



## Test Monitoring Center

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Sequence IVA Information Letter No. 08-1  
Sequence No. 16  
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***ASTM consensus has not been obtained on this information letter. An appropriate ASTM ballot will be issued in order to achieve such consensus.***

TO: Sequence IVA Mailing List

SUBJECT: 1. Quality Index Calculations  
2. Editorial Changes

1. At the November 12, 2008 Sequence IVA Surveillance Panel Meeting, the panel agreed to add equations to ensure correct Quality Index (QI) calculations, including situations where missing or Bad Quality Data (BQD) are encountered. Section 6.3.1.4 of Test Method D 6891 has been revised to include the equation for calculating QI, as well as the equation for calculating an adjusted QI when missing or BQD are encountered.
2. An obvious typographical error was noted in Section 11.2.6.3, (2). The section made reference to 120 rpm, rather than the correct value of 1200 rpm. A revised Section 11.2.6.3, (2) is attached.

The attached changes to Test Method D 6891 are effective the date of this information letter.

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Chairman  
Sequence IVA Surveillance Panel

John L. Zalar  
Administrator  
ASTM Test Monitoring Center

Attachment

c: [ftp://ftp.astmtmc.cmu.edu/documents/gas/sequenceiv/procedures\\_and\\_ils/ivail08-1-16.pdf](ftp://ftp.astmtmc.cmu.edu/documents/gas/sequenceiv/procedures_and_ils/ivail08-1-16.pdf)

Distribution: Electronic Mail

6.3.1.4 *Quality Index*—The Quality Index (QI) is an overall statistical measure of the variation from test targets of the steady-state operational controlled parameters. The Sequence IVA Surveillance Panel has chosen the QI upper and lower control limits, shown in Table 3.

(1) Calculate QI using the following equation.

$$QI = 1 - \frac{1}{n} \sum_{i=1}^n \left( \frac{U + L - 2X_i}{U - L} \right)^2 \quad (1)$$

where:

- $X_i$  = values of the parameter measured
- $U$  = allowable upper limit of  $X$
- $L$  = allowable lower limit of  $X$
- $n$  = number of data points used to calculate QI

(2) Where missing or Bad Quality Data (BQD) or both are encountered, calculate the adjusted Quality Index ( $QI_{ADJ}$ ) using the following equation.

$$QI_{ADJ} = QI \left( \frac{n}{N} \right) + QI \left( \frac{n}{N} \right) x \left( \frac{N-n}{N} \right) \quad (2)$$

where:

- $QI$  = QI calculated without missing/BQD points
- $n$  = number of data points used to calculate QI
- $N$  = number of data points for a complete data set

(3) If the QI calculation of a controlled parameter is less than zero, investigate the reason, assess its impact on test operational validity, and document such finding in the final test report. For calibration tests, review the operational validity assessment with the TMC.

#### 11.2.6.3

(2) After Stage II, decrease the engine speed with minimal undershoot from a nominal 1500 rpm to the Stage I engine speed target of 800 rpm. Do not allow speed to drop below 750 rpm during the transition. The transitory time is defined as the first 5 min of Stage I, following the end of Stage II. At 30 s into the ramp, the engine speed shall range from 1100 to 1200 rpm. At 60 s into the ramp, the engine speed shall range from 800 to 900 rpm. By the end of the 5 min ramp, stabilize the engine speed at  $800 \pm 20$  rpm.

Existing equation (1), Section 11.5.1, is renumbered as equation (3).