AIR SHUTTER ADJUSTMENT

If the burner flame exhibits flame lifting and/or noise, do the following:

1. Use a screw driver to loosen the air shutter screw.
2. Adjust the air shutter by rotating the shutter. Counter clockwise to close and Clockwise to open.
   a. Close air shutter - to prevent noisy flames that are lifting from the burner ports.
   b. Open air shutter – to reduce yellow tipping of the flame. (A small number of yellow tips can be normal to LP gases.)
3. Tighten the air shutter screw to secure the air shutter.

See ***Adjusting the Air Shutter*** (page 10).

HOUSEKEEPING

Vacuum around base of water heater for dust, dirt, and lint on a regular basis.

INSTALLED IN SUITABLE AREA: To ensure sufficient ventilation and combustion air supply, proper clearances from the water heater must be maintained. See ***Facts to Consider About the Location*** (page 9). Combustible materials such as clothing, cleaning materials, or flammable liquids, etc. must not be placed against or adjacent to the water heater which can cause a fire.

ANODE ROD INSPECTION

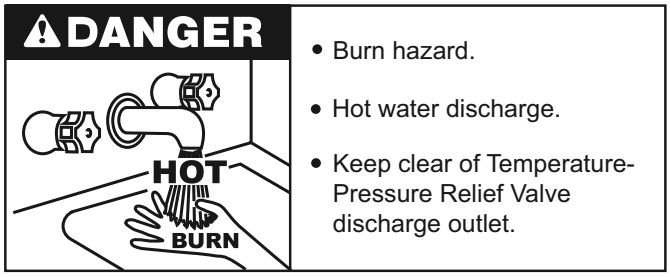
Remove and inspect the anode rod. See ***Figure 1*** (page 7) for location of the anode rod. Replace the anode rod if it is depleted.

Anode rods from new (top) to partially depleted (middle) to fully depleted stage (bottom).

FIGURE 18. Anode Depletion

The anode rod is a sacrificial metal rod that helps reduce corrosion and premature failure (leaks) in the tank. The anode rod is a consumable item. Inspect the anode rod after the first six months of operation or when you drain and flush the tank. Replace the anode rod if it is substantially worn out or depleted. Thereafter, inspect the anode rod annually or more frequently if needed. If you use a water softener, your anode rod will deplete faster than normal. Inspect the anode rod more frequently, replacing the anode rod as needed. Obtain new anode rods from your local plumbing supplier or have a qualified person replace it. (Anode rods are a consumable item and are not covered under warranty).

TEMPERATURE-PRESSURE RELIEF VALVE TEST



It is recommended that the temperature-pressure relief valve should be checked to ensure that it is in operating condition every 6 months.

When checking the temperature-pressure relief valve operation, make sure that (1) no one is in front of or around the outlet of the temperature-pressure relief valve discharge line, and (2) that the water discharge will not cause any property damage, as the water may be extremely hot. Use care when operating valve as the valve may be hot.

To check the relief valve, lift the lever at the end of the valve several times, see ***Figure 22***. The valve should seat properly and operate freely.

If after manually operating the valve, it fails to completely reset and continues to release water, immediately close the cold water inlet to the water heater and drain the water heater, see “Draining and Flushing” (page 29). Replace the temperature-pressure relief valve with a properly rated/sized new one, see ***Temperature-Pressure Relief Valve*** (page 15) for information on replacement.

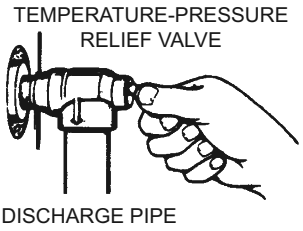


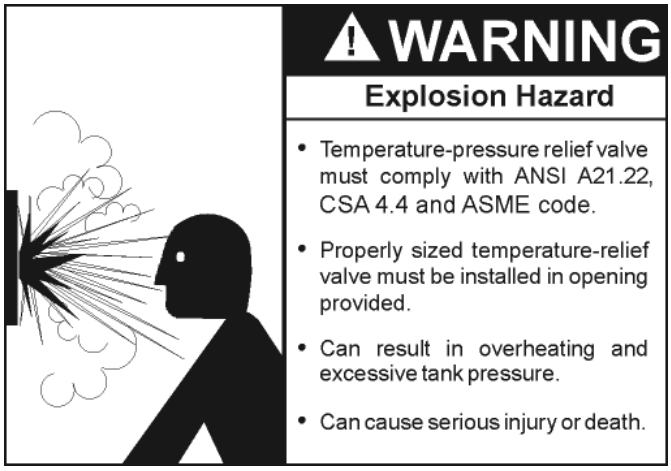
FIGURE 22. CHECKING THE RELIEF VALVE

If the temperature-pressure relief valve on the water heater weeps or discharges periodically, this may be due to thermal expansion.

