- Work Lights
- Wheel Dolly

### 4.1.4 Fluids and Lubrication

- Hydraulic Oil: Dexron III ATF, for DMF supplied electric/hydraulic power units
- Wheel Bearing Grease / Grease Fittings:
  - **Factory Standard**: Citgo Syndurance Premium Synthetic 460 #2
  - **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2, or equivalent

## 4.1.5 Bolt Torque Specifications

See the following page for recommended torque specifications.

TITLE: Purchased Fastener Torque Specifications

PURPOSE: To establish production methods for the installation of commonly purchased threaded fasteners.

COMMON USAGE: Most areas of multiple part assembly and retention.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Most common sizes of SAE J429 Grade 5 and 8 and of ASTM A574 socket head cap screws. PROCEDURE:

A) Identify the fastener as either fine or coarse thread, select the appropriate chart below.

B) Identify the fastener size (diameter and threads per inch), select the appropriate row in the chart selected.

C) Identify grade of the bolt.

D) Read across the size row and down the grade column. The intersection of row and column gives torque.

#### FINE THREAD BOLTS

SIZE (DIA-TPI)	SAE J429 GRADE 5 (3 MARKS) PLATED (FTLB)	SAE J429 GRADE 8 (6 MARKS) PLATED (FTLB)	ASTM A574 SOCKET HEAD CAP SCREW (FTLB)
1/4-28	6	8	12
5/16-24	12	15	24
3/8-24	21	27	43
7/16-20	33	43	68
1/2-20	51	66	105
9/16-18	72	96	-
5/8-18	100	135	202
3/4-16	180	223	354
7/8-14	260	350	564
1-12	390	530	860
1 1/8-12	540	750	-
1 1/4-12	745	1050	1697
1 3/8-12	-	-	2288
1 1/2-12	1320	1850	3001

COARSE THREAD BOLTS (MATCHING HEX NUTS				
SIZE (DIA-TPI)	SAE J429 GRADE 5 (3 MARKS) PLATED (FTLB)	SAE J429 GRADE 8 (6 MARKS) PLATED (FTLB)	ASTM A574 SOCKET HEAD CAP SCREW (FTLB)	
1/4-20	5	7	10	
5/16-18	19	14	22	
3/8-16	19	24	38	
7/16-14	30	38	61	
1/2-13	45	59	93	
9/16-12	66	84	-	
5/8-11	90	120	179	
3/4-10	160	200	317	
7/8-9	240	320	511	
1-8	360	480	767	
1 1/8-7	480	670	1087	
1 1/4-7	670	930	1533	
1 3/8-6	-	-	2010	
1 1/2-6	1170	1650	2668	

#### COMMENTS:

A) Torque valves specified are for bolts with residual oils or no special lubricants applied. if special lubricants of high stress capacity (such as Never-Seez, graphite and oil, molybdenum disulphite, colloidal copper or white lead) are applied, multiply the torque values in charts by 0.90. The use of Loctite does not affect the torque values in charts.

B) All values are in Foot-Pounds (FTLB). Multiply by 12 for Inch-Pounds.

- C) Flat washers of equal strength must be used.
- D) Bolt manufacturer's specs should be used when available.
- E) Values shown are for Nylock nuts or Grade C prevailing torque nuts.
- F) Never re-use a highly stressed, torque fastener: IT MAY FAIL!

	07/15/15	UPDATED /	UPDATED ALL TORQUE VALUES, REMOVED PLAIN TORQUE SPECS				DJJ	
$\mathbb{A}$	12/29/99	ADDED RE	COMMENDE	D TORQUE CHA	RT		LOR	
REV	DATE			DESCRIPTIO	1		BY	APP
TOLERANI (UNLE COMMON FRAC, M FRAC, C .X .XX	CES: <u>SSPECIFIED)</u> <u>SENSE PREVAILS</u> ACH: ± 1/32" THER: ± 1/16" ± .063 ± .030 ± .030			TITLE: PROD FASTE DIVERSIFIED M	JCTION PROCEE NER TORQUE S ETAL FABRICATORS	OURE 006 PECIFICATION	l 175–15	12
DRILL SI ANGULAF	ZES: ± .005 t: ± 1*	DRAWN BY:	APPD BY:	DATE:		DRAWING NUM	BER:	REV:
THREADS BREA	NISH: 125 MICRO 3: 2A AND 2B K SHARP EDGES	TSH		06/02/94	ATLANTA	PP006		в

### 4.1.6 Welding Information

- Dual Shield Wire spec.  $\rightarrow$  AWS E71T-1
- Low Hydrogen spec.  $\rightarrow$  AWS E-7018

Low Hydrogen Electrodes (AWS E-7018)

Manufacturer	Equivalent Rod
Air Products	AP-7018, 7018IP
Airco	7018C, 7018-A1
Arcos	Ductilend 70
Air Products	170-LA, SW-47,616
Chemtron	170-LA, SW-47,616
Hobart	718, 718-SR
Marquette	7018
McKay Co	7018
Reid-Avery	7018
Uniblaze	7018
Westinghouse	Wiz-18
Lincoln	Jetweld LH-70

Table 4.1.6 Manufacturer Equivalent Welding Rod

## 4.2 INITIAL INSTRUCTIONS

#### 4.2.1 Work Area

The Railgear installation area should meet the minimum requirements listed below. Doing so will help to complete the install in a safe, accurate and timely manner.

- Floor: Should be level to provide good measurements for Railgear installation.
- Lighting: The work area should be adequately lite.
- Space: There should be enough room to maneuver the Railgear components into position and to safely work around other equipment.

### 4.2.2 Chipper Trailer Condition

Before installation, the following trailer items should be inspected:

- Tires: Tires must be in good condition and inflated to manufacturer's recommended pressure.
- Alignment: Railgear axle(s) must be square with trailer hitch. If multiple axles are being used they must also be squared with one another.
- Frame: Inspect to ensure that there is no damage and has not been bent.

#### NOTE:

Deploying Railgear lifts the trailer tires completely off rail. Ensure the trailer will remain stationary during this operation.

## 4.3 GENERAL INFORMATION

The Chipper Railgear has been designed for use on many makes and models of towable chippers. Therefor minor modifications to the trailer or Railgear may be required for proper installation. The Railgear provided consists of the listed major components below, which are also shown in Figure 4.3. This figure shows the standard RW-1019 Chipper Railgear.

