VEHICLE SPECIFICATIONS

**Weights**
- Design Curb Weight: 3160 lbs
- Vehicle Test Weight: 3400 lbs
- GVWR: 3795 lbs
- GAWR F/R: 2335/2250
- Distribution: 54.2%/45.8%
- Payload: 635 lbs
- Performance Goal: 400 lbs

**Engine**
- Model: 1NZ-FXE
- Output: 76 HP @ 5000 RPM
- Configuration: 4 Cylinder, In-line
- Displacement: 1.5L
- Fuel Tank Capacity: 11.9 gal
- Fuel Types: Unleaded

**Electric Drive System**
- Battery Manufacturer: Valence
- Battery Type: Li-Ion
- Number of Cells: 2376
- Nominal Cell Voltage: 3.2V
- Nominal System Voltage: 230V
- Nominal Pack Energy: 10 kWh
- Measured Useable Energy: 4.88 kWh

**Charge System**
- Input Voltages: 120V
- Required Breaker Current: 15-Amp
- Charger Power Output: 1.2 kW
- Charger Plug Type: NEMA 5-15
- 80% Charge Time: 6.5 Hrs
- 100% Charge Time: 8 Hrs

**Charge Depleting**
- **Acceleration 0-60 MPH**
  - Time: 13.0 seconds
- **Acceleration 1/4 Mile**
  - Time: 20.1 seconds
- **Maximum Speed**
  - 75.7 MPH
- **Acceleration 1 Mile**
  - Maximum Speed: 104.9 MPH

**Charge Sustaining**
- **Acceleration 0-60 MPH**
  - Time: 12.8 seconds
- **Acceleration 1/4 Mile**
  - Time: 20.0 seconds
- **Maximum Speed**
  - 75.7 MPH
- **Acceleration 1 Mile**
  - Maximum Speed: 105.0 MPH

**Brake Test @ 60 MPH**
- Distance Required: 126.8 ft

**Fuel Economy**
- **UDDS**
  - Distance (miles)
  - Fuel Economy (mpg)
  - AC Energy Consumed (kWh)
  - 10
  - 118.0
  - 1.83
  - 20
  - 137.6
  - 3.65
  - 40
  - 124.7
  - 5.52
  - 60
  - 105.9
  - 5.65
  - 80
  - 94.7
  - 5.65
  - 100
  - 89.2
  - 5.65
  - 200
  - 77.9
  - 5.65
- **HWFET**
  - Distance (miles)
  - Fuel Economy (mpg)
  - AC Energy Consumed (kWh)
  - 10
  - 106.6
  - 1.77
  - 20
  - 116.4
  - 3.45
  - 40
  - 99.9
  - 5.46
  - 60
  - 86.7
  - 5.84
  - 80
  - 79.5
  - 5.93
  - 100
  - 75.2
  - 5.93
  - 200
  - 66.6
  - 5.93

**TEST**
1. Cumulative fuel economy over EPA standard urban drive cycle.
2. Vehicle soaked at ambient temperature while off for a minimum of 12 hours prior to testing.
3. Average non-cold start charge depleting fuel economy.
4. Value determined from average charge sustaining fuel economy tests with appropriate energy correction calculations.
5. A/C on coldest setting with full blower power.
6. Calculated cumulative fuel economy values, includes cold start.
7. Cumulative AC energy based on measured charge efficiency.

This vehicle meets all HEV America Minimum Requirements listed on back of this sheet.

Values in red indicate the Performance Goal was not met. All Power and Energy Values are DC unless otherwise specified.

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This vehicle meets the following PHEV America minimum requirements:

1. Vehicles shall comply with Federal Motor Vehicle Safety Standards applicable on the date of manufacture and such compliance shall be certified by the manufacturer in accordance with 49 CFR 567. Suppliers shall provide a completed copy of Appendix A and Appendix B with their proposal, providing vehicle specifications and the method of compliance with each required section of 49 CFR 571. If certification includes exemption, the exemption number issued by the National Highway Traffic Safety Administration (NHTSA), the date of its publication in the Federal Register and the page number(s) of the Federal Register acknowledging issuance of the exemption shall be provided along with Appendix B. Exemptions for any reason other than non-applicability shall not be awarded.

2. Vehicles shall be certified under current California Air Resources Board (CARB) or Environmental Protection Agency (EPA) regulations.

3. Suppliers shall supply Material Safety Data Sheets (MSDSs) for all unique hazardous materials the vehicle is equipped with, including RESS batteries or capacitors, and auxiliary batteries.

4. Suppliers shall provide recycling plans for batteries and other vehicle hazardous materials including how the parts will be reused or recycled.

