

Motor Propulsion

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As shown in the illustration, the function of component "1" is to _____. Illustration MO-0128
evaporate circulating boiler water into saturated steam

Illustrations: MO0128_WM_102016

As shown in the illustration, what component would normally be installed at location "D"? Illustration MO-0128
Oil fired mechanical burner

Illustrations: MO0128_WM_102016

As shown in the illustration, the component labeled 'E' would be identified as a _____. Illustration MO-0128
waste heat boiler circulating pump

Illustrations: MO0128_WM_102016

As shown in the illustration, the component labeled "H" would be identified as a _____. Illustration MO-0128
main condensate pump

Illustrations: MO0128_WM_102016

A schematic diagram of an isochronous hydraulic governor is shown in the illustration. When the load is removed the speed increases, and the _____. Illustration MO-0100
pilot valve (piece 10) moves upward

Illustrations: MO0100_WM_101918

The pneumatic circuit shown in the illustration is part of a complex large low speed engine control system. Which of the following statements describes the function of this circuit? Illustration MO-0117

Valve D, when depressed, allows the retained pneumatic pressure within the shut-down servo motor to be relieved.

Illustrations: MO0117_WM_102218

In the illustrated auxiliary diesel engine governor, decreasing the distance between piece #6 and piece #10 will affect the engine by _____. Illustration MO-0094

increasing the speed

Illustrations: MO0094_WM_101918, MO0094_WM_081516, MO0094

See REF2346

The governor for an emergency diesel generator is shown in the illustration. When a large change in load results in a change in engine speed, which of the parts listed will be the FIRST governor component to react to the change in load? Illustration MO-0094

Piece #9

Illustrations: MO0094_WM_101918, MO0094_WM_081516, MO0094

See REF2346

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Illustration MO-0094

Piece #9

Illustrations: MO0094_WM_101918, MO0094_WM_081516, MO0094

See REF2346

If governor Item #19 in the illustration were to break on a diesel engine operating under full load, the engine RPM will _____.

Illustration MO-0095

decrease to a slightly lower value

Illustrations: MO0095_WM_081716

Which of the following statements is correct concerning the operating function of the governor shown in the illustration?

Illustration MO-0096

Excess oil under high pressure is released from the spring loaded accumulators to the sump.

Illustrations: MO0096_WM_101918

Which of the following statements is correct concerning the operating function of the governor shown in the illustration?

Illustration MO-0096

Excess oil under high pressure is released from the spring loaded accumulators to the sump.

Illustrations: MO0096_WM_101918

Increasing the oil pressure acting on the power piston of the hydraulic governor shown in the illustration will _____.

Illustration MO-0092

increase the governor output power

Illustrations: MO0092_WM_101918

The function of the synchronizing motor on the generator governor illustrated is to _____.

provide remote control for speed adjustment

Illustrations: MO0092_WM_101918

The governor, shown in the illustration, will have its preset speed droop altered whenever _____. Illustration MO-0092

the speed droop lever fulcrum is changed

Illustrations: MO0092_WM_101918

As the load is being decreased on the engine controlled by the governor shown in the illustration, the _____. Illustration MO-0092

right hand end of the floating lever will move up

Illustrations: MO0092_WM_101918

How is lubrication provided to the device shown in the illustration? Illustration MO-0120

The lube oil enters through the supply pipes shown as #11 and eventually drains to the main engine sump.

Illustrations: MO0120_WM_102218

What type of bearing is shown in the illustration? Illustration MO-0120

Michell bearing

Illustrations: MO0120_WM_102218

What prevents the thrust bearing blocks shown in the illustration from rotating within the housing? Illustration MO-0120

Found within the thrust bearing cap or cover are extended protrusions to position the thrust shoe segments and maintain minimum clearance.

Illustrations: MO0120_WM_102218

The symbol with the output 'ee' shown in the illustration, is properly called a blocking valve. Which of the following statements describes its function when incorporated into a slow speed diesel engine pneumatic control circuit? Illustration MO-0116

The device is used to interrupt the pneumatic signal to port "A" of the distributor shown in illustration MO-0053.