- Axle Assembly: The axle is provided fully assembled w/ rail wheels and brakes, if ordered. The axle is welded to the Tower Assembly during installation.
- Tower Assembly: Left and right side assemblies are provided with the hydraulic cylinders. This assembly will be welded to the mounting plate during installation.
- Mounting Plate: Welded to the tower assembly and bolted to the trailer frame once the Railgear height has been established.
- Pin Offs: Secures the Railgear in place when both stowed and deployed. Prevents the Railgear from drooping over long periods of time and from moving in case of a hydraulic failure.
- Locking Valves: Safety feature to prevent movement of Railgear cylinders when stationary and in cases of hydraulic failures. This is only a backup safety measure however, pin offs should always be engaged in both rail and highway positions.
- Hydraulic Power Unit: Provides hydraulic power for operating the Railgear and Railgear brakes when supplied.
- Brake Toggle Switch: Switch mounted on chipper used to turn on the hydraulic Railgear brakes for use on rail only.



Figure 4.3 – RW-1019 Chipper Railgear Major Components

Prior to installation, review the components provided and understand how the Railgear operates. Check for sufficient clearances to prevent interference with Railgear and other parts of the trailer. This includes operation of the Railgear and chipper both on rail and on highway use.

## 4.4 INSTALLATION OF CHIPPER RAILGEAR

#### NOTE:

The following section describes a typical installation of RW-1019 Chipper Railgear mounted directly to the frame of the chipper. The gear may be installed on a fabricated cross member if frame space is not available. In this case modification to the mount between the Tower Assemblies and the Axle would be required. This procedure is up to the installer and has not been detailed in this manual.

#### 4.4.1 Chipper Railgear Installation

1. Ensure there is sufficient frame space to install both Chipper Tower assemblies. The Cylinders and Guide Tube assembly were designed to mount parallel to the axle centerline. See Figure 4.4.1.A.



FIGURE 4.4.1.A - Tower Assembly Alignment w/ Axle

2. Chock the trailer tires in place so the trailer does not move during installation.

#### NOTE:

When fully deployed the Railgear is designed to lift the chipper tires off the ground. It is recommended at this point to secure the chipper to a tow vehicle to keep it from moving.

3. All measurements should be from a common location to square the Railgear with the trailer hitch. This may be difficult so an alternative is to find a common point relative to the front hitch on both sides of the frame. See Figure 4.4.1.B.



Figure 4.4.1.B – Selecting a Common Alignment Reference Point

4. Measure the height of the trailer frame. Determine the height needed to lift the trailer above rail when pinned off. In most cases 3" above rail is required but this may vary based on application. Determine this location with respect to the Tower Assembly and the Mounting Plate. Take into consideration axle droop and rail wheel diameter. Figure 4.4.1.C & 4.4.1.D shows the basic overall dimensions of Railgear in both deployed and stowed positions.



Figure 4.4.1.C - Stowed & Deployed Measurements RW-1019



Figure 4.4.1.D - Stowed & Deployed Measurements RW-1212

5. Clamp the Mounting Plate and Tower Assembly to the trailer frame at the previously determined location.

- 6. Measure from the Tower Assembly to the reference point, see Figure 4.4.1.E.
- 7. Clamp the other Mounting Plate and Tower Assembly on to the opposing side of the trailer frame. Use the measurements taken from the reference point to position these components and clamp in place. See Figure 4.4.1.E.



Figure 4.4.1.E – Tower Assembly Alignment

- 8. Use the mounting plate as a template to drill holes in the chipper frame. Bolt the Mounting Plates to the frame and tack weld the Tower Assemblies to the plates.
- 9. Ensure the Tower Assemblies are square with the reference point. Adjust as necessary and fully weld into place.
- 10. Insert the lower Cylinder Rod Pin through the Axle Lugs and rod end of the cylinder as shown in Figure 4.4.1.F for both sides. For RW-1019 Railgear the larger Axle Lug is placed inside the base of the Tower Assembly.



Figure 4.4.1.F - Axle Rod Pin, Axle Lugs & Cylinder Interface

NOTE:

Figure 4.4.1.F shows both tower assemblies in the deployed position for clarity only. Follow installation instructions as detailed in this section.

- 11. Pin off both Tower Assemblies to keep them in the stowed position.
- 12. Carefully move the axle into place below the Tower Assemblies. Center the axle about the frame and tower assemblies. The brakes may be oriented vertically or horizontally to address clearance issues.
- Raise the axle into place using a jack or a recommended lifting device as listed in Section 4.1.3. Verify that the axle is centered and square to the reference points, see Figure 4.5.1. Tack weld each lug in place and add the cotter pins. Reference Figure 4.4.1.G.



Figure 4.4.1.G – Axle Lug Weldment

- 14. At this point the hydraulic and electrical systems should be installed. Run the Railgear cylinders in both directions to ensure there are no clearance issues.
- 15. Follow these steps if a second axle is required. Ensure the second axle is squared to the other axle. Adjust as needed, see Figure 4.4.1.H.



Figure 4.4.1.H – Alignment of Second Axle

- 16. Run all Railgear up and down to makes sure it can be pinned off in both positions and as a final clearance check.
- 17. Secure all hoses away from moving parts and pinch points.

## 4.5 ALIGNMENT AND RAIL TEST PROCEDURES

With the Railgear fully assembled on the chipper it is necessary to do a final alignment and rail test. When performing the alignment procedure, record the final alignment measurements on the tear sheet provided at the end of the section.

#### NOTE:

DMF recommends these procedures to be performed after the hydraulic and electrical systems have been installed. A fully functional hydraulic system will make it possible to repeatedly lift and lower the Railgear to check and verify adjustments.

The Railgear must be absolutely square to the trailer hitch to prevent towing issues. The following measurements are to be taken with the Railgear fully deployed and the chipper properly supported and secured in place. All pin offs must be in use. If available hitch the chipper to a suitable tow vehicle.

#### NOTE:

When the Railgear is deployed the chipper axle(s) will be completely lifted off rail and will have no affect with travel on rail. This is why it is not acceptable to measure from the axle(s) to align the Railgear.

### 4.5.1 Railgear Alignment – Single Axle

Refer to Figure 4.5.1 for the alignment of chipper Railgear with a single axle.

- A & B: Diagonal measurement from the hitch to the axle. The measurements should be equal to within 1/4".
- C & D: Length measurement from the flange face of the Railgear to the chipper frame. The measurements should be equal to within 1/8".

If adjustments are required grind the axle loose from the mounting lugs and reposition to meet the above requirements. Tack weld the lugs and recheck the measurements. When the measurements are within the tolerances listed, record them in the alignment tear sheet included at the end of this section.



Figure 4.5.1 – Railgear Alignment Single Axle

#### 4.5.2 Railgear Alignment – Dual Axles

Refer to Figure 4.5.2 for the alignment of chipper Railgear with dual axles.

- A & B: Diagonal measurement from the hitch to the rear axle. The measurements should be equal to within 1/4".
- C & D: Length measurement from the flange face of the rear Railgear to the chipper frame. The measurements should be equal to within 1/8".
- E & F: Length measurement from front Railgear to rear Railgear. Values should be equal to within 1/8".
- G & H: Diagonal measurements from front Railgear axle to rear Railgear axle. The measurements should be equal to within 1/4".

