

Here is some information on how to go about certifying your 2ZZ-GE swapped MR2 Spyder. As of 11/26/19, this MR2 Spyder was approved for a legal 2ZZ-GE engine change, the first California certified 2ZZ Spyder in nearly 10 years. This can provide a path to get things done properly and spare any future heartache.

Disclaimer: Not a representative of the Bureau of Automotive Repair or California Air Resources Board. Repairs and modifications to your vehicle should be done at your discretion following the guidelines available on the BAR website.

Including parts and labor after the swap, expect to pay anywhere from \$400-600 to gather the additional parts needed:

- OEM Celica GT-S exhaust manifold
- OEM Celica GT-S exhaust downpipe
- CARB Legal Celica GT-S catalytic converter
- CARB Legal or OEM Celica GT-S Air Intake System
- OEM Celica GT-S ECU to match donor vehicle engine year
- Crossmember Spacer (optional)
- Labor to modify crossmember (optional)
- Labor to modify exhaust downpipe
- Labor to calibrate ECU

### Why swap the engine?

To those who are unfamiliar, the original 1ZZ-FED engine configuration for the MR2 Spyder was met with its share of performance challenges. The pre-cats are commonly known to fail as early as 80,000 miles. As a result, many Spyders rest in the wrecking yards for that very reason. And while rebuilding the engine is possible, most will opt for swapping in the 1.8L 2ZZ-GE from the Toyota Celica GT-S, Matrix, or Pontiac Vibe. For all intents and purposes, I would suggest using the Celica GT-S 2ZZ-GE, as they were produced in greater numbers and the configuration is more favorable for certified swaps into the Spyder ranging from 2000-2005.

### Clearing the Air...

Contrary to the beliefs of many, the Bureau of Automotive Repair & California Air Resources Board is here for the benefit of the state emissions and air quality. In my experience, the referees have been helpful and courteous during the multiple inspections. You get what you give in terms of respect to their officials.

### Swap Criteria

Please note, the criteria can be verified on the BAR website. The steps in bold are mandatory, however, I have included a few which may come up in conversation and save multiple visits.

#### **1. The donor engine must be in a stock certified configuration, and support ALL the certified OBD II functionality.**

- "Modifications of the intake and exhaust system are permissible only if necessary to accommodate the packaging of the vehicle and only if they do not affect the functionality of the systems. Any changes must not modify the stock functional design of the components (i.e. the intake air box must not be modified, EGR valves still properly mounted, etc.) c. The transmission and evaporative systems will be allowed to remain in the recipient vehicle configuration, but must function appropriately."

#### **2. All model year vehicles (gasoline, diesel, hybrid, CNG, LNG, LPG, etc.) must meet the following:**

- a. **Model Year** - The installed engine must be of the same model year or newer than the model year of the recipient vehicle
- b. **Engine Classification** - Vehicle and engine classifications of the donor and recipient vehicles must be the same based on Gross Vehicle Weight Rating (GVWR). In short it means a truck or diesel engine cannot be swapped into a car.
- c. **Certification Type** - The certification type (California or Federal certification) of the engine and recipient vehicle must be the same or, if not, the engine must adhere to the more stringent standard. **For example, a California certified engine may be installed in a Federal vehicle but a Federal engine may not be installed in a California vehicle.** Proof of the certification type from the manufacturer or CARB EO of the donor engine must be provided at the time of the engine change inspection at the Referee.
  - Find a California based Celica, which has VIN information of being originally sold here in California.
- d. **Smog Check Tests**- The vehicle must pass ALL of the following Smog Check tests (regardless of model year) using the donor vehicle Smog Check test type requirements:
  - This is your standard visual and emissions smog test including BAR-97 tailpipe test, Acceleration Simulation, etc.



Once you have the engine swapped using the criteria above, you can dive into the real specifics. To start, let's take a look at the intake. Fortunately for those with a 2000-2001 MR2 Spyder, **Weapon R's "Dragon" intake (EO D-489-1)** pictured left, for the Celica GT-S will work, however it only carries a CARB exemption for 00-01.

