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# **Warranty Registration Record**

Please complete this section for your records.
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Please complete and return the provided WARRANTY REGISTRATION FORM

Model Purchased: \_\_\_\_\_\_Serial #\_\_\_\_\_

In Service Date: \_\_\_\_\_

**Owners Complete Mailing Address:** 

Telephone #:\_\_\_\_\_

Fax #:\_\_\_\_\_

I have read, understand, and will apply the contents of the Concord warranty, safety, operation and maintenance manual.

Owner's Signature

**Owner's Name Printed** 

# **CONCORD ROAD EQUIPMENT MFG., INC.**

# WARRANTY STATEMENT

Concord Road Equipment Mfg., Inc. warranties all new CRE products manufactured by this company according to the terms as set forth below, BUT EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY and there are no warranties which extend beyond the description of the face of this warranty.

Should any Concord Road Equipment product prove defective in material or workmanship, under normal service and use, within a period of one year from date of shipping to the original purchaser, CRE shall repair or replace if the following conditions have been met: the equipment was properly set up, adjusted, used and operated by a trained person. Which on inspection by CRE appears to have been defective in workmanship or material, but the cost of labor in replacement of these parts will be paid by the purchaser and transportation of the equipment to the company's facility will also be the responsibility of the purchaser. This warranty will be effective only if CRE receives written notice of the equipments defect or failure to perform within thirty (30) days of the expiration of the (1) one year warranty period. This warranty does not cover and will not be effective in the event that any defect or failure to perform occurs as a result of a defect in a part accessory sold by this company but produced by another manufacturer. Such merchandise is warranted only through the manufacturer of the part or accessory. This warranty shall be void where equipment has been subject to misuse, neglect, alteration, accident, or when repaired with parts other than genuine CRE Mfg. Inc.

Concord Road Equipment's Mfg., Inc. obligations under this warranty shall be suspended during any period in which it is prevented from fulfilling its responsibilities by forces beyond our control such as lack of supplies, labor disputes, acts of God and transportation inadequacies. Damages for breach of this warranty shall be limited to replacement of the defective parts as set out herein and shall not include consequential damage for injuries to persons, property or loss of profits occasioned by such defects. No representative or other person is authorized or permitted to make any warranty or assume for this company any liability not strictly in accordance with the foregoing.

This warranty shall extend only to the original purchaser of the equipment from Concord Road Equipment Mfg., Inc.

# CONCORD ROAD EQUIPMENT MFG., INC. 88 THRU 555 SERIES TAR KETTLE

## GENERAL

This tar kettle has been designed to, when properly maintained, give you years of reliable and dependable service. As with all equipment, you must familiarize yourself with the operation of the machine BEFORE it is put into service. It is the responsibility of the owner of this machine to make sure that the person or persons operating the machine read and understand all safety, operation and maintenance instructions in this manual. Above all, always use good common sense when using your machine.

## SAFETY INSTRUCTIONS

- 1) Observe and follow all safety precautions to avoid personal injury and/or damage to this machine.
- 2) Read and follow all safety, operation and maintenance instructions in this manual before operating this machine.
- 3) Do not stand, sit or ride on any part of this machine.
- 4) Keep all body parts, clothing, etc., away from moving parts.
- 5) Always turn off hydraulic power source before performing maintenance. Never disconnect pressurized hydraulic lines. Failure to compile with this warning may result in property damage, serious injury or death.
- 6) All drive covers, shields and guards should be in their proper locations and in good working condition before operating this machine.
- 7) When towing this machine make sure it is securely attached to tow vehicle.
- 8) Wear OSHA approved protective clothing at all times when operating machinery:
  - a. Hard hats.
  - b. Safety face shield and/or eyewear.
  - c. Long sleeves shirts with button cuffs.
  - d. Gloves with elastic tops that are heat/flame resistant.
  - e. High top shoes with thick rubber or composition soles.
- 9) Melted material is extremely hot and can cause serious burns. Use extreme caution when handling material.
- 10) Keep working fire extinguisher of appropriate type and size on hand at all times.
- 11) **DO NOT** overheat material. Check with material manufacturer for maximum or safe operating temperature of material being heated. **NEVER** exceed this temperature or serious personal injury and/or damage to machine will occur.
- 12) **NEVER** leave operating unit unattended.
- 13) **DO NOT** heat unit without material in kettle. Load enough material in the kettle to cover the bottom surface. Failure to fill kettle properly can cause serious injury and/or damage to unit.

# **TOWING A TRAILER MOUNTED KETTLE**

This unit, as a portable unit, has been designed for simple and safe attachment to the tow vehicle. All connections MUST be carefully checked and the following precautions must be taken before trailering the unit.

- 1. Towing vehicle must have the proper towing capacity for unit being towed.
- 2. Check your maintenance schedule and be sure you are up-to-date.
- 3. Check hitch. Is it showing wear? Is it properly lubricated? Inspect towing hookup for secure attachment. Check to see that no binding or restrictions exist.
- 4. The jack leg has been raised and properly secured.
- 5. The safety chains are properly attached to towing vehicle.
- 6. The lights and braking systems (if so equipped) are properly functioning. Units supplied with electric brakes require that the towing vehicle have a properly functioning brake controller within easy reach of towing vehicle's operator and breakaway cable properly attached to vehicle.
- 7. Check the fuel tanks and/or LPG bottles are securely attached to unit.
- 8. The tires are inflated to the proper PSI as indicated on sidewall of each tire. (See Chart on page 16)
- 9. Check wheel mounting nuts/bolts with a torque wrench. Torque in proper sequence, to the levels specified in this manual. (See page 16)
- 10. Check that all tools, doors, lids, covers and accessories are properly secured prior to towing.
- 11. NEVER TOW VEHICLE WHILE BURNER OR BURNERS ARE IN OPERATION. LID/DOOR(S) MUST BE FASTENED DOWN DURING TOWING.

# HEATING AND LOADING PROCEDURES

Before proceeding with the following operations, be sure to wear OSHA approved protective clothing and face mask (Refer to safety instructions page 4).

# KETTLE LID MUST BE IN THE OPEN POSITION WHILE HEATING KETTLE (USE PROP ATTACHED TO THE LATCH ROD ON LID)

- 1. Fill the kettle with small pieces or lumps of tar material to be melted. Cover as much of the bottom of kettle surface as possible so that "FLASHING" will not result due to exposed heated metal. NOTE: Failure to fill kettle properly can cause serious injury and/or damage to unit.
- 2. **IMPORTANT**: Heat penetrates the asphalt lumps slowly. If heating is done to fast, the tar material will burn and form a layer of coke along the kettle bottom and sides. Fire could result due to rapid heating. **DO NOT OVERHEAT!** Check with material manufacturer for maximum operating temperature. **DO NOT EXCEED THIS TEMPERATURE**.
- 3. When heating operations are to begin, refer to the instructions that apply to type of burner system your unit is equipment with, i.e. LPG burner unit on page 9 or diesel burner unit on page 10.

#### \*MAXIMUM KETTLE VOLUME BY MODEL\*

88 SERIES — 80 GALLON 166 SERIES — 165 GALLON 222 SERIES — 220 GALLON 333 SERIES — 330 GALLON 444 SERIES — 440 GALLON 555 SERIES —550 GALLON

# DIGITAL TEMPERATURE CONTROL

All units (LPG or diesel fueled) are thermostatically controlled with auto ignite burners and are supplied with a standard dual reading digital scale that indicates both the set temperature to be maintained and actual temperature of material as it cools.

#### \*NEVER SET TEMPERATURE CONTROL AT A HIGHER TEMPERATURE THAN WHAT IS THE RECOMMENDED BY THE MATERIAL MANUFACTURER\*

There is a separate controller for each burner that will be operated, i.e.; main hopper/material storage bin burner(s), and if so equipped optional sealant and tack tanks burner(s). Digital type temperature controller(s) are located within sealed NEMA enclosure located on the side of material storage bin. To maintain the set desired temperature follow these instructions.

- 1. Open NEMA enclosure hinged cover.
- 2. Turn on Key Switch and Toggle Switches.
- 3. Digital Controller will read actual temperature of hopper to set temperature:
  - A) Press and hold "\*" key; screen will read temperature set point.
  - B) Press up or down arrow keys to increase or decrease setting to desired temperature
  - C) Let go of "\*" key, unit will maintain temperature +/- 20 degrees.
- 4. After setting desired temperature, close and secure NEMA enclosure hinged cover.

See pages 7-10 for detailed programming and set-up guide.

5. See following pages entitled BURNER OPERATION for proper initial start-up, specific for the type of heating system installed on unit; i.e. liquid propane, vapor propane (page 9) or diesel (page 10).

#### DIGITAL TEMPERATURE CONTROL PROGRAMMING AND SETUP GUIDE: Omega CN-132-12v Controllers

#### A) MAIN PROGRAM UNLOCK: Use only if program has been locked.

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter the controller into programming mode. The display should read "tunE".

Press the arrow down key once. The display should read "LEVL" & "1".

Press and hold the **"\*"** key and then press the arrow up key twice. The display should read **"LEVL" & "3"**. Release the **"\*"** key.

Press the arrow up key eleven times until screen reads "VEr".

Press and hold both the arrow up key and arrow down key for 10 seconds until the screen reads: **"Locy"** & **"nonE"**, **"LEV.3"**, **"LEV.2"**, or **"ALL"**.

Press and hold the "\*" key and then press the arrow up key or the arrow down key until screen reads "**nonE**". This unlocks all functions. Release the "\*" key.

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter into memory the above programmed parameters.

#### B) RESET THE CONTROL PROGRAM CONFIGURATION (controller must be re-programmed afterward)

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter the controller into programming mode. The display should read "tunE".

Press the arrow down key once. The display should read "LEVL" & "1".

Press and hold the "\*" key and then press the arrow up key twice. The display should read "LEVL" & "3". Release the "\*" key.

Press the arrow up key twelve times. The display should read "rSEt".

Press and hold the **\*\*** key and then press the arrow up key once. The display should read **"rSEt"** & **\*ALL"**. Release the **\*\*** key.

Press and hold both the arrow up key and the arrow down key for 5 seconds. This has reset the memory of the controller. Proceed to Section C.

#### C) FIRST TIME POWER-UP (for factory & field replacements)

Verify all wiring is correct and proper voltage is applied to controller.

Display should be cycling between "inPt" and "none". (If not, go to Section B)

Press and hold the **\*\*** key and then press the arrow up key until **\*tcJ** is displayed. Release the **\*\*** key.

Press the arrow up key once. The display should read "unit" and "nonE".

Press and hold the **"\*"** key and then press the arrow up key until **"F"** is displayed. Release the **"\*"** key.

Press the arrow up key once. The display should read "SPI.d" and "nonE".