Illustrations: MO0116WM_101116, MO0053_AO_040115WM, MO0053

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Illustrations: MO0116WM_101116, MO0053_AO_040115WM, MO0053

The pneumatic circuit shown in the illustration is part of a control system used with large low speed diesel engines. The arrangement may be used to control _____. Illustration MO-0118

main engine speed

Illustrations: MO0118_WM_092216

The circuit shown in the illustration represents a/an _____. Illustration MO-0115

detented, control air pressure, reducing and filtering unit

Illustrations: MO0115_WM_102218

See REF2337

Which of the operating positions, for valve "A" shown in the illustration, should be chosen to maintain the circuit in continuous flow, regardless of failure to the included downstream components? Illustration MO-0115

2

Illustrations: MO0115_WM_102218
See REF2337

Which of the following statements describes the function of the device labeled "C" shown in the illustration? Illustration MO-0115

The regulator, or pressure reducer, drops the supply pressure to the desired operating level.

Illustrations: MO0115_WM_102218
See REF2337

The device represented by the symbol "B" in the illustration is used to _____. Illustration MO-0115
remove most contaminants present in the air supply

Illustrations: MO0115_WM_102218
See REF2337

Regarding the turbocharger shown in the illustration, the part labeled "B" would be attached to the _____. Illustration MO-0080
after cooler inlet

Illustrations: MO0080_WM_071416, MO0080B_WM

The section of the turbocharger which would be connected to the aftercooler inlet is labeled _____. Illustration MO-0080
B

Illustrations: MO0080_WM_071416, MO0080B_WM

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after cooler inlet

Illustrations: MO0080_WM_071416, MO0080B_WM

When inspecting the valve mechanism shown in the illustration, normal maintenance would include _____. Illustration MO-0074
measuring the cold valve clearance between components "C" and "D"

Illustrations: MO0074_WM_101918

Which of the following statements would apply when checking the valve clearance of the unit shown in the illustration? Illustration MO-0074

Cold valve clearance is measured between components "C" and "D".

Illustrations: MO0074_WM_101918

Item labeled "L" as shown in section 6 of the illustration is identified as the _____. Illustration MO-0025
after cooler

Illustrations: MO0025_WM_131419

See REF2329

Air scavenging of the cylinder shown in the illustration begins between figures _____. Illustration MO-0025
3 and 4

Illustrations: MO0025_WM_131419

See REF2329

What is the primary purpose of the pneumatic component shown in the illustration? Illustration MO-0119
If the throttle is manually moved from its 'zero' position, the resulting effect will tend to override the output of the governor, and secure the air to the control circuit.

Illustrations: MO0119_WM_102218

The governor utilized with the device shown in the illustration has become inoperative while the vessel is underway at sea. Which of the following statements describes what action should be taken? Illustration MO-0119

The engine speed can be controlled using the fuel control lever without changing the position of the maximum fuel stop.

Illustrations: MO0119_WM_102218

If the input signal rises above the set point of '17A', shown in the illustration, but remains below the set point of '17B', the output from '22A' will _____.

Illustration MO-0114
indicate a pressure on '67B' equal to the set point of '17A'

Illustrations: MO0114_WM_102218

A propulsion engine, using the speed control circuit shown in the illustration, fails to function at speeds lower than the low end of the critical speed range. Which of the following statements describes what should be done to correct this malfunction? Illustration MO-0114

Device 17A needs to be replaced, repaired, or reset to the setpoint coinciding with the RPM value for the low end of the critical speed range.

Illustrations: MO0114_WM_102218

Which of the following statements describes the operation of the circuit shown in the illustration? Illustration MO-0114

The output from "2" is equal to the input to "1" except when the input of "1" is between the set points of '17A' and '17B', when it will remain at the value of '17A'.