Those with 2002 or newer 2ZZ-GE engines will need to make use of the **Injen RD2046P Cold Air Intake (EO D-670-15)** for 2000-2004 Celica, or **K&N Typhoon intake (EO D-476-8)**, for 2000-2003 Celicas. All of which are available through Midship Garage. I cannot confirm the fitment of the other intakes, since the Weapon R model was correct for my application.

It is important to note, that modifications are not allowed to the intake piping or hoses. If all else fails, I can confirm that the original Celica GT-S intake will fit the engine bay. It will not look pretty, but it will fit.

Next comes the exhaust system, which presented the greatest challenge in my opinion. **The manifold cannot be modified in any way.** The only available options are either to

notch the cross member in a U-shape to allow for clearance, or add a spacer between the mounting points of the crossmember to the chassis. I decided on the latter, since it could be undone. Please note that spacing the crossmember will change suspension geometry, adding more

negative camber. Rear toe alignment may be needed. I consider this a "short term" solution. The spacer is also available upon request if needed.



From there, the Celica downpipe can be modified and installed by any competent exhaust shop.

### **3. Exhaust System**

- The Spyder will retain one upstream O2 sensor before the catalytic converter and one after the converter.
- The Spyder will use a CARB Legal catalytic converter for the Celica, which can only be purchased at a certified exhaust repair shop. I would recommend **Magnaflow 418004**.
- You can use any CARB legal muffler, but it's probably best to stick with OEM for simplicity.
- "All required after-treatment sensors including Oxygen (O2) sensor(s) must (see. BAR Appendix D 48):
  - i. Be within 1 inch of the original location (relative to the associated after treatment device)
  - ii. Have bungs properly welded into the exhaust pipes and must be oriented in the exhaust stream identically to the original configuration"



#### **4. OBD II System**

- Your ECU must match the donor engine year. (i.e. using a 2000 GT-S ECU for a 2000 2ZZ-GE engine.) This is crucial and can save you from having to buy several computers.
- I have data on the part #s for 2000-2002:
  - 2000: 89666-20082 (Manual)
  - 2001: 89666-20083 (Manual)
  - 2002: 89666-20190 (Manual)
- You will need to have your ECU calibrated by your local Toyota service center. Only a calibration test performed by the dealer will suffice. This confirms the ECU was not modified or tampered with in any way. In my experience, the service fee was \$134. Keep the invoice for your records.
- The ECU will need to have ALL monitors set by completing the necessary drive cycles. (**see attached .pdf - Toyota Service Bulletin for Monitor Readiness Procedures**).
  - In my experience, the dealership will assist in pre-setting the monitors, except the Catalytic converter. If not, the drive cycles are not too difficult to complete on your own.

#### **5. Aftermarket Parts**

- All non-OEM configurations or aftermarket components installed on the recipient vehicle or donor engine must adhere to BAR's Aftermarket Parts Verification Guidelines located in the Smog Check Manual, Appendix G available at BAR's website.

#### **6. Emissions Systems**

- All emissions systems (including the evaporative system monitoring) from the donor vehicle must be installed and fully functional. For example, the evaporative system components, i.e. plumbing, canister, tanks, valves, etc. must be present and functioning. If a non-OBD II certified

vehicle is receiving an OBD II certified replacement engine, the transmission and fuel storage/evaporative system from the recipient vehicle may still be used. However, these components and systems must be integrated with the engine's OBD II system such that the OBD system's transmission and evaporative system monitoring strategies remain operational.

Once you have passed the inspection, which may take a few tries due to oversight, you will receive paperwork for your visual and emissions test, as well as a CARB sticker for your engine bay or door jamb, which officially denotes your vehicle as having a 2ZZ-GE engine change. From there on out, your emissions tests are conducted using the data for the Celica 2ZZ-GE engine and ECU.

