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Tesla Model 3 Benchmark Report

Email sales@leandesign.com for a Quote!

Purchasers of this ~2000-page report will receive the following:

- a. Vehicle Executive Summary
- b. Zone Eye Catching Features
- c. Zone Quick Cost Estimate Report
- d. Zone Costed Bill of Material with weights and most materials and suppliers identified

Individual Zone Reports are Available for Those Only Interested in Specific Vehicle Areas

- | | |
|---|-----------|
| ○ Zone 1 Body and Chassis | 500 Pages |
| ○ Zone 2 Controlling Electronics | 374 Pages |
| ○ Zone 3 Interiors and Safety | 621 Pages |
| ○ Zone 4 Powertrain and Battery Pack | 448 Pages |

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Side-by-Side Analysis Report

Email sales@leandesign.com for a Quote!

- a. Tesla 3 -v- BMW i3 -v- Chevy Bolt Side-by-Side **Plus**
- b. Tesla Topology: Wiring & Cooling Architecture Diagrams



Description of the Analyzed Tesla 3

Long Range Premium Package

- ❖ The Tesla 3 Munro analyzed is the highest option version available.
- ❖ It is a Premium Package with Autopilot (*\$10,000 worth of upgrades*). Although Auto Pilot is not yet functional, Munro has analyzed all the circuit boards.
- ❖ Prior to Munro, the car was never driven, however, it was held back by Tesla for two extra weeks due to an undisclosed Quality issue.
- ❖ Munro has disassembled the Tesla 3 down to nuts, bolts, sensors, PCBs, including battery, control management, drivetrain, etc.
- ❖ Munro documented findings related to eye catching features, weights, number of parts , materials and suppliers where possible and conducted a complete Munro Vehicle Quick Cost Analysis.

Report Delivery

- ❖ All reports and accompanying deliverables will be made available for easy access through a secure File Transfer Protocol FTP site.
- ❖ A user-friendly PDF format will help ensure that subscribers can easily locate a wide range of materials in addition to the reports.
- ❖ The large reports utilize hyperlinks within a table of contents to facilitate the ability to easily navigate throughout the contents and quickly find specific data and information to meet user needs.



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Model 3 Benchmark Report

- ❖ The Benchmark Report is highly advantageous for OEMs or Tier Suppliers looking to effectively expand and compete in new EV markets.
- ❖ The report is a comprehensive analysis of all four Zones of the vehicle.
- ❖ This ~2400 report contains descriptive and pictorial detail on every facet of the vehicle from manufacturing including Quick Cost Analysis and perceived Quality.
- ❖ Those who chose to purchase the report will receive:
 - a. Component Fit Finish Quality Assessment (FFQ) and Ride & Drive Report
 - b. Zone Eye Catching Features and Quick Cost Estimate Report with Zone Summary Costed Bill of Material.
 - c. Vehicle Executive Summary with Consolidated Eye-Catching Features
 - d. Complete Vehicle Summary CBOM with associated weights and most materials and suppliers identified

- OR -

Individual Zone Reports

- ❖ Zone Reports are designed to accommodate Tier Suppliers or non-automotive companies looking to enter the EV market.
- ❖ Zone Reports are similar to the full report and contain descriptive and pictorial detail on every facet of the Zone from manufacturing through assembly including cost analysis and quality projections.
- ❖ Individually purchased Zone Reports, include:
 - a. FFQ Initial Quality with Calibrated Ride & Drive report.
 - b. Zone related component weights, materials and suppliers (as is possible) and Munro Quick Cost estimates.
 - c. Summary Zone Costed Bill of Materials (CBOM)

Prospective customers are invited to a “Genba” tour of the Munro BIC.