Press and hold the **"\*"** key and then press the arrow up key until **"rLy"** is displayed. Release the **"\*"** key.

Press and hold both the arrow up and the arrow down key for 5 seconds.

This will enter into memory the above programmed parameters. Proceed to Section D.

#### D) MAIN PROGRAM CONFIGURATION

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter the controller into programming mode. The display should read "tunE".

Press the arrow up key once. The display should read **"bAnd"**.

Press and hold the **\*\*** key and then press the arrow up key or the arrow down key until: **\*20** is displayed. Release the **\*\*** key.

Press the arrow up key once. The display should read "intt".

Press and hold the **"\*"** key and then press the arrow down key until **"oFF"** is displayed. Release the **"\*"** key.

Press the arrow up key once. The display should read "dErt".

Press and hold the **\*\*** key and then press the arrow down key until **\*oFF** is displayed. Release the **\*\*** key.

Press the arrow up key twice. The display should read "CyCt".

Press and hold the **\*\***" key and then press the arrow down key until: **\*on.oF**" is displayed. Release the **\*\***" key.

(Procedure continued on next page)

#### 88 THRU 555 SERIES TAR KETTLE

Press and hold both the arrow up key and the arrow down key for 5 seconds. This will enter into memory the above programmed parameters. Proceed to Section E.

#### E) CHANGE HIGH SET POINT

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter the controller into programming mode. The display should read "tunE".

Press the arrow down key once. The display should read "LEVL" & "1".

Press and hold the "\*" key and then press the arrow up key once. The display should read "LEVL" & "2". Release the "\*" key.

Press the arrow up key eight times until screen reads "hi.SC"

Press and hold the "\*" key and use the arrow up key or arrow down key until display reads "400" Release the "\*" key.

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter into memory the above programmed parameters. Proceed to Section F.

#### F) MAIN PROGRAM LOCK-OUT

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter the controller into programming mode. The display should read "tunE".

Press the arrow down key once. The display should read "LEVL" & "1".

Press and hold the "\*" key and then press the arrow up key twice. The display should read "LEVL" & "3". Release the "\*" key.

Press the arrow up key eleven times until screen reads "VEr"

Press and hold both the arrow up key and arrow down key for 10 seconds until the screen reads: **"Locy"** & **"nonE"**, **"LEV.3"**, **"LEV.2"**, or **"ALL"**.

Press and hold the "\*" key and then press the arrow up key or the arrow down key until the display reads "ALL". This locks all functions except "LEVL", "dAtA", and set point lock "SK.LY". Release the "\*" key.

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter into memory the above programmed parameters. Proceed to Section G.

#### G) SET OPERATING TEMPERATURE

Press and hold the "\*" key use the arrow up key or the arrow down key until the display reads the proper and desired operating temperature for the material being used. The proper operating temperature can be obtained from the material manufacturer or from the vendor where the material was purchased.

#### \*Optional Procedure: To Lock Out Adjustment of the Operating Temperature

#### H) SET POINT LOCK-OUT

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter the controller into programming mode. The display should read "tunE".

Press the arrow up key seven times until the display reads "SP.LY".

Press and hold the **"\*"** key and then press the arrow up key or the arrow down key until the display reads **"On"** Release the **"\*"** key.

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter into memory the above programmed parameters.

#### \*Procedure To Unlock Adjustment of the Operating Temperature

#### I) SET POINT UNLOCK

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter the controller into programming mode. The display should read "tunE".

Press the arrow up key seven times until the display reads "SP.LY".

Press and hold the **\*\***"key and then press the arrow up key or the arrow down key until the display reads **"oFF**" Release the **\*\***" key.

Press and hold both the arrow up key and the arrow down key for 5 seconds.

This will enter into memory the above programmed parameters.

# **BURNER OPERATION - PROPANE FIRED**

- 1. Follow all safety procedures and checks prior to operation of this unit. This burner is intended for outdoor use only.
  - a. If you smell gas shut off all gas supplies, extinguish all open flames and contact a qualified gas service technician for assistance.
  - b. Do not use this burner in any area containing flammable vapors such as gasoline, paint thinner, degreaser, etc.
  - c. Do not use this burner near flammable material such as dead & dry weeds, pine needles, sawdust, paper, etc.
- 2. Check LPG bottles, regulators, valves, hoses, burners and all connections for leaks. Inspect all connections for breaks or damage. Bottle types must match burner types i.e.: vapor withdrawal or liquid withdrawal.
  - Vapor withdrawal burners draws from top of LPG bottle, burner has no preheat coils
  - Liquid withdrawal burners draws from bottom of bottle, burner will have preheat coils
- 3. Set temperature controller for desired temperature required for the material you will be heating. Always use the temperature recommended by the material manufacturer.
- 4. Open all hinged exhaust stack cover(s) make sure that they are free of any obstructions. Prop open kettle lid using the attached rod on lid.
- 5. Adjust regulator(s) to desired PSI setting; recommended setting is 15 to 25 PSI. DO NOT EXCEED 30 PSI.
- 6. Turn Master System Key Switch to the "ON" position (located on NEMA enclosure)
- 7. Toggle the ON/OFF switch (located on NEMA enclosure) to the "ON" position for the burner that is to be fired.
  - Standard units are shipped <u>less any power supply</u> and are designed to be wired to a 12 volt DC power source provided by the towing vehicle. The optional 12 volt DC deep cycle battery is recommended for safe and reliable operation of this unit.
  - Units that are supplied with the <u>optional</u> self-contained battery and trickle charger system can be plugged into a standard 120 volt DC outlet to recharge and/or maintain battery voltage.
- 8. Burner will automatically ignite within 15-20 seconds if material temperature is lower than the desired setting as indicated on the temperature controller(s). A "sparking sound" of the igniter in front of the burner should be heard and burner should ignite when operating properly. If burner does not ignite, cycle through 2 to 3 times. If burner still will not ignite, contact your local service technician.
- 9. When not in use, the toggle switch for each burner and master key switch should be in the "OFF" position.

## DO NOT ATTEMPT TO LIGHT OR OPERATE IF THERE IS ANY EVIDENCE OF A GAS LEAK.

# DO NOT LET UNBURNED FUEL BUILD UP IN HEATING CHAMBER, ALWAYS ALLOW ENOUGH TIME FOR GASES TO VENT TO ATMOSPHERE PRIOR TO IGNITION OF ANY BURNER.

See Liquid Propane Burner page 19.

See Vapor Propane Burner page 20.

# **BURNER OPERATION - DIESEL FIRED**

- 1. Follow all safety procedures/precautions and checks prior to operation of this unit.
- 2. Inspect fuel tank, valves, lines, fuel pump and all connections for any leaks, breaks or damages, repair as necessary.
- 3. Check and top off fuel level in fuel tank. (Fuel requirements: No. 1 or No. 2 diesel fuel or No. 1 or No. 2 kerosene heating oil [ASTM D396]).
- 4. Set temperature controller for desired temperature required for the material you will be heating. Always use the temperature recommended by the material manufacturer.
  - On units with multiple burners, i.e.; main hopper burner, optional sealant tanks burners, optional tack tanks burners, etc. there are separate identified temperature controllers and ON/OFF switches for each burner assembly.
- 5. If so equipped, fully open all hinged exhaust stack cover(s) and make sure that it is free of any obstructions.
- 6. Turn Master System Key Switch to the "ON" position (located on NEMA enclosure)
- 7. Toggle the ON/OFF switch (located on NEMA enclosure) to the "ON" position for the burner that is to be fired.
  - When equipped with multiple burners, i.e.; sealant tanks, tack tanks, etc. do not intentionally fire burners at the same time. A fully charged, in good condition 12 volt DC power source is required for proper operation of burner control system.
  - Standard units are shipped <u>less any power supply</u> and are designed to be wired to a 12 volt DC power source provided by the towing vehicle. The optional 12 volt DC deep cycle battery is recommended for safe and reliable operation of this unit.
  - Units supplied with the <u>optional</u> self-contained Battery/Battery Trickle Charger\_system can be plugged into a standard 120 volt DC outlet to recharge or maintain battery voltage.
- 8. Burner will automatically ignite within 15-30 seconds if material temperature is lower than the desired setting as indicated on the temperature controller(s). If burner does not ignite, cycle through 2 to 3 more times. If burner still will not ignite contact your local service technician.
- 9. When not in use the toggle switch for each burner and master key switch should be in the "OFF" position.

#### DO NOT LET UNBURNED FUEL BUILD UP IN HEATING CHAMBER; ALWAYS ALLOW ENOUGH TIME FOR FUEL VAPORS TO VENT TO ATMOSPHERE PRIOR TO IGNITION OF ANY BURNER.

See Diesel Oil Burner Section page 21-27 for operational instructions, service and maintenance, replacement part numbers, and troubleshooting.

# **POWER SPRAY SYSTEM (optional equipment)**

Read and understand ALL of the following safety precautions and operating instructions before using power spray system. Failure to do so can result in personal injury and/or damage to machine.

#### **SAFETY PRECAUTIONS:**

- 1. Always check with the manufacturer of the material that you are going to use to make sure that it is safe to use in your kettle and power spray system.
- 2. Follow all safety precautions supplied by manufacturer of material you are using, i.e.: minimum flow temperature, maximum temperature, flash point, curing time, etc.
- 3. Always wear proper clothing (safety glasses, face shields, safety gloves, etc.) when using power spray system.
- 4. Make sure that the unit is securely attached to tow vehicle.

#### ALWAYS OPERATE POWER SPRAY SYSTEM IN A CAUTIOUS AND SAFE MANNER.

#### **PREPARATION:**

- 1. Check all fuel and oil levels before each use.
- 2. Make sure that spray wand valve is in the "OFF" position.
- 3. Make sure the hydraulic flow valve is set at zero.
- 4. Make sure the hydraulic control valve in is the neutral (centered) position.
- 5. Make sure that the material selector valve is set to draw material from the appropriate source.

#### **OPERATION:**

1. After material being heated is at application temperature, with hydraulic valve in neutral position, turn on hydraulic source.

On self contained hydraulic systems, start the engine. After the engine has been given enough warm up time, raise engine RPM to approximately full throttle.

- 2. With ON/OFF valve handle on spray wand still in the "OFF" position. Shift the hydraulic valve into spray position, the valve is detente in this direction.
- 3. Open the ON/OFF valve on the spray wand and increase the hydraulic flow valve setting to achieve desired material application rate. **\*CAUTION: material will begin to spray\***
- 4. As the material begins to cool it may become difficult to spray. Recirculation is required to re-heat material in the hose and pump. Open the top lid of the material vat, point nozzle into vat and open spray wand ball valve completely; **CAUTION: be sure to shield yourself from possible hot spatter.** Raise hydraulic flow as necessary to draw hot material back it the pump and power spray hose. When material is back at spray able temperature, resume normal operation.
- 5. Do not leave system full of material during times of inactivity. It may cool down and destroy your power spray components.