NOTE: Excessive water pressure is the most common cause of temperature-pressure relief valve leakage. Excessive water system pressure is most often caused by thermal expansion in a "closed system." See ***Closed Water Systems*** (page 14) and ***Thermal Expansion*** (page 14). The temperature-pressure relief valve is not intended for the constant relief of thermal expansion.

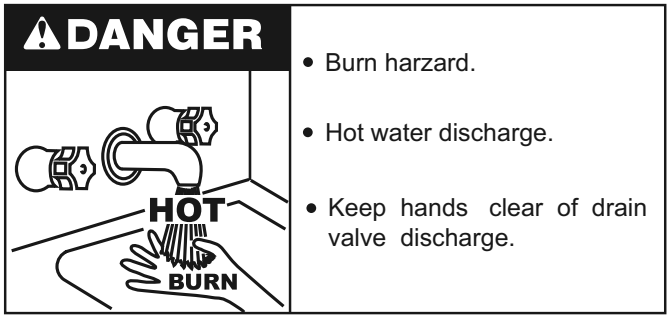
Temperature-pressure relief valve leakage due to pressure build up in a closed system that does not have a thermal expansion tank installed is not covered under the limited warranty. Thermal expansion tanks must be installed on all closed water systems.

DO NOT PLUG THE TEMPERATURE-PRESSURE RELIEF VALVE OPENING. THIS CAN CAUSE PROPERTY DAMAGE, SERIOUS INJURY OR DEATH.



DRAINING AND FLUSHING

It is recommended that the water heater storage tank be drained and flushed every 6 months to reduce sediment buildup. The water heater should be drained if being shut down during freezing temperatures. See ***Figure 25*** for the location of the water heater components described below.



TO DRAIN THE WATER HEATER STORAGE TANK:

1. Turn off the gas supply at the Main Gas Shutoff Valve if the water heater is going to be shut down for an extended period.
2. Ensure the cold water inlet valve is open.
3. Open a nearby hot water faucet and let the water run until the water is no longer hot.
4. Close the cold water inlet valve to the water heater.
5. Connect a hose to the water heater drain valve and terminate it to an adequate drain.
6. Open the water heater drain valve and allow all the water to drain from the storage tank.
7. Close the water heater drain valve when all water in the storage tank has drained.
8. Close the hot water faucet opened in Step 4.
9. If the water heater is going to be shut down for an extended period, the drain valve should be left open.

TO FLUSH THE WATER HEATER STORAGE TANK:

1. Ensure the cold water inlet valve is open.
2. Open a nearby hot water faucet and let the water run until the water is no longer hot. Then close the hot water faucet.
3. Connect a hose to the drain valve and terminate it to an adequate drain.
4. Ensure the drain hose is secured before and during the entire flushing procedure. Flushing is performed with system water pressure applied to the water heater.
5. Open the water heater drain valve to flush the storage tank.
6. Flush the water heater storage tank to remove sediment and allow the water to flow until it runs clean.
7. Close the water heater drain valve when flushing is completed.
8. Remove the drain hose.
9. Fill the water heater - see ***Filling the Water Heater*** (page 16) .
10. Turn on the gas supply to the water heater at the Main Gas Shutoff Valve.
11. Allow the water heater to complete several heating cycles to ensure it is operating properly.

