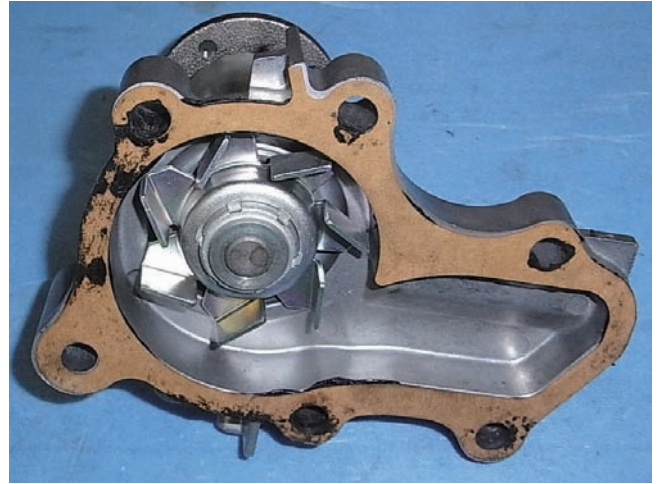
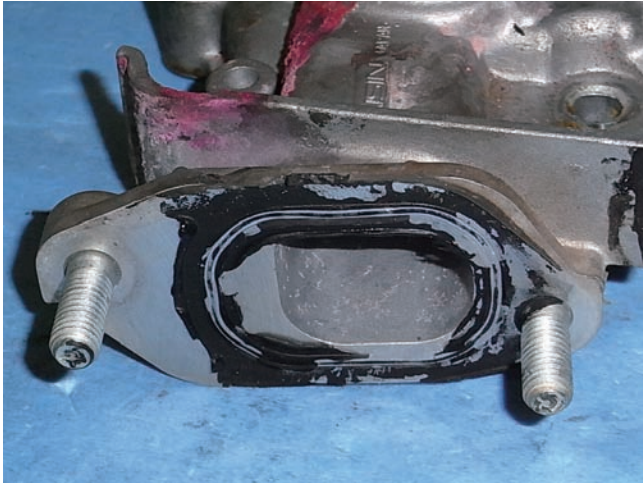


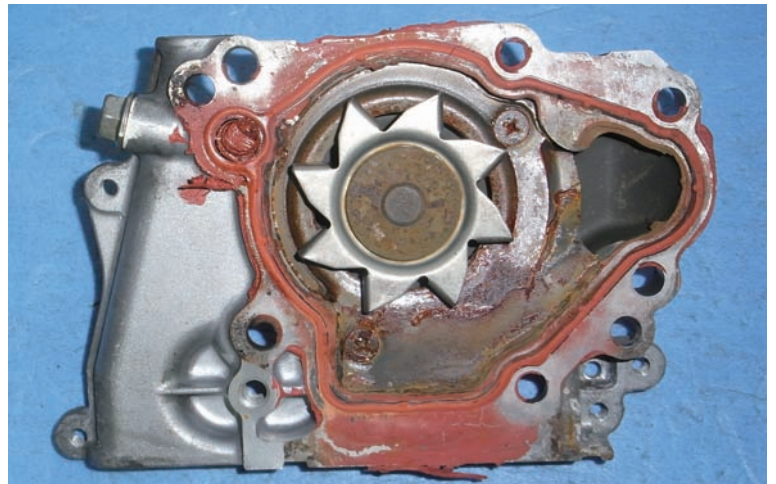
Gasket installation

Use only the gaskets and O-rings supplied with the water pump. Combined usage of the liquid gaskets and supplied gaskets (or O-rings) could result in water leakage or other serious problems.

Possible issue 1: Liquid gasket is used instead of the supplied gasket



Possible issue 2: Liquid gasket is used instead of the supplied O-ring



If liquid gasket is used with supplied gaskets or O-rings

The debris of the liquid gasket enters inside

The debris of the liquid gasket enters inside the mechanical seal

Dirt accumulates on the surface of mechanical seal and it wears down

This results in coolant leakage

The surface of a worn down mechanical seal due to the liquid gasket debris.