#### SYSTEM DRAW-BACK

- 1. When material spraying is complete, shift the hydraulic valve into the neutral position.
- 2. After the pump stops completely, shift the hydraulic valve into the opposite direction to draw back the material from the hose and wand to the material vat.

NOTE: During this procedure (system draw-back) the ON/OFF valve located on spray wand handle must always be in the "ON" or open position.

#### SYSTEM CLEAN OUT

- 1. With the hydraulic valve in the neutral position, turn the 3-way valve to the clean out position. In this position, the valve will be closed to the kettle and open to the line from the wash out tank.
- 2. With spray wand ON/OFF valve handle in the "ON" (open) position insert spray wand nozzle into a waste collection container.
- 3. Shift the hydraulic valve to the spray position. Cleaning solution will be drawn into suction side of asphalt pump and out the power spray hose and wand assembly.
- 4. While cleaning the system, momentarily close the ON/OFF valve on spray wand handle to allow clean solution to pass through the pumps internal relief valve.
- 5. After clean out procedure is complete, shut off the engine (if equipped) turn all valves to OFF positions and properly dispose of used cleaning solution.

Symptom	Possible Cause Additional Information/Procedure
Leaking Valves	Most valves in the system are of the tapered seat style. To stop severe leakage tighten large nut on bottom of valve. DO NOT over tighten or valve spool will not turn in valve body.
Too Little/Much Material Pressure	Material pressure at the nozzle is based off of material flow. Adjust the hydraulic flow (and engine RPM if equipped) to your desired needs. If increasing hydraulic flow does not increase the output, the system must be inspected for blockage.

## TROUBLE SHOOTING AND ADJUSTING POWER SPRAY SYSTEM



**POWER SPRAY SYSTEM - HOSES AND FITTINGS** 

# **REPLACEMENT PART NUMBERS**

Adjustable Eye	C060-00067
Axle Assembly with Electric Brakes:	
SERIES 88	C070-00005
SERIES 166 THRU 333	C070-00007
SERIES 444 THRU 555	C070-00009
Axle Assembly with Hydraulic Brakes:	
SERIES 88	C070-00006
SERIES 166 THRU 333	C070-00008
SERIES 444 THRU 555	C070-00010
Battery	C030-00034
Battery Box	C030-00035
Compression Nut	C055-00016
Diesel Fuel Cap	C055-00017
Diesel Oil Burner (Beckett Model ADC) - 250 KBtu/hr	C055-00030
Digital Temperature Control System	
Diesel Fired	C055-00020
Propane Fired, Single Burner Liquid or Vapor	
Propane Fired, Dual Burner Liquid or Vapor	C055-00032
Gasoline Powered Engine (Briggs & Stratton)	C055-00001
Fire Extinguisher	C060-00068
Fuel Tank (Complete)	C055-00002
Jack Leg - 5000 lbs.	C060-00069
Key (Digital Temperature Control System)	C055-00027
LPG Liquid Burner – 250 KBtu/hr @ 25psi	C055-00028
LPG Vapor Burner – 250 KBtu/hr @ 25psi	C055-00029
STT Light	C030-00042
STT Light (w/ Plate Holder)	C030-00043
Molasses Valve 1-1/2"	C060-00070
Power Convertor & Battery Charger	C030-00038
Power Spray System (Optional)	
3 Way Steam Valve	C060-00071
Coupler	C060-00072
Coupler	C060-00073
Flow Control Valve	C010-00027
Handle	C060-00074
Hydraulic Motor	C010-00005
Hydraulic Pump	C055-00025
Material Pump, Standard Flow	C055-00004
Material Pump, High Flow	C055-00010
Engine to Hydraulic Pump Coupler Sleeve	C060-00075
Spray Wand (Complete)	C001-01526
Spray Wand Ball Valve	C055-00008
Nozzle	C055-00007
Hydraulic Control Valve	C010-00026
Hydraulic Motor to Material Pump Coupler	C060-00076
Safety Chain Hook	C060-00079
Slow Moving Vehicle Sign	C090-00092
Strobe Light (360)	C030-00039
Strobe Toggle Switch	C030-00040
Toggle Switch Boot	C030-00041
Tire (ST235/85R16)	C070-00013
Torch Assembly (Complete kit)	C055-00025
Wheel	C070-00012





ITEM	DESCRIPTION OF INSPECTION	INTERVAL
Tire Inspection	-Check tires for proper inflation as recommended by tire manufacturer. Recommended inflation is located on side wall of tire.	Daily - prior to operation
	-Check tires for abnormal wear, cuts, bulging, tread depth, etc. Replace tire(s) as necessary. (See page 42)	Daily - prior to operation
Wheel Lug Nuts	Wheel Lug Nuts -Check wheel nuts and studs for condition and torque. Torque to 90 to 100 lb-ft.	
-Check wheel bearing nut torque. Torque 50 lb-ftInspect for corrosion or wear and leakage around sealClean and repack wheel bearings with high quality commercial wheel bearing grease and replace wheel bearing seals.		After first initial 50 miles Once yearly thereafter
	-Test that brakes are operational.	Daily - prior to operation
	-Adjust to proper operating clearance.	3000 miles or every 3 months
Trailer Brakes	Electrical: -Inspect brake magnets for wear and current draw. -Check brake controller for correct amperage and modulation. -Inspect brake wiring for bare spots, fraying, etc.	6000 miles or every 6 months
	Hydraulic: -Check brake cylinders for leaks, and sticking. -Inspect brake lines for cracks, leaks and kinks -Inspect hub/drum for abnormal wear or scoring. -Inspect brake linings for wear or contamination. -Adjust, repair or replace as necessary.	After first initial 150 miles and once yearly there after
Lights, Reflectors and FMVSS Components	-Check for proper operation and condition. -Repair or replace as necessary	Daily - prior to operation
Trailer Hitch/ Pintle Hook	-Check for proper height adjustment. Trailer to be level when connected to towing vehicle.	Daily - prior to operation
	-Check trailer hitch and mounting for good condition i.e. properly torque fasteners, safety chains and hooks in good condition, etc. Repair as necessary.	Daily - prior to operation
Rubber Torsional Type Axle	-Check condition: fasteners for tightness (torque to 125 to 155 lb-ft) and wear, axle to trailer frame welds and general suspension component condition. Repair or replace as necessary.	After first initial 50 miles and every 6 months there after

## TRAILER MAINTENANCE SCHEDULE

# FIRE EXTINGUISHER INSPECTION AND MAINTENANCE

#### INSPECTION

An inspection is a "quick check" to assurance that a fire extinguisher is available, fully charged and operable. The frequency of inspection will vary from hourly to monthly, based on need. Inspections should always be conducted when extinguishers are initially placed in service and thereafter at approximately 30-day intervals. If a fire extinguisher is not installed directly on the unit or readily available, or if fire extinguisher is not in operating condition, DO NOT USE THE EQUIPMENT, as it is unsafe until proper fire suppression is available.

#### MAINTENANCE

Maintenance is a "thorough check" of the extinguisher. Fire extinguishers should be maintained at regular intervals (at least once a year), or when specifically indicated by an inspection. It includes a thorough examination and any necessary repair, recharging or replacement.

You must ensure that:

- The extinguisher is not blocked by equipment, or other objects that could interfere with access in an emergency.
- The pressure is at the recommended level. On extinguishers equipped with a gauge (such as that shown on the right), the needle should be in the green zone not too high and not too low.
- The nozzle or other parts are not hindered in any way.
- The pin and tamper seal (if it has one) are intact.
- There are no dents, leaks, rust, chemical deposits and/or other signs of abuse/wear. Wipe off any corrosive chemicals, oil, gunk etc. that may have deposited on the extinguisher.

Fire extinguishers should be pressure tested (a process called hydrostatic testing) after a number of years to ensure that the cylinder is safe to use. Consult your owner's manual, extinguisher label or the manufacturer to see when yours may need such testing.

#### ! WARNING !

If the extinguisher is damaged or needs recharging, replace it immediately! Recharge all extinguishers immediately after use regardless of how much they were used.



# 7430 SERIES POWER CONVERTER AND BATTERY CHARGER

The Parallax 7430 Series switch mode power converter and battery charger has been designed to provide many years of trouble free operation. The converter charger comes from the factory set at a normal 13.8 volts output for battery charging. Your converter charger is virtually maintenance free. If the 12 volt load exceeds the converter output rating the output voltage will drop to prevent any further increase in current. Turn off or reduce the power demand on the converter charger and the output voltage will restore itself. For extended periods of inactive use or storage disconnect the battery following the battery manufacturer's recommendation.

If the converter charger isn't working properly check the following:

- 1. Check to see if the power cord is connected to a live circuit.
- 2. Check for loose wires or bad connections in the fuse panel and at the battery. Replace any blown fuses with a fuse of the same ampere rating.
- 3. Check to see that the converters air circulation is not blocked and the fan's intake and exhaust is adequately ventilated.
- 4. Check the battery for charge, on a non-maintenance free battery check water level often. Do not allow the battery cell plates to become exposed to the air. Poor battery performance will result.
- 5. The 7430 Series power converter battery charger has no adjustments or serviceable parts and must be returned for repairs.

**CAUTION:** When installing a new battery always observe polarity. Connecting a battery with reverse polarity will open the two 30 ampere power converter output fuses.

# LIQUID PROPANE BURNERS



SPECIFICATIONS		
C055-00028		
BTU RATING	250,000 @ 25 PSI	
FUEL	Liquid Propane	



LIQUID PROPANE BURNER

# **VAPOR PROPANE BURNERS**



SPECIFICATIONS		
C055-00029		
BTU RATING	250,000 @ 25 PSI	
FUEL	Vapor Propane	





# **DIESEL OIL BURNER - BECKETT MODEL ADC**

Have your equipment inspected at regular intervals by a qualified service agency to assure continued proper operation. The burner should be adjusted using dedicated combustion testing equipment. Failure to properly set the burner could potentially cause severe personal injury, death or substantial property damage.