LEAKAGE TEST POINTS

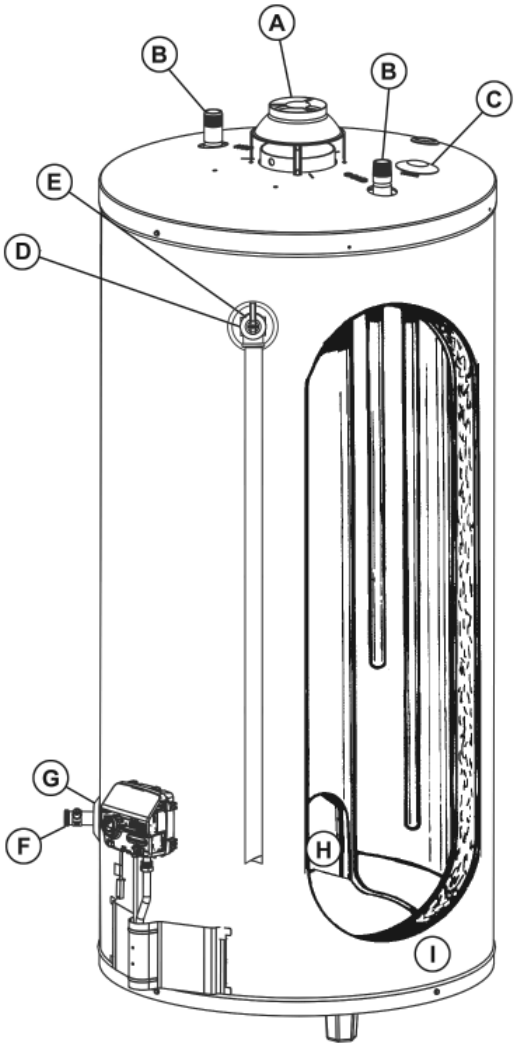
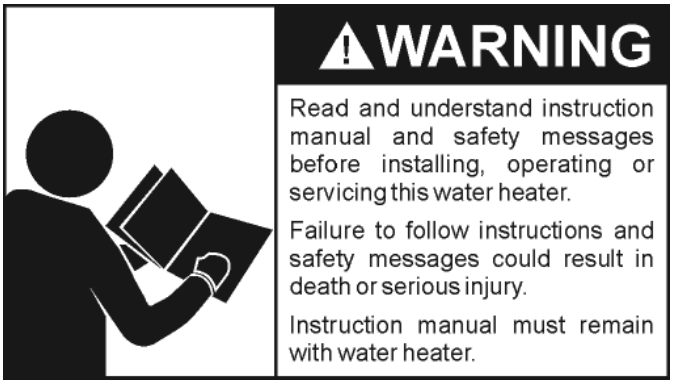


FIGURE 25. WATER HEATER COMPONENTS



A. Water at the draft hood is water vapor which has condensed out of the combustion products. This is caused by a problem in the vent. Contact the gas utility.

B. *Condensation may be seen on pipes in humid weather or pipe connections may be leaking.

C. *The anode rod fitting may be leaking.

D. Small amounts of water from temperature-pressure relief valve may be due to thermal expansion or high water pressure in your area.

E. *The temperature-pressure relief valve may be leaking at the tank fitting.

F. Water from a drain valve may be due to the valve being slightly opened.

G. *The drain valve may be leaking at the tank fitting.

H. Combustion products contain water vapor which can condense on the cooler surfaces of the tank. Droplets form and drip onto the burner or run on the floor. This is common at the time of start-up after installation and when incoming water is cold.

I. Water in the water heater bottom or on the floor may be from condensation, loose connections, or the relief valve. DO NOT replace the water heater until a full inspection of all possible water sources is made and necessary corrective steps taken.

*To check where threaded portion enters tank, insert cotton swab between jacket opening and fitting. If cotton is wet, follow the instructions in Draining and Flushing (page 29) and then remove fitting. Put pipe dope or thread sealant tape on the threads and replace. Then follow the instructions in ***Filling the Water Heater*** (page 16).

SERVICE

Before calling for repair service, read the “Start Up Conditions” and “Operational Conditions” found in the “For Your Information” section of this manual.

If a condition persists or you are uncertain about the operation of the water heater contact a service agency. If you are not thoroughly familiar with gas codes, your water heater, and safety practices, contact your gas supplier or qualified installer to check the water heater.

Use the ”Leakage Checkpoints” guide to check a “leaking” water heater. Many suspected leaks are not leaking tanks. Often the source of the water can be found and corrected.

Read this manual first. Then before checking the water heater make sure the gas supply has been turned OFF, and never turn the gas ON before the tank is completely full of water.

Never use this water heater unless it is completely filled with water. To prevent damage to the tank, the tank must be filled with water. Water must flow from the hot water faucet before turning “ON” gas to the water heater.

