

# **1982 SEAGRAVE TRIPLE**

## **APPARATUS STATISTICAL INFORMATION**

Make SEAGRAVE TRIPLE Model H.B. 50 DD Year 1982

Laden Weight 32,000 Front 14,400 Rear 23,000

Tire Size Front 12R-22.5 - Rear 12R-22.5

Tire Pressure Front 115 Rear 75 "90

Make of Engine DETROIT DIESEL Model 8V71TA

No. of Cylinders 8      Cubic Inches 568      Horsepower 370

### CAPACITIES:

Fuel		50	al	
Crankcase	23	qts	SAE 15w-40	2 qts for filter = 25 qts. total
Transmission	8	gal	SAE DEXTRON II	
Pump Transmission	22	pts	SAE DEXTRON II	
Differential	28	pts	SAE-QQ--L4D	
Common reservoir				
Power Steering	* ar	pts	DEXTRON II	
Steering Housing	* ar	pts	DEXTRON II	
Water Tank	500	gal		

Transmission	HT 740 ALLISON AUTOMATIC
Main Pump	WATEROUS      Type CMUYCX TWO-STAGE
Rated Capacity	1500 pm @ 150 psi
Priming Pump	WATEROUS Type ROTARY VANE-POSITIVE DISPLACEMENT
Rockwell Rear Axle	MODEL      R170
Differential Gear Ratio	4:63 to 1

\*As required

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### **ENGINE:**

- ◆ DETROIT ALLISON **2 cycle**, 8 cylinder "V" type  
568 cubic inch - 370 horsepower  
Engine is turbocharged & after-cooled.
- ◆ Excessive idling allows engine temperature to fall below normal operating range. Causing incomplete combustion of fuel in a cold engine.  
This will cause:
  1. Plugged fuel injectors
  2. Crankcase dilution
  3. Formation of lacquer or gummy deposits on the valves, pistons, and rings.
  4. Rapid accumulation of sludge in the engine.
- ◆ Engine must not be shut down if excessively hot > **200 degrees**. This can transfer heat to the turbo and cause the bearings to seize.
- ◆ Governor controls engine idle speed & limits the maximum operational speed of the engine.
- ◆ Operating temperature range is **160 - 185** degrees.  
Red warning light operates at 212 degrees
- ◆ Maintain engine coolant temperature at 180 degrees for maximum engine efficiency.
- ◆ Let engine run between **900 & 1000 rpm in neutral** until the temperature returns to normal. Then stay at idle for about 30 seconds before shutting down.
- ◆ This engine was selected for its length, enables wheelbase of this vehicle to be substantially shorter than previously purchased apparatus.
- ◆ During prolong idling, maintain at least **800 rpm.**
- ◆ When you must idle set throttle at 900 to 1100 rpm, this will bring operating temperature up to a safe level.

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### **TURBOCHARGER:**

- ◆ Makes air charge more dense so it can:
  1. Burn fuel more efficiently
  2. Create more horsepower
  3. Burn cleaner
  4. Allows engine to be more efficient at higher altitudes.
- ◆ Uses exhaust gas as a power source high volume low pressure.
- ◆ The maximum turbocharger output pressure under full load is 12 psi. This coupled with the blower pressure of 2½ psi will produce 14½ psi at the engine air box.
- ◆ **ROOTS blower** - supplies fresh air for combustion and this continues throughout the compression stroke and facilitates *scavenging*.
- ◆ Blower is driven at 2.05 engine speed rpm.
- ◆ **SCAVENGING** - a process in which a charge of air is forced into the cylinder by the blower and thoroughly **sweeps out** all of the burned gases through the exhaust valve ports. This air also helps to cool the internal engine parts particularly the exhaust valves.
- ◆ **Oil lag** or oil starvation to the turbo will cause **premature wear on the bearings**.
- ◆ Do not over-rev on cold starts.

### **EMERGENCY ENGINE SHUT-OFF PROCEDURES:**

If a complete air loss occurs in apparatus air system or if a defective system, the engine **will continue to run**.

- ◆ To manually shut down engine:
  1. Leave ignition switch & battery master switch "ON".
  2. Open the hood on driver's side; locate the turbocharger housing.
  3. Locate the engine **shut-off cylinder** and **fuel shut-off lever**, which can be found just in front and below of the turbocharger housing.
  4. Reach in and turn the fuel shut-off lever **clockwise until engine dies**.
  5. Turn ignition switch off and battery switch if needed.

