

## H35 (35 MPa/350 bar) vs. H70 (70 MPa/700 bar) Fueling

## Mirai Refueling Tips

### Raising the bar: Hydrogen Units Defined

Hydrogen tank fill pressures are referred to using three terms that will be new to customers switching from internal combustion engine (ICE) vehicles: Mega Pascal (MPa), bar, and psi. One MPa is equal to 10 bar and 145 psi. MPa is the most common way to refer to fueling pressures. The higher the pressure, the more fuel that can be stored in the same space.

Hydrogen tank capacity is referred to using units of weight, specifically kilograms (kg), unlike the volume units for gasoline (gallons, liters, etc.).

One kilogram of H<sub>2</sub> has approximately the same energy as one gallon of gasoline. Because FCV are 2-3 times as efficient as a gasoline vehicle, they do not need as much fuel. Mirai holds approximately 5 kgs.

### H35 vs. H70 Standards

Hydrogen stations have two different ending fuel pressures: half-pressure H35 and full-pressure H70. These pressures equate to approximately 5,000 psi and approximately 10,000 psi, respectively. The Toyota Mirai is built to accommodate the latest H70/10,000 psi stations, which contributes to its excellent range.

**Tip:** Think of MPa or pressure as a conventional gas tank's capacity. H70 is the pressure in a full Mirai tank, so an H70 station allows a driver to fully fill Mirai. An H35 station fills to half pressure, which essentially results in a half fill of Mirai's hydrogen tanks.

H35 fueling adds hydrogen at half the pressure of an H70 station, which creates a few considerations for Mirai drivers:

- Fueling from empty, an H35 pump can only fill Mirai's tanks half way, resulting in reduced driving range.
- If Mirai has half a tank or more hydrogen remaining, an H35 pump will not be able to add hydrogen since the pressure in Mirai's tanks already exceeds the station's final H35 pressure.
- Many stations offer both H70 and H35 pumps, so look carefully and use the H70 (if possible).

### Factors That Affect Refueling

Several factors affect the fueling of a hydrogen fuel cell vehicle:

- Pressure capacity of the vehicle's tanks
- Pressure capacity of the station
- Temperature of the vehicle's tanks
- Environmental factors such as ambient temperature

### H70 Automated Fill Logic

- Hydrogen stations have "smart" features that allow them to deliver as much hydrogen fuel as possible into the vehicle as fast as possible, while still meeting all safety requirements.
- There are two H70 fill strategies per station, one for vehicles with infrared communication and one for vehicles that do not have infrared communication, or where infrared communication with the station is not working correctly. The Toyota Mirai has infrared communication capabilities.
- The Mirai is equipped with a hydrogen fuel control computer that helps to ensure optimal filling by measuring a variety of factors, including ambient air temperature, pressure and temperature in the hydrogen tanks, and current fill level.
- Infrared communication provides the fastest and most complete fill. After refueling, the station will show kg dispensed and percentage of fill.
- Vehicles that do not have the ability to communicate with the station will have a less complete fill (approximately 92% fill). After refueling, the station will only show kg dispensed.

For more information, refer to the Toyota Mirai Owner's Manual—Refueling.

If you notice anything unusual with the vehicle receptacle or O-rings, please notify your Authorized Toyota Mirai Fuel Cell dealer.

If you notice anything unusual with the hydrogen dispenser or nozzle, please notify the hydrogen station operator.

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## THE 2016 TOYOTA MIRAI FUELING THE TOYOTA MIRAI



### Before You Fuel

Fueling the 2016 Toyota Mirai is different than adding gasoline or diesel to an internal combustion vehicle, but the process is easy to learn. Follow these steps when you arrive at the station to prepare your Mirai to accept hydrogen fuel:

1. Ensure that the vehicle is OFF and in Park with the parking brake set.
2. Press the fuel-filler door opener switch on the lower left side of the dash (the fuel-filler door will not release if the power switch is ON or if the READY indicator is illuminated).

**Hint:** The fuel-filler door will automatically re-lock if you don't open it within 30 seconds.

3. Exit the vehicle, open the fuel-filler door by pushing inward, releasing the rear edge of the fuel-filler door, remove the fuel-filler cap and place it on the holder.
4. Use the station's best practice guidelines and the instructions on how to fuel your Toyota Mirai. Be careful to follow the directions that pertain to the nozzle you are using.

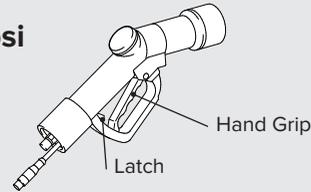
Need Assistance? Call Customer Support toll free at **1-800-331-4331**.



