# Q-VIEW 2.1 QA/QC Software

## Quality Assessment and Discharge All-in-One Reporting

The quality assessment of moving-boat ADCP streamflow measurements is critically important but it can often be a challenging and highly technical task. Teledyne RDI's newly updated **Q-View 2.1 QA/QC Software** overcomes these complex issues and provides a unified quality assessment framework that is accessible to all ADCP users independent of their level of expertise.

This newly updated software includes state-of-the-art methodologies for uncertainty analysis and statistical quality control, which helps gain insights into the quality of your data.

**Q-VIEW delivers:**

- All-in-One professional report that combines a summary of discharge results with a comprehensive quality assessment
- In-depth qualification of discharge measurements including:
  - A single universally-accepted measurement quality score and 100 point grading system
  - Uncertainty-based quality control
  - Discharge measurement sensitivity analysis
  - Detailed discharge statistics
  - Uncertainty analysis for both individual transects and the entire measurement

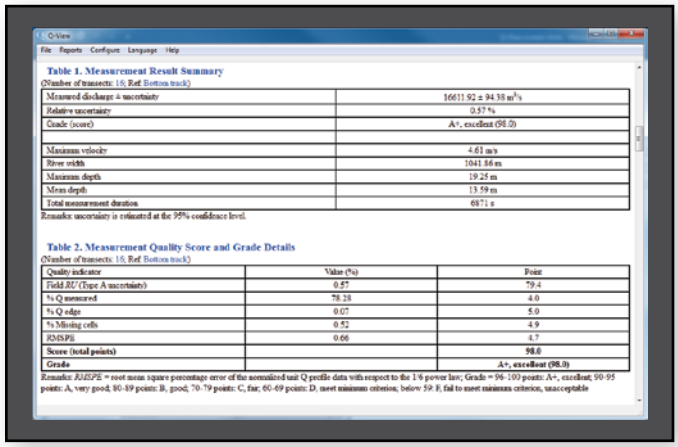


**Table 1. Measurement Result Summary**

(Number of transects: 16, Ref: Bottom track)

| | |
|---|---|
| Measured discharge ± uncertainty | 16611.92 ± 94.38 m³/s |
| Relative uncertainty | 0.57 % |
| Grade (score) | A+, excellent (98.0) |
| | |
| Maximum velocity | 4.61 m/s |
| River width | 1041.86 m |
| Maximum depth | 19.25 m |
| Mean depth | 13.59 m |
| Total measurement duration | 6871 s |

Remarks: uncertainty is estimated at the 95% confidence level.

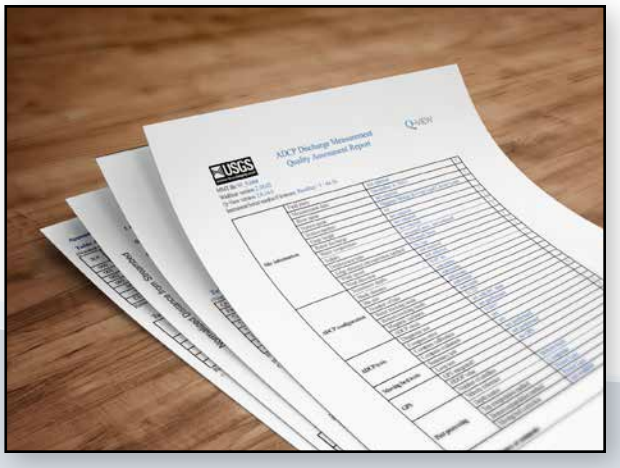
**Table 2. Measurement Quality Score and Grade Details**

(Number of transects: 16, Ref: Bottom track)

| Quality indicator | Value (%) | Point |
|---|---|---|
| Field *RU* (Type A uncertainty) | 0.57 | 79.4 |
| % Q measured | 78.28 | 4.0 |
| % Q edge | 0.07 | 5.0 |
| % Missing cells | 0.52 | 4.9 |
| *RMSPE* | 0.66 | 4.7 |
| **Score (total points)** | | **98.0** |
| **Grade** | | **A+, excellent (98.0)** |

Remarks: *RMSPE* = root mean square percentage error of the normalized unit Q profile data with respect to the 1/6 power law; Grade = 96-100 points: A+, excellent; 90-95 points: A, very good; 80-89 points: B, good; 70-79 points: C, fair; 60-69 points: D, meet minimum criterion; below 59: F, fail to meet minimum criterion, unacceptable

*Figure 1: Tables 1 and 2: Q-View 2.1 report including a measurement summary and measurement quality score*



- Instant data qualification for the field user, saving you valuable time, while ensuring that you've collected the data set you need
- Accelerated processing, allowing you to create multiple data reports and analyses in a fraction of the time
- Seamless, user-friendly integration with WinRiver II, eliminating the need to learn a new software platform

### Built-in Quality Grading Systems

Q-View has two built-in quality grading systems: TRDI's new 100-point grading system and an Australian grading system, to provide a quantitative measure of the overall quality of moving-boat ADCP streamflow measurements. The 100-point rating scale is analogous to the well-known 100-point wine rating scale, and the American high school grading system. Based on the scoring for five important quality indicators, Q-View generates a final score that can then be graded accordingly to a standardized and universally familiar system based on: A+ (excellent), A (very good), B (good), C (fair), D (meet minimum criterion), or F (fail to meet minimum criterion, unacceptable).