Illustrations: MO0114_WM_102218

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Illustrations: MO0114_WM_102218

The gear drive, shown in the illustration, can have the backlash determined best by using a _____. Illustration MO-0091

feeler gauge

Illustrations: MO0091_WM_101918

After removing the bowl hood of the device shown in the illustration, excessive quantities of sludge are visible. Which of the following statements represents the approach to rectify the situation? Illustration MO-0112

Disassemble the entire unit, clean all components, replace any defective gaskets and use the proper lubricants where required.

Illustrations: MO0112_WM_042419

When tightening the lock ring "G" of the device shown in the illustration, two events are simultaneously accomplished. Which of the following statements represents these events? Illustration MO-0112

When tightened, the lock ring allows for movement of the sliding piston and positions the sliding piston within the bowl bottom.

Illustrations: MO0112_WM_042419

In the engine shown in the illustration, the part labeled 'W' is cooled by _____. Illustration MO-0003

seawater

Illustrations: MO0003_WM_030322

The diesel engine shown in the illustration, which of the lettered parts listed is cooled by sea water? Illustration MO-0003

W

Illustrations: MO0003_WM_030322

The large, slow-speed, main propulsion diesel engine shown in the illustration, the part labeled 'B' contains _____. Illustration MO-0003

water

Illustrations: MO0003_WM_030322

The diesel engine shown in the illustration, is provided with an auxiliary blower to _____. Illustration MO-0003

provide scavenge air pressure at low load

Illustrations: MO0003_WM_030322

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Illustrations: MO0116WM_101116, MO0053_AO_040115WM, MO0053

Which of the following statements describes the primary reason for the device shown in the illustration to be incorporated into the air start system? Illustration MO-0116

The unit shown is used to prevent starting of the main engine when the turning gear is engaged.

Illustrations: MO0116WM_101116

What device is installed and used as a safety feature to satisfy Coast Guard regulations for the unit shown in the illustration? Illustration MO-0116

Electrical limit switch

Illustrations: MO0116WM_101116

See REF2347

In the reversing reduction gear shown in the illustration, the forward and reverse main pinions are in constant mesh with the main gear. This means the _____ . Illustration MO-0085

idling gears rotate in a direction opposite to their rotation when carrying load

Illustrations: MO0085_WM_101918

In the water level electrode assembly, shown in the illustration, the feed pump should restart when the level of the water reaches the position indicated by arrow _____ . Illustration MO-0047

C

Illustrations: MO0047_WM_101818

When installing the bearing cap on the device shown in the illustration, which of the precautions listed must be observed? Illustration MO-0121

Once the bearing cap is properly torqued, measure the end gap dimensions to ascertain even tightening of the cap.

Illustrations: MO0121_WM_102218

What is the maximum allowable clearance permitted between the bearing, shown in the illustration and the shaft along its vertical axis? Illustration MO-0121

0.80 mm

Illustrations: MO0121_WM_102218

What is the normal bearing clearance permitted at the horizontal axis of the shaft for the bearing shown in the illustration? Illustration MO-0121

The normal play on both sides of the shaft will be one tenth of a millimeter.

Illustrations: MO0121_WM_102218

After following the prescribed procedures to measure the thrust bearing clearance shown in the illustration, the distance "F" is determined to be 200 mm, and 'f1' is 2.3 mm. Which of the following statements describes the condition indicated by these dimensions? Illustration MO-0121

It is possible for the shaft to move axially 2.3 mm during astern operation and relates to an excess movement of 1.3 mm, 0.3 mm beyond the maximum worn play.

Illustrations: MO0121_WM_102218

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Illustrations: MO0121_WM_102218

The thrust bearing shown in the illustration has over eight years of ahead running time. Measurements show "i1" is 4 mm and "i2" is 1mm. Which of the following conditions is indicated and what steps should be taken, if any? Illustration MO-0121

No appreciable wear has occurred, and the proper maintenance procedures should continue to be followed.