**WARNING:** The following could result in fire hazard, severe personal injury, death or substantial property damage. Read carefully:

1. Never attempt to use gasoline, crankcase oil, waste oil or material other than the approved fuel oils in this burner.

Approved Fuels: No. 1 or No. 2 diesel fuel; No. 1 or No. 2 kerosene heating oil (ASTM D396)

- 2. Never store or use gasoline or other combustible materials near this burner.
- 3. Never attempt to light the burner by throwing burning material into the fire chamber.
- 4. Never restrict the air inlet openings to the burner or combustion air ventilation. Burners can't consume fuel properly without an adequate air supply.
- 5. A low or erratic power supply could result in impaired burner operation, delayed ignition or an explosion inside the heat exchanger resulting in burn and/or asphyxiation hazards. The burner requires a continuous supply of 11 to 16 volts DC at 25 amps measured at the burner during operation.
- 6. Always ensure proper ventilation to exhaust all fumes. Smoke, carbon monoxide and any fumes produced by the materials that are being heated can impair burner operation and produce an asphyxiation hazard.
- 7. Make certain the correct nozzle is selected for the actual pump pressure.
- 8. DO NOT start the burner when excess oil and/or vapors have accumulated in the combustion chamber.
- 9. DO NOT attempt to re-establish flame with the burner running if the flame becomes extinguished during start-up, venting or adjustment.

## SERVICE AND MAINTENANCE

This equipment should be serviced only by a qualified service agency (notify your service provider if your burner is not operating properly). The appropriate testing instruments must be used at all times. Failure to do so could result in burner or equipment failure and could potentially cause severe personal injury, death or substantial property damage. Please take care of your equipment by following the warnings provided and by doing the following:

#### DAILY MAINTENANCE

Check the area around your burner to make sure:

- a. Nothing is blocking the burner inlet air openings.
- b. Air ventilation openings are clean and unobstructed and the exhaust is not crusted.
- c. No combustible materials are stored near the burner.
- d. There are no signs of oil or water leakage around the burner.

#### **REGULAR SERVICE/MAINTENANCE**

Have your burner serviced annually by your qualified service agency. The following components/assemblies should be checked on a regular basis. Refer to the Replacement Parts exploded view for part locations on page 26.

- Replace the oil supply line filter. The filter cartridge must be replaced to avoid contamination of the pump and nozzle.
- Inspect the oil supply system. All fittings should be leak-free. The supply lines should be free of water, sludge and other restrictions.
- Remove and clean the pump strainer.
- Verify the nozzle is the one originally specified by Concord Road Equipment and replace the nozzle with one having the exact specifications from the same manufacturer.
- Clean and inspect the electrodes for damage, replacing any that are cracked, or chipped.
- Check electrode tip settings. Replace electrode if tips are rounded.
- Inspect the igniter spring contacts. Clean or replace if corroded.
- Clean the cad cell; use a soft clean dry cloth to wipe dirt off photo cell.
- Make sure Low Firing Rate Baffle is in place. Omitting the baffle can result in unacceptable burner combustion.
- Inspect all gaskets including the igniter base plate gasket. Replace any that are damaged, missing or showing signs of deterioration.
- Clean the blower wheel, air inlet, air guide, retention head and static plate of any dirt, asphalt or other material.
- Check motor current. The amp draw should not exceed the nameplate rating. Check all wiring for loose connections or damaged insulation.
- Check the pump pressure and cutoff function.
- Check ignition system for proper operation.
- Inspect the exhaust system for soot accumulation or other restriction.
- Clean the equipment thoroughly.
- Check the burner performance using test instruments. (See TROUBLESHOOTING page 27)
- It is good practice to make a record of the services performed and the combustion test results.

## NOZZLE ASSEMBLY MAINTENANCE

**WARNING:** Incorrect nozzles and flow rates could result in impaired combustion, under firing, over-firing, sooting, puffback of hot gases, smoke and potential fire or asphyxiation hazards.



## Nozzle, Line & Electrode Assembly

Item#	Description	ltem#	Description
1	Electrode Contact (3" ATC or extension over 3")	7	Nozzle Line Set Screw
2	Nozzle Line	8	Electrode Insulator
3	Spider Spacer Assembly	9	Nozzle Adapter
4	Static Plate	10	Nozzle Tip
5	Electrode Clamp	11	Electrode Tip
6	Electrode Clamp Retaining Screws		



# **Electrode Tip Setting**

#### **CHECK/ADJUST ELECTRODES**

Check and adjust if necessary to comply with the dimensions shown. To adjust, loosen the electrode clamp screw and slide/rotate electrodes as necessary. Securely tighten the clamp screw when finished.

#### **IGNITER MAINTENANCE**

The igniter assembly does not require adjustments beyond making sure the springs and the burner electrode rods make solid contact when the igniter is in the closed position. Replace the ignition base plate gasket at the first sign of damage or deterioration. Clean any dirt or residue from the porcelain bushings, springs and base plate. Check the igniter operation by supplying voltage to the input and checking either by looking or listening to see whether there is an arc across the electrodes while the burner is running and the igniter is energized.

#### **FUEL SUPPLY**

Never use gasoline, crankcase oil or any oil containing gasoline in the fuel tank. The recommended fuels to be used in this burner are: No. 1 or No. 2 diesel fuel or No. 1 or No. 2 kerosene heating oil (ASTM D396). Insure that the pressure limiting device is installed and that the oil inlet pressure to the burner does not exceed 3 psig. Inspect fuel supply lines for leaks and/or restrictions and keep supply lines free of water and sludge. A shutoff valve is located in the oil supply line for maintenance. When repairing fuel supply lines use only oil resistant pipe sealant compounds.

# **MOTOR REPLACEMENT**

The motor will require replacement if the proper voltage is measured at the motor input, and the motor will either not run or the current draw with a free running pump exceeds 10% of the rated current.

## **PUMP MAINTENANCE**

Long or oversized inlet lines may require the pump to operate dry during initial bleeding period. The priming may be assisted by injecting fuel oil in the pump gear set. Under lift conditions, lines and fittings must be air tight. To assure this, thread sealant should be applies to both the used and unused inlet and return fittings.

To bleed the pump, attach a clear plastic hose over the vent fitting. Loosen the fitting and catch the oil in an empty container. Tighten the fitting when all air has been purged from the supply system. Note: If the burner stops after a flame is established, the unit probably requires additional bleeding. Continue to bleed the system until the pump is primed and a flame is established when the bleed valve is closed.

To check vacuum pressure a vacuum gauge may be installed in either of the ¼" NPT inlet ports.

Check the operating pressure by removing the copper tubing from the nozzle line and installing a pressure gauge in the line. With the motor running and coil energized, check the gauge. The pressure should read 140 psig unless otherwise stated.

To check the cutoff function, deadhead the pressure gauge onto the copper connector tube attached to the nozzle port. Run the burner for a short period of time. Shut the burner off; the pressure should drop and hold. Pressurized or gravity feed installations must not exceed 3 psi on inlet line or return line at the pump. A pressure greater than 10 psi may cause damage to the shaft seal.



**Pump and Valve Assemblies** 

# **COMBUSTION SET-UP**

#### WARNING

**DO NOT** attempt to start the burner when excess oil has accumulated in the combustion chamber, the chamber is full of vapor, or when the chamber is very hot.

**DO NOT** attempt to re-establish flame with the burner running if the flame becomes extinguished during start-up, venting or adjustment. Allow the unit to cool off and all vapors to dissipate before attempting another start.

For oil flooded unit, shut off the electrical power and the oil supply to the burner and then clear all accumulated oil before continuing. If the condition still appears unsafe, contact the Fire Department and carefully follow their directions. Keep a working fire extinguisher nearby and ready for use.

As soon as burner motor starts rotating bleed all the air from the pump (required with single-pipe systems). To bleed the pump, see pump maintenance on previous page.

#### SET COMBUSTION WITH INSTRUMENTS

Allow the burner to run for approximately 5 to 10 minutes. Follow these four steps to properly adjust the burner:

- 1. Adjust the air until a trace smoke level is achieved.
- 2. At the trace of smoke level, measure the CO<sub>2</sub> (or O<sub>2</sub>). This is the vital reference point for further adjustments.
- 3. Increase the air to reduce CO<sub>2</sub> by 1% (O<sub>2</sub> will be increased by approximately 1.4%).
- 4. Recheck the smoke level. It should be zero.

This procedure provides a margin of reserve air to accommodate variable conditions. Once the combustion level is set, tighten the fasteners on the air band and air shutter. Start and stop the burner several times to ensure satisfactory operation. Test the equipment safety controls to verify that they function according to the manufacturer's specifications.



Air Supply Components

# **REPLACEMENT PARTS FOR BECKETT MODEL ADC OIL BURNER**



#	Description	Part	#	Description	Part
#	Description	Number	#	Description	Number
1	DC Motor	21699UF	13	Escutcheon Plate Spline Nut	3666
2	Blower Wheel	21404U	14	Escutcheon Plate	3493
3	Coupling	21405	15	Electrode Kit over 3-5/8"	570731
4	Air Guide	31231U	16	Cad Cell Detector	7006U
5	Burner Housing – Black	55874BKU	17	7 Ignitor Gasket Kit 5	
6	Air Band	31840A	18	4x4 Wiring Box Kit	5770
7	Air Shutter – 4 Slot	3709	19	Control Kit 7556.	
8	Cord Set	21807	20	Ignitor w/o ICB 5177	
9	Pump (Clean Out)	2184402U	21	ICB Kit	51663
10	Valve	21441	22	Ignitor Only	7435U
11	12 Volt Coil	21754U	23	Air Tube Assembly	A76WFDC
12	8" Copper Tubing	5394	24	Flange Mounting Gasket	31653
Not Shown	Nozzle – 1.50 x 80 B DLVN SLD	2500	Not Shown	Tune-up Kit for 30 & 35 Air Tube Lengths	578730

# **TROUBLESHOOTING BURNER - BECKETT MODEL ADC**

Beckett oil burners have been designed to take extreme temperatures, vibrations and rough handling. When performing the following troubleshooting steps, we assume that the oil burner motor and ignition transformer operate continuously and the oil solenoid valve, which controls oil flow, is cycled by the trigger in the wand. We also assume that there is power to the burner and fuel in the tank.

In addition to normal mechanics tools, it is recommended to have the following equipment on hand.

