IIIH Task Force Matrix Test Re-run Test Validation Conference Call
November 3, 2015 09:00 Central 10:00 Eastern
Call-in 713-222-0377
Pass Code 5214824464

Attendees:

The secretary was unable to catch all the attendees due to some people having problems calling in by phone and others using the computer to call in.

Chrysler: Haiying Tang
Shell: Karin Haumann, Scott Lindholm
Oronite: Jo Martinez, Kaustav Sinha, Robert Stockwell
Afton: Ed Altman
Ashland: Amol Savant
Infineum: Andy Ritchie, Gordon Farnsworth, Mike McMillan, Doyle Boese
Lubrizol: George Szappanos, Kevin OMalley, Jerry Brys
Intertek: Adison Schweitzer
SwRI: Ankit Chaudhry, Travis Kostan, Sid Clark, Pat Lang
TMC: Rich Grundza
OHT: Jason Bowden
IMTS: Dave Passmore
Neste: Chris Castanien
Ford: Ron Romano
Idemitsu: Scott Rajala
Toyota: Teri Kowalski, Hirano Satoshi

After spending some time getting everyone connected via phone or computer, Addison Schweitzer reviewed the data from the outstanding tests for CMIR-111422 and CMIR-106783. (See Attachments #1, QI Plots from Repeat runs of Matrix tests.pdf and #2 Non QI Parameters from 4th round and repeat tests.pdf)

The group discussed both sets of data with Addison commenting everything looked good on his review with exception on a left side exhaust thermocouple problem that was corrected on a non controlled parameter.

Motion: Addison Schweitzer / Karin Haumann
After review Adison Schweitzer, made a motion to accept tests 111422 and 106783 as valid tests for the Precision Matrix.

The group continued discussion looking at oil pressure plots comparing oil pump pressures vs gallery pressures. After some discussion the group agreed the engine does exhibit varying oil pressures between pump and gallery pressures. Discussions continued focused on filter by-pass and variable pump operations. George Szappanos commented Lubrizol had run some

tests controlling the gallery and pump pressures and did not find any real correlation to test severity results.

Karin called the question asking if there were any negatives, or waves?
The motion passed unanimously.
Robert Stockwell asked to make a few comments; commenting that there seemed to be a lot of pushback on the Chrysler IIIH Test regarding test variability last week during the Sequence III Surveillance Panel Meeting. Robert commented on test variability possibly not being fully understood at this time and the reference oils;

438-1 was blended twelve years later than 438 and we may not really know how it performs. 434-2 may be more variable than we thought, and there are a couple data points that are really good results that show it where 434-2 doesn't separate from 436. Robert indicated the really low Pvis 434-2 test results show it only exhibits half the EOT TAN and Oxidation as any of the other 434-2 tests. Robert suggests we really look closely at this test to identify any possible cause for this result. Robert also talked about test CMIR 107872 as being another influential observation, suggesting we look closer at these tests as they really make the test look bad and he doesn't think the test is bad. Robert suggested a group look closely at these tests looking at control valve positioning and other parameters to identify possible causes for these observations.

Ed Altman commented he has been working with internal operations and talking with George Szappanos about controls and the results on these tests. George commented abnormalities in crankcase pressures on these tests being very unusual when looking at oil pressure data oscillations during the first 20 hours. Ed indicated crankcase pressure is something he doesn't trust in the test due to where the pressure tap is taken from the block. Ed indicates he will continue looking at the tests to see if he can identify any cause.

Kevin OMalley commented he has files and the group discussed possibly working with the lab guys to review this data, i.e., operational data, chemical data, and other ideas we might look at.

Karin commented that she felt the lab group looking at the data might be more advisable than the statisticians digging through everything.

George Szappanos set up a Webex call through Lubrizol to review the data, and the group discussed other topics while waiting for everyone to connect.

The group discussed MRV test results and how the raw data was presented. Pat Lang commented about different data file formats asking everyone to send their data to SwRI and they would try to put it into a common format for the review. Pat asked everyone to send the Cell type and length used for the data generation.

The group talked about standardization of IR data being something that Joe Franklin and Mike Birke are working on standardizing for different tests. Karin mentioned they need to have another call to get the correct people involved to continue these efforts.

After several minutes waiting for everyone to connect, the secretary took this opportunity to perform a roll call of the attendees and update the initial attendee list.

After waiting for the majority of the group to get connected to the Lubrizol Webex, the group reviewed a number of plots that Kevin generated in answer to everyone's questions and suggestions. The group reviewed many plotted parameters overlaid over each other and discussed many analytical results.

The group asked questions and offered up suggestions as to ideas that could possibly have contributed to the influential test results, including oil additions, blowby configurations, crankcase pressures, and correlations to Oxidation and Nitration with Pvis results.

After fielding many suggestions and questions, the group decided they needed to have an additional meeting to review the data with suggestions from the lab core groups and Karin and George discussed availability and schedules for tentative meetings with Webex data reviews for Wednesday November 4, 2015 from 3:00 to 4:00pm Eastern and Thursday November 5, 2015 from 09:00 to 10:00pm Eastern.

Ed Altman asked if we could find any reason to invalidate these tests, what the data would then show. Kaustav responded he felt the delta between 434-2 and 436 would improve.

In closing, Haiying Tang reiterated the fact that Chrysler has already delayed the Engine Build-out 2 years and they need a formative vote to move forward and conduct the Engine Build-out now.