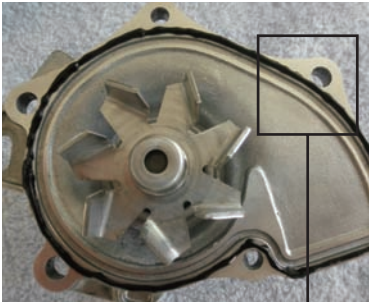


How to apply the liquid gasket

Where to apply the liquid gasket on the mating surface of the engine

For Toyota vehicles

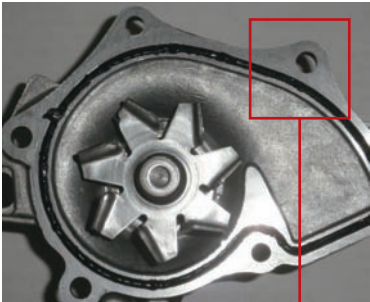
Good example



Enlarged view

Apply the liquid gasket onto outside of the groove

Poor example



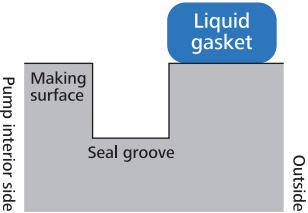
Enlarged view

Do not apply the liquid gasket inside the groove!

Good example

Cross Section view of mating surface of the engine

The position where the liquid gasket is applied



Pump interior side

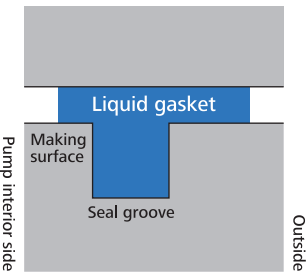
Making surface

Seal groove

Outside

By applying the liquid gasket onto the outside of the seal groove, the mating surface gets sealed as shown below.

When installing the engine



Pump interior side

Making surface

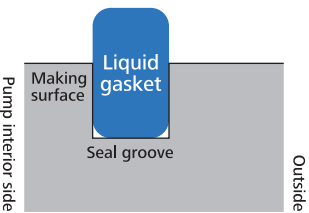
Seal groove

Outside

✗ Poor example

Cross Section view of mating surface of the engine

The position where the liquid gasket is applied



Pump interior side

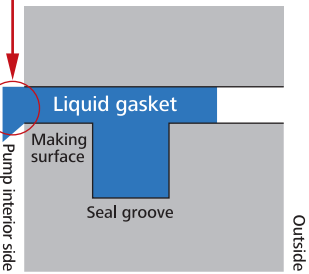
Making surface

Seal groove

Outside

By applying the liquid gasket directly onto the seal groove, the liquid gasket gets pushed out from the mating surface into the interior of the pump, resulting in debris that would cause water leakage.

When installing the engine



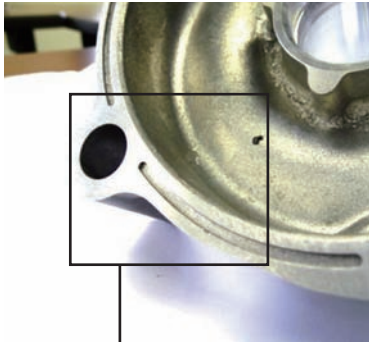
Pump interior side

Making surface

Seal groove

Outside

For Nissan vehicles

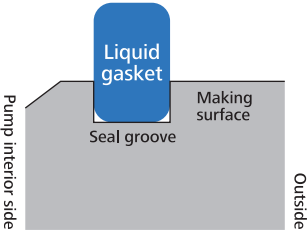


Enlarged view

Apply the liquid gasket onto the groove

Cross-section view of the mating surface of the engine

The position where the liquid gasket is applied



Pump interior side

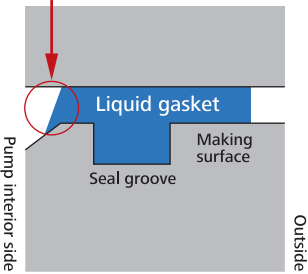
Making surface

Seal groove

Outside

By applying the liquid gasket onto the seal groove, a small notch on the mating surface holds excess gasket and it gets sealed as shown below.