- Meter capable of measuring volts, ohms and amps
- Ignition transformer tester
- Smoke pump tester
- Combustion analyzer and 0 to 200 psi pressure gauge

Symptom	Possible Cause		
, I	Additional Information/Procedure		
	If the burner is not igniting, the burner motor, drive coupling, and oil pump are operating and oil is		
Oil Not Igniting	1) Check the air shutter adjustment. If the air shutter is enough too for the flow of air may provent		
	1) Check the all shutter adjustment. If the all shutter is opened too lat, the now of all may prevent the arc from reaching the oil corray. This may appear as a white yaper exhaust from the heater		
on Not igniting	2) The ignition system may have failed to supply an adequate arc to ignite the oil Check the battery		
	2) The ignition system may have raned to supply an adequate arc to ignite the on. check the battery and charging system to insure a continuous supply of 11 to 16 yolts DC (15 amps)		
	Check the electrodes for wear and damage Insure that the electrodes are adjusted properly		
	If there is no flame, the burner motor and igniter operate continuously and the oil solenoid value is		
	functional, check the following possibilities.		
	1) Check for a plugged oil pozzle		
	2) If the coil on the solenoid value is actuating insure that the value is opening or closing properly		
	2) There con on the solenoid valve is actuating, insure that the valve is opening of closing property.		
No Flame	noted		
	4) Check the nump pressure Check for air in fuel lines		
	5) Check hurper for broken motor coupling. If the coupling is broken check nump rotation prior to		
	renlacing the counling		
	6) Check for contaminated fuel and /or partially plugged fuel filter		
	If the blower motor is not operating check the following possibilities		
Motor Not	1) Check voltage at the motor to insure that switches and relays in line with the motor are		
Operating	operating properly.		
operating	2) Check pump and motor shaft operation. They should work freely without binding.		
	If the blower motor is operating, there is fuel in the tank, but oil does not spray out the end of the nozzle,		
	check the following possibilities.		
	1) Check for a broken or stripped coupling between the pump and the motor.		
No Oil Spray	2) Check the pump output for oil.		
NO OII Spray	3) Check operation of the oil valve.		
	4) Check for a plugged nozzle		
	5) Check for air in the oil line		
	6) Check for fuel contamination or plugged filter		
	If the pump pressure, as determined by a pressure gauge, is erratic or does not exist, check the following		
	possibilities.		
	1) Check motor rotational speed. Low rpm can cause erratic or no pump pressure.		
Fluctuating or	2) Check for a broken or worn motor coupling		
No Pump	3) Check that the pump turns freely		
Pressure	4) Check for all leaks in the lines		
	6) Check for on from at the meter		
	7) Check for fuel contamination or partially plugged filter		
	If the blower motor is not operating at the rpm's listed on the pamentate check the following		
Slow Motor	1) Check the supply voltage to the motor		
Rotation	2) Check for free operation of the motor shaft and pump assembly.		

# **GASOLINE POWERED ENGINE (BRIGGS & STRATTON)**

Compare the illustration on this page with your engine to familiarize yourself with the location of various features and controls.

Engine identification (located on illustration below)

- A. Spark Plug
- B. Air Cleaner (flat or oval)
- C. Choke Control
- D. Fuel Shut-off Valve (optional)
- E. Starter Cord Handle
- F. Finger Guard
- G. Throttle Control (optional)
- H. Stop Switch (optional)
- I. Fuel Tank and Cap
- J. Extended Dipstick (optional)
- K. Short Dipstick (optional)
- L. Oil Drain Plug
- M. Oil Fill
- N. Muffle, Muffle Guard (optional) and Spark Arrester (optional)
- 0. Safety Key (electric start models)
- P. Gear Reduction Unit (optional)



# **OPERATOR SAFETY**

The operation this equipment could result in fire hazard, severe personal injury, death or substantial property damage.

Read carefully:

- **WARNING:** Engine gives off carbon monoxide, an odorless, colorless poisonous gas. Breathing carbon monoxide can cause nausea, fainting or death.
- WARNING: Start and run engine outdoors. Do not start or run engine in enclosed area, even if doors or windows are open.
- **WARNING:** The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

**WARNING:** Gasoline and its vapors are extremely flammable and explosive. Fire or explosion can cause severe burns or death.

#### When Adding Fuel:

Turn engine off and let engine cool at least 2 minutes before removing the fuel cap

Fill fuel tank outdoors or in a well-ventilated area.

Do not overfill fuel tank. To allow for expansion of the gasoline, do not fill above the bottom of the fuel tank neck.

Keep gasoline away from sparks, open flames, pilot lights, heat and other ignition sources.

Check fuel lines, tank, cap and fittings frequently for cracks or leaks. Replace if necessary.

If fuel spills, wait until it evaporates before starting engine.

#### When Starting Engine:

Ensure that spark plug, muffler, fuel cap and air cleaner are in place and secured.

Do not crank engine with spark plug removed.

If engine floods, set choke to OPEN/RUN position, move throttle to FAST position and crank until engine starts.

#### When Operating Equipment:

Do not tip engine or equipment at angle which causes gasoline to spill.

Do not choke the carburetor to stop engine.

Never start or run the engine with the air cleaner assembly or the air filter removed.

#### When Changing Oil:

If you drain the oil from the top oil fill tube, the fuel tank must be empty or fuel can leak out and result in a fire or explosion.

#### When Transporting Equipment

Transport with fuel tank EMPTY or with fuel shut off valve OFF.

#### When Storing Gasoline Or Equipment With Fuel In Tank:

Store fuel away from furnaces, stoves, water heaters or other appliances that have a pilot light or other ignition source because they can ignite gasoline vapors.

#### Starting engine creates sparking. Sparking can ignite nearby flammable gases. Explosion and fire could result.

If there is natural or LP gas leakage in area, do not start engine. Do not use pressurized starting fluids because vapors are flammable.

# Rapid retraction of starter cord (kickback) will pull hand and arm toward engine faster than you can let go. Broken bones, fractures, bruises or sprains could result.

When starting engine, pull the starter cord slowly until resistance is felt and then pull rapidly to avoid kickback. To reduce starting load ensure hydraulic valve is in the neutral position.

# Rotating parts can contact or entangle hands, feet, hair, clothing or accessories. Traumatic amputation or severe laceration can result.

Operate equipment with guards in place. Keep hands and feet away from rotation parts Tie up long hair and remove jewelry. Do not wear loose fitting clothing, dangling drawstrings or items that could become caught.

Running engines produce heat. Engine parts, especially muffler, become extremely hot. Severe thermal burns can occur on contact. Combustible debris, such as leaves, grass brush, etc. can catch fire.

#### 88 THRU 555 SERIES TAR KETTLE

Allow muffler, engine cylinder and fins to cool before touching. Remove accumulated debris from muffler area and cylinder area. It is a violation of California Public Resource Code, Section 44442. To use or operate the engine on any forest-covered, brush covered or grass covered land unless the exhaust system is equipped with a spark arrester.

# Unintentional sparking can result in fire or electric shock. Unintentional start-up can result in entanglement, traumatic amputation or laceration. Fire Hazard!

#### **Before Performing Adjustments Or Repairs:**

Disconnect the spark plug wire and keep it away from the spark plug.

Use only correct tools.

Do not tamper with governor spring, links or other parts to increase engine speed.

Replacement parts must be the same and installed in the same position as the original parts.

Do not strike the flywheel with a hammer or hard object because the flywheel may later shatter during operation.

#### When Testing Spark Plug

Use approved spark plug tester.

Do not check for spark with spark plug removed.

## **OIL RECOMMENDATIONS**

It is recommended that high-quality detergent oil is used, do not use special additives. Use 10W-30 or Synthetic 5W-30 for best performance. Do not use SAE30 for temperatures over 40°F or SW30 for temperatures over 80° F. Before checking or adding oil place engine on a level surface and clean the oil fill area of any debris. Remove dipstick cap and pour the oil slowly into the engine, do not over fill. Wait one minute and check oil level. (See the following illustration)



#### **FUEL RECOMMENDATIONS**

Use only clean fresh unleaded gasoline with a minimum 87 octane, gasoline with up to 10% ethanol or 15% MTBE is acceptable. Do not use E85 gasoline, mix oil in gasoline or modify the engine to run on alternate fuels. This will damage the engine components and void the warranty. To protect the fuel system from gum formation, mix a fuel stabilizer into the fuel. Before adding fuel turn off engine and let cool for at least 2 minutes then remove the fuel cap. Fill the tank outside or in a well ventilated area. Do not over fill fuel tank. To allow for expansion of the gasoline do not fill above the bottom of the fuel tank neck (**C**). Keep gasoline away from sparks, open flames, pilot lights, heat and other ignition sources. Check fuel lines, tank (**B**), cap (**A**) and fittings frequently for cracks or leaks. Replace parts if necessary. If fuel spills, wait until it evaporates before starting engine.



## STARTING AND OPERATING ENGINE

Start and run engine outdoors. Do not start or run engine in an enclosed area, even if doors and windows are open. Check oil level before starting engine. Ensure that spark plug, muffler, fuel cap and air cleaner are in place and secured. Never start or run the engine without the air cleaner assembly or air filter in place. Do not crank engine with spark plug removed. Remove external loads before starting engine. Turn the fuel shut-off valve (**A**) to the on position. Move the choke control lever (**B**) to the choke position. Move the throttle control lever (**C**) to the fast position. On engine equipped with a stop switch (**D**), move the switch to the on position. Pull the starter cord (**E**) slowly until resistance is felt and then pull rapidly to avoid kickback. If engine floods, set choke to OPEN/RUN position, move throttle to FAST position and crank until engine starts. Operate the engine with the throttle control lever in the fast position. As the engine warms up, move the choke control to the run position.

**WARNING:** Rapid retraction of the starter cord (kickback) will pull your hand and arm toward the engine faster that you can let go. Broken bones, fractures, bruises or sprains could result. When starting the engine, pull the starter cord slowly until resistance is felt and then pull rapidly to avoid kickback.



WARNING: Starting engine creates sparking and can ignite nearby flammable gases. Explosion and fire could result.

When operating engine do not tip equipment at an angle, this could cause gasoline to spill. Rotating parts can contact or entangle hands, feet, hair, clothing or accessories. Running engines will produce heat and can cause severe burns on contacts or debris such as leaves, grass, etc to catch fire. Allow muffler, engine cylinder and fins to cool before touching. Always operate equipment with guards in place. Do not choke carburetor to stop engine.

#### **STOPPING ENGINE**

On models equipped with throttle control lever (**A**), move the throttle control lever to slow and then to the stop position or move the stop switch (**B**) to the stop position. After the engine stops, turn the fuel shut-off valve (**D**) to the closed position.



# SERVICE AND MAINTENANCE

We recommend that you see an authorized dealer for all maintenance and service of the engine and engine parts. Before performing adjustments or repairs:

- 1. Disconnect the spark plug wire and keep it away from the spark plug.
- 2. Use only correct tools.
- 3. Do not tamper with governor spring, links or other parts to increase engine speed.
- 4. Replacement parts must be the same and installed in the same position as the original parts.
- 5. Do not strike the flywheel with a hammer or hard object because the flywheel may later shatter during operation.
- 6. When testing for spark, use approved spark plug tester. Do not check for spark with spark plug removed.

#### **CARBURETOR ADJUSTMENTS**

Never make adjustments to the carburetor. However, if adjustments are required, see an authorized dealer for service.

#### **REPLACING THE SPARK PLUG**

When checking or replacing the spark plug, reset the gap  $(\mathbf{A})$ , install and tighten the spark plug to the recommended torque. If this engine was originally equipped with a resistor spark plug, use the same type for replacement. See the specifications

for the gap setting and torque on page 36.