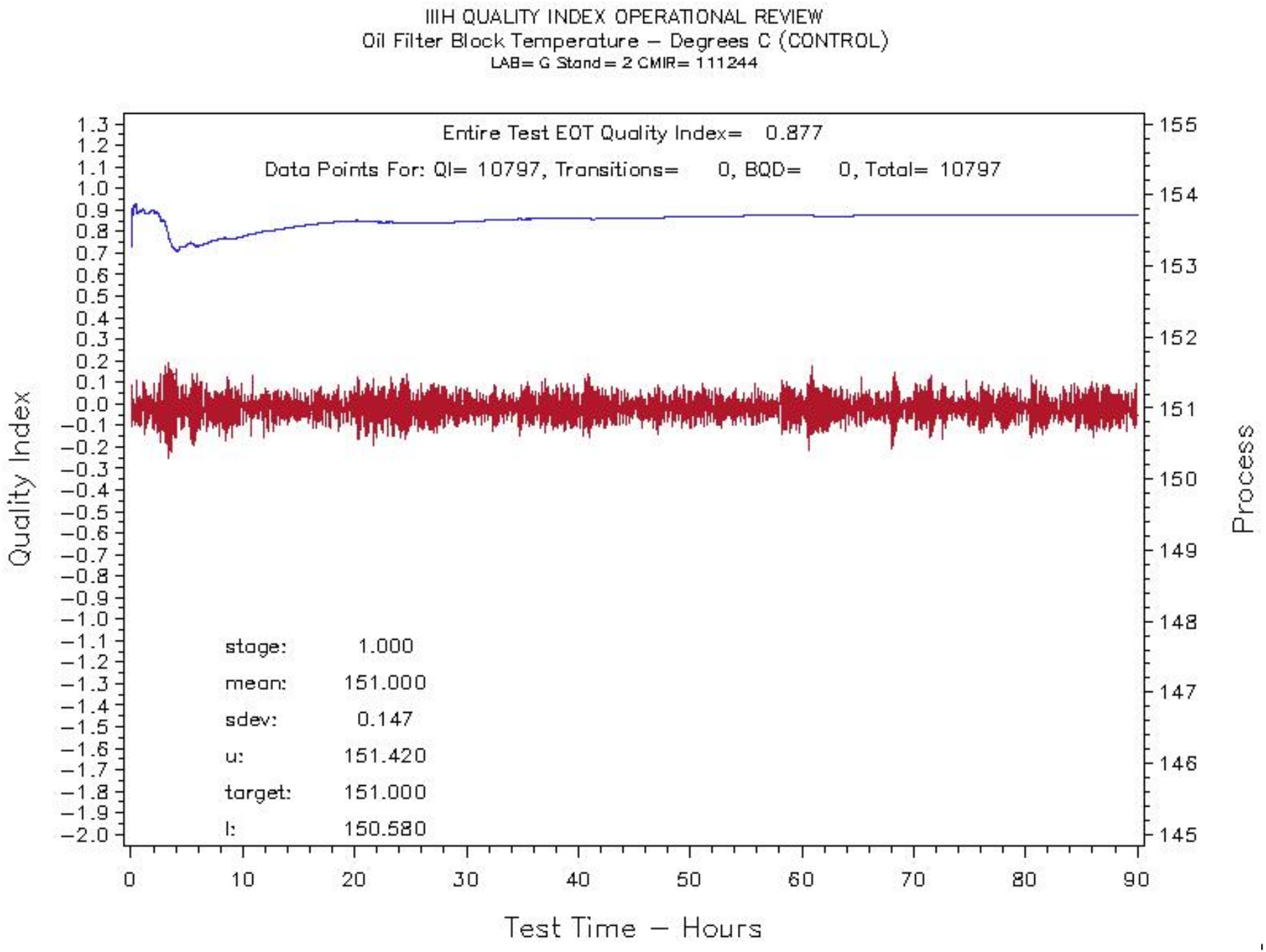
The meeting adjourned at 11:35pm Eastern.

This is a compilation from notes recorded during the call, with comments from member participants during the Draft Review. Certain subjects may not necessarily be in exact order; however, they are believed to represent an accurate account of the call. If anyone feels changes or additional content may be necessary, please contact Sid Clark @ 586-873-1255 or Sidney.Clark@swri.org