If adjustments are required grind the axle loose from the mounting lugs and reposition to meet the above requirements. Tack weld the lugs and recheck the measurements. When the measurements are within the tolerances listed, record them on the alignment tear sheet included at the end of this section.


Figure 4.5.2 – Railgear Alignment Dual Axles



## 4.5.3 Rail Test

After aligning the Railgear and welding the components in place, attach the chipper to a suitable tow vehicle and put it on a segment of test track following the procedures found in Section 2. Note if a second axle has been installed a tow bar is required between the tow vehicle and the chipper. Run the following tests:

- Run the trailer forwards and backwards on rail.
- Check for proper clearance between the trailer tires and the rail.
- If available, run the trailer through curves and switches.
- If applicable verify that the Railgear brakes operate smoothly.
- Verify alignment by observing the wear pattern on the rail wheels and the behavior of the trailer.

# 4.5.4 Final Weld-out

After the Railgear has been aligned and tested satisfactorily on rail, it is necessary to fully weld all lug blocks.

## 4.5.5 Installation Review Checklist

The following checklist is intended to assist the installer in re-checking and verifying aspects of the installation that are often overlooked or forgotten.

- □ Check tire pressures.
- Double check all welds and fasteners. Tie strap all hydraulic hoses, air hoses, and electrical wires away from moving parts. Ensure that all hydraulic hoses have sufficient radius at bends.
- **Q** Raise the Railgear to highway position and check that it is possible to pin off both sides.
- □ Rail test the trailer to check for braking. Check that rail wheels with brakes do not lock-up or slide.
- □ Adjust the Railgear height as required to completely lift all tires off rail when all pin offs are in place. Verify the Railgear does not interfere with the chipper operation.
- □ Re-check alignment of the Railgear to the trailer hitch.
- □ Touch-up the black acrylic enamel paint on the Railgear.
- □ Check hydraulic oil level and top off if needed.

# **SECTION 5.0** RAILGEAR OPTIONS

5.1 R	AIL SWEEPS	
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5.1.2	Rail Sweep Parts	5-2
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522	Brake Parts	5-6

# 5.1 RAIL SWEEPS

## 5.1.1 Rail Sweep Adjustment

Rail sweeps are available as an option for Chipper Railgear. Installation and adjustment of rail sweeps are done with the Railgear in the deployed position. The bottom of the rubber rail sweep should lightly brush the rail surface. Adjust up or down as necessary.

- Axles with brakes: Rail sweeps are typically shipped loose.
- Axles without brakes: Weld-on rail sweeps are shipped loose and should be welded to the axle by the installer.

### 5.1.2 Rail Sweep Parts

The rubber rail sweeps should be replaced when they are worn to a point where satisfactory adjustment is no longer possible. Bent or broken rails sweeps should be repaired or replaced as necessary. See parts diagrams on following pages.

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	12471	1	RAILSWEEP BRACKET (PASSENGER'S SIDE) (10HD)
2	818503	2	RAILSWEEP RUBBER BELTING DETAIL
3	12475	4	FLAT WASHER, 3/8
5	12475	4	LOCK WASHER, 3/8", GR8
6	106243	4	HEX NUT, 3/8-16
7	12470	1	RAILSWEEP BRACKET (DRIVER'S SIDE) (10HD)
		5	
F	A 1/25/96 REV DATE		DESCRIPTION BY APP
Ľ	IOLERANCES:		
E	(UNLESS SPECIFIED)		RW-1019 RAILSWEEP ASSEMBLY
	FRAC, MACH: ± 1/32* FRAC, OTHER: ± 1/16"	RW	-1019
	.X ± .063 .XX ± .030		
	.XXX ± .005 DRILL SIZES: ± .015	DDAWNDV	
	ANGULAR: ± 1°	DRAWN BY:	APPO BT: DATE: DRAWING NUMBER: REV:
	THREADS: 2A AND 2B	PRP	ТЅН 3/16/95 12476 В
L	BREAK SHARP EDGES (0.030 X 45' MAX)		

ITEM NO. 1 2	PART NUMBER 10042 818503	QTY. 2 2	DESCRIPTION RW-1019 RAILSWEEP MOUNTING BRACKET, WELD ON RAILSWEEP RUBBER BELTING DETAIL
4	12566	4	3/8* LOCK WASHER, GRADE 8
6	106243	4 4	HHCS, 3/8-16 X T, GK5 HEX NUT, 3/8-16
TOL	REV DATE RANCES: JNLESS SPECIFIED)		DESCRIPTION BY APP
FRA	C, MACH: ± 1/32* C, OTHER: ± 1/16* , 042	RV	V-1019 RW-1019 RAILSWEEP ASSEMBLY (WELD ON)
.X. .XX .XX .XX	± .063 ± .030 ± .005 L SIZES: + .015		DIVERSIFIED METAL FABRICATORS, INC. (404)875-1512
AN SUF THE	GULAR: ± 1° F FINISH: 125 MICRO EADS: 2A AND 2B BECAC SHAPP ECCES (0000 X 45° MAX)	JDI JDI	- 12/12/13 DRAWING NUMBER: REV: #



# 5.2 RAIL BRAKES

## WARNING:

The rail wheel brake system is intended to assist the tow vehicle brakes when on rail. The brakes on the chipper are applied for a 30 second interval when the vehicle brakes are applied. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

## 5.2.1 Brake Adjustment

It may be periodically necessary to adjust the rail brakes to compensate for pad and wheel wear. See the figure below for brake adjustment procedures.



Figure 5.2.1 Rail Brake Adjustment

### 5.2.2 Brake Parts

- See the figures on following pages for replacement brake actuation parts.
- See Section 6 for hydraulic and electrical brake control components.

	ITEM	PART	QTY.	DESCRIPTION
	<u>NO.</u>	12710	1	HYDRAULIC BRAKE CYLINDER: RW-1019/1212
	2	12745	2	HYDRAULIC BRAKE SIDE BRACKET, RW-1019/1212
$\left( \begin{array}{c} \text{COALW} \\ \text{ANTECLEZE} \end{array} \right) \left( \begin{array}{c} 9 \\ 7 \end{array} \right) $	3	12735	1	HYD. BRAKE LEVER ARM ASSEMBLY W/ STOP, RW-1212
AINTI-SIEZE	4	12434	1	HYDRAULIC BRAKE SHOE, COBRA CUTOFF, RW-1019/1212
	5	12436	2	HYDRAULIC BRAKE SHOE MOUNTING BLOCK, RW-1019/1212
	6	818452	1	AIR BRAKE SHOE PIN
	7	12424	1	PIN WELDMENT, 1019/1212/1420 HYDRAULIC BRAKE SHOE
	8	12760	1	HYDRAULIC BRAKES CYLINDER ROD PIN, RW-1019/1212
(9)(8)	9	818456	3	COTTER PIN, 1/8" X 1-1/2"
	10	818105	2	GREASE FITTING, 1/4"-28 (ALEMITE 1641-B)
	11	12479	4	HHCS, 1/2-13 X 1-1/4", GR8
	12	12481	4	LOCK WASHER, 1/2", GR8
	13	12750	REF	HYDRAULIC BRAKE AXLE SADDLE, 10" WHEEL
$ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $				
(11)(12)	КО	1/11/17	GRAIED	REMOVED 12476; 12750 QTY REF WAS 12750 QTY 2
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	FRAC, MA FRAC, OTH .X	CH: ± 1/32" #ER: ±1/16" ± .063		RW-1019 FRONT HYD. BRAKE ASSY. (1-1/16"
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		EDGES .03 X 45" MAX 04)875-1512	ЛRV	TSH 11/28/95