#### **INSPECT MUFFLER AND SPARK ARRESTER**

Inspect muffler (A) for cracks, corrosion or other damage. Remove spark arrester (B) (if equipped) and inspect for damage or carbon blockage. If replacement parts are required, make sure to use only original equipment replacement parts. (See following illustration)







#### **CHANGING OIL**

Change oil when engine is turned off but still warm. Disconnect the spark plug wire (**A**) and keep it away from the spark plug. Remove the oil drain plug (**B**) and drain the oil into an approved receptacle. Used oil is a hazardous waste product and must be disposed of properly. Do not discard with household waste. Check with your local authorities, service center or dealer for safe disposal/recycling facilities. After the oil has drained, install and tighten oil drain plug (**B**). Clean the oil fill area of any debris. With engine in a level position, remove the dipstick (**F**) then pour the oil slowly into the engine oil fill (**E**). **Do not over fill**. After adding oil wait one minute and then check the oil level. Remove the dipstick (**F**) and wipe with a clean cloth. Install and tighten the dipstick. Remove the dipstick and check the oil level. It should be at the top of the full (**G**) indicator on the dipstick. Install and tighten the dipstick. See the specifications for oil capacity.



#### **CHANGING AIR FILTER**

The air cleaner system uses a pleated filter with an optional pre-cleaner. The pre-cleaner can be washed and reused. Loosen the fastener (D) that holds the cover (A) in place. Open the cover and remove the pre-cleaner (C) and the filter (B). Remove the pre-cleaner (if equipped) from the filter. Gently tap the filter on a hard surface to loosen debris. If the filter is excessively dirty, replace with a new filter. Wash the pre-cleaner in liquid detergent and water. Then allow it to thoroughly air dry. Do not oil the pre-cleaner into the base (E) and onto the stud (F). Make sure filter fits securely into base. Install air filter cover and secure with the fastener. Make sure the fastener is tight.

#### **! WARNING !**

Never start or run the engine with the air cleaner assembly (if equipped) or the air filter (if equipped) removed.



#### **CHANGING FUEL FILTER**

Before replacing the fuel filter (**A**) (if equipped) drain the fuel tank or close the fuel shut-off valve. Otherwise fuel can leak out and cause a fire or explosion. Use pliers to squeeze tabs (**B**) on the clamps (**C**), then slide the clamps away from the fuel filter. Twist and pull the fuel lines (**D**) off of the fuel filter. Check the fuel lines for cracks or leaks and replace if necessary. Replace the fuel filter with an original equipment replacement filter. Secure the fuel lines with the clamps.

#### **CLEANING AIR COOLING SYSTEM**

This is an air cooled engine, dirt or debris can restrict air flow and cause the engine to overheat, resulting in poor performance and reduced engine life. Use a brush or dry cloth to remove debris from the finger guard (A). Keep linkage, springs and controls (B) clean. Keep the area around and behind the muffler (C) free of any combustible debris.

## **! WARNING !**

Replacement parts must be the same and installed in the same position as the original parts or fire could result.



# **MAINTENANCE CHART**

FIRST 5 HOURS	Change oil	
EVERY 8 HOURS OR DAILY	Check air filter	
	Clean area around muffler and controls	
	Clean finger guard	
EVERY 25 HOURS OR ANNUALLY	/ Clean air filter *	
	Clean pre-cleaner *	
EVERY 50 HOURS OR ANNUALLY	Change engine oil	
	Check muffler and spark arrester	
EVERY 100 HOURS	Change gear reduction oil (if equipped)	
ANNUALLY	Replace air filter	
	Replace pre-cleaner	
	Replace spark plug	
	Replace fuel filter	
	Clean air cooling system *	
	Check valve clearance	

\*(In dusty conditions or when airborne debris is present, clean more often)

# **ENGINE SPECIFICATIONS**

Model 120000					
Displacement	12.48 ci (205cc)				
Bore	2.688 (68.28 mm)				
Stroke	2.200 in (55.88 in)				
Oil Capacity	18-20 oz (0.54-0.59 L)	)			
Gear Reduction Oil	80W-90				
TUNE-UP SPECIFICATIO	INS				
Model 120000, 150000					
Spark Plug Gap	0.030 in (0.76 mm)				
Spark Plug Torque	Spark Plug Torque 180 lbin (20 Nm)				
Armature Air Gap 0.010-0.014 in (0.25-0.36 mm)					
Intake Valve Clearance 0.004-0.006 in (0.10-0.15 mm)					
Exhaust Valve Clearance 0.009-0.011 in (0.23-0.28 mm)					
COMMON SERVICE PARTS					
SERVICE PART	PN#	SERVICE PART	PN#		
Flat Filter	491588, 5043	Fuel Additive	5041, 5058		
Flat Filter Pre-Cleaner	493537, 5064	Resistor Spark Plug	491055		
Oval Filter	697029, 5059	Long Life Platinum Spark Plug	5066		
Oval Filter Pre-Cleaner	273356	Spark Plug Wrench	89838, 5023		
Fuel Filter	694485	Spark Tester	19368		

# **ELECTRIC BRAKES**

# 12 x 2" Electric Brakes 4000 – 7000 LBS. Capacity



ITEM	PN#	QTY	DESCRIPTION	
0	023-105-00	1	LH Complete Brake Assembly	
0	023-106-00	1	RH Complete Brake Assembly	
1	036-089-05	1	Backing Plate Assembly	
2	047-107-05	1	LH Actuating Lever Arm Assembly	
2	047-108-05	1	RH Actuating Lever Arm Assembly	
3	027-005-00	2	Wire Clip	
4	046-009-00	2	Retractor Spring	
5	K71-048-00	1	Shoe and Lining Kit Containing	
			1-#040-044-00 Primary S&L	
			1-#040-045-00 Secondary S&L	
			2-#049-011-00 Shoe Hold Down Pin #2	
			2-#046-077-00 Shoe Hold Down Spring & Cup	
6	043-004-00	1	Adjuster Assembly	
7	046-018-00	1	Adjusting Screw Spring	
8	K71-105-00	1	Magnet Kit containing	
			1-#042-099-01 Magnet (white wire)	
			1-#027-009-00 Magnet Clip	
			1-#046-080-00 Magnet Spring	
9	046-007-00	1	Adjuster Slot Plug	
10	046-016-00	1	Wire Grommet	
11	005-067-00	1	Anchor Post Washer	
12	005-004-00	5	Lock Washer	
13	006-193-00	5	Brake Mounting Nut	

# **HYDRAULIC BRAKES**

# 12 x 2" Hydraulic Brakes Free Backing 5500 – 7000 LBS. Capacity



Note: Uni-servo brakes to be used with surge actuator

ITEM	PN#	QTY	DESCRIPTION	
0	023-342-00	1	LH Brake Assembly Complete	
0	023-343-00	1	H Brake Assembly Complete-Shown	
1	036-093-08	1	cking Plate Assembly	
2	054-064-00	1	Brake Cylinder Uni-Servo	
2	054-065-00	1	Brake Cylinder Uni-Servo	
3	054-060-00	1	linder Push Rod US	
4	087-001-00	2	ems (Screw & Washer Assembly)	
5	005-113-00	1	nchor Post Washer	
6	046-101-00	2	Retractor Spring	
7	K71-394-00	1	LH Shoe & Lining Kit containing:	
7	K71-395-00	1	1-#040-243-06 LH Primary Shoe & Lining 1-#040-315-06 LH Secondary Shoe & Lining 1-#046-077-01 Shoe Hold Down Spring & Cup- Secondary 2-#035-001-00 Shoe Hold Cup-Primary 1-#046-006-01 Shoe Hold Down Spring & Cup- Primary 1-#049-013-01 Shoe Hold Down Pin #1- Primary 1-#049-002-00 Shoe Hold Down Pin #8- Secondary RH Shoe & Lining Kit containing 1-#040-243-09 LH Primary Shoe & Lining 1-#040-315-01 LH Secondary Shoe & Lining 1-#046-077-00 Shoe Hold Down Spring & Cup- Secondary 2-#035-001-00 Shoe Hold Cup-Primary 1-#046-006-01 Shoe Hold Down Spring & Cup- Primary 1-#049-013-01 Shoe Hold Down Pin #1- Primary 1-#049-013-01 Shoe Hold Down Pin #8- Secondary	
8	043-028-00	1	Adjuster Assembly	
_	* Continued on next page *			

* Continued from previous page *				
ITEM	PN#	QTY	DESCRIPTION	
9	046-123-00	1	Adjusting Screw Spring	
10	046-007-00	1	Adjuster Slot Plug	
11	006-193-00	5	ut Washer Assembly	
13	040-244-01	1	Shoe Lever	
14	006-011-00	1	ocknut	
15	007-210-00	1	Screw	
16	005-064-00	1	Washer	
17	046-108-01	1	Primary Shoe Return Spring	
ns	054-089-00	1	Bleeder Screw (included with item #2)	

# AXLE 655 HUB GROUP



GREASE LUBE PARTS				HUBS			
ITEM	PN#	DESCRIPTION	ITEM	PN#	DE	SCRIPTION	Bolt Circle
1	010-054-00	Grease Seal - 2.250"	Hubs a	ind Drums			
2	031-030-02	25580 Inner Bearing Cone	24	008-201-09	½" Stud fo for 6000#	or 151123 Bearing	6 on 5.50
3	031-030-01	25520 Inner Bearing Cone					
4	031-029-01	15245 Outer Bearing Cup – 6000#					
5	031-029-02	15123 Outer Bearing Cone – 6000#					
6	006-001-00	Spindle Nut					
7	019-002-00	Cotter Pin					
8	021-001-00	Grease Cap					
9	005-057-00	Spindle Washer					
STUDS & WHEEL NUTS				12 X 2 BRAKES			
ITEM	PN#	DESCRIPTION	ITEM	PN#		DESCRIPTION	
10	007-262-00	1/2-20 x 2.5 Long Press in Stud	20	K23-105-00/0	23-106-00	LH/RH DXQ Electi	ric
*10	007-122-00	½-20 x 1.84 Long Press in Stud	ns	K23-342-00/0	23-343-00	LH/RH Hydraulic	Free
		(hubs prior to 1/04)				Backing	
13	006-080-00	½"-20 60° Cone Nut					

# HUBS/DRUMS/BEARINGS MAINTENANCE

**<u>CAUTION</u>**: You must follow these maintenance procedures to prevent damage to structural components. Damage to certain structural components such as wheel bearings can cause the wheel to come off of the axle. Loss of a wheel while the trailer is moving can cause you to lose control and lead to an accident, which can result in property damage, serious injury or death.