Thanks, Sid

QI Plots from Repeat Tests

Block Oil Temperature


IIIH QUALITY INDEX OPERATIONAL REVIEW
Oil Filter Block Temperature – Degrees C (CONTROL)
LAB= G Stand= 2 CMIR= 111244
Entire Test EOT Quality Index= 0.877
Data Points For: QI= 10797, Transitions= 0, BQD= 0, Total= 10797
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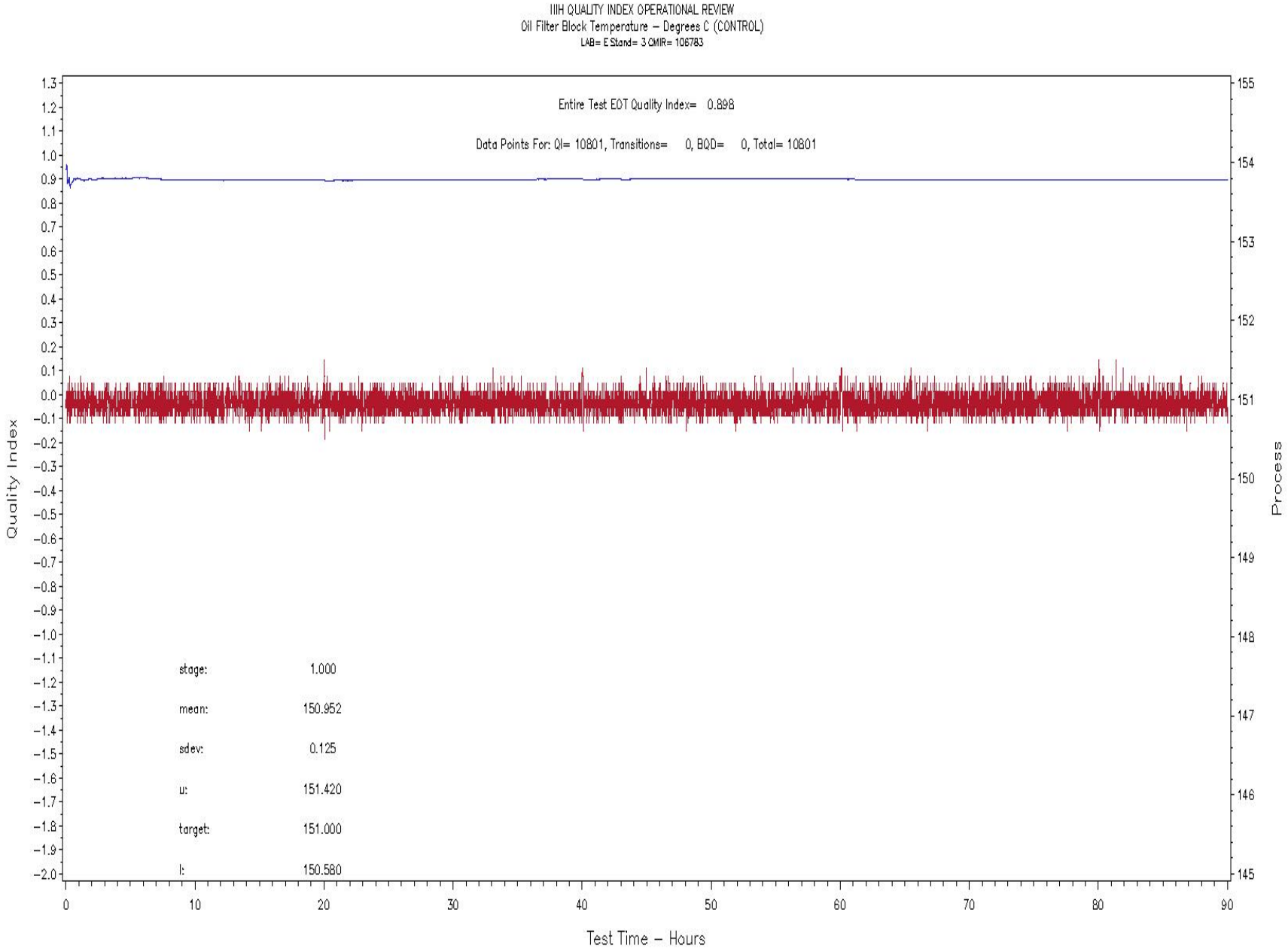
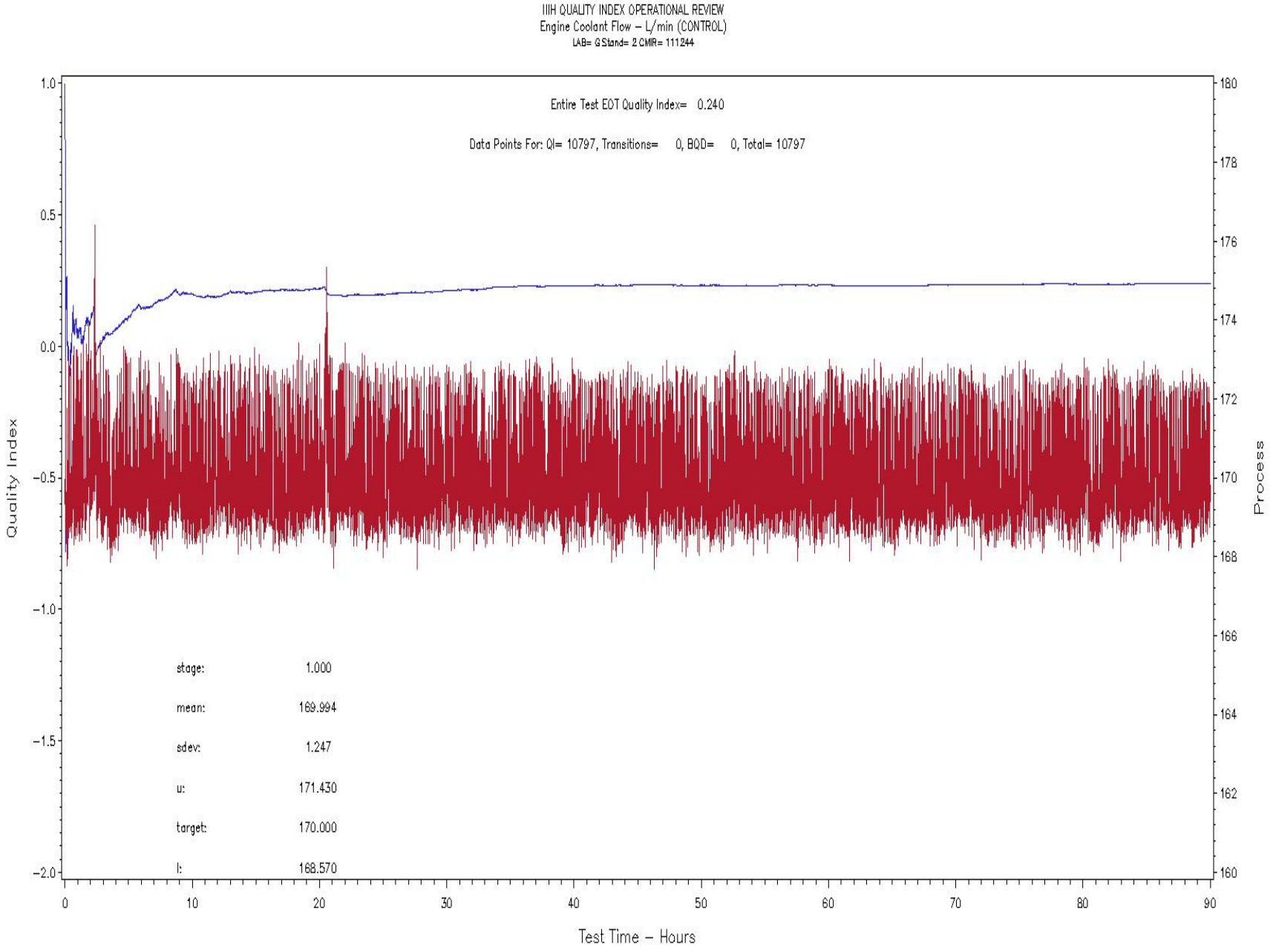
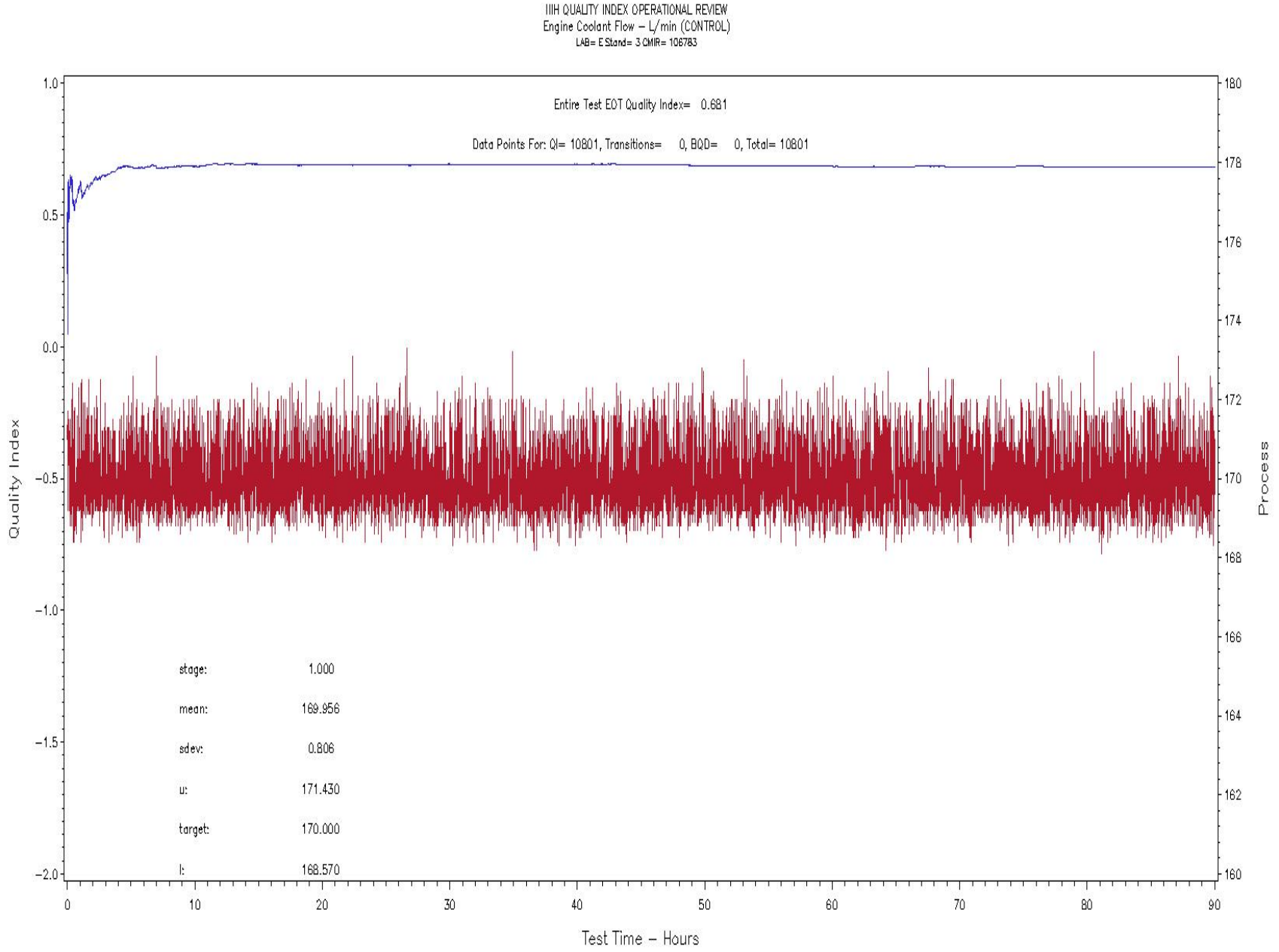
mean: 151.000
sdev: 0.147
u: 151.420
target: 151.000
l: 150.580
Quality Index
Process
Test Time – Hours