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## **ENGINE LUBRICATION SYSTEM:**

- ◆ Observe oil pressure guage immediately after starting.
- ◆ Oil pressure should be 25 psi @- 1200 rpm 30 psi @- 2100 rpm
- ◆ Observe the oil pressure gauge immediately after starting:
  1. If there is no pressure within 10 to 15 seconds and the
  2. **Low oil pressure light** stays on - **IMMEDIATELY STOP ENGINE.**
- ◆ Due to the inherent design of the DETROIT diesel engine, the dash oil pressure gauge will read low and the dash oil warning light may flash off and on at idle speed. This condition is considered normal.
- ◆ **CAUTION:** The oil level should never be allowed to drop below the low mark on the dipstick. Overfilling the crankcase may contribute to:
  1. **Abnormal oil consumption** and
  2. **High oil temperatures** and may also result in
  3. **Oil leaking past the crankshaft rear oil seal.**

## **ENGINE COOLING SYSTEM:**

- ◆ Maintain engine temperature @ **180 degrees** for maximum engine efficiency.
- ◆ Radiator cap is a pressure relief type with a **7 lbs.** rating. This allows water temperature to reach 233 degrees before boiling.
- ◆ Deaeration tank purges air which could become trapped in the cooling system.

Air in the system can cause:

1. Hot spots
2. Cavitation
3. Electrolysis

All of which decreases water pump and impeller life.

- ◆ Engine heater uses 120 volts AC and maintains the engine temperature at approximately 140 degrees.

This shall be connected whenever apparatus is parked on the apparatus floor.

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- ◆ Cooling fan is belt driven with - the **clutch pneumatically operated and thermostatically controlled**.
- ◆ If a grease fitting is noted on fan clutch, lube with **two cubic inches** of general purpose grease every **15,000 miles**.
- ◆ Oil cooler; this system has a combination transmission oil and engine oil cooler.
- ◆ Water filter - offers protection to the cooling system through a constant addition of chemicals as **rust inhibitors** and a **sacrificial plate** to help in electrolytic protection. *If water appears rusty or dirty, notify shops.*

### **AIR CLEANER:**

- ◆ If gauge on dash reads **20 inches** or more, **check for** restrictions at the **filter intake screen**. If clean, call shops for immediate filter element replacement
- ◆ When washing the apparatus with water hose, **DO NOT** direct stream at filter intake.
- ◆ An aftercooler is a device in the engine intake system designed to **reduce intake air temperature** and/or preheat intake air temperature to improve combustion.

### **ELECTRICAL SYSTEM:**

Refer to Training Bulletin #65 for six pack batteries

- ◆ The starting motor is 24 volts heavy duty. Do not crank the engine for more than **30 seconds @** a time and **then hesitate** about 30 seconds before making another attempt.
- ◆ The alternator is a DELCO with silicon diode rectifiers, it produces the maximum capacity **160 amps** at 14 volts.
- ◆ DO NOT switch battery master switch and ignition switch to "OFF" **before engine** stops. Doing this can damage the:
  1. Voltage regulator
  2. Alternator diodes
- ◆ **DO NOT START** the apparatus with the house battery charger still in operation. **Severe damage** to the **12/24 volt series parallel solenoid** and the **starting wire** can occur.
- ◆ Electrical system is protected by fuses and breakers. Operating and cooling of breakers will produce clicking sound. Notify shops.

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## **MISC INFO:**

- ◆ DO NOT REMOVE OR PAINT THE I.D. TAG LOCATED ON THE LEFT SIDE OF THE ENGINE VALVE COVER. THIS TAG IS A BUILT-IN PARTS BOOK FOR THE DETROIT DIESEL ENGINE INSTALLED IN THIS APPARATUS.
- ◆ Matching tires - problems are likely to result if tires on a dual assembly differ by more than ½" in diameter.
- ◆ DO NOT use air outlet for operating spray gun.

## **AIR RESERVOIR SYSTEM:**

- ◆ BENDIX air compressor creates **16 cubic feet per minute**. Lubricated by engine oil and cooled by engine coolant.
- ◆ Air storage tanks:  
1 primary and 3 secondary, separated by a regulating valve.
- ◆ **Secondary tanks** will not fill until **primary reaches 90 psi**.