Illustrations: MO0121_WM_102218

The main engine thrust bearing shown in the illustration contains how many thrust shoes? Illustration MO-0121
12

Illustrations: MO0121_WM_102218

Which of the operating characteristics listed is correct concerning the blower shown in the illustration? Illustration MO-0082
Air delivery is approximately proportional to engine speed.

Illustrations: MO0082_WM_101918, MPCA09_WM_030118
See REF2274

Which of the operating characteristics listed is correct concerning the blower shown in the illustration? Illustration MO-0082
Air delivery is approximately proportional to engine speed.

Illustrations: MO0082_WM_101918, MPCA09_WM_030118
See REF2274

The starter control valve in the hydraulic system shown in the illustration is malfunctioning. Before removing the valve, you must first _____. Illustration MO-0049
bleed off all accumulator pressure in "E"

Illustrations: MO0049_WM_101818, MPSR05_WM_03_18_15
See REF2279

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Illustration MO-0049

bleed off all accumulator pressure in "E"

Illustrations: MO0049_WM_101818, MPSR05_WM_03_18_15

See REF2279

The thermostatic valve in the illustration is used for controlling the coolant temperature in a main propulsion diesel engine. Which of the following can be used to verify proper valve operation with the valve disassembled? Illustration MO-0079

Place the thermostatic element in a container of water at various operating temperatures and note the movement of the valve stem.

Illustrations: MO0079_WM_101918

The items labeled "21" and "22", shown in the illustration are used to remove _____.

non-condensable gases and brine

Illustrations: MO0111_WM_102218

What occurs within the tubes of the device labeled "23" shown in the illustration? Illustration MO-0111

The feed water flowing through the inside of the tubes is being heated by the jacket water on the outside of the tubes.

Illustrations: MO0111_WM_102218

Which of the following statements describes what will occur to the volume of water vapor as it is exposed to the lower temperatures existing in the device labeled "24" shown in the illustration? Illustration MO-0111

The volume is greatly reduced, contributing to condensation within the condenser.

Illustrations: MO0111_WM_102218

Device "27" shown in the illustration is used to _____.

regulate maximum vacuum during normal operation

Illustrations: MO0111_WM_102218

Which of the valve arrangements listed would be correct for operating the distillation plant shown in the illustration?

Illustration MO-0111

Valves "J", "K", "L", "M" open, valves "D" and "H" closed.

Illustrations: MO0111_WM_102218

Excess brine accumulated in the distiller, shown in the illustration, is removed during normal operation by _____.

Illustration MO-0111

the continuous action of ejector "22"

Illustrations: MO0111_WM_102218

During operation which device listed removes air and non-condensable gases from the unit shown in the illustration?

Illustration MO-0111

"21"

Illustrations: MO0111_WM_102218

The gage glass on a coil-type auxiliary boiler is connected to the _____.

accumulator

See REF325

With which of the following types of diesel engine arrangements is a waste heat boiler most likely to produce the maximum steam pressure, temperature, and flow conditions?

Supercharged, four-stroke/cycle diesel engine

Burner ignition failure in an automatically fired auxiliary boiler would be caused by _____.

a burned out solenoid in the oil supply valve

When checking for the presence of sulfite in the feed water of an auxiliary boiler, you are in essence checking _____.

to ensure the compound additions are adequate for controlling dissolved oxygen

See REF2351

In a turbocharger, inlet air velocity is increased in the _____.

rotating impeller vanes

When running a large, dual fuel, main propulsion diesel engine on heavy fuel, which of the following precautions should be observed when switching from heavy fuel oil to diesel oil?

The temperature of the fuel from the preheater should be gradually reduced after switching over the three-way valve.

If a tube ruptures in a water-tube auxiliary boiler due to low water, you should _____.

secure both the fires and the feed inlet valve

As a general rule, what would be the recommended operating water jacket outlet temperature range for medium speed marine diesels set up with closed treated fresh water cooling systems and fitted with vented expansion tanks?