When installing the engine



Pump interior side

Making surface


Seal groove

Outside

5

1 For your safety

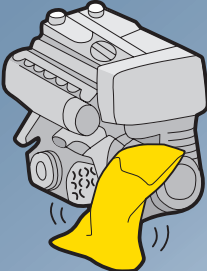
1 Thoroughly flush the cooling system (radiator) 2-3 times to remove the stains and rust with the engine running and the original water pump still in place.



Drain and refill 2-3 times.

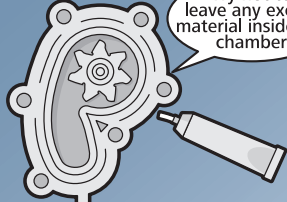
Why? To prevent water leakage caused by foreign materials caught in the mechanical seal.

2 Before installation, remove the old gasket and other foreign materials with white gasoline or another solvent. Then, remove all oil and grease from the mating surface.



Why? To prevent water leakage from the mating surface.

3 If the pump requires the liquid gasket, apply it evenly on the seal. If gaskets are supplied with the pump, use the supplied gaskets only. *Do not use the liquid gasket and supplied gasket together.

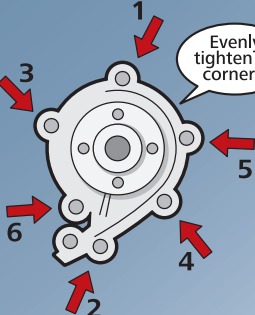


Try not to leave any excess material inside the chamber.

Why? If the liquid gasket gets into the water chamber, it will get caught in the mechanical seal, causing water leakage.

*Please refer to page 2 for details on how to apply liquid gasket.

4 Fasten bolts with the torque specified by the car manufacturer to evenly tighten all corners.



Evenly tighten all corners.

Why? To prevent water leakage from the mating surface.

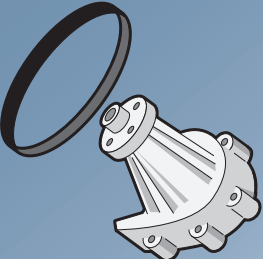
5 When installing other parts such as a pulley or fan coupling, make sure to prevent failures caused by foreign materials that get caught. For vehicles with a fan coupling, make sure there is no rust or looseness, and then use a dial gauge to check the run-out accuracy after installation.



No foreign materials.

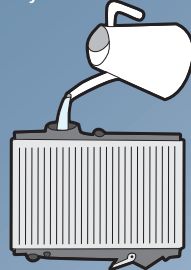
Why? To prevent foreign materials from getting caught which leads to eccentricity (excess vibration) and looseness on the pulley and fan coupling. This may cause the parts to fall off or get damaged.

6 Adjust the belt tension to the tension specified by the car manufacturer.



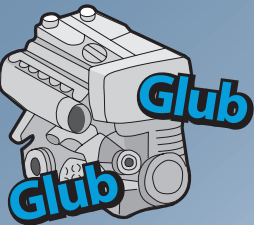
Why? To prevent damage to the shaft parts (body and bearing) that might be caused by excess tension on the belt.

7 When changing the pump, fill the new LLC to the specified amount and density.



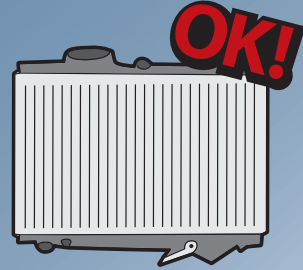
Why? If the pump spins without having enough LLC, the mechanical seal gets worn down, causing water leakage and abnormal noise.

8 Make sure to thoroughly remove all the air before filling the radiator and reservoir tank to the specified amount.



Why? If the pump spins without having enough LLC, the mechanical seal gets worn down, causing water leakage and abnormal noise.

9 After checking the LLC level and belt tension again, start the engine.



OK!



Warning

• For your safety, please follow the directions. Inaccurate installation may lead to injury or breakdowns.