~	ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
/.\	1	12712	1	CYL BODY DETAIL 1019/1212
/ K 🔪	2	12763	1	GLAND DETAIL; GEN2 HYD. BRAKE CYLINDER; RW-1019/1212
	3	12720	1	O-RING; #022; 90A DURO
~	4	12719	1	BACK UP RING, #022
	5	605165	1	ROD WIPER, AN 959/940, .75" ID, 1/8" W
$/ K \setminus$	6	605545	1	ROD SEAL, STD POLYPAK, .75" ID, 1/8"W
	7	12717	1	EXTERNAL SNAP RING; 3/4" DIA SHAFT
	8	12715	1	CYLINDER ROD 1019/1212
	9	12722	1	COMPRESSION SPRING; HYDRAULIC BRAKE CYLINDER
	10	12718	1	INTERNAL SNAP RING; 1-3/16" BORE; #118
	11	605071	1	JAMB NUT, 3/8-24 UNF
	12	12716	1	RW-1019/1212 HYD.BRAKE CYL.ROD EXTENTION
	13	818105	1	GREASE FITTING, 1/4"-28 (ALEMITE 1641-B)
	14	12726	1	RW-1019/1212 HYD.BRAKE CYL.BLEEDER SCREW (40160)
	15	10432	1	FITTING 402X3 90 DEG BRAKE LINE 1/8 MPT X 1/8 INVERTED FLARE

### ASSEMBLY PROCEDURE:

- 1. Ensure all parts are clean and free of burrs and sharp edges.
- 2. Lubricate rod, gland, and all seals lightly with blue assembly goo.
- 3. Install wiper (#5), rod seal (#6), backup ring (#4), and o-ring (#3) in gland (#2) in orientations shown in Detail A.
- 4. Install external snap ring (#7) and spring (#9) onto rod (#8).
- 5. Place rod into body (#1) with threaded end facing upwards.
- 6. Slide gland assembly over rod, compress spring, and secure with internal snap ring (#10).
- Install jamb nut (#11) onto rod extension (#12). Coat exposed threads with antizieze. Thread extension completley into rod, and tighten jamb nut.
- 8. Install grease fitting (#13), bleed valve (#14), and hydraulic fitting (#15). Observe orientation shown.

### **TEST PROCEDURE:**

- 1. DURING TEST PROCEDURE, DO NOT ALLOW ROD TO REACH FULL EXTENSION. MAX ROD EXTENSION SHOULD BE PHYSICALLY RESTRAINED TO 3/4" OR LESS.
- 2. Connect hydraulic power unit; set pressure relief to 2,000 psi.
- 3. Open bleed valve, cycle cylinder to purge air, and close bleed valve.
- 4. With rod extension limited to 3/4", pressure test for 15 sec. while inspecting for leaks.
- 5. Disconnect power unit and cap hydraulic fitting.

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DRILL SIZES: ANGULAR: SURF FINISH: THREADS: BREAK SHARP	+ .015 ± 1° 125 MICRO 2A AND 2B	DRAWN BY:	APPD BY: TSH	DATE: 11/28/95		DRAWIN	g number: 12710	REV: K

# SECTION 6.0 HYDRAULIC & ELECTRICAL SYSTEMS

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6.1.2	Using Hydraulic Power Unit Provided by DMF	6-2
6.1.3	Fitting Installation	6-3
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6.3 H	YDRAULIC & ELECTRICAL COMPONENT DRAWINGS	

# 6.1 GENERAL INFORMATION

## 6.1.1 System Pressures and Relief Settings

Various components within the Chipper Railgear require different pressure setting to operate safely and reliably. Relief valves are typically factory set and should not require adjustment. Adjusting relief valves above or below the values shown below may result in damage to components and/or unsafe operation.

- Railgear System Relief: 2000 PSI
- Rear Brake Relief (when equipped): 1700 PSI
- Front Brake Relief (when equipped): 700 PSI
- Rear Railgear Control Valve: 1850 PSI
- Front Railgear control Valve (when equipped): 1600 PSI

## 6.1.2 Using Hydraulic Power Unit Provided by DMF

DMF typically provides an electric over hydraulic power unit (Monarch M-304) to power the Railgear and rail brakes, when equipped.

The unit includes a pump, motor and reservoir. This unit must be located somewhere accessible on the chipper. The unit should be protected from road spray and moisture. Only operate with Dexron III hydraulic oil.

ITEM	PART NO.	QTY	DESCRIPTION	
1				
2				

TITLE: SAE (JIC) 37 Degree Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of SAE (JIC) Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With SAE (JIC) 37 Degree Flared Ends.

PROCEDURE: A) Inspect fitting components to ensure that mating parts are free of burrs, nicks, scratches or any foreign material.

- B) Align tube flare against nose of fitting body and screw on the nut, finger tight, clamping the tube flare between the fitting nose and the nut.
- C) Tighten the nut the indicated Flats From Finger Tight (F.F.F.T.) listed in the chart below. Use a second wrench to hold the hose in proper alignment while tightening to avoid twisting the lay line. One flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat (1/24th of full turn).

Size	Thread Size	Tube Connection F.F.F.T.	Swivel Nut or Hose Connection F.F.F.T.
-4	7/16-20	2	2
-6	9/16-18	1.5	1.25
-8	3/4-16	1.5	1
-12	1 1/16-12	1.25	1
-16	1 5/16-12	1	1
-20	1 5/8-12	1	1
-24	1 7/8-12	1	1

# SAE (JIC) 37° Flare Fittings

A							
$\square$							
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TOLERANC (UNLES COMMON FRAC, M FRAC, O	TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS FRAC, MACH: ± 1/32 FRAC, OTHER: ± 1/32 FRAC, OTHER: ± 1/32			TITLE: PROD JIC F	DURE 005 TION		
XX XXX OR	± .030			DIVERSIFIED N	IETAL FABRICATORS	i, INC. (404) 875–	1512
DRILL SU	ZES: ± .005	DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBER:	REV:
SURF FIN THREADS BREAN	NISH: 125 MICRO 24 AND 28 K SHARP EDGES	TSH		06/02/94	ব্যা≯	PP005	#

ITEM	PART NO.	QTY	DESCRIPTION
1			
2			

TITLE: SAE O-Ring Fitting Installation

PURPOSE: To Establish Production Methods For The Installation Of O-Ring Medium And High Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With O-Ring Seals And SAE Straight Threads.