5. All vehicles shall comply with the FCC requirements for unintentional emitted electromagnetic radiation, as identified in 47 CFR 15. Subpart B, "Unintentional Radiators."

6. Vehicles shall have a minimum payload of at least 400 pounds.

7. For conversions, Gross Vehicle Axle Weight Ratings (GVWRR) shall not be increased. For conversion vehicles, Suppliers shall specify the OEMs gross vehicle weight rating (GVWR).

8. For conversions, OEM Gross Vehicle Axle Weight Ratings (GAWR) shall not be increased. Suppliers shall provide axle weights for the vehicle as delivered, and at full rated payload.

9. Tires shall be subject to the following requirements:
   - Tires provided with the vehicle shall be the standard tire offered by the HEV Supplier for the vehicle being proposed.
   - Tires shall correspond to the requirements of the placard installed in accordance with 49 CFR 571. 109, 110, 119 and 120, as applicable.
   - Suppliers shall specify manufacturer, model and size of the standard tire.
   - Replacement tires shall be commercially available to the end user in sufficient quantities to support the purchaser’s needs.
   - Tires provided to the original equipment manufacturer (OEM) shall have minimum warranty restrictions in excess of those of the tire’s manufacturer, unless the Supplier is the sole warrantor for the tires.
   - If the vehicle may be equipped with more than one standard tire, this information shall be provided for each type/manufacturer of each standard tire.

10. Seating capacity shall be a minimum of 1 driver and 1 passenger. Suppliers shall specify seating capacity (available seat belt positions) for their vehicle. For conversion vehicles, if the vehicle’s seating capacity is changed from that specified by the OEM on their FMVSS placard, the seat(s) being added or removed shall be modified as required by 49 CFR 571.207, et al. and a new FMVSS placard installed as required by 49 CFR 571.676 or 571 at, as applicable.

11. For conversion vehicles, the OEM passenger space shall not be intruded upon by the Rechargeable Energy Storage System (RESS) or other conversion materials.

12. The vehicle shall have a parking mechanism.

13. The controller/inverter shall limit the minimum RESS battery discharge voltage to prevent degradation of battery life, and should limit the maximum regeneration voltage to prevent external gassing of the batteries.

14. Vehicles shall comply with the requirements of 49 CFR 571.105.SS.2.1, or alternatively, 49 CFR 571.105.SS.2.2 for parking mechanisms.

15. Vehicles shall be capable of completing rough road tests (ETTA-HTP-005) including (1) driving through standing water without damage and without battery to chassis leakage current exceeding 0.5 MIU per UL Standard 2022, and (2) standing for extended periods in extreme temperatures without damage to or failure of the vehicle or its systems.

16. Vehicle shall be capable of completing all AVTA tests without repairs exceeding a cumulative total of 72 hours.

17. Concentrations of explosive gases in the battery box shall not be allowed to exceed 25% of the LEL. [Lower Explosive Limit], Suppliers shall describe how battery boxes will be vented, to allow any battery gases to escape safely to atmosphere during and following normal or abnormal charging and operation of the vehicle. Battery gases shall not be allowed to enter the occupant compartment.

18. Batteries shall comply with the requirements of SAE J1118.

19. Suppliers shall not auto-start the engine to charge the batteries while the key switch is in the OFF position.

20. RESS batteries shall meet the requirements of NEC 625-29(c) or (d) for charging in enclosed spaces without a vent fan. The vehicle shall be labeled as not requiring ventilation for charging (or have the appropriate classification label from a UL-recognized Testing Laboratory).

21. For vehicles with RESS systems voltage of 48 volts and higher, or higher, and the enclosures shall be designed and constructed in a manner that complies with 49 CFR 571.305. For vehicles with RESS system voltage of 96 volts and higher, and the enclosures, shall be designed and constructed in accordance with the requirements of SAE 1796. Further, irrespective of RESS system voltage, batteries or capacitors, and electrolyte shall not intrude into the passenger compartment during or following FMVSS frontal barrier, rear barrier and side impact collisions, and rollover requirements of 49 CFR 571.301. Suppliers shall prove verification of conformance to this requirement.

22. Concentrations of explosive gases in the battery box shall not be allowed to exceed 25% of the LEL. [Lower Explosive Limit]. Suppliers shall describe how battery boxes will be vented, to allow any battery gases to escape safely to atmosphere during and following normal or abnormal charging and operation of the vehicle. Battery gases shall not be allowed to enter the occupant compartment.

23. Batteries shall comply with the requirements of SAE J1118 and SAE J1127. At a minimum shall meet the requirements of NEC 625-29(c) or (d) for charging in enclosed spaces without a vent fan.