# FUELING THE TOYOTA MIRAI | Nozzle Variations

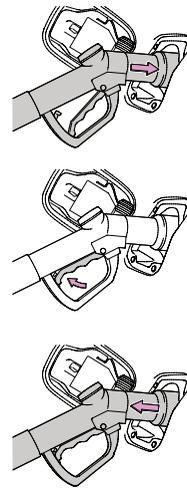
## WEH H70 Hydrogen Gas Nozzle

70 MPa/700 bar/10,000 psi



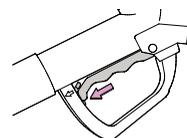
The WEH H70 is the most common hydrogen fuel nozzle type for full H70 filling. The integrated hand grip locks and unlocks the nozzle, creating a secure connection for safe fueling.

1. Make sure that the hydrogen gas nozzle is fully seated onto the receptacle.
2. Squeeze the hand grip until the latch is engaged to connect the hydrogen gas nozzle (the latch is to lock the nozzle in place, not to begin fueling).
3. Gently pull back on the hydrogen gas nozzle to make sure it is locked and securely attached onto the receptacle before dispensing fuel. Be careful not to squeeze or contact the hand grip when checking if the nozzle is secure, as it may unlock the nozzle.



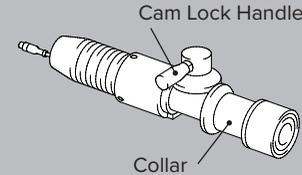
**CAUTION:** It is important to ensure that the nozzle lock is properly engaged to the vehicle. Failure to do this may result in the nozzle coming off when the flow of hydrogen begins. This may result in damage to the nozzle, station, vehicle, your own person or people near the fueling station.

4. Operate the hydrogen station's equipment and fill the tank.
5. After fueling is complete, pull the latch to unlock the hand grip and remove the hydrogen gas nozzle.



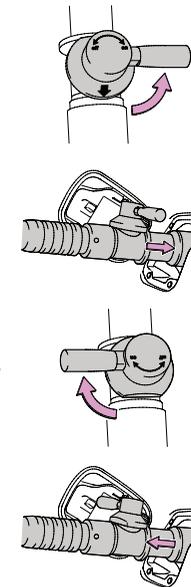
## WEH H35 Hydrogen Gas Nozzle

35 MPa/350 bar/5,000 psi

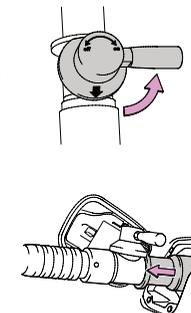


The WEH H35 is the most common nozzle for H35 filling. The integrated collar snaps into place with a "click" and the cam lock handle rotates clockwise, creating a secure connection.

1. Make sure the cam lock handle is positioned fully counterclockwise to the OFF position, as shown in the illustration. The cam lock handle will be pointing to the right of the reference arrow.
2. Hold the grip section and fully insert the hydrogen gas nozzle onto the receptacle.
3. Rotate the cam lock nozzle fully clockwise to the ON position. The cam lock handle will be pointing to the left of the reference arrow.
4. Pull back on the hydrogen gas nozzle to make sure it is locked and securely attached to the receptacle before dispensing fuel.
5. Operate the hydrogen station's equipment and fill the tank.



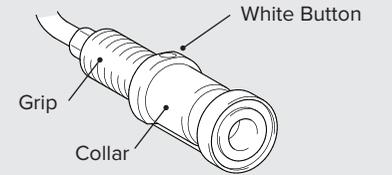
6. After filling is complete, rotate the cam lock handle fully counterclockwise OFF. The cam lock handle will be pointing to the right of the reference arrow.
7. Hold the grip section and collar, pull back on the collar to unlock and remove the fuel nozzle.



## Other Nozzle Styles You May Encounter

### Walther H70 Hydrogen Gas Nozzle

70 MPa/700 bar/10,000 psi  
(Not Common)



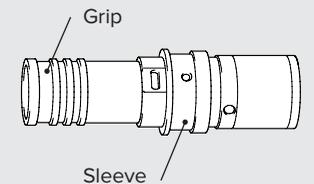
The integrated collar snaps into place with a "click," creating a secure connection.

The white button at the top of the nozzle pops out during fueling and retracts when fueling is complete.

For full instructions on how to operate, refer to the Toyota Owner's Manual—Refueling.

### Nitto-Kohki Hydrogen Gas Nozzle

70 MPa/700 bar/10,000 psi  
(May see in the future)



The integrated sleeve snaps into place with a "click," creating a secure connection.

For full instructions on how to operate, refer to the Toyota Owner's Manual—Refueling.

## After Refueling—Helpful Information

If the nozzle cannot be removed after fueling, it may be frozen to the vehicle. Wait for the hydrogen nozzle to thaw before attempting to remove. Do not pull or rotate the hydrogen nozzle forcibly. Failure to follow these precautions may cause damage.

Refer to the Toyota Owner's Manual—Refueling, for additional Warnings/Notices.