# PROCEDURE:

- A) Inspect to ensure that both mating parts are free of burrs, nicks, scratches or any foreign particles.
- B) Lubricate O-Ring with light coat of system fluid or compatible oil.
- C) For adjustable fittings, back off lock nut as far as possible. Make sure back up washer is not loose and is pushed up to nut.
- D) Screw fitting into port until finger tight. Back up washer (adjustable) or hex face (non-adj.) should contact port face. Light wrenching may be necessary.
- E) To align an adjustable fitting, unscrew by desired amount but not more than one full turn. Use wrench to hold in position. Screw nut down to port face until finger tight.
- F) Tighten lock nut (adjustable) or fitting (non-adj.) the indicated Flats From Finger Tight (F.F.F.T.) in either the Adjustable chart or the Non-Adjustable chart below. One Flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat (1/24th of full turn).
- G) Inspect to ensure that O-Ring is not pinched and back up washer/hex seats flat on face of port.

ADJUSTABLE FITTINGS

SAE Port Thread Size	F.F.F.T.
5/16-24	1.0
7/16-20	1.5
9/16-18	1.5
3/4-16	1.5
7/8–14	1.5
1 1/16-12	1.5
1 3/16-12	1.5
1 5/16-12	1.5
1 5/8-12	2.0
1 7/8–12	2.0
	SAE Port   Thread Size   5/16-24   7/16-20   9/16-18   3/4-16   7/8-14   1   1   1/16-12   1   3/16-12   1   5/16-12   1   5/16-12   1   5/16-12   1   5/16-12   1   5/8-12   1   7/8-12

# NON-ADJUSTABLE FITTINGS

Fitting Size	SAE Port Thread Size	F.F.F.T.
2	5/16-24	1.0
4	7/16-20	1.0
6	9/16-18	1.5
8	3/4-16	1.5
10	7/8-14	1.5
12	1 1/16-12	1.5
14	1 3/16-12	1.5
16	1 5/16-12	1.5
20	1 5/8–12	1.5
24	1 7/8–12	1.5

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$ \mathbb{A} $							
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TOLEPARCES:   OPECIFIED     UNLESS:   SPECIFIED     COMAON:   SENSE:   PREVALS:     FRAC,   THES:   1/16'     X   ±.003		TITLE: PRODUCTION PROCEDURE 003 O-RING FITTING INSTALLATION DIVERSIFIED METAL FABRICATORS, INC. (404) 875-15				12	
DRILL SIZES: ± .005 ANGULAR: ± 1 SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES	DRAWN BY: TSH	APPD BY:	DATE: 06/02/94		DRAWING NUM PP003	BER:	REV: #

	ITEM
	1
2	2

TITLE: National Pipe Thread (NPT) Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of NPT Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 3000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With Tapered Pipe Threads.

PROCEDURE: A) Inspect port components to ensure that male and female threads are free of nicks, burrs, dirt etc.

- B) Apply sealant/lubricant to male pipe threads. Use only Permatex #14D "Thread Sealant With Teflon" paste (or Engineering approved equal). The first few threads must be left uncovered to avoid system contamination.
- C) Screw fitting into female pipe port to the finger tight position.
- D) Wrench tighten the fitting to the appropriate Turns From Finger Tight (T.F.F.T.) shown in chart below. Make sure that tube end of shaped fitting is aligned to receive in coming tube or hose assembly.

Fitting Size	Pipe Thread Size, NPT	T.F.F.T.
2	1/8-27	2.0-2.5
4	1/8-27	2.0-2.5
6	1/4-18	1.5-2.0
8	3/8-18	2.0-2.5
10	1/2-14	2.0-2.5
12	3/4-14	1.5-2.0
14	3/4-14	1.5-2.0
16	1-11 1/2	1.5-2.0
20	1 1/4-11 1/2	1.5-2.0
24	1 1/2-11 1/2	1.5-2.0

# STEEL PIPE THREAD FITTINGS

COMMENTS: Teflon Tape May Be Used In Certain Situations With Engineering Approval. A Pipe Fitting Is Limited To One Or Two Re-Uses.

A								
$\square$								
REV	DATE		DESCRIPTION					APP
TOLEPANCES:   Openance     COMLOS: SPECIFIED)   COMLOS: SPECIFIED)     COMMON: SENSE PREVAILS:   FRAC: MACH: 1/32     FRAC: MACH: 1/32   FRAC: MACH: 1/36     X   ± 0/30			TITLE: PRODUCTION PROCEDURE 004 PIPE FITTING INSTALLATION				512	
DRILL S ANGULAI SURF FI THREADS BREA	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	DRAWN BY: TSH	APPD BY:	DATE: 06/02/94		DRAWING NUM PP004	BER:	REV: #







	ITEM F	PART NO.	QTY	DESCRIPTION
	1 10	0400	1	MONARCH PWR UNIT W/ TANK (M304) W/OUT FITTINGS
	2 09	9765	REF	CHIPPER, HYDRAULIC CYLINDER, 2 X 1-1/2 X 14, CONTTRELL C95050, RW-1019
	3 10	0295	1	ENT HYD VALVE W/ FITTINGS RW-1019
	4 70	01035	1	LOCKING VALVE W/ ORFICE_FITTINGS/CART_RW-1016
	5 12	2069	1	FLOW DIVIDER W/ FITTINGS FOR 1212 VERTICAL GEAR
	6 81	19534	1	T - FITTING, #4 MJIC
	7 18	8952	1	FITTING, 90 DEG, #4 MJIC X #6 MAORB
	8 10	0428	1	FITTING, 90 DEG, #4 NPT X #4 JIC, 2501-04-04
	9 81	10622	4	HOSE ASSY. 1/4" X 38"
	10 81	10642	6	HOSE ASSY, 1/4" X 62"
	11 81	10130	1	FNT HYDRAULIC VALVE MOUNTING PLT
$\sim$	12 81	10508	6	J-CLIPS, 3/8", NOT SHOWN
OUT 8 SET RELIEF TO 1850 PSI 10 10				2
		9		
		5		

◬		1	-					-	-
$\mathbb{A}$		1	-					-	-
REV	D	ATE		DESCRIPTION			BY	APP	
TOLERANC FRAC, M FRAC, O X XX XX	ES (UNLES	\$\$ \$PECIFIED): ±1/32" ±1/16" ±.063 ±.030 ±.005 +.015	RW-	RW-1019		TITLE: HYDRAULIC SCHEMATIC, CHI RAILGEAR, SINGLE AXLE, NO B THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF			
ANGULA SURF FI THREAD DME	NR: NISH: DS: ARP EDGE - (404)	±1° 125 MICRO 2A & 2B 5.03 X 45° M 875-1512	DRAWN BY:	APPD BY:	date: 07/21/17		DRAWING NUME 09665	BER:	REV: #