#### **HUB REMOVAL - STANDARD BEARINGS**

Whenever the hub equipment on your axle must be removed for inspection or maintenance the following procedure should be utilized:

- 1. Elevate and support the trailer. Remove the wheel.
- 2. Remove the grease cap by carefully prying progressively around the flange of the cap. If the hub is an oil lube type, then the cap can be removed by unscrewing it counterclockwise while holding the hub stationary.
- 3. Remove the cotter pin from the spindle nut.
- 4. Unscrew the spindle nut (counterclockwise) and remove the spindle washer.
- 5. Remove the hub from the spindle, being careful not to allow the outer bearing cone to fall out. The inner bearing cone will be retained by the seal.

#### **BEARING INSPECTION**

Wash grease and oil from the bearing cone using a suitable solvent. Dry with a clean, lint free cloth and inspect rollers completely. If any pitting, spalling or corrosion is present, then the bearing must be replace. Bearings must be replaced in sets of a cone and a cup.

#### **BEARING LUBRICATION - GREASE**

Proper lubrication is essential to proper function and reliability of the trailer axle. Bearings should be lubricated every 12 months or 12,000 miles.

- 1. Place a quantity of grease into the palm of your hand. Press a section of the widest end of the bearing into the outer edge of the grease pile closest to the thumb forcing grease into the interior of the bearing.
- 2. Repeat this while rotating the bearing from roller to roller. Continue this process until the entire bearing completely filled with grease.
- 3. Apply a light coat of grease on the bearing cup. Reinstall bearing.

#### **BEARING LUBRICATION - OIL**

If your axles are equipped with oil lubricated hubs, periodically check and refill the hub as necessary with a high quality of hypoid gear oil to the level indicated on the clear plastic oil cap. The oil can be filled from either the oil fill hole in the hub or through the rubber plug hole in the cap itself.

#### **BRAKE DRUM INSPECTION**

There are two areas likely to wear and require periodic inspection. The drum surface where the brake shoes makes contact with drum and the armature surface where the magnet contacts (electric brakes only), If drum surface show excessive wear, heavy scoring, worn more than .020 oversized or out of round by more than .015 then the surface will need to be machined. If the scoring or wear is greater than .090 on the diameter, the drum must be replaced. If the armature surface is scored or worn unevenly it should be refaced. The magnets should be replaced whenever the armature surface is refaced and the armature should be refaced when the magnets are replaced. Always keep the wheel bearing bores and cavities clean and free of contaminants. Failure to do so will decrease the life of your wheel bearings and brakes.

# TIRES

Trailer tires requirements are different than standard automotive tires. The trailer does not have driving torque applied to their axles. The only time trailer tires must have traction is during the applications of brakes. Tires with the ST (Special Trailer) rating have about a 10% more load capacity than light truck rated tire and 40% more than passenger rated tire. The ST tire is narrower than the LT and P tire and has a stiffer sidewall. This reduced flexibility helps the tire to track straighter and minimizes the risk of trailer sway. The load range or ply rating branded on the tire's side helps identify its strength and ability to contain air pressure. The further along the letter is in the alphabet the stronger the tire and greater amount of pressure it can withstand and load it can carry. The average life expectancy of a trailer tire is three to five years. After five years the tire is considered worn out and should be replaced.

#### AIR PRESSURE

Maintaining the proper tire inflation pressure is the most important safety procedures on any trailer owner checklist. Using the correct inflation pressure for the load means cooler-running, longer-lasting trailer tires. Proper inflation assures the best fuel and tire mileage and improved overall handling. It is recommended to check the tire pressure when the tires are cold. If the trailer needs to be moved to a source of compressed air, the distance traveled should be a mile or less to be considered the tires still cold. Allow tires to cool three or four hours after moving trailer before checking air pressure. Ambient temperatures will affect pressure levels; 10 degrees can increase/decrease the pressure of a tire by 1 psi. Sun light and shade will also affect the inflation level of the tire. Because environmental changes can affect the tire pressure, and tires naturally leak 1 to 3 psi a month, it's important to check tire inflation once a month. Weekly pressure checks are advisable during times of heavy use along with visual inspection every day.

#### DAMAGE

Trailer tires rarely wear out because of tread wear; generally the effects of sunlight, ozone and other environmental factures wear out tire first. A puncture or other damage means immediate need for repair or replacement. Tread punctures of ¼" or smaller diameter can be repaired by a tire professional. Sidewall punctures of any kind are fatal to a tire and no repairs are possible. Aerosol "flat-fixers" should only be used to take the trailer to a tire shop for permanent tire repairs. If bulges appear after a sidewall impact, replace the tire immediately. Damage to the internal structure has occurred. Bulges or high spots on the tread can mean tread separation which requires replacement. Under-inflation damage can show up as a bulge or rupture along the sidewall and ply separation. This is caused by the cords breaking under the excessive strain when air pressure in low. Such damage in fatal to the tire and needs to be replaced.

We	ar 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	Make sure load doesn't exceed axle rating. Align at alignment shop	
	Toe Wear	Incorrect toe-in	Align at alignment shop	
	Cupping	Out-of-balance	Check bearing adjustment and balance tires	
	Flat Spots	Wheel lockup & tire skidding	Avoid sudden stops when possible and adjust brakes	

# TIRE WEAR TROUBLESHOOTING

<u>CAUTION</u>: 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.

	Description	PN#	Specifications	
	Axle w/Electric Brakes	C070-00005	Model 11 Torsion Axle with 4000 lb capacity,	
88 Series Tar Kettle	Axle w/Hydraulic Brakes	C070-00006	starting angle 22.5° up	
166 thru 333 Series	Axle w/Electric Brakes	C070-00007	Model 11 Torsion Axle with 5000 lb capacity,	
Tar Kettle	Axle w/Hydraulic Brakes	C070-00008	bracket, starting angle 22.5° up	
444 thru 555 Series Tar Kettle	Axle w/Hydraulic Brakes	C070-00010	Model 11 Torsion Axle with 6000 lb capacity, 78" hub face to hub face, 63" outside of bracket, starting angle 22.5° up	
All Units	Wheels	C070-00012	Steel Rim, 16 x 6k, 6 lugs on 5.5 inch bolt circle	
All Units	Trailer Tire	C070-00013	ST235/85R16, 10 ply, load range E, 3700+ lb capacity, 80 psi cold	

# **1. TIRE SAFETY INFORMATION**

This portion of the User's Manual contains tire safety information as required by 49 CFR 575.6.

Section 2.1 contains "Steps for Determining Correct Load Limit - Trailer".

Section 2.2 contains "Steps for Determining Correct Load Limit – Tow Vehicle".

Section 2.3 contains a Glossary of Tire Terminology, including "cold inflation pressure", "maximum inflation

pressure", "recommended inflation pressure", and other non-technical terms.

Section 2.4 contains information from the NHTSA brochure entitled "Tire Safety – Everything Rides On It". This brochure, as well as the preceding subsections, describes the following items;

- Tire labeling, including a description and explanation of each marking on the tires, and information about the DOT Tire Identification Number (TIN).
- Recommended tire inflation pressure, including a description and explanation of: A. Cold inflation pressure.
  - B. Vehicle Placard and location on the vehicle.
  - C. Adverse safety consequences of under inflation (including tire failure).
  - D. Measuring and adjusting air pressure for proper inflation.
- Tire Care, including maintenance and safety practices.
- Vehicle load limits, including a description and explanation of the following items:

A. Locating and understanding the load limit information, total load capacity, and cargo capacity.

B. Calculating total and cargo capacities with varying seating configurations including quantitative examples showing / illustrating how the vehicles cargo and luggage capacity decreases as combined number and size of occupants' increases. This item is also discussed in Section 3.

C. Determining compatibility of tire and vehicle load capabilities.

D. Adverse safety consequences of overloading on handling and stopping on tires.

# **1.1. STEPS FOR DETERMINING CORRECT LOAD LIMIT – TRAILER**

Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a Federal certification/VIN label that is located on the forward half of the left (road) side of the unit. This certification/VIN label will indicate the trailer's Gross Vehicle Weight Rating (GVWR). This is the most weight the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided. If your trailer has a GVWR of 10.000 pounds or less, there is a vehicle placard located in the same location as the certification label described above. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity. Cargo can be added to the trailer, up to the maximum weight specified on the placard. The combined weight of the cargo is provided as a single number. In any case, remember: the total weight of a fully loaded trailer can not exceed the stated GVWR. For trailers with living quarters installed, the weight of water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the trailer before it is loaded with cargo, and is not considered part of the disposable cargo load. Water however, is a disposable cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank when filled would weigh about 800 pounds. If more cargo is being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the limits of the GVWR so as not to overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel needs. When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk to your dealer to discuss the weighing methods needed to capture the various weights related to the trailer. This would include the weight empty or unloaded, weights per axle, wheel, hitch or king-pin, and total weight.

Excessive loads and/or under-inflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. The proper air

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pressure may be found on the certification/VIN label and/or on the Tire Placard. This value should never exceed the maximum cold inflation pressure stamped on the tire.

# 1.1.1. TRAILERS 10,000 POUNDS GVWR OR LESS



Tire and Loading Information Placard – Figure 1-1

1. Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's placard. See figure 1-1.

2. This figure equals the available amount of cargo and luggage load capacity.

3. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.

The trailer's placard refers to the Tire Information Placard attached adjacent to or near the trailer's VIN (Certification) label at the left front of the trailer.

# 1.1.2. TRAILERS OVER 10,000 POUNDS GVWR

(NOTE: THESE TRAILERS ARE NOT REQUIRED TO HAVE A TIRE INFORMATION PLACARD ON THE VEHICLE)

1. Determine the empty weight of your trailer by weighing the trailer using a public scale or other means. This step does not have to be repeated.

2. Locate the GVWR (Gross Vehicle Weight Rating) of the trailer on your trailer's VIN (Certification) label.

3. Subtract the empty weight of your trailer from the GVWR stated on the VIN label. That weight is the maximum available cargo capacity of the trailer and may not be safely exceeded.

# **1.2. STEPS FOR DETERMINING CORRECT LOAD LIMIT – TOW VEHICLE**

1. Locate the statement, "The combined weight of occupants and cargo should never exceed XXX lbs.," on your vehicle's placard.

2. Determine the combined weight of the driver and passengers who will be riding in your vehicle.

3. Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.

4. The resulting figure equals the available amount of cargo and luggage capacity. For example, if the "XXX" amount equals 1400 lbs. and there will be five 150 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 650 lbs.  $(1400-750 (5 \times 150) = 650 \text{ lbs.})$ . 5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage capacity calculated in Step # 4.

6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult the tow vehicle's manual to determine how this weight transfer reduces the available cargo and luggage capacity of your vehicle.