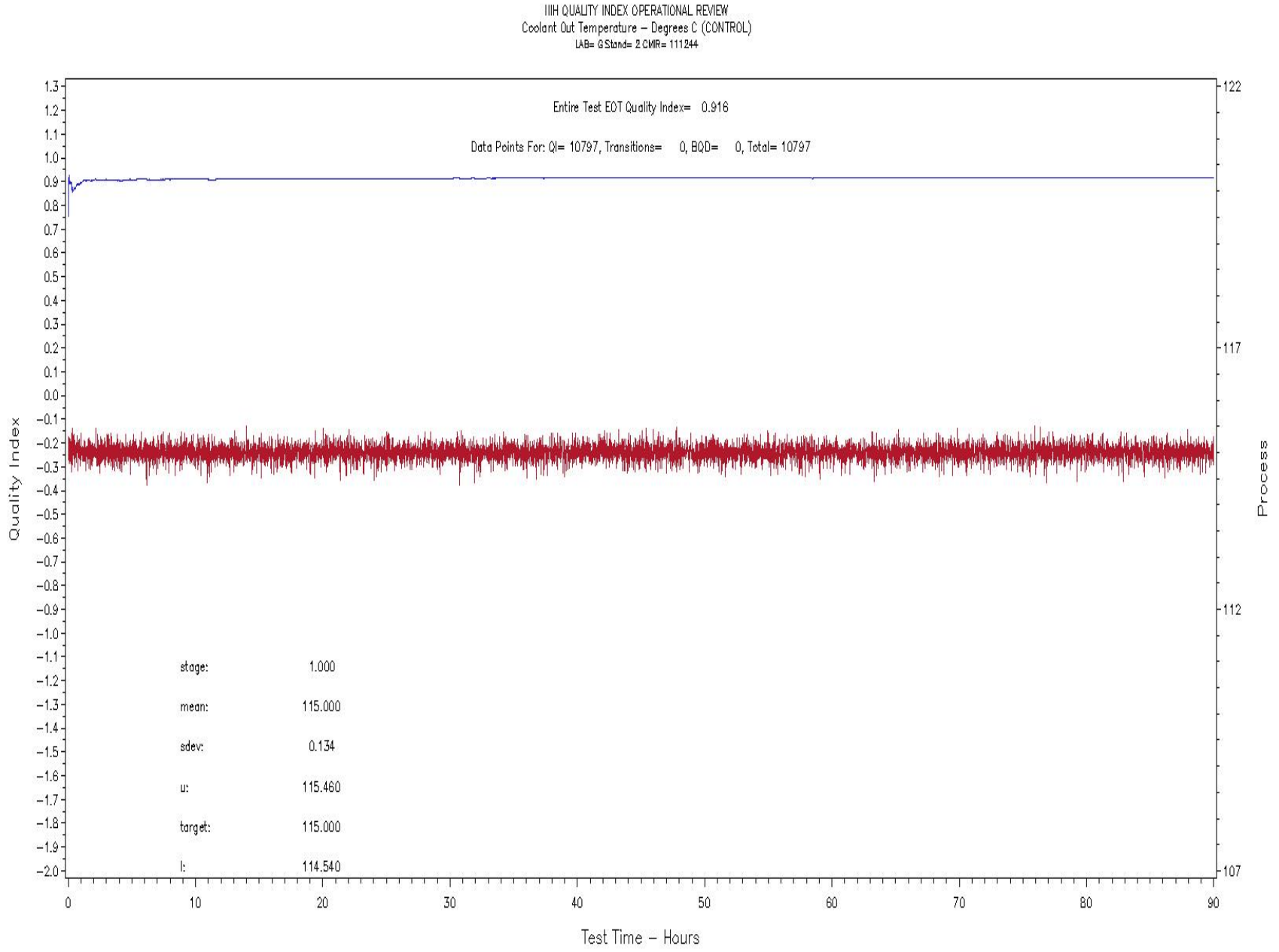


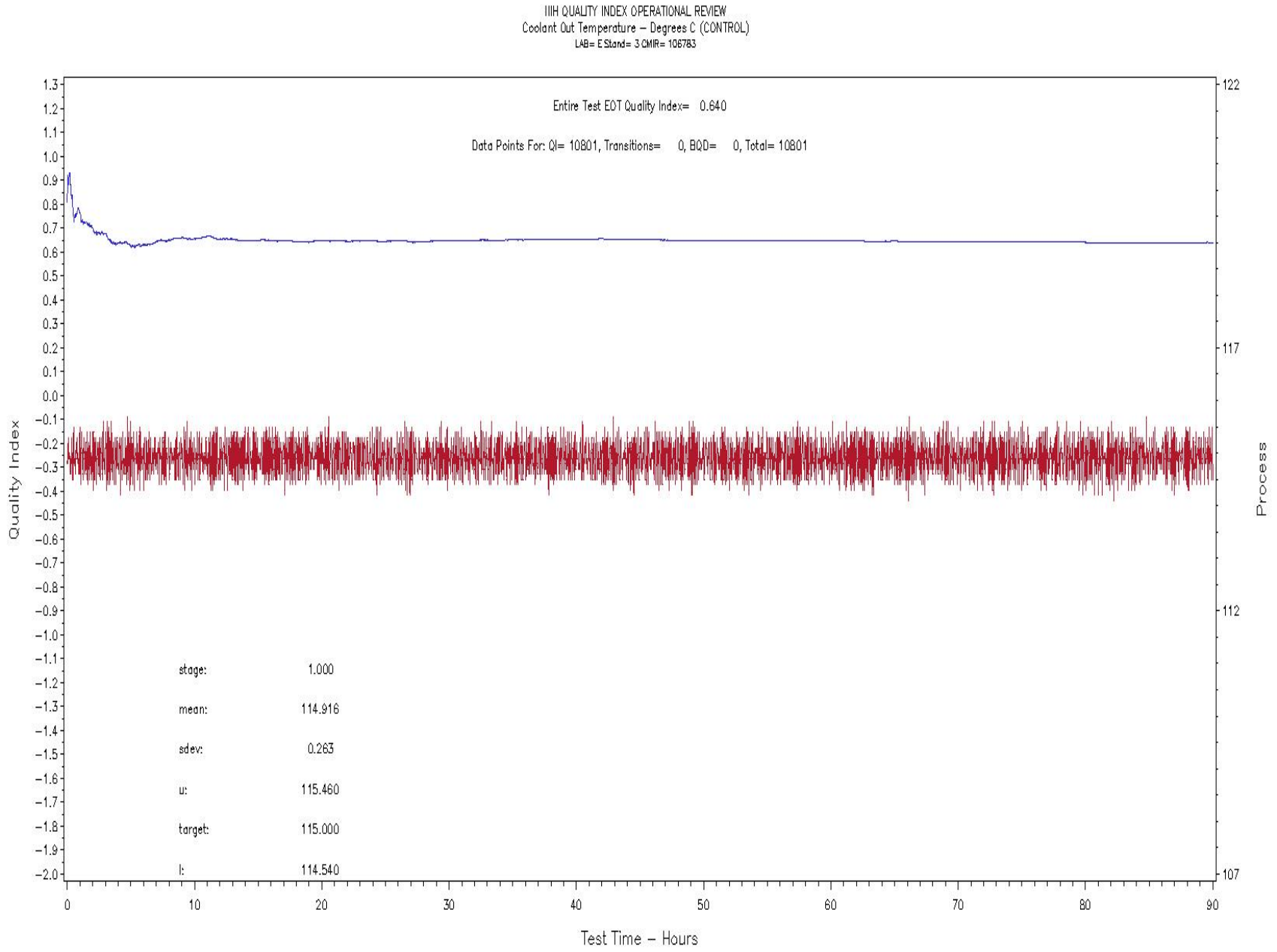
Coolant Flow





Coolant Out Temperature





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