NOTE: 1. MAX PRESSURE 1850 PSI 2. 2" TUBE ID, 1.5" ROD OD	ITEM   PART NO.   OTY   DESCRIPTION     1   C95030   1   COTTRELL HYDRAULIC CYLINDER, 12" STROKE, 2" TUBE, 1.5" ROD     2
#6 JIC O-RING 23.0 CLOSED 35.0 OPEN (12.0 STROKE)	
	Image: Stream of the



ITEM	PART #	QTY	DESCRIPTION
1	10491	1	FRONT RELIEF VALVE
2	10469	1	REAR RELIEF VALVE
3	10471	1	BRAKE CIRCUIT ENABLE VALVE (CARTRIDGE ONLY)
4	10472	2	BRAKE LOCKING VALVE (CARTRIDGE ONLY)
5	500727	3	VALVE SOLENOID
6	10438	2	DIAGNOSTIC NIPPLE
7	10470	4	ADAPTER, 1/4 MORB X 1/8 FPT
8	10432	2	BRAKE LINE ELBOW, 1/8 MPT X 1/8 INV. FLARE
9	10457	3	1/4 MORB X #4 MJIC 90 DEG. ELBOW





									1
$\mathbb{A}$	7/2/14	1700 PSI WAS 1800 PSI					JDI		L
$\mathbb{A}$	10/21/13	ADDED 1800 PSI, 700 PSI				JDED 1800 PSI, 700 PSI JDI			
REV	DATE		DESCRIPTION				BY	APP	L
OLERANC (UNLESS FRAC, MA FRAC, OTI X .X .XX	ES: SPECIFIED) CH: ± 1/32* ± 1/16" ± .063 ± .030 ± .005	-		TITLE: MANUAL, DIVERSIFIED META	.SSY (I	F&R),			
DRILL SIZES ANGULAR	+ .015 ± 1°	DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBE	ER:	REV:	
SURF FINISH THREADS: BEEAK SH	125 MICRO 2A AND 2B	NEH		5/20/11		M101913	5	В	



MANIFOLD LABELED "HYDRAFORCE 7024840" <u>REQUIRES ORRIFICE</u>	MANIFOLD LABELED "DMF#701061" NO ORRIFICE REQUIRED (INTEGRATED INTO MANIFOLD)
ORIFICE ORIENTATION: BEVELED FACE INTO MANIFOLD; FLAT EDGE TOWARDS LOCKING VALVE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
ITEM NO.   PART NUMBER   QTY.   DESCRIPTION     1   600612   1   1015 LOCKING VLV BODY ONLY (7024840)     2   10457   4   #04 MJIC X #04 MAORB X 90 FITTING (6801-04-04)	ITEM NO.   PART NUMBER   QTY.   DESCRIPTION     1   10457   4   #04 MJIC X #04 MAORB X 90 FITTING (6801-04-04)
4	3ORIFICE
	A   11/20/17   ADDED INTEGRAL ORIFICE CONFIGURATION   TAM     REV   DATE   DESCRIPTION   BY   APP
	Interverse Invests secreted PRAC, UNACE:   Is 1/32 FRAC, OTHER:   Is 1/32 FRAC, OTHER:   RW-1016     Image: Secreted Frac, OTHER:   Image: Secreted Frac, OTHER:   RW-1016
	Image: State

	ITEM NO. P 1 2 3 4 5 6	ART NUMBER 600612 10457 600613 241016 605324 605206	QTY. 1 3 1 1 1 1 1 1	1015 LC #04 MJIC 3 VAL 0 TEE, #04	DESCRIPTIO DCKING VLV BODY X #04 MAORB X 90 ORIFICE .070" (70 VE, LOCKING, CPD- 4JIC MALE X 04 O-F MJIC X #04 FJIC SV	N ONLY (7024840) FITING (6801-04-04) 51-070) 084P, PARKER ING MALE VIVEL X #04 MJIC	
A Constant of the second of th	50RCE 4840				1		
		REV D. TOLERANCES (UN FRAC, MACH FRAC, OTHER .X .XX XXX	ATE ILESS SPECIFED: 1 ± 1/32* ± .063 ± .063 ± .005	RW-1212	DESCRIPTION TITLE: LOCKING VAL	/E w/ ORFICE/FTGS/C CHIPPER	by Ap
		DRILL SIZES: ANGULAR: SURF FINISH: THREADS: BREAK SHARP EDG	+ .015 + 1° 125 MICRO 2A AND 28 385.03 X 45° MAX )875-1512	Y: APPD BY: -	THIS DRAWING CONTAINS CON METAL FABRICATORS, INC DATE: 07/21/17	FIDENTIAL PROPRIETARY INFORMATION (DMF).COPYRIGHT DMF, ALL RIGHTS R DRAWING NUMBER 600650	eserved. k: REV: #

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	12073	1	FLOW DIVIDER, 12 GPM
2	600511	3	FITTING, STRAIGHT, #6 MAORB X #4 MJIC







REV	DA	TE				DESCRIPTIC	DESCRIPTION			
TOLERANC, N FRAC, N FRAC, O .X .XX .XX DRILL SI	Kit   Kit <td>D):</td> <td colspan="2">RW-1019/1212</td> <td>TITLE: FLOW</td> <td colspan="2">R F DIVERSIFIED</td>		D):	RW-1019/1212		TITLE: FLOW	R F DIVERSIFIED			
ANGUL SURF FIT	LAR: NISH: DS:	± 1° 125 MICI 24 AND	20	DRAWN BY:	APPD BY:	DATE:		DRAWING NUMBER:	R	EV:
BREAK SHA	(404)	3.03 X 45" N 875-15	ых 12	DJJ	-	07/26/17		12069		#

	ITEM	PART NO.	QTY	DESCRIPTION
<b>A</b>	1	HAMMOND 1591TSBK	1	1019 BRAKE CONTROLLER BOX
	2	10486	1	TIMER
	З	HE87416	1	MICRO RELAY - HELLA 87416
	4	HE87125	1	MICRO 5 TERMINAL MOUNT CON BLK - HELLA 87125
	5	TERMINAL-HELLA87272	4	TERMINAL-HELLA87272

NCC TIMER (PART # Q4T-00060-346) - TIMER IS RED IN COLOR

- HAS ADJUSTMENT DIAL (3-60 SEC)
- 5 TERMINALS



▲ AIROTRONICS TIMER (PART # TGLB730SC2H) - TIMER IS BLACK IN COLOR

- NO ADJUSTMENT DIAL (FIXED 30 SECONDS)
- 3 TERMINALS



NDTES: 1) RELAY SHOWN IN DE-ENERGIZED STATE. 2) SET TIMER TO APPROXIMATELY 30 SECONDS. 3) NUMBERS ON RELAY DENOTE SPADE TERMINAL NUMBERS. 4) REFERENCE HD10481C FOR SYSTEM WIRING DETAILS.