TELEDYNE MARINE

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These two grading systems help emphasize a due diligence by the ADCP user for following standard quality assurance procedures, while quickly identifying any non-compliance. In Figure 1, Table 1 shows an example of a measurement summary; Table 2 shows an example of a measurement quality score and grade details.

### Uncertainty Analysis and Uncertainty-based Statistical Quality Control

Quantifying the measurement uncertainty is rapidly being adopted as one of the best methods of providing a direct metric for measurement quality. Q-View estimates the so-called Type A uncertainty by analyzing discharge data collected from multiple transects made under steady flow conditions. Q-View displays the uncertainty control chart based on a recently developed theory for statistical quality control of moving-boat ADCP streamflow measurements. The uncertainty control chart provides a visual qualification against acceptance criteria. This allows users to observe changes in the overall measurement and data quality from one transect to another, with a clear qualification threshold. Figure 1 shows an example of uncertainty control charts.

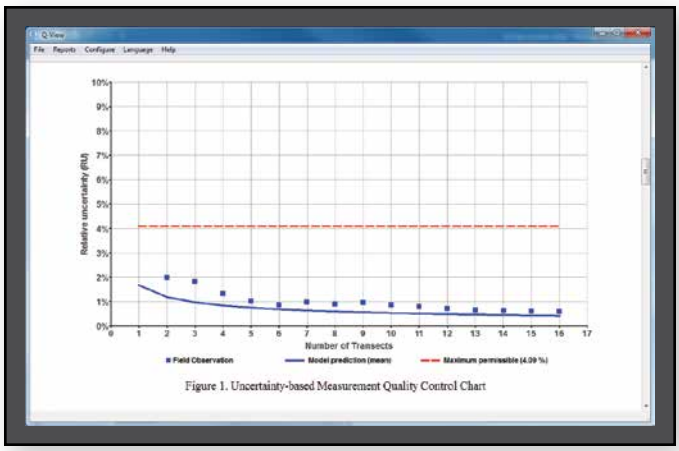


***Figure 2:*** *Q-View 2.1 Uncertainty-based Measurement Quality Control Chart*

### Built-in Uncertainty Model for Single Transect Discharge

Q-View has a built-in sophisticated model for estimating the uncertainty of a single transect discharge measurement. An important benefit of this uncertainty model is that it can be used for all conditions, not only for steady flow, but also for unsteady flow conditions such as tidal or flood flows. In unsteady flow conditions, the usual uncertainty analysis is impracticable. This uncertainty model was calibrated using 205 transect datasets and verified with an additional 382 transect datasets. It provides a useful tool for uncertainty analysis and uncertainty-based measurement quality control of moving-boat ADCP streamflow measurements.

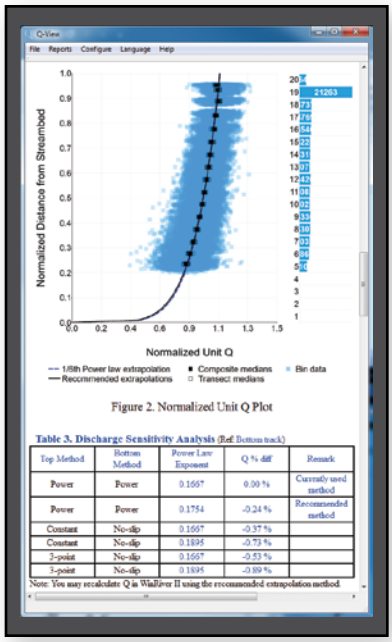


***Figure 3:*** *Q-View 2.1 Normalized Unit Q Plot and Table*

### Discharge Sensitivity Analysis

Q-View provides discharge sensitivity analysis that automatically determines the best extrapolation method for the unmeasured top and bottom layers. It includes:

- Graphical display of normalized unit discharge vs depth data for visualization of the profile
- Individual ensemble/bin values
- Average profile values vs depth
- Fitted extrapolation curve
- Summary of extrapolation methods used and Recommended
- Sensitivity analysis showing projected impact of various extrapolation methods on computed discharge

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