165° to 180°F

See REF2339

A diesel engine with a full speed of 1000 RPM drives a propeller at 300 RPM. What is the speed reduction ratio?

3.33 to 1

Exhaust pipes for separate main propulsion diesel engines can be combined only when _____.

they are arranged to prevent gas backflow to each engine

The purpose of the compensating adjustment used in a diesel engine hydraulic governor is to _____.

prevent governor hunting

If the speeder spring of a main propulsion diesel engine governor breaks while operating at full load, the engine RPM will _____.

decrease to a slightly lower value

Downcomers installed on auxiliary package boilers are protected from direct contact with hot gases by _____.

refractory and insulation

See REF2136

Waste heat boilers may be equipped with vents on the feedwater heater heads to _____.

prevent air binding

In the event of a flame failure in an auxiliary water-tube boiler, you must _____.

purge the furnace of any combustible gases before attempting to relight the fire

Before any work is done on a burner in an automatically fired auxiliary boiler, you should always _____.
close all manually operated fuel valves

A diesel generator governor is hunting. After changing the oil, the governor is flushed and the compensation needle valve is adjusted, but the hunting persists. You should NOW _____.
carefully check for binding in the governor linkage
See REF2336

Air is normally bled from a diesel engine fuel system by _____.
loosening the compression nuts at the injectors

What is the best way of stopping an over speeding diesel engine?
Secure the fuel supply and block the air intake

In a diesel engine closed freshwater cooling system, the cooling water pressure drop through the engine is 10 psig, and the pressure drop through the heat exchanger is 4 psig at maximum flow rates. The cooling water pump must produce a discharge head of at least _____.
15 psig

One of the factors limiting the amount of load which can be put on a modern marine diesel engine is the _____.
exhaust temperature

The hunting of a diesel engine may be caused by _____.
low governor power

Coast Guard Regulations (46 CFR Part 56) require steel tubing connections and fittings used with diesel fuel oil systems, to be either flared or _____.
of the flareless nonbite type
See REF2348

Which of the following statements concerning fire-tube boilers is correct?
Combustion gases flow through the tubes.

Casing drains may be required on a waste heat boiler gas passage side to _____.
drain off condensation

A burner producing black smoke in an automatic auxiliary boiler, would be caused by a/an _____.
incorrect primary air setting

Before any work is to be carried out on a burner in an automatically fired auxiliary boiler, you should always _____.
close all manually operated fuel valves

REF2136

The Steam and Water Drum is made from a Wrapper Sheet (A) and a Tube Sheet (K). The tube sheet is pierced by different type of boiler tubes. It is thicker than the wrapper sheet to compensate for the strength lost due to the boiler tube holes in it. Air for the furnace's fire is supplied through the Air Intake(B). The Water Wall Header (C) supplies water to the water walls. (D) are the back Water Wall tubes that return to the drum. The Downcomers (E) supply water to the Mud Drum (I) that is actually a header to supply water to Generating (F) and Screen (J) Tubes. The Superheater (G) heats steam taken from the drum. The resulting steam is "superheated. " The Economizer (H) heats feed water going into the drum.

REF2159

Zinc, when used as a sacrificial anode, reduces and controls electrolysis (i.e., electrolytic action) in a heat exchanger.

REF2274

A Roots-type mechanical blower is classified as a positive-displacement air pump. A positive displacement pump is a pump in which a measured quantity of fluid (in this case, air) is entrapped in a closed space and its pressure is raised. The lobes in the Roots blower trap the air and compress it when discharged into the "air box."

REF2279

Bleed all pressure from the system before opening any part to service or repair a hydraulic starting system.

REF2286

Knurling - A method of placing ridges in a surface, thereby forcing the areas between these ridges to rise.