	8/22/11	FIXED ERRO	R FROM RE∨	'B: PURPLE [	IN NCC TIMER W	ENT TO NC	BJF	
A	1/7/11	ADDED AIRE	TRONICS D	PTION			BJF	
	2/25/09	HE87416 W	E87416 WAS HE87401; HE87125 WAS HE87122					
REV	DATE		DESCRIPTION					
TULERANCES (INLESS SPECIFIED) COMMON SENSE PREVAILS FRAC, UNCH # 1/32 FRAC, UNCH # 1/32 FRAC, UNCH # 1/32			/-1019	TITLE: RW-10	)19 / 1212 HYDR/	AULIC BRAKE (	CONTRO	JLLER
	DIVERSIFIED METAL FABRICATORS, INC. (404)						375-15	12
DRILL S	IZES: + .015	DRAWN BY:	APPD BY:	DATE:		DRAWING NUM	BER:	REV⊨
THREADS	1041371 (123) MICRU SI 2A AND 2B 104621 (0.030 X 47 HMX)	SEW		9/7/03		10483		С

# SECTION 7.0 RAILGEAR PARTS

7.1	BEFORE ORDERING PARTS	7-2
7.2	ASSEMBLY DRAWINGS	7-3
7.3	AXLE DRAWINGS	7-6

# 7.1 **BEFORE ORDERING PARTS**

### Required Information for Ordering Parts:

- You must have the Railgear serial numbers when ordering parts. This uniquely identifies the Railgear, as it was built to the customer's specifications, and also allows DMF to help maintain a history of it. If you are placing a parts order through a maintenance facility, please inform them of the serial number, so that they can relay the information.
- Returns: DMF has a Return Authorization Procedure. You must contact DMF for an RA# before returning any parts for any reason. Parts will not be credited without an RA#.
- Labor: In extremely rare situations, on a discretionary basis and with prior approval, DMF will reimburse certain, specific labor costs. If you feel this may apply in your situation, you must contact DMF's Service Department for a Service Authorization Number (SA#). No labor will be reimbursed without an SA#. The SA# must be included on your request for reimbursement.
- Please use driver's side / passenger's side terminology (instead of left/right side) when describing issues with the Railgear. This leaves no room for interpretation and ensures that everyone involved is clear about where the issue is occurring.

#### Other Considerations for Ordering Parts:

This is a list of considerations to make before placing a parts order with DMF. There are many variations and customer requirements that we strive to accommodate, and as a result, the more information that can be provided when placing an order, the more likely that we will be able to help quickly and efficiently.

Wheels:

- If you are a customer using special wheel profiles (this is especially prevalent in Metros), please be sure to inform the DMF Parts Department that there may be a special wheel profile involved in your order.
- DMF offers both insulated and non-insulated wheels Please confirm which wheel is need before ordering. Insulated wheels can be identified by a grooved ring machined around the inside of the rail wheel. This grooved ring can been seen and felt, and is located about an inch in from the outside tread.



		ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
		1	09747	1	CHIPPER, OUTER TUBE ASSEMBLY, RH
		2	09751	1	CHIPPER INNER TUBE ASSEMBLY
		3	09765	1	HYDRAULIC CYLINDER, CHIPPER, 2" X 1-1/2" X 14"
		4	09766	1	CHIPPER BASE END PIN
		5	818456	2	COTTER PIN, 1/8" X 1-1/2"
PLATE SHIPP	ed loose. 🔨	6	18952	2	#04 MJIC X #06 MAORB X 90 FITTING
WELDED AT		( 100 × ED 15/16")			24 15/16 WAS 25: 38 7/16 WAS 39 MICRATED TO SOLIDWORKS, ADDED 18952 & ADDED REFERENCE DIM, 818456 WAS 09770, DIL
	<u>+    −    + } ←▼</u> _		REV	ATE	
			KEV D. TOLERANCES [UN FRAC, MACH FRAC, OTHER X X XX	ALE ALESS SPECIFIED): ± 1/32" ± 1/16" ± .063 ± .030 ± .005	RW-1019
			DRILL SIZES: ANGULAR:	+ .015 ± 1°	THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION OF DIVERSIFIED METAL FABRICATORS, INC (DIF). COPYRIGHT DWF, ALL RIGHTS RESERVED.
			SURF FINISH: THREADS: BREAK SHARP EDG DMF (404	125 MICRO 2A AND 2B GES .03 X 45° MAX 875-1512	LOR - 08/13/99 DRAWING NUMBER: REV: 09745 B


WELDED IN PLACE
_DURING FINAL
ASSEMBLY OF
RAILGEAR

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ITEM NO.	PART NUMBFR	QTY.	DESCRIPTION
1	10570	2	RW-1019-HD WHEEL,NON-INS., W/RACES
2	10682	1	RW 1019 HD REAR TUBE DETAIL
3	10603	1	RW-1019-HD AXLE
4	10592	2	RW-1019-HD SEAL, STANDARD
5	10516	2	RW-1019 HUBCAP, H.D. STYLE
6	12750	4	RW-1019 HYD.BRAKE AXLE SADDLE 10" WHEEL
7	12700	2	RW-1019 FRONT HYD. BRAKE ASSY. (1-1/16" BORE)
8	09761	2	RW-1019 CHIPPER AXLE LUG
9	09762	2	CHIPPER CYLINDER LUG ON AXLE
10	10591	4	RW-1019-HD BEARING CONE
11	10595	2	NUT, AXLE (TIMKEN TN-08)
12	10596	2	WASHER, TONGUE (TIMKEN K-91508)
13	10598	2	WASHER, AXLE TAB (TIMKEN WH-08)
14	09767	2	CHIPPER HYDRAULIC CYLINDER, ROD PIN ASSEMBLY
15	108220	8	LOCK WASHER, 5/16", GR8
16	800108	8	HHCS, 5/16-18 X 3/4", GR5
17	12566	1	LOCK WASHER, 3/8", GR8
18	12564	1	PIN, AXLE, ANTI-ROTATION
19	818456	2	COTTER PIN, 1/8" X 1-1/2"