*This provides a rapid buildup of air pressure in the primary tank for immediate use.*

## **AIR RESERVOIR SYSTEM:**

- ◆ Air storage tanks:  
1 - Primary  
3 – Secondary

Secondary tanks will not fill until primary reaches 90 psi.

- ◆ On the air gauge, there are two indicator hands, **red and green**.  
**Red hand** indicates amount of air in **primary tank**  
**Green hand** indicates amount in **secondary tanks**.
- ◆ When air pressure is below 90 psi:
  1. Secondary tanks will not fill until primary reaches 90 psi.
  2. At 90 psi apparatus may be moved, **but only the rear brakes will have full braking psi**. Full braking psi is reached when secondary tanks are at 90 psi.
- ◆ EFFECTIVE braking air pressure is at **80 psi**.
- ◆ All auxiliary air powered equipment is supplied from the **secondary system**.

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- ◆ Lights and buzzer on the driver's panel will operate when pressure falls **below 60 psi** and ignition switch is on.
- ◆ Moisture ejection system is a desiccant filtration system that removes both liquid and water vapor from the compressor discharge before it reaches the air brake reservoir.

This is serviced **YEARLY** at Shops.

- ◆ Air outlet on left side of running board for charging water extinguisher. UNDER NO, CONDITIONS SHALL BE USED FOR OPERATING A PAINT SPRAY GUN OR HAVE AN AIR BOTTLE CONNECTED TO IT.
- ◆ **Automatic bleeder valve** Operate valve by hand **weekly** to insure it is functioning correctly.
- ◆ Foot throttle is air actuated, engine will idle until **approximately 30 psi of air is pumped into system.**

### **BRAKE SYSTEM:**

- ◆ Anchorlock spring brake system on rear brakes only.
- ◆ Brake is applied by absence of air by spring pressure.
- ◆ Adjusting procedure:
  1. Start engine and achieve full system pressure (120 psi)
  2. Depress brake pedal fully and hold for 1 second
  3. **Repeat four or more times.**
- ◆ Three primary uses:
  1. **Emergency brake** - will automatically bring rig to a safe gentle stop if air pressure loss.
  2. **Low pressure starting protective device** - will hold rig firmly in place until air pressure rises to safe operating level.
  3. **Parking brake** - pull YELLOW button to apply push yellow button to release.

### **TRANSMISSION:**

- ◆ Equipped with HT 740 ALLISON automatic transmission
- ◆ **Four forward** speeds, one reverse.

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- ◆ **Under NO CIRCUMSTANCES** should you allow this apparatus to **coast in NEUTRAL**.
- ◆ Down shifting should be avoided when the apparatus engine speed is **above** the maximum speed attainable in the next lowest gear.
- ◆ Full throttle upshifts should occur at approximately 1900 rpm in each gear.
- ◆ A diesel engine **must be driven by the TACH**. Under even moderate loads, engine rpm's should be maintained @ **1900 rpm**.
- ◆ If transmission overheats during normal operation:
  1. Check oil level. Add oil if necessary.
- ◆ **Discontinue operation if transmission temperature rises above 25Q degrees**.
- ◆ **Normal** transmission operating temperature is **160 to 220 degrees**.
- ◆ **Oil must be changed:**
  1. **Every 1000 hours** or often depending on the operating conditions.
  2. Traces of dirt or metal contamination are found in the oil.
  3. The **effects** of High Operating Temperatures, such as:
    - a. **Discoloration**
    - b. **Strong odor**.
- ◆ Draining transmission:

Remove the drain plug from the **right** side of sump.
- ◆ **CHECKING FLUID LEVEL OF TRANSMISSION**

**Cold check:**

Engine not running - purpose is to see if sufficient oil is transmission to safely start the engine.

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Hot check:

1. Check oil level with engine running at **1000 rpm**
2. Transmission in neutral
3. Oil at normal operating temperature.

- ◆ The engine cannot be started by towing or pushing.
- ◆ Before towing or pushing beyond a few blocks, the **driveline must be disconnected.**
- ◆ **Torque converter** is a single-stage three element unit consisting of:
  - Pump
  - Turbine
  - Stator
- ◆ **Torque converter** serves two primary operations:
  1. Acts as a fluid coupling to smoothly connect engine power through oil to the transmission gear train.
  2. Multiplies the torque, or twisting effort, of the engine when additional performance is desired.