24. If a Supplier provides a vehicle with parallel battery packs, the Supplier shall provide detailed information on the equipment and charging algorithms required to prevent the parallel strings from becoming unbalanced.

25. Flywheels and their enclosures shall be designed and constructed such that there is complete containment of the wheel energy storage system during all modes of operation. Additionally, wheel and their enclosures shall be designed and constructed such that there is complete containment of the wheel energy storage system during or following frontal barrier, rear barrier and side impact collisions, and rollover requirements of 49 CFR 571.301. Suppliers shall provide verification of conformance to this requirement.

26. For vehicles using fuels other than gasoline, manufacturers shall comply with appropriate and applicable standards from SAE, NHTP, etc. [e.g., for vehicles using Compressed Natural Gas as fuel, manufacturers should indicate compliance with NFPA 52, ’’Compressed Natural Gas (CNG) Vehicular Fuel Systems Code,’’ as well as 49 CFR 571.303 and 304.]

27. Rechargeable Energy Storage Systems (RESS) shall be battery, capacitor, or electromechanical wheel technology-based as defined in SAE J1711.

28. Vehicles shall not contain exposed conductors, terminals, such that there is complete containment of the wheel energy storage system during or following frontal barrier, rear barrier and side impact collisions, and rollover requirements of SAE J1711. Vehicles shall be designed and constructed such that the vehicle is capable of completing rough road tests (ETTA-HTP-005) including (1) driving through standing water without damage and without battery to chassis leakage current exceeding 0.5 MIU per UL Standard 2022, and (2) standing for extended periods in extreme temperatures without damage to or failure of the vehicle or its systems.

29. The controller shall not initially energize to move the vehicle with the gear selector in any position other than “PARK” or “NEUTRAL;”

   - The start key shall be removable only when the “ignition switch” is in the “OFF” position, with the drive selector in “PARK;”

   - With a pre-existing accelerator input, the controller shall not energize or excite such that the vehicle can move under its own power from this condition.

30. The vehicle shall be prevented from being driven with the key turned on and the drive selector in the drive or reverse position while the vehicle’s charge cord is attached. Additionally, the following interlocks shall be present:

   - The controller shall not initially energize to move the vehicle with the gear selector in any position other than “PARK” or “NEUTRAL;”

   - The start key shall be removable only when the “ignition switch" is in the “OFF” position, with the drive selector in “PARK;”

   - With a pre-existing accelerator input, the controller shall not energize or excite such that the vehicle can move under its own power from this condition.

31. The grid-connected charger shall be capable of recharging the RESS to a state of full charge from any possible state of discharge in less than 12 hours, at temperatures noted in Section 5.5, as applicable. The preferred charging rate shall be one that meets the requirements of 49 CFR 571.301. Suppliers shall describe the automatic disconnect provided for the main propulsion battery.

32. The vehicle shall be prevented from being driven with the key turned on and the drive selector in the drive or reverse position while the vehicle’s charge cord is attached. Additionally, the following interlocks shall be present:

   - The controller shall not initially energize to move the vehicle with the gear selector in any position other than “PARK” or “NEUTRAL;”

   - The start key shall be removable only when the “ignition switch” is in the “OFF” position, with the drive selector in “PARK;”

   - With a pre-existing accelerator input, the controller shall not energize or excite such that the vehicle can move under its own power from this condition.

33. The grid-connected charger shall be capable of recharging the RESS to a state of full charge from any possible state of discharge in less than 12 hours, at temperatures noted in Section 5.5, as applicable. The preferred charging rate shall be less than eight (8) hours.

   - The charger shall be fully automatic, determining when “end of charge” conditions are met and transitioning into a mode that maintains the main propulsion battery at a full state of charge while not overcharging it, if continuously left on charge.

   - The RESS charger shall be on board the vehicle and shall use 120V or 208/240V single-phase 60-Hertz alternating current service, with an input voltage tolerance of ±10% of rated voltage. Input current for charges operating at 120V shall be compatible with 20A circuit breakers. Input current for chargers operating at 208V and 240V shall be compatible with 40-ampere circuit breakers. Rechargeable energy storage systems shall be in accordance with the requirements of UL Standard 2202, and (2) standing for extended periods in extreme temperatures without damage to or failure of the vehicle or its systems.

34. Suppliers shall specify all optional equipment required to meet the requirements of this Vehicle Specification. The installation of options shall not relieve Suppliers of meeting other “shall requirements.”

35. Vehicles shall be accompanied by non-proprietary manuals for parts, service, operation and maintenance, interconnection wiring diagrams and schematics.