• The water pump is a consumable part, and if it breaks down it can disable operation. It is recommended to change the pump on a regular basis such as when getting your car major-serviced, changing the timing belt, and etc.

2 Possible causes of issues

Symptoms of water pump failure **water leakage**

Location	Symptom	Primary cause
Drainage opening	The mechanical seal has foreign materials caught in it.	<ul style="list-style-type: none"> • The coolant is inferior in quantity or quality. • The liquid gasket is sticking into the water chamber.
	The mechanical seal surface is worn out.	<ul style="list-style-type: none"> • The coolant is inferior in quantity or quality. • The inside of the radiator was not cleaned properly.
	The mechanical seal is burned.	<ul style="list-style-type: none"> • The engine was running without any coolant.
Mating surface	Foreign materials are caught inside.	<ul style="list-style-type: none"> • There are still foreign materials remaining on the mating surface of the engine.
	There is a problem with the installation.	<ul style="list-style-type: none"> • The liquid gasket was applied unevenly. • The liquid gasket was used together with a supplied gasket (paper, O-ring). • The bolts were not tightened properly. • The mating surface of the body has scratches or an irregular shape.
	The gasket is damaged or irregularly shaped.	<ul style="list-style-type: none"> • The gasket was cut or damaged during shipping or handling. • The bolts were unevenly tightened.

Symptoms of water pump failure **Abnormal noise**

Location	Symptom	Primary cause
Bearing	Rumbling noises Locking	<ul style="list-style-type: none"> • Excess belt tension has caused bearing damage. • The pulley and fan coupling were not installed correctly, which has caused bearing damage.
Mechanical seal	Whining noises	<ul style="list-style-type: none"> • Carbon buildup has accumulated on the ceramic surface of the mechanical seal. • The engine was running without any coolant.

Symptoms of water pump failure **Others**

Location	Symptom	Primary cause
Impeller Corrosion	Rust or corrosion on the fan blades (cavitation)	<ul style="list-style-type: none"> • The coolant is inferior in quantity or quality which has caused corrosion. • The inside of the radiator was not cleaned properly.

3 Examples of water pump failure

Water leakage - Coolant is leaking from the drainage opening

Situation there are traces of coolant leakage from the drainage opening.

However, if the traces of leakage are wet, or the coolant in the reservoir tank is clearly lower after a month, it is possible that there is water leakage.

Cause

Dirt, particles, or sludge, etc. in the coolant get caught in the sliding surface of the mechanical seal, which wears the sliding surface down, reducing the effectiveness of the seal and causing water leakage.

Preventative countermeasures

Cleaning

Thoroughly flush the cooling system 2-3 times to remove the stains and rust with the engine running and the original water pump still in place.

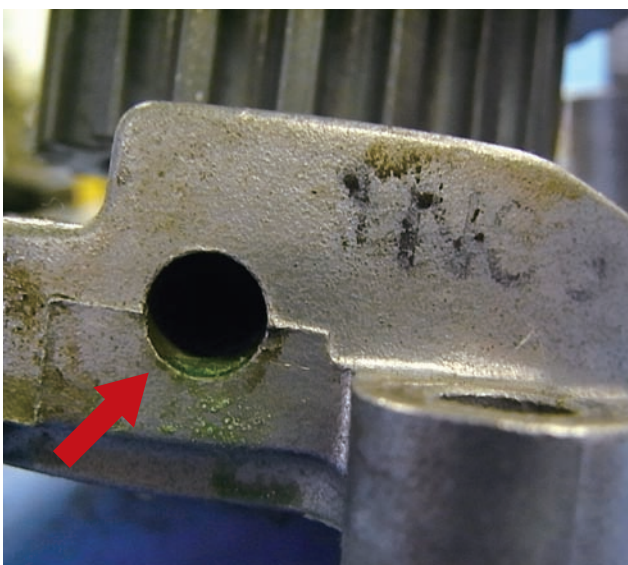
Coolant

Replace the LLC on a regular basis to the amount and density specified by the manufacturer.

Usage of liquid gasket

Do not use the liquid gasket if the gaskets are supplied with the pump. When using liquid gasket, apply evenly so that any excess does not stick out into the water chamber.