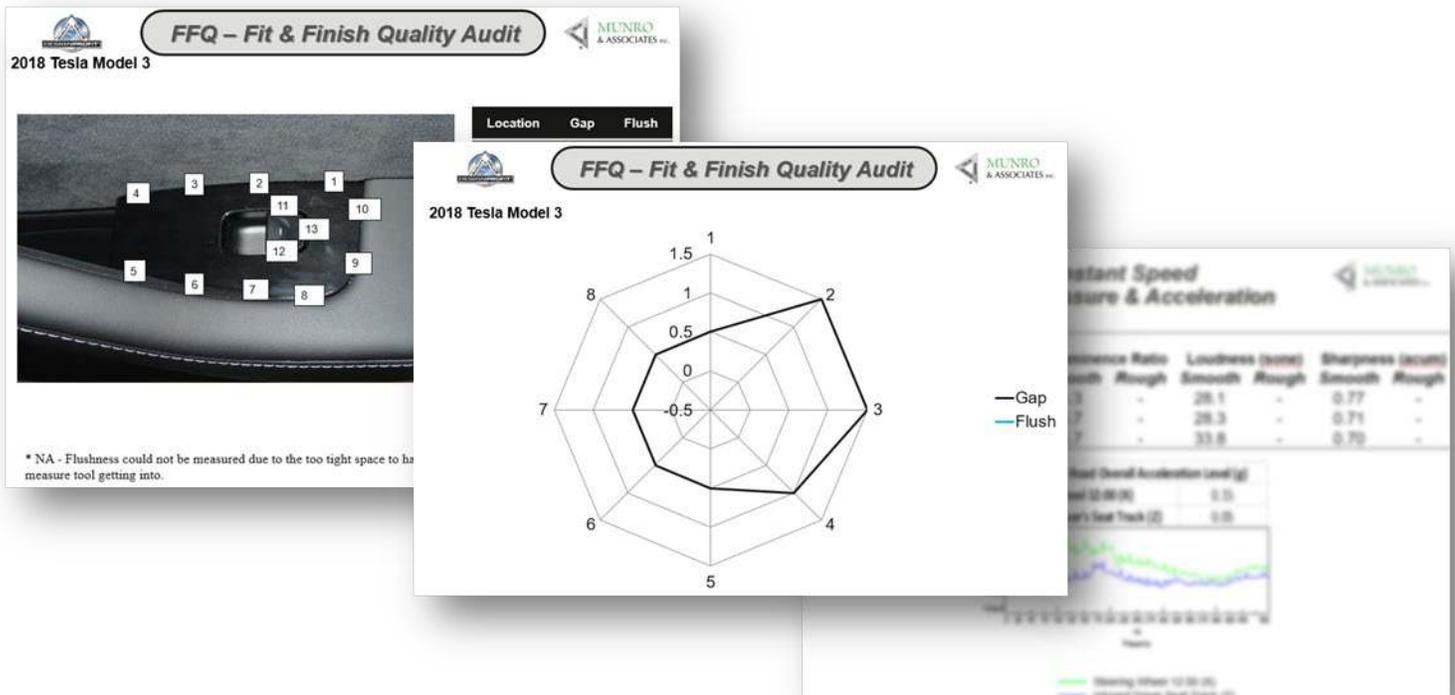


1a

Fit, Finish & Quality Report with Ride & Drive

- ❖ The Fit, Finish & Quality Audit (FFQ) is a thorough yet non-intrusive evaluation of the Tesla 3.
- ❖ The purpose is to analytically document a new buyer, “first time” experience - what they see, hear and feel.
- ❖ The FFQ also contains weights and all gap dimensions along with all flushness and operating forces.
- ❖ It is a comprehensive 255-page report of detailed information.
- ❖ Munro’s partner on NVH fingerprinting is Siemens, a worldwide expert in NVH assessments. Siemens provides’ objective analytically derived, tactile vibration response at driver touch points for rough and smooth roads. Tesla 3 NVH calibrated ride and drive section includes an operational NVH status of:
 - Sound pressure and acceleration attributes on smooth & rough roads
 - Sound pressure frequency content on smooth & rough roads

**The complete NVH analysis is available in Report #3
the Siemens Operational NVH Evaluation.**





1b

Zone Eye Catching and Quick Cost Report

Munro has identified ,n each Zone, specific observations of interest which are called ‘Eye Catching Features’. These observations can represent both advantages or disadvantages in cost or weight as related to material choice and assembly or manufacturing process selection.

Each Zone is then further broken down to systems and components for Quick Cost Estimating (QCE). QCE is gaining popularity due to the need for speed-driven results. In response, Munro has developed a proprietary methodology. Quick Cost estimates provide the customer with approximate versus detailed costs which are more expensive and time consuming to generate. A Quick Cost analysis will deliver complete vehicle estimates with an accuracy of +/- 8%. This level of accuracy provides OEM’s and Suppliers the ability to make sound comparisons and directional decisions.

[Richman from EPA]

Munro is recognized as being technically competent, highly experienced, knowledgeable and creative in benchmarking and lean engineering of automotive and non-automotive systems. Costing models are thorough covering all elements of total production cost.