Read this manual first. Then before checking the water heater make sure the gas supply has been turned “OFF”, and never turn the gas “ON” before the tank is completely full of water.

Never use this water heater unless it is completely filled with water. To prevent damage to the tank, the tank must be filled with water. Water must flow from the hot water faucet before turning “ON” gas to the water heater.

Leakage from other appliances, water lines, or ground seepage should also be checked.

REMOVING AND REPLACING THE GAS CONTROL VALVE/THERMOSTAT

IMPORTANT: Use only factory authorized replacement parts. *This gas control valve/thermostat is shipped from the factory as a natural gas unit. However, it may be converted to use LP gas. Before installing this gas control valve/thermostat, make sure that it is configured for the type of gas that you are using.*

REMOVING THE GAS CONTROL VALVE/THERMOSTAT:

1. Turn the gas control/temperature knob to the OFF position. See ***Figure 20*** (page 25).
2. Turn off the gas at the manual shut-off valve on the gas supply pipe.
3. Drain the water heater. Follow the instructions in Draining and Flushing (page 29).
4. Disconnect the igniter wire from the igniter lead wire. Use needle nose pliers to disconnect the red (+) and white (-) thermopile wires. Disconnect the pilot tube (7/16” wrench) and manifold tube (3/4” wrench) at the gas control valve/thermostat. See ***Figure 23*** (page 32).

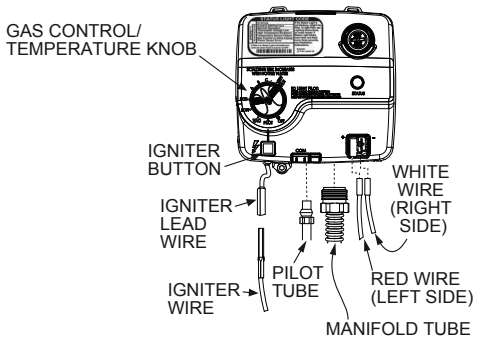


FIGURE 23. GAS CONTROL VALVE REMOVAL

5. Referring to ***Figure 24*** (page 32), disconnect the ground joint union in the gas piping.
6. Disconnect the remaining pipe from the gas control valve/thermostat.

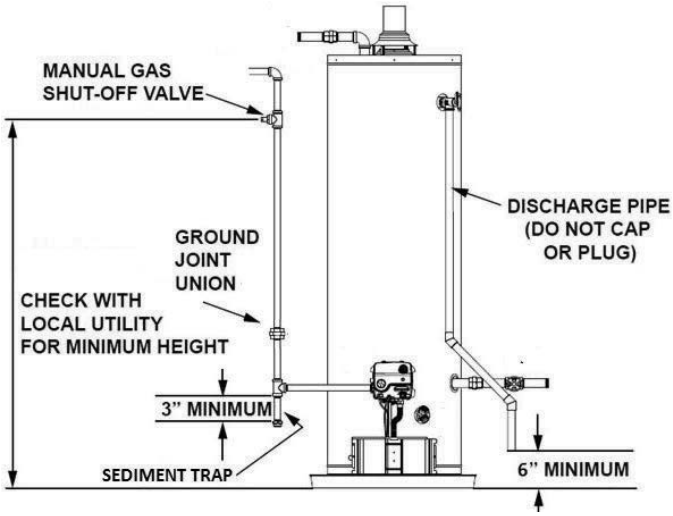


FIGURE 24. PIPING CONFIGURATION

7. To remove the gas control valve/thermostat, thread a 4” section of gas pipe into the gas inlet and use it to turn the gas control valve/thermostat (counterclockwise.) Do not use a pipe wrench or equivalent to grip body. Damage may result, causing leaks. Do not insert any sharp objects into the inlet or outlet connections. Damage to the gas control valve/thermostat may result.

REPLACING THE GAS CONTROL VALVE/THERMOSTAT:

1. To replace the gas control valve/thermostat, reassemble in reverse order. When replacing the gas control valve/thermostat, thread a 4” section of gas pipe into the inlet and use it to turn the gas control valve/thermostat (clockwise). DO NOT OVER TIGHTEN; damage may result.

2. Be sure to use approved thread sealant tape or pipe joint compound on the gas piping connections and fitting on the back of the gas control valve that screws into the tank.