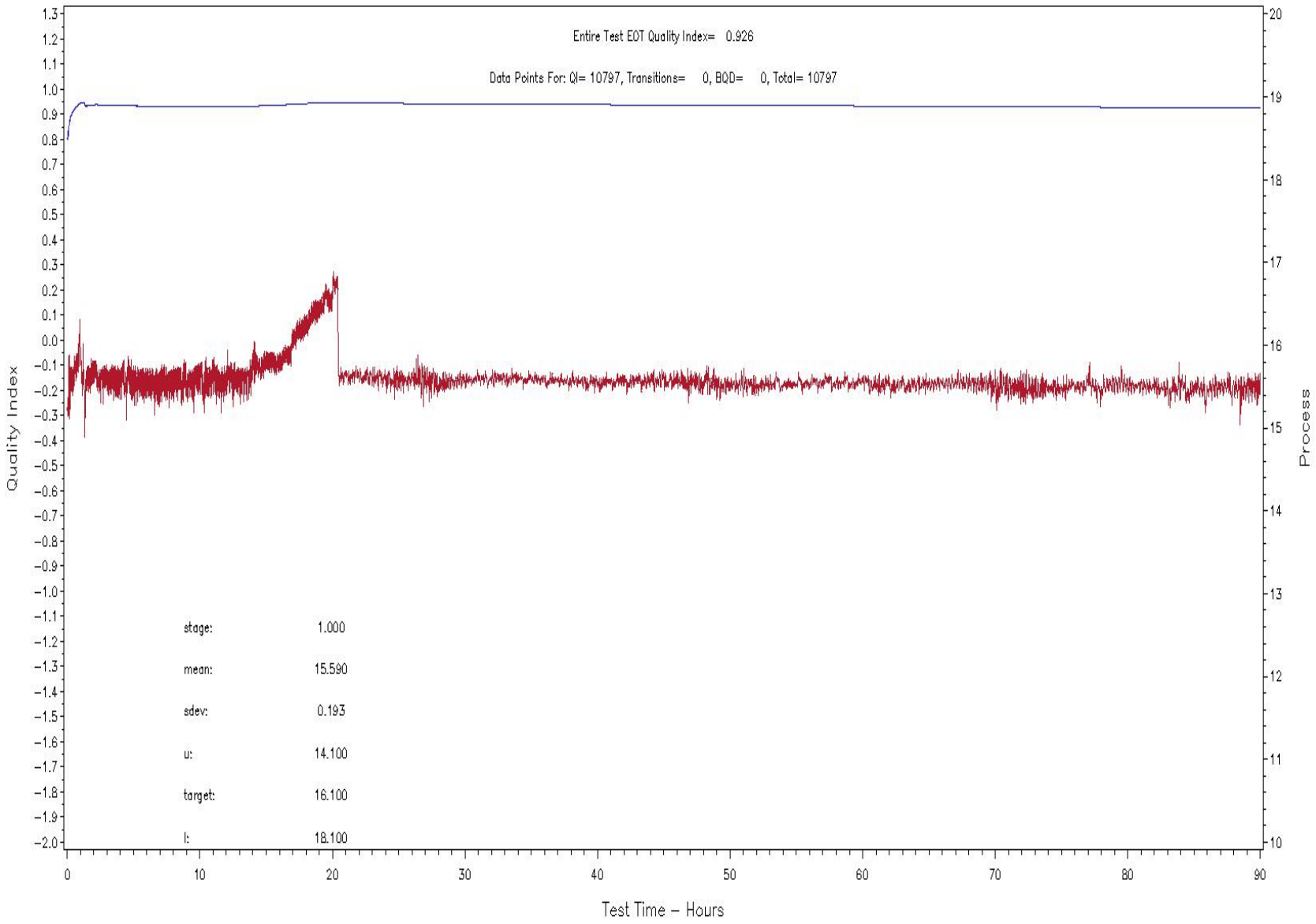
Dew Point Temperature

IIIH QUALITY INDEX OPERATIONAL REVIEW
Inke Air Dew Point Temperature – Degree C (CONTROL)
LAB= GStand= 2 CMR= 111244