# **1.3. GLOSSARY OF TIRE TERMINOLOGY**

Accessory weight: The combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

- **Bead:** The part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.
- Bead separation: This is the breakdown of the bond between components in the bead.
- **Bias ply tire:** A pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.
- Carcass: The tire structure, except tread and sidewall rubber which, when inflated, bears the load.
- Chunking: The breaking away of pieces of the tread or sidewall.
- **Cold inflation pressure:** The pressure in the tire before you drive.
- **Cord:** The strands forming the plies in the tire.
- **Cord separation:** The parting of cords from adjacent rubber compounds.
- Cracking: Any parting within the tread, sidewall, or inner liner of the tire extending to cord material.
- **CT:** A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.
- **Curb weight:** The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.
- **Extra load tire:** A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.
- Groove: The space between two adjacent tread ribs.
- **Gross Axle Weight Rating:** The maximum weight that any axle can support, as published on the Certification / VIN label on the front left side of the trailer. Actual weight determined by weighing each axle on a public scale, with the trailer attached to the towing vehicle.
- **Gross Vehicle Weight Rating:** The maximum weight of the fully loaded trailer, as published on the Certification / VIN label. Actual weight determined by weighing trailer on a public scale, without being attached to the towing vehicle.
- Hitch Weight: The downward force exerted on the hitch ball by the trailer coupler.
- **Innerliner:** The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.
- Innerliner separation: The parting of the innerliner from cord material in the carcass.
- **Intended outboard sidewall:** The sidewall that contains a white-wall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same molding on the other sidewall of the tire or the outward facing sidewall of an asymmetrical tire that has a particular side that must always face outward when mounted on a vehicle.
- **Light truck (LT) tire:** A tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.
- Load rating: The maximum load that a tire is rated to carry for a given inflation pressure.
- Maximum load rating: The load rating for a tire at the maximum permissible inflation pressure for that tire.
- Maximum permissible inflation pressure: The maximum cold inflation pressure to which a tire may be inflated.
- Maximum loaded vehicle weight: The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.
- Measuring rim: The rim on which a tire is fitted for physical dimension requirements.

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- **Pin Weight:** The downward force applied to the 5th wheel or gooseneck ball, by the trailer kingpin or gooseneck coupler.
- **Non-pneumatic rim:** A mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.
- **Non-pneumatic spare tire assembly:** A non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.
- **Non-pneumatic tire:** A mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.
- **Non-pneumatic tire assembly:** A non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.
- **Normal occupant weight:** This means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.
- **Occupant distribution:** The distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.
- Open splice: Any parting at any junction of tread, sidewall, or innerliner that extends to cord material.
- Outer diameter: The overall diameter of an inflated new tire.
- **Overall width:** The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.
- Ply: A layer of rubber-coated parallel cords.
- Ply separation: A parting of rubber compound between adjacent plies.
- **Pneumatic tire:** A mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.
- **Production options weight:** The combined weight of those installed regular production options weighing over 2.3 kilograms (5 lbs.) in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.
- **Radial ply tire:** A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.
- **Recommended inflation pressure:** This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification / VIN tag.
- **Reinforced tire:** A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.
- Rim: A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

Rim diameter: This means the nominal diameter of the bead seat.

- Rim size designation: This means the rim diameter and width.
- Rim type designation: This means the industry of manufacturer's designation for a rim by style or code.
- Rim width: This means the nominal distance between rim flanges.
- Section width: The linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

**Sidewall:** That portion of a tire between the tread and bead.

Sidewall separation: The parting of the rubber compound from the cord material in the sidewall.

**Special Trailer (ST) tire:** The "ST" is an indication the tire is for trailer use only.

- **Test rim:** The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.
- Tread: That portion of a tire that comes into contact with the road.
- Tread rib: A tread section running circumferentially around a tire.
- Tread separation: Pulling away of the tread from the tire carcass.
- **Treadwear indicators (TWI):** The projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.
- Vehicle capacity weight: The rated cargo and luggage load plus 68 kilograms (150 lbs.) times the vehicle's designated seating capacity.
- Vehicle maximum load on the tire: The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.
- Vehicle normal load on the tire: The load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of CRF 49 571.110) and dividing by 2.
- Weather side: The surface area of the rim not covered by the inflated tire.
- Wheel center member: In the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or, in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between tire and the vehicle.

Wheel-holding fixture: The fixture used to hold the wheel and tire assembly securely during testing.

# 1.4. TIRE SAFETY - EVERYTHING RIDES ON IT

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires\_index.html

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling
- Help protect you and others from avoidable breakdowns and accidents
- Improve fuel economy
- Increase the life of your tires.

This booklet presents a comprehensive overview of tire safety, including information on the following topics:

- Basic tire maintenance
- Uniform Tire Quality Grading System
- Fundamental characteristics of tires

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• Tire safety tips.

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

# **1.5. SAFETY FIRST-BASIC TIRE MAINTENANCE**

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Underinflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

# 1.5.1. FINDING YOUR VEHICLE'S RECOMMENDED TIRE PRESSURE AND LOAD LIMITS

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

- Recommended tire size
- Recommended tire inflation pressure
- Vehicle capacity weight (VCW-the maximum occupant and cargo weight a vehicle is designed to carry)
- Front and rear gross axle weight ratings (GAWR- the maximum weight the axle systems are designed to carry).

Both placards and certification labels are permanently attached to the trailer near the left front.

# 1.5.2. UNDERSTANDING TIRE PRESSURE AND LOAD LIMITS

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure– measured in pounds per square inch (psi)–a tire requires to be properly inflated. (You will also find this number on the vehicle information placard expressed in kilopascals (kpa), which is the metric measure used internationally.)

Manufacturers of passenger vehicles and light trucks determine this number based on the vehicle's design load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size. The proper tire pressure for your vehicle is referred to as the "recommended cold inflation pressure." (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

# 1.5.3. CHECKING TIRE PRESSURE

It is important to check your vehicle's tire pressure at least once a month for the following reasons:

- Most tires may naturally lose air over time.
- Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking.
- With radial tires, it is usually not possible to determine under-inflation by visual inspection.

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them 48

to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

## **1.5.4. STEPS FOR MAINTAINING PROPER TIRE PRESSURE**

- Step 1: Locate the recommended tire pressure on the vehicle's tire information placard, certification label, or in the owner's manual.
- Step 2: Record the tire pressure of all tires.
- Step 3: If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.
- Step 4: If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These "missing" pounds of pressure are what you will need to add.
- Step 5: At a service station, add the missing pounds of air pressure to each tire that is underinflated.
- Step 6: Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure).

If you have been driving your vehicle and think that a tire is underinflated, fill it to the recommended cold inflation pressure indicated on your vehicle's tire information placard or certification label. While your tire may still be slightly underinflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the vehicle manufacturer's recommended cold inflation pressure than to drive with a significantly underinflated tire. Since this is a temporary fix, don't forget to recheck and adjust the tire's pressure when you can obtain a cold reading.

## 1.5.5. TIRE SIZE

To maintain tire safety, purchase new tires that are the same size as the vehicle's original tires or another size recommended by the manufacturer. Look at the tire information placard, the owner's manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

## 1.5.6. TIRE TREAD

The tire tread provides the gripping action and traction that prevent your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in treadwear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down and facing you. If you can see the top of Lincoln's head, you are ready for new tires.

#### 1.5.7. TIRE BALANCE AND WHEEL ALIGNMENT

To avoid vibration or shaking of the vehicle when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

## 1.5.8. TIRE REPAIR

The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

#### 1.5.9. TIRE FUNDAMENTALS

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

#### 1.5.9.1. Information on Passenger Vehicle Tires



#### Ρ

The "P" indicates the tire is for passenger vehicles.

#### Next number

This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

#### Next number

This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.

#### R

The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.

#### Next number

This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.

#### Next number

This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. Note: You may not find this information on all tires because it is not required by law.

# M+S

The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings; hence, they have some mud and snow capability.

# **Speed Rating**

The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed below. Note: You may not find this information on all tires because it is not required by law.

Letter Rating	Speed Rating		
Q	99 mph		
R	106 mph		
S	112 mph		
Т	118 mph		
U	124 mph		
Н	130 mph		
V	149 mph		
W	168* mph		
Y	186* mph		

\* For tires with a maximum speed capability over 149 mph, tire manufacturers sometimes use the letters ZR. For those with a maximum speed capability over 186 mph, tire manufacturers always use the letters ZR.

# **U.S. DOT Tire Identification Number**

This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.

# **Tire Ply Composition and Materials Used**

The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

# **Maximum Load Rating**

This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

# Maximum Permissible Inflation Pressure

This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

# 1.5.9.2. UTQGS Information

## **Treadwear Number**

This number indicates the tire's wear rate. The higher the treadwear number is, the longer it should take for the tread to wear down. For example, a tire graded 400 should last twice as long as a tire graded 200.

## **Traction Letter**

This letter indicates a tire's ability to stop on wet pavement. A higher graded tire should allow you to stop your

car on wet roads in a shorter distance than a tire with a lower grade. Traction is graded from highest to lowest as "AA","A", "B", and "C".

# **Temperature Letter**

This letter indicates a tire's resistance to heat. The temperature grade is for a tire that is inflated properly and not overloaded. Excessive speed, underinflation or excessive loading, either separately or in combination, can cause heat build-up and possible tire failure. From highest to lowest, a tire's resistance to heat is graded as "A", "B", or "C".

# 1.5.9.3. Additional Information on Light Truck Tires



Please refer to the following diagram.

Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.

# LT

The "LT" indicates the tire is for light trucks or trailers.

## ST

An "ST" is an indication the tire is for trailer use only.

## Max. Load Dual kg (lbs) at kPa (psi) Cold

This information indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

# Max. Load Single kg (lbs) at kPa (psi) Cold

This information indicates the maximum load and tire pressure when the tire is used as a single.

## Load Range

This information identifies the tire's load-carrying capabilities and its inflation limits.

# **1.6. TIRE SAFETY TIPS**

## **Preventing Tire Damage**

• Slow down if you have to go over a pothole or other object in the road.

• Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

# **Tire Safety Checklist**

- Check tire pressure regularly (at least once a month), including the spare.
- Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
- Remove bits of glass and foreign objects wedged in the tread.
- Make sure your tire valves have valve caps.
- Check tire pressure before going on a long trip.
- Do not overload your vehicle. Check the Tire Information and Loading Placard or User's Manual for the maximum recommended load for the vehicle.

# **REPORTING SAFETY DEFECTS:**

This portion of the User's Manual contains information on reporting possible safety defects as required by 49 CFR Part 575.6 (a)(2)(i).

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Concord Road Equipment MFG., INC.

If NHTSA receives similar complaints, it may open an investigation and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Concord Road Equipment MFG., INC.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to http://www.safercar.gov; or Write to: NHTSA, US Department of Transportation, 1200 New Jersey SE, Washington, DC 20590. You can also obtain other information about motor vehicle safety from http://www.safercar.gov.



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