3. Be sure to remove the pilot ferrule nut from the new gas control valve/thermostat.

4. Turn the main gas supply on and check the gas supply connections for leaks. Correct any leak found. Next, light the pilot and main burner, then check the manifold tube and pilot tube connections for leaks. Correct any leak found. Use an approved noncorrosive leak detection solution. If such a solution is not available, use a mixture of hand dish washing soap and water (one part soap to 15 parts water) or childrens’ soap bubble solution. Bubbles forming indicate a leak.

Be sure tank is completely filled with water before lighting and activating the water heater. Follow the ***Lighting Instructions*** on the front of the water heater.

TABLE 5. STATUS LIGHT AND DIAGNOSTIC CODE TROUBLESHOOTING CHART

LED Status	Problem	Corrective Action
0 FLASHES (LED NOT LIT)	Pilot light is not lit or Thermopile has not yet reached normal operating temperature.	Turn Gas Control Valve/Thermostat knob to OFF. Wait 10 minutes, then attempt to relight Pilot by following the lighting instructions on the water heater's label. Until the Thermopile reaches its normal operating temperature, the Status Light will not blink, even if the Pilot is lit. It may take up to 90 seconds of continuous Pilot operation before the Thermopile reaches normal operating temperature and the Status Light starts to blink. If the Status Light does not blink after three lighting attempts, check to make sure unit is getting gas. Remove the outer door. Press reset button. Replace outer door. Turn Gas Control Valve/Thermostat knob to OFF. Wait 10 minutes, then attempt to light Pilot by following the lighting instructions on the water heater's label. Look through the view port for the Pilot flame. If Pilot is not visible, the spark igniter or gas supply to the Pilot should be checked. If the Pilot is visible and the Status Light does not blink after 90 seconds of continuous Pilot operation, the Pilot flame may not be heating the Thermopile sufficiently (weak Pilot), the Thermopile may be defective, or wiring connectors may be loose. **NOTE:** If the water heater has been operating but has stopped and will not re-light, check the flame-arrestor for signs of high temperature (blue or black) discoloration indicating a flammable vapor incident. If you suspect a flammable vapor incident has occurred, do not use this appliance. Immediately call a qualified technician to inspect the appliance. Water heaters subjected to a flammable vapors ignition will require replacement of the entire water heater.
LIGHT ON (SOLID)	Pilot light was recently extinguished and the Thermopile is cooling down.	Turn Gas Control Valve/Thermostat knob to OFF. Wait 10 minutes for the Thermopile to cool, then attempt to relight Pilot by following the lighting instructions on the water heater's label. NOTE: This gas control valve/thermostat has built-in circuitry that requires waiting 10 minutes between lighting attempts. Until the Thermopile reaches its normal operating temperature, the Status Light will not blink, even if the Pilot is lit. It may take up to 90 seconds of continuous Pilot operation before the Thermopile reaches normal operating temperature and the Status Light starts to blink
1 FLASH (EVERY 3 SECONDS)	Normal Operation	No corrective action necessary.
2 FLASHES	Pilot is lit but the Thermopile is not producing the required output voltage.	Turn Gas Control Valve/Thermostat knob to OFF. The Thermopile is probably defective, but loose wiring connections or a weak Pilot flame can also cause this symptom.
4 FLASHES	The Gas Control Valve's temperature sensor has detected that the water temperature was too high. Once this condition occurs, the Main Burner and the Pilot Light will be shut off. Since the Pilot light will be off, should this condition occur, this Flash Code will only be displayed immediately after the Pilot has been relit. Turn Gas Control Valve/Thermostat knob to OFF.	Relight pilot and verify 4 flashes. If 4 flashes are observed, turn Gas Control Valve/Thermostat knob to OFF. Turn Main Gas Supply OFF. Replace the Gas Control Valve/Thermostat. See ***Removing and Replacing the Gas Control Valve/Thermostat*** (page 32).