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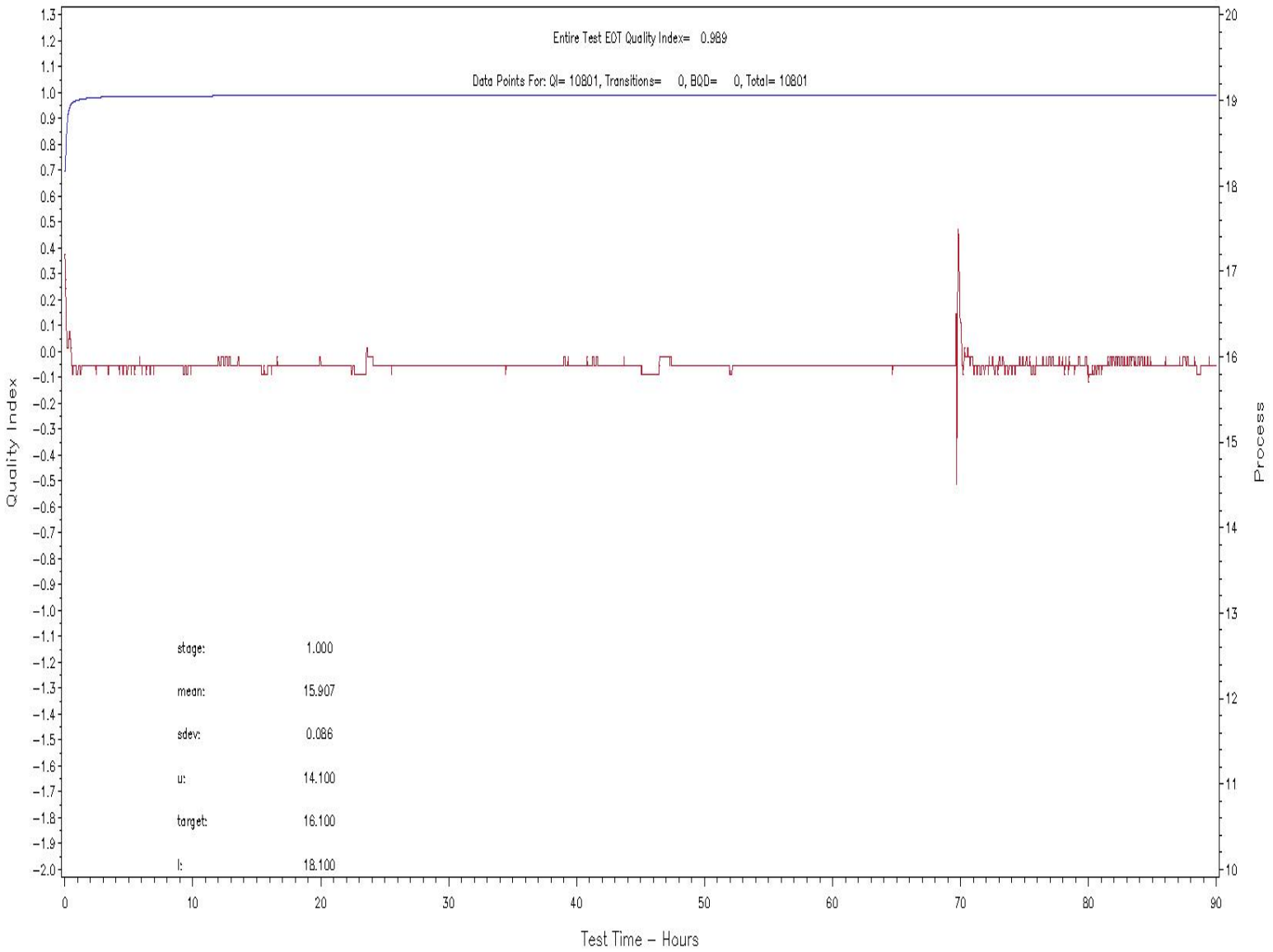
IIIH QUALITY INDEX OPERATIONAL REVIEW
Inke Air Dew Point Temperature – Degree C (CONTROL)
LAB= E Stand= 3 CMR= 106783