1d

Vehicle or Zone Summary Costed Bill of Material

- ❖ The costed bill of material is a consolidated view of the information presented in the Zone reports (51 pages) or an individually purchased Zone report.
- ❖ The bill of material is in an indented format and includes:
 - Part name
 - Material
 - Supplier (as is feasible)
 - Total Cost
 - Weight
 - Quantity
 - Total Weight

Tesla Model 3								
Symbol Name	Material Name	Supplier Name	Total Cost*	Weight (kg)	Item Qty	Total Cost* (Total)	Weight (kg) (Total)	
■ Rear Shock Assembly	Multiple							
■ Rear Coil Spring Assembly	Commodity Item							
■ Rear Spring Bottom Pad	NBR							
■ Rear Coil Spring	Commodity Item							
■ Rear Spring Top Pad	NBR		\$8.93	0.1180	1	\$8.93	0.11	
■ Bolt Lwr Control Arm to Rear Cradle Assy	Commodity Item	-	\$0.60	0.1492	2	\$1.20	0.29	
■ Nut Lower Control Arm to Rear Cradle Assy	Commodity Item	-	\$0.10	0.0322	2	\$0.20	0.06	
■ Bolt Suspension Link Toe to Rear Cradle Assy	Commodity Item	-	\$0.44	0.1065	2	\$0.88	0.21	
■ Washer Suspension Link Toe to RR Cradle	Commodity Item	-	\$0.11	0.0276	2	\$0.22	0.06	
■ Nut Suspension Link Toe to RR Cradle Assy	Commodity Item	-	\$0.06	0.0189	2	\$0.12	0.03	
■ Bolt Upper Top Control Arm to RR Cradle Assy	Commodity Item	-	\$0.46	0.1142	2	\$0.90	0.22	
■ Nut Upper Top Control Arm to Cradle	Commodity Item	-	\$0.10	0.0322	2	\$0.20	0.06	
■ Bolt M12 Lower Suspension Link Rear to RR Cradle	Commodity Item	-	\$0.31	0.0863	2	\$0.62	0.17	
■ Bolt Upper Control Arm Link to RR Cradle	Commodity Item	-	\$0.32	0.0863	2	\$0.64	0.17	
■ Nut Upper Control Arm Link to RR Cradle Assy	Commodity Item	-	\$0.07	0.0212	2	\$0.14	0.04	
■ Nut M10 Swaybar Link to Swaybar	Commodity Item	-	\$0.05	0.0147	2	\$0.10	0.02	
■ Bolt M6x1x15 ABS Sensor Wire Brkt to RR Knuckle	Commodity Item	-	\$0.02	0.0071	2	\$0.04	0.01	
■ Mounting Bracket, RR Sups. Assy, RH	Steel 1018 - Coil	-	\$8.88	0.2724	1	\$8.88	0.27	
■ Mounting Bracket, RR Sups. Assy, LH	Steel 1018 - Coil	-	\$1.03	0.2735	1	\$1.03	0.27	

Side by Side Summary Example



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Side by Side Analysis and Topology Report

- ❖ This report is only available to purchasers of the full Benchmark Report .
- ❖ The **Side-by-Side Report** is a description and cost comparison of the differences between the Tesla Model 3, the BMW i3 and the Chevy Bolt. Items of comparison are generally cost, weight and part count, however there will also be a spider diagram comparing many functions that are related to Fit and Finish, Ergonomics and weight distribution. Munro will also use its best efforts to compare materials and their usage in the three different vehicles.
- ❖ Also included in this report is the Munro Topology Report for Wiring and Cooling. These reports are pictorial and describe the BIW structure and materials as well as the wiring strategy with major electrical connection points and cooling layout/flow.

Tesla Model 3

Cost	Weight (kg)
\$\$\$	kg

BMW i3

Cost	Weight (kg)
\$\$\$	kg

Chevy Bolt

Cost	Weight (kg)
\$\$\$	kg

Side by Side Summary Example

a. Side by Side and Radar Charts

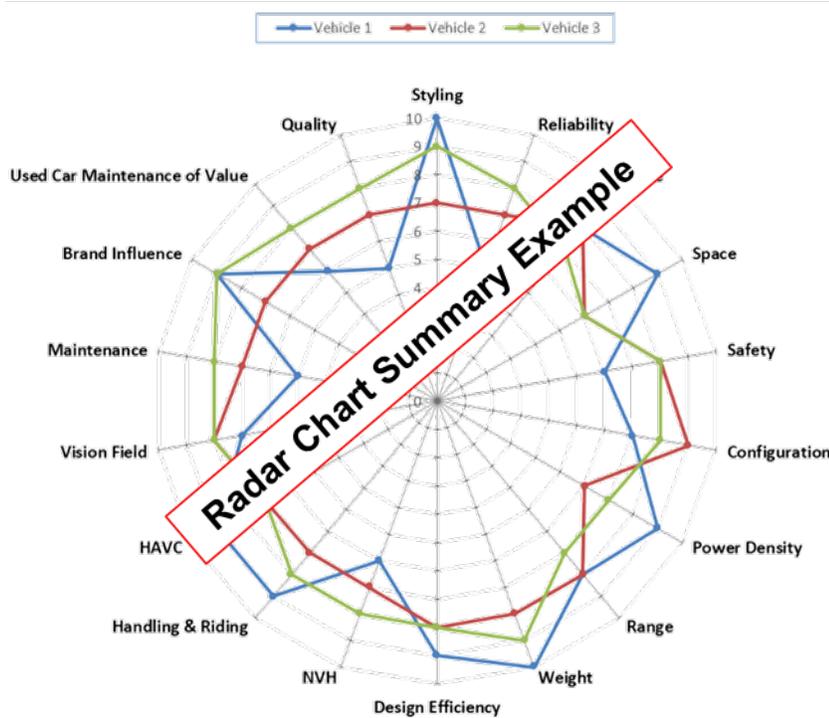
b. Cooling Topology & Electrical Topology