TABLE 5. STATUS LIGHT AND DIAGNOSTIC CODE TROUBLESHOOTING CHART		
LED Status	**Problem**	**Corrective Action**
5 FLASHES	The temperature sensor (thermistor) is defective.	Turn Gas Control Valve/Thermostat knob to OFF. Turn Main Gas Supply OFF. Replace the Gas Control Valve/Thermostat. See ***Removing and Replacing the Gas Control Valve/Thermostat*** (page 32).
7 FLASHES	Gas Control Valve failure.	Turn Gas Control Valve/Thermostat knob to OFF. Turn Main Gas Supply OFF. Replace the Gas Control Valve/Thermostat. See ***Removing and Replacing the Gas Control Valve/Thermostat*** (page 32).
8 FLASHES	This condition only appears if the gas control/temperature knob has been turned off and the thermopile continued to produce electric power. This condition can occur if the thermopile does not cool down as quickly as expected when the unit is shut off. This condition can also occur if the gas control/temperature knob has been turned off and the pilot continues to operate because the pilot valve is stuck in the open position.	Make sure that the gas control valve/thermostat knob is set to OFF. Wait one minute. Remove the outer door. Look through the sight glass for a pilot flame. If a pilot flame is observed with the gas control valve/thermostat knob set to the OFF position, the pilot valve is stuck open. Turn the main gas supply OFF. Replace the gas control valve/thermostat. For instructions, see ***Removing and Replacing the Gas Control Valve/Thermostat*** (page 32). If the pilot flame is not observed when the gas control valve/thermostat knob is set to the OFF position, wait 10 minutes for the thermopile to cool, then attempt to relight the pilot by following the lighting instructions on the water heater's label. If this condition returns, replace the gas control valve/thermostat. See ***Removing and Replacing the Gas Control Valve/Thermostat*** (page 32).

TABLE 6. GENERAL TROUBLESHOOTING GUIDELINES
These guidelines should be used by a qualified service agent.

Symptom	Problem	Corrective Action
WATER LEAKS	Improperly sealed, hot or cold supply connection, relief valve, drain valve, or thermostat threads.	Tighten threaded connections.
	Leakage from other appliances or water lines.	Inspect other appliances near water heater.
	Condensation of flue products.	See ***Condensation*** (page 26).
LEAKING T&P VALVE	Thermal expansion in closed water system.	Install thermal expansion tank (DO NOT plug T&P valve).
	Improperly seated valve.	Check relief valve for proper operation (DO NOT plug T&P valve).
SMELLY WATER	High sulfate or mineral content in water supply.	Drain and flush heater thoroughly, then refill.
	Bacteria in water supply.	Chlorinate or aerate water supply.
PILOT WILL NOT LIGHT	Gas control knob not positioned correctly.	See the ***Lighting Instructions*** on the water heater's label.
	Main gas supply off.	Turn on main gas shutoff valve.
	Thermopile malfunction.	Replace pilot/thermopile assembly.
	No spark.	Locate piezo switch on thermostat. Replace if needed.
BURNER WILL NOT STAY LIT	Thermopile malfunction.	Replace pilot/thermopile assembly.
	Defective Gas Control.	Replace Gas Control.
PILOT OUTAGE	Dirty pilot burner.	Clean pilot assembly.
	Thermopile malfunction.	Replace pilot/thermopile assembly.
	Defective Gas Control.	Replace Gas Control.
	Thermopile tip is not in contact with pilot flame.	Insert thermopile correctly.
NOT ENOUGH HOT WATER	Heater not lit or thermostat not on.	See ***Lighting Instructions*** on the water heater's label.
	Thermostat set too low.	See ***Temperature Regulation*** (page 25).
	Heater undersized.	Reduce hot water use.
	Low gas pressure.	Contact your gas supplier.
	Incoming water is unusually cold.	Allow more time for heater to re-heat.
	Leaking hot water pipes or fixtures.	Have plumber check and repair leaks.
	High temperature limit switch activated.	Contact a service agency to determine cause.
WATER TOO HOT	Thermostat set too high.	See ***Temperature Regulation*** (page 25).
WATER HEATER SOUNDS	Condensation dripping on burner.	See ***Condensation*** (page 26).
SIZZLING OR RUMBLING	Sediment or calcium in bottom of heater tank.	Drain and flush the water heater. See Draining and Flushing (page 30).
SOOTING	Improper combustion.	No adjustment available. Contact a service agency to determine cause.
VENT GAS ODORS	Lack of supply air.	Contact a service agency to determine cause.
	Improperly installed vent piping.	
	Downdraft.	
	Poor combustion.	

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