Comparison of a drain leakage for conforming/non-conforming samples.



Conforming sample

There are traces of leakage, but because it is only temporary, the marks are dried out.



Non-conforming sample

The traces of leakage are large, the marks are constantly wet or dripping.

Examples of issues that occur when the fan coupling or some other parts are not installed properly.

Situation

- The water pump body is damaged
- The water pump bearing section is damaged

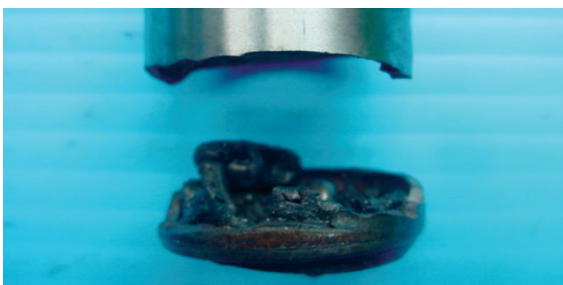
Cause

- The fan coupling was improperly installed (large eccentricity).
If foreign materials get inside when attaching the pulley sheet and pulley, excessive force is applied to the shaft due to eccentricity. As a result, bearing and body are damaged.

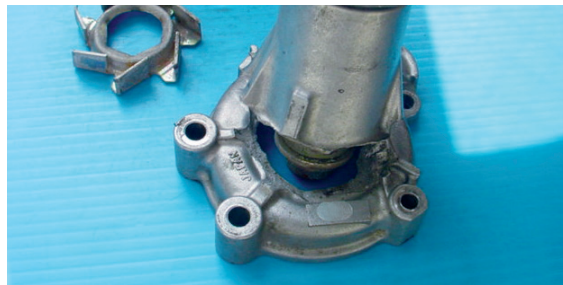
Preventative countermeasures

- Please reattach them after removing all foreign materials and dirt on the surface of pulley sheet and pulley.
- When replacing the water pump, it is also recommended to replace the fan coupling with a new one.

Damaged bearing



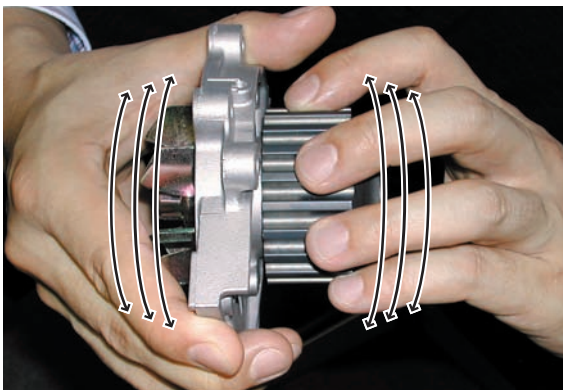
Damaged body



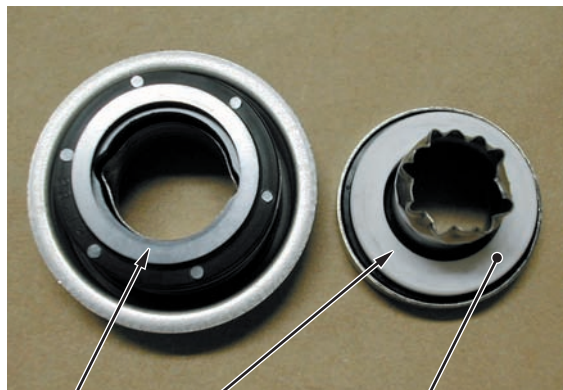
4 Read before water pump installation

If you purposely spin the pulley sheet before installation while the mechanical seal is dry, the carbon part of the mechanical seal (soft while it is new) will scrape the surface of the ceramic, causing the carbon on both surfaces to create carbon build-up. This may result in making abnormal whining noises.

1. Do not spin while it is dry.



2. Mechanical seal part breakdown



Carbon section

Ceramic section

If you repeatedly spin while it is dry, carbon will stick to the ceramic part and potentially make abnormal noises.