### **BEGINNING TO MOVE .. On severe grade**

- ◆ The engine should be accelerated until the converter is in a stall condition before the foot brakes are released. This will allow smooth acceleration and eliminate any rollback, which could **damage** driveline components.
- ◆ If engine coolant leaks into the transmission oil system:
  - Immediate action must be taken to prevent **malfunction and possible serious damage.**
  - Transmission must be completely disassembled, inspected and cleaned.
- ◆ **Shifting down hill** - Governor **WILL NOT** control engine when descending hill. Back wheels are driving engine.
- ◆ **200-300 rpm above maximum** range will **cause valves to float, causing valve contact with pistons.**

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### **PUMP:**

- ◆ WATEROUS centrifugal, two stage pump, chain driven. Series/parallel type.
- ◆ Rated capacity - 1500 gpm @ 150 psi
- ◆ High pressure - 150 gpm @ 600 psi.
- ◆ Hydrostatically tested @ 600 psi.
- ◆ Two position manual **transfer valve**, controlled by handle on panel.
- ◆ Pump should be operated at least once each month for 10 minutes @ 150 psi.
- ◆ Acceptable pump packing **leakage** is from **10 drops/min** to **1 to 2 drops/second**. This leakage cools and lubricates packing.
- ◆ Dried out packing will not only result in excessive leakage but may prevent the pump from priming. Thus, pump should be operated for at least 10 minutes each month at 150 psi.
- ◆ Priming Pump: Electric, Rotary vane
- ◆ **Pump transmission** provides power to the pump from the engine.
  - It is located behind the road transmission.
  - The control lever is located on the floor to the **right** of the driver's position in the cab.
- ◆ **Radiator fill valve** has been provided for the purpose of filling the radiator from the discharge side of the pump.
- ◆ DO NOT add water to the radiator unless necessary and above all avoid overfilling. This will **dilute and weaken** the balance of corrosion inhibitors in the cooling system.
- ◆ PUTTING PUMP INTO OPERATION
  1. Engine at idle  
Transmission in neutral  
Shift pump transmission to pump position.

NOTE: If pump shift will not engage due to butt-tooth, shift momentarily to reverse and then back to NEUTRAL while **keeping pressure on pump shift lever**.

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2. Shift transmission to 1-4 (pumping gear).

CAUTION: Do not open throttle to start pumping unless the green light is ON. This indicates pump is engaged and it is safe to pump.

- ◆ Prolonged pump operation allow at least ½" in diameter to discharge from pump.

### **RELIEF VALVE:**

- ◆ WATEROUS relief valve
- ◆ A spring loaded, pressure actuated unit that is installed between the discharge and suction sides of pump.
- ◆ WATEROUS relief valve system consists of two units;
  1. Relief valve
  2. Pilot valve, which controls the relief valve

Controls discharge of 75 psi to 300 psi. NOT for pressure over **300 psi**.

Discharge pressures LOWER than **suction pressure, plus 50 psi** cannot be controlled.

If operating from a **draft** or **tank**, the difference can be NO LESS than **75 psi**.

- ◆ RELIEF VALVE MAINTENANCE

#### **Sluggish or Erratic**

- ◆ Usual cause is **sand** or foreign material clogging one of the **valves** or **strainer**
  1. Remove strainer rod assembly and clean the strainer and the orifice in the rod end.
  2. Check condition of "O" ring.
  3. Turn throttle out ½ and provide ½" discharge of water to keep pump cool.
  4. With 4-way valve **ON**, turn pilot valve handle **counter- clockwise** all the way to relieve spring pressure. This will cause the discharge pressure to decrease.

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\*If no pressure drop, valve is stuck. Operate 4-way valve rapidly several times to flush assembly.

If unable to free valve call shops.

**Once a year** or as often as necessary, disassemble and clean pilot valve assembly. Notify shops to perform this.

### **WATERTANK:**

- ◆ 500 gallons 3/16" steel tank with three baffles.
- ◆ Six cathodic sacrificial rods.
- ◆ Flow capacity from tank to pump is 600 gpm.