REF2302

Control and safety devices for marine diesel engine The principal control device on any engine is the governor. It governs or controls the engine speed at some fixed value while power output changes to meet demand. This is achieved by the governor automatically adjusting the engine fuel pump settings to meet the desired load at the set speed. Governors for diesel engines are usually made up of two systems: a speed sensing arrangement and a hydraulic unit which operates on the fuel pumps to change the engine power output. Mechanical governor A flyweight assembly is used to detect engine speed. Two flyweights are fitted to a plate or ballhead which rotates about a vertical axis driven by a gear wheel . The action of centrifugal force throws the weights outwards; this lifts the vertical spindle and compresses the spring until an equilibrium situation is reached. The equilibrium position or set speed may be changed by the speed selector which alters the spring compression. As the engine speed increases the weights move outwards and raise the spindle; a speed decrease will lower the spindle. The hydraulic unit is connected to this vertical spindle and acts as a power source to move the engine fuel controls. A piston valve connected to the vertical spindle supplies or drains oil from the power piston which moves the fuel controls depending upon the flyweight movement. If the engine speed increases the vertical spindle rises, the piston valve rises and oil is drained from the power piston which results in a fuel control movement. This reduces fuel supply to the engine and slows it down. It is, in effect, a proportional controller . The actual arrangement of mechanical engine governors will vary considerably but most will operate as described above. Electric governor The electric governor uses a combination of electrical and mechanical components in its operation. The speed sensing device is a small magnetic pick-up coil. The rectified, or d.c., voltage signal is used in conjunction with a desired or set speed signal to operate a hydraulic unit. This unit will then move the fuel controls in the appropriate direction to control the engine speed. Governors and Over-speed Trips These must be fully operational and regularly tested in accordance with manufacturers' instructions. Attention is drawn to the testing of over speed trip and protection devices. The condition of the linkage coupling the engine's fuel pump actuating levers and the governor is also to be regularly examined. The governor cannot compensate for either seized fulcrum pins or excessive clearances.

REF2328

When oil vapor, oxygen, and hot spots occurring at the same time, they can cause a crankcase explosion. The purpose of crankcase explosion vent (Illustration MO-OI05) is to protect the engine crankcase from overpressure damage in an explosion. Do not open crankcase inspection covers after an engine stops as a result of piston seizure caused by severe overheating until the engine cools. Opening an inspection cover invites a crankcase explosion as fresh air pours into the crankcase.

REF2329

"Scavenging" replaces the products of combustion that linger in a cylinder after it receives a charge of fresh air. On a two stroke engine scavenging is accomplished by a mechanical blower since the engine has no intake or exhaust stroke to remove these gases .

REF2335

The Roots type supercharger or Roots blower is a positive displacement lobe pump which operates by pumping a fluid with a pair of meshing lobes not unlike a set of stretched gears. Fluid is trapped in pockets surrounding the lobes and carried from the intake side to the exhaust. It is frequently used as a supercharger in engines, where it is driven directly from the engine's crankshaft via a belt, chain, or gears.

REF2336

Diesel engine speed is controlled solely by the amount of fuel injected into the engine by the injectors. Because a diesel engine is not self-speed-limiting, it requires not only a means of changing engine speed (throttle control) but also a means of maintaining the desired speed. The governor provides the engine with the feedback mechanism to change speed as needed and to maintain a speed once reached. A governor is essentially a speed-sensitive device, designed to maintain a constant engine speed regardless of load variation. Since all governors used on diesel engines control engine speed through the regulation of the quantity of fuel delivered to the cylinders, these governors may be classified as speed-regulating governors. As with the engines themselves there are many types and variations of governors. The major function of the governor is determined by the application of the engine. In an engine that is required to come up and run at only a single speed regardless of load, the governor is called a constant-speed type governor. If the engine is manually controlled, or controlled by an outside device with engine speed being controlled over a range, the governor is called a variable-speed type governor. If the engine governor is designed to keep the engine speed above a minimum and below a maximum, then the governor is a speed-limiting type. The last category of governor is the load limiting type. This type of governor limits fuel to ensure that the engine is not loaded above a specified limit. Note that many governors act to perform several of these functions simultaneously.