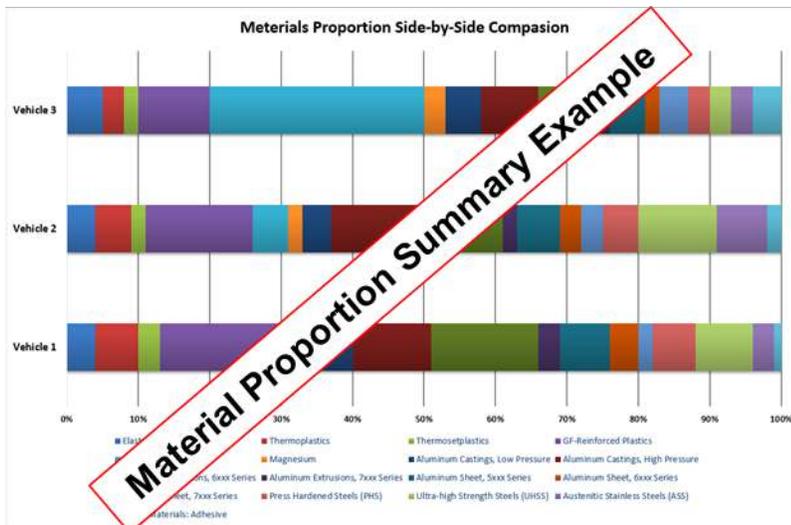
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Description of the Side by Side Comparison

- ❖ Evaluation on multiple dimensions, such as styling, reliability, price, safety, weight, configuration, NVH, handling & riding, maintenance, etc.
- ❖ Evaluation results are displayed in the form of radar chart to better demonstrate Side by Side results.



- ❖ Material identification and usage proportional distribution in the compared vehicles.
- ❖ Results are presented in the Side-by-Side cumulative percentage comparison histogram to demonstrate the trend of lightweight in recent years.





3

Siemens

Operational NVH and BIW Characterization Reports

There are two Siemens reports intended for customers with a need for deeper knowledge in specific areas. Siemens, a world expert in NVH has teamed up with Munro to fingerprint Tesla 3 for NVH and BIW performance.

These reports are available for purchasers regardless of the other report purchases.

a. Tesla 3 Operational NVH Evaluation

On road operational NVH performance at standard operating conditions

- Sound pressure levels at occupant ear
- Sound quality indices – Articulation index, loudness ...
- Tactile response at steering wheel and seat track

b. Tesla 3 BIW Dynamic Characterization*

BIW (with Glazing) characterization for:

- Global modal frequencies and mode shapes
- Global Static stiffness – Torsion and vertical bending
- Body attachment point stiffness

* *Evaluation was done on the BIW with and without battery*



FAQ (Frequently Asked Questions)

- ❖ Was Tesla involved in the study?
No, Tesla proprietary costs nor any Tesla 3 suppliers quoted costs were used in this study.
- ❖ Is there any Tesla 3 propriety (stolen) IP in this report?
No. All data was developed through Munro's proven methodologies from the purchased production Tesla 3
- ❖ Is the car costed using only NAFTA costing centers?
Yes, Munro includes labor, factory floor cost, taxes and SG&A for OEM or Tier Suppliers.
- ❖ Is this a Costing or Pricing report?
This is a Costing Report. Pricing has too many variables.

Legal Disclaimers & Sales Condition

- ❖ How can I see the sample report before purchasing?
Please contact your regional Munro salesperson. They can provide sample information in digital PDF format NOTE: critical data will be hidden in the sample.
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Internal Company correspondence is authorized.
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- ❖ If there is a request for someone from Munro to visit and to explain in detail the report, is it possible to do or is it included in the price of report?
No, it is not included in the price of report.
Munro will visit if the customer pays for the travel and daily fee.
- ❖ If there are a few but specific questions on the content of report, is it possible to support a phone or e-mail communication?
Yes, please contact the local area salesperson and we will respond with our answers.