J.D. POWER

U.S. Initial Quality Study℠ (IQS)

BACKGROUND

June 2018

Global Automotive Division

At A Glance

The *J.D. Power U.S. Initial Quality Study^{SM} (IQS)* provides a measurement of owner-reported problems during the first 90 days of ownership. Information for the study was gathered via an online survey of owners who registered their 2018 model-year vehicle between November 2017 and February 2018. These owners were surveyed between February and May 2018. Survey invitations were mailed to a random, national sample of vehicle owners. Quota sampling was conducted at the model series level, and the results were then weighted to reflect vehicle sales and ensure that the *IQS* results are representative of the overall marketplace.

Survey responses are reported using problems per 100 vehicles (PP100) as the unit of analysis. Each model's PP100 score is the average number of problems reported per 100 vehicles. A lower PP100 score reflects higher quality, indicating that owners have experienced fewer problems, on average.

Each of the 233 problems included in the study is classified into one of eight categories, and is also identified as either a Design problem, Defect/Malfunction problem, or Other (unspecified) problem:

- Design problems generally refer to components or features that may be functioning properly but are still perceived as problems by owners because they are difficult to understand or use. Examples include controls that are overly complicated or features that are difficult to operate due to poor location.
- Defect/Malfunction problems generally refer to a complete breakdown or malfunction of any component, feature, or item. Examples include components that stop functioning and trim pieces that break or come loose.
- Other (unspecified) problems are those that cannot be classified into an existing Design or Defect/Malfunction problem.

233 Problem Breakdown

Problem Category	Design	Defect/ Malfunction	Other (unspecified)	Total
Exterior	9	30	1	40
Driving Experience	8	12	1	21
Features/Controls/Displays (FCD)	27	28	1	56
Audio/Communication/Entertainment/Navigation (ACEN)	8	4	1	13
Seats	12	13	1	26
Heating, Ventilation, and Air Conditioning (HVAC)	7	4	1	12
Interior	9	32	1	42
Engine/Transmission	8	14	1	23
Total	88	137	8	233

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At A Glance (continued)

Awards are presented to:
- The plant assembly lines that produce the most problem-free vehicles in the Americas, Asia, and Europe-Africa (only Defect/Malfunction problems are included in the assessment)
- The vehicle(s) in each segment with the lowest PP100 score

Methodology

The specific criteria used to determine the sample for the study are as follows:
- Purchasers and lessees of new 2018 model-year cars and light trucks
- Vehicles registered for personal use only
- Vehicles registered during November and December 2017 and January and February 2018
- Sample obtained from a national random selection of vehicle registrations from IHS Automotive (formerly R. L. Polk & Co.)

Registration Month	Nov	Dec	Jan	Feb
Survey Month	Feb	Mar	Apr	May

Invitations to an online survey were mailed to new-vehicle owners after approximately 90 days of ownership, and included:
- $1 incentive
- Opportunity to enter a sweepstakes for a chance to win $100,000

Reminder postcards were sent one week after the invitation was mailed.

A target of 450 total returns was established for each individual model series. Additionally, a secondary target of 100 returns per assembly line location was set, where feasible. A minimum sample of 100 returns is deemed sufficient to ensure statistical accuracy and validity.

75,712	11%	240
Returns	**Response Rate**	**Models**

Methodology (continued)

A detailed list of model series, registration counts, mailout counts, and returns is included in the Exhibits.

Returned questionnaires are also cleaned to eliminate inaccuracies and "impossible" answers based on respondent answers.

Sales Weighting

All returns are weighted against each model's sales availability (based on personal-use registrations for the time period as provided by IHS Automotive) to ensure the mix of models accurately reflects the marketplace.

$$\text{Sales Weight} = \frac{\text{Total Registrations (Population)}}{\text{Actual Ending Sample (Returns)}}$$

PP100 scores are also aggregated to generate make and segment PP100 scores. Although these scores can be useful, one should be mindful of the role of model mix and the sometimes dramatic impact it may have on a given make or segment score. For example, a make's PP100 score may change year over year due to model mix changes, even when the individual model scores for that make remain unchanged.

Equivalent Sample

Equivalent sample is an indication of how robust the sample is in relation to the population and provides an allowance for small populations. If the population is small but the response rate is high enough, an actual sample of less than 100 may provide as much confidence in the data as an actual sample of 100 or more taken from a larger population. Equivalent sample allows the comparison of models with low availability and small market population, relative to the rest of the industry.

$$\text{Equivalent Sample} = \frac{\text{Returns} \ \ X \ \ \text{Population}}{\text{Population} \ \ - \ \ \text{Returns}}$$

(Please note: This calculation is not used for assembly lines. Sample methodologies target model-level availability, and J.D. Power does not receive assembly line availability counts from IHS Automotive.)

Equivalent Sample (continued)

There are other considerations taken into account to ensure a relevant and reliable calculation:

- The personal-use vehicle registration population must be greater than 100.
- The calculated population cannot exceed the actual population, as this would indicate the results are based on a population that does not yet exist.

Regardless of the equivalent sample size, if the actual sample size is less than 30 or the population is less than 100, the model is not considered to have an adequate sample.

Sample Size		Notation
100 or greater	Adequate Sample	
30 – 99	Small Sample	*
29 or fewer	Insufficient Sample	#

History

1987	Study inception
1998	Study redesigned. The objective was to provide additional diagnostic information to the industry about owner-reported problems and update the survey to provide better coverage of new vehicle technologies.
2006	Study redesigned. As in 1998, the goal of the redesign process was to provide improved diagnostic information and update the survey to provide more comprehensive coverage of new vehicle technologies. This redesign also included the addition of significantly more "write-in" space to allow owners to provide additional information about the problems they report.
2013	Study redesigned. As in the previous redesigns, the goal was to provide more comprehensive coverage of new vehicle technologies, as well as much greater detailed information to help explain the problems. The movement of the study from paper to online facilitated this additional detail.