REF2337

DETENT: A spring device which maintains the spool of a directional control valve in position.

REF2338

"The water cooling of the exhaust manifold ... prevents excessive heating of the air in the Engine room."

REF2339

Note: As a general rule, closed treated freshwater cooling systems are maintained at a temperature as high as practical for thermal efficiency purposes while minimizing the risk for boil-over. 105° to 120° F : Incorrect answer. Although very unlikely to boil over, this temperature would produce comparatively very low thermal efficiency. 135° to 150° F : Incorrect answer. Although unlikely to boil over, this temperature would produce comparatively low thermal efficiency. 165° to 180° F : Correct answer. This temperature would produce comparatively high thermal efficiency and is unlikely to boil over. 195° to 215° F : Incorrect answer. Although this temperature would produce comparatively very high thermal efficiency, it is very likely to boil over.

REF2340

The expansion tank maintains a constant head (i.e., pressure) on the cooling system and provides room for changes in the volume of coolant (i.e., water and chemical mi) with changes in its temperature. Any rapid drop in the water level of an expansion tank normally indicates a leak in the primary engine cooling system (i.e., the jacket coolant). Leakage anywhere in the system results in loss of the jacket water coolant, as long as the jacket water pressure remains higher than the cooling water pressure.

REF2341

Jacket water temperature normally increases 10°F to 20°F as it passes through a diesel engine.

REF2342

Helical gears produce smoother power transmission and less noise than spur gears. Double helical cut gears reduce end thrust and noise. Helical reduction gears have surfaces of several different teeth that mesh at the same time. This provides smooth, continuous power transmission and reduces noise. Helical gears are also best suited for medium speed main propulsion engines.

REF2343

Reduction gear casings are vented to avoid the buildup of pressure .

REF2344

The exhaust system of a turbocharged engine discharges exhaust gases and smoke, reduces engineroom noise, and powers the turbocharger.

REF2345

A manometer is a device that measures air pressure using a container with a "U"-shaped tube open at one or both ends. ... The height of the fluid on the open side will be higher on that side when air pressure is less than the gas pressure and lower on the open side when the air pressure exceeds the gas pressure.

REF2346

Apparently the new illustration did not contain the same info as the old so I have put the old one back in to go with it.

REF2347

46 CFR 62.35-50 , ABS 4-9-2 table 1, page 645, CFR 62.25-5 Limit switch = a switch designed to cut off power automatically at or near the limit of travel of a moving object controlled by electricity.

REF2348

46 CFR 56.50-60(d)(3)(i)

REF2349

56.50–75 Diesel fuel systems.

REF2350

A boiler feedwater pump is a specific type of pump used to pump feedwater into a steam boiler. The water may be freshly supplied or returning condensate produced as a result of the condensation of the steam produced by the boiler. These pumps are normally high pressure units that take suction from a condensate return system and can be of the centrifugal pump type or positive displacement type.

REF2351

Note: Boiler water treatment chemicals include phosphates that control hard scale. Caustic soda controls pH and sulfites control oxygen pitting corrosion. The reserve sulfite test is used to determine if adequate sulfite is present to control dissolved oxygen. Since sulfites increase the dissolved content of the boiler water and decompose into acidic gases at high temperatures, use is generally limited to boiler pressures below 600 psi. Hydrazine is commonly utilized for boiler pressures above 600 psi.

REF325

An "accumulator" contains hydraulic oil under pressure and is ready to do "work". An accumulator is an "unfired pressure vessel" (i.e., one that does not use an outside source of heat) in which energy is stored at high pressure in the form of a gas or a gas and hydraulic fluid. An example of an accumulator would be a tank that stores hydraulic fluid under pressure that, when released, can be used to start a lifeboat engine. Such an accumulator can be designed to recharge itself as the engine runs (assuming that the engine will run) or can be recharged manually by using a hand pump.