12

13

11

16 X 15

## WHEEL ASSEMBLY PROCEDURE:

1. PACK ALL BEARINGS ENSURING COMPLETE COVERAGE, BOTH INSIDE AND OUT.

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18

2

- 2. INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE).
- 3. PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING.
- 4. INSTALL SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB
- 5. PLACE WHEEL ON AXLE.
- 6. FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE.
- 7. INSTALL AXLE WASHERS ALIGN THEM WITH KEYWAYS.
- 8. INSTALL AXLE NUT.
- 9. ADJUST BEARING ENDPLAY.
  A) TIGHTEN AXLE NUT TO 200 FT-LBS WHILE ROTATING WHEEL.
  B) BACK OFF AXLE NUT ONE FULL TURN.
  C) TIGHTEN AXLE NUT TO 50 FT-LBS WHILE ROTATING WHEEL.
  - D) BACK OFF AXLE NUT BY ONE NOTCH OF THE TAB WASHER.
- 10. SELECT TABS ON TAB WASHER THAT MOST NEARLY LINE UP WITH SLOTS IN AXLE NUT. BEND THE TABS UP TO SECURE THE NUT.
- 11. VERIFY BEARING END PLAY IS 0.001" TO 0.005" WITH DIAL INDICATOR.
- 12. FILL OUTBOARD CAVITY WITH GREASE.
- 13. RUN A BEAD OF SILICONE ON HUBCAP MOUNTING SURFACE (OUTBOARD FACE).
- 14. INSTALL HUBCAP WITH PROVIDED HEX SCREWS AND LOCK WASHERS.

RW-1019 AXLE ASSEMBLIES: NON INSULATED AXLE- 09760 NON INSULATED AXLE, W/ HYD BRAKES - 09773 INSULATED AXLE - 09793 INSULATED AXLE, W/ HYD BRAKES - 09771

<u>RW-1019 WHEELS:</u>

6

NON INSULATED W/ RACES - 10570 INSULATED W/ RACES - 10580

INSULATOR SLEEVE - 10581 BEARING RACE (TIMKEN HM-903210) - 10590

				N	1	ΡV	ADD
TOJERANCE (INIESS SPECIFED):           FRAC, MACH:         ± 1/32*           FRAC, OTHER:         ± 1/16*           .X         ± .063           .XX         ± .030           .XXX         ± .005           DPBH.STZES         .015	RW-1019		TITLE: NON-INSULATED WHEEL & AXLE ASSEMBLY, CHIPPER W/ BRAKES				
ANGULAR: 1° SURF FINISH: 125 MICRO THREADS: 2A AND 2B BREAK SHARP EDGES .03 X 45° MAX	DRAWN BY: DJJ	APPD BY:	DATE: 06/28/17	CATORS, INC (DMF). COPYF	DRAWING NUMBER:	RVED.	ev: #

ITEM NO.	PART NUMBER	QTY.	DESCRIPTION
1	12693	1	REAR AXLE WELDMENT ASSEMBLY, SHOE BRAKES, NO SADDLE
2	12510	2	RW-1212 WHEEL, NON-INSULATED, w/RACES (HT)
3	12591	4	BEARING; TIMKEN HM-807049
4	12595	2	AXLE NUT; TIMKEN TN-10
5	12596	2	Tounge Washer; Hardened, Timken K-91510
6	12598	2	TAB WASHER; TIMKEN TW-110
7	12702	2	RW-1212 HYDRAULIC BRAKE ASSEMBLY
8	12560	2	RW-1212/1420 HUBCAP DETAIL
9	12592	2	SEAL, STANDARD (CR-34868), RW-1212/1420
10	108220	8	LOCK WASHER, 5/16", GR8
11	800108	8	HHCS, 5/16-18 X 3/4", GR5

## WHEEL ASSEMBLY PROCEDURE:

- 1. PACK ALL BEARINGS ENSURING COMPLETE COVERAGE , INSIDE AND OUT.
- 2. INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE).
- 3. PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING.
- 4. INSTALL A NEW SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB.
- 5. PLACE WHEEL ON AXLE.
- 6. FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE.
- 7. INSERT BEARING IN OUTBOARD SIDE OF WHEEL.
- 8. INSTALL TONGUE WASHER.
- 9. INSTALL A NEW TAB WASHER.
- 10. INSALL AXLE NUT.
- 11. ADJUST BEARING END-PLAY:
  A) TIGHTEN AXLE NUT TO 200 FT-LBS WHILE ROTATING WHEEL.
  B) BACK OFF AXLE NUT ONE FULL TURN.
  C) TIGHTEN AXLE NUT OT 50 FT-LBS WHILE ROTATION WHEEL.
  - D) BACK OFF AXLE NUT BY ONE TAB OF TAB WASHER.
- 12. BEND DOWN TAB THAT MOST NEARLY LINES UP WITH A NOTCH IN AXLE NUT.
- 13. VERIFY BEARING END-PLAY IS 0.001" TO 0.005" WITH A DIAL INDICATOR.
- 14. FILL OUTBOARD CAVITY WITH GREASE.
- 15. RUN A BEAD OF SILICONE ON HUB MOUNTING SURFACE (OUTBOARD FACE OF HUB).
- 16. INSTALL HUBCAP WITH PROVIDED HEX SCREWS AND LOCK WASHERS.

## WHEEL & AXLE ASSEMBLIES:

INSULATED, NO BRAKES - 12683 INSULATED, HYDRAULIC BRAKES - 12679 NON-INSULATED, NO BRAKES - 12681 NON-INSULATED, HYDRAULIC BRAKES - 12677

RW-1212 WHEELS:

NON-INSULATED W/ RACES - 12510 INSULATED W/ RACES - 12530 INSULATOR IN BOARD - 14527 INSULATOR OUT BOARD - 14528 WHEEL RACE, TIMKEN HM-807010 - 12590

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11 X 10

## **DMF LIMITED WARRANTY POLICY**

**Diversified Metal Fabricators (DMF)** products are designed to provide the utmost service and reliability. Competent workmen, guided by stringent quality standards, manufacture the products from high-grade material. **DMF** warrants products of its manufacture to be free of defects in material and workmanship, under normal use and service, for a period of **ONE CALENDAR YEAR**. **DMF's** obligation under this warranty is limited to repairing or replacing at its factory, or other location designated by us, any part or parts there-of which shall, within 30 DAYS of the date of failure or notice of defect, be returned, and which upon examination shall appear to **DMF's** satisfaction to have been defective. Such repair or replacement does not include the cost of installing the new part or any other expenses incident thereto; however, the outbound direct ground freight on the part will be prepaid to locations within the continental United States and Canada. **DMF** shall not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products.

Ordinary wear and tear, abuse, misuse, neglect, or alteration is not covered by this warranty. **DMF** assumes no liability for expenses or repairs made outside its factory except by written consent. Warranty is null and void if instructions and operating procedures specifically referring to warranty coverage are not followed.

Equipment or parts not manufactured by this company, but which are furnished in connection with **DMF** products are covered directly and solely by the warranty of the manufacturer supplying them.

This warranty is in lieu of other warranties, expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose and any liability for special or consequential damages.

All warranty claims must reference a serial number. Returns must reference a RA number.