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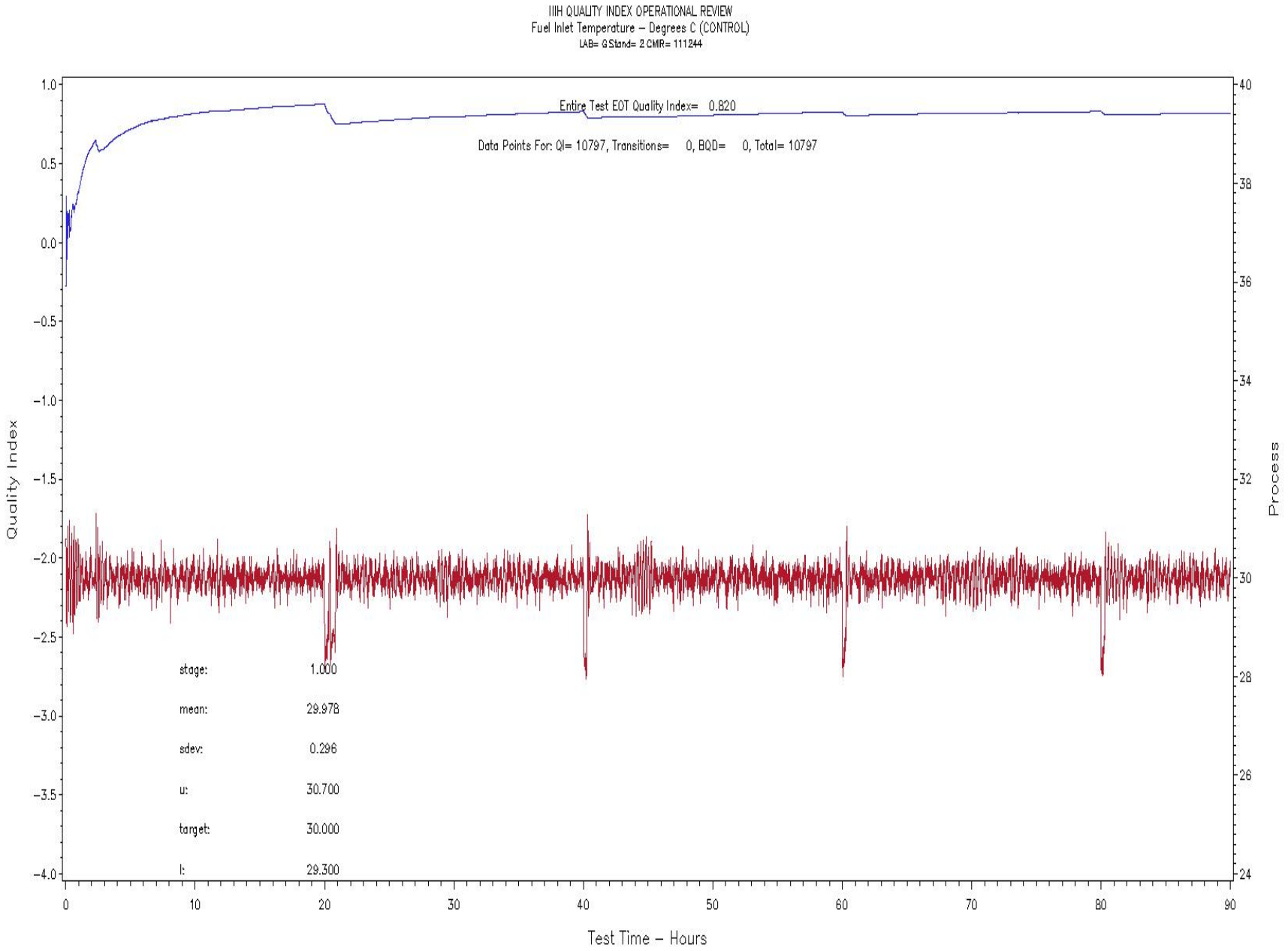
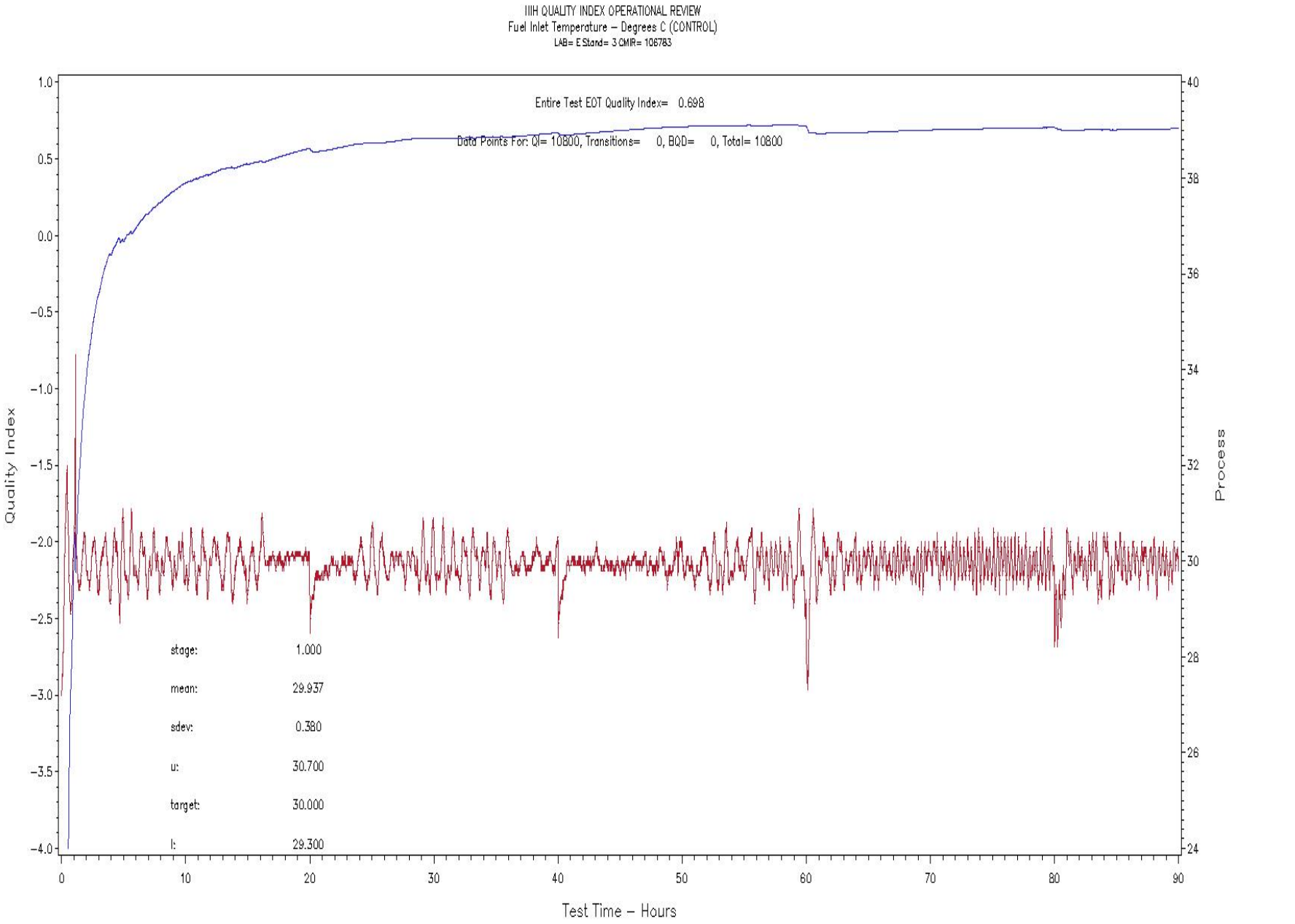
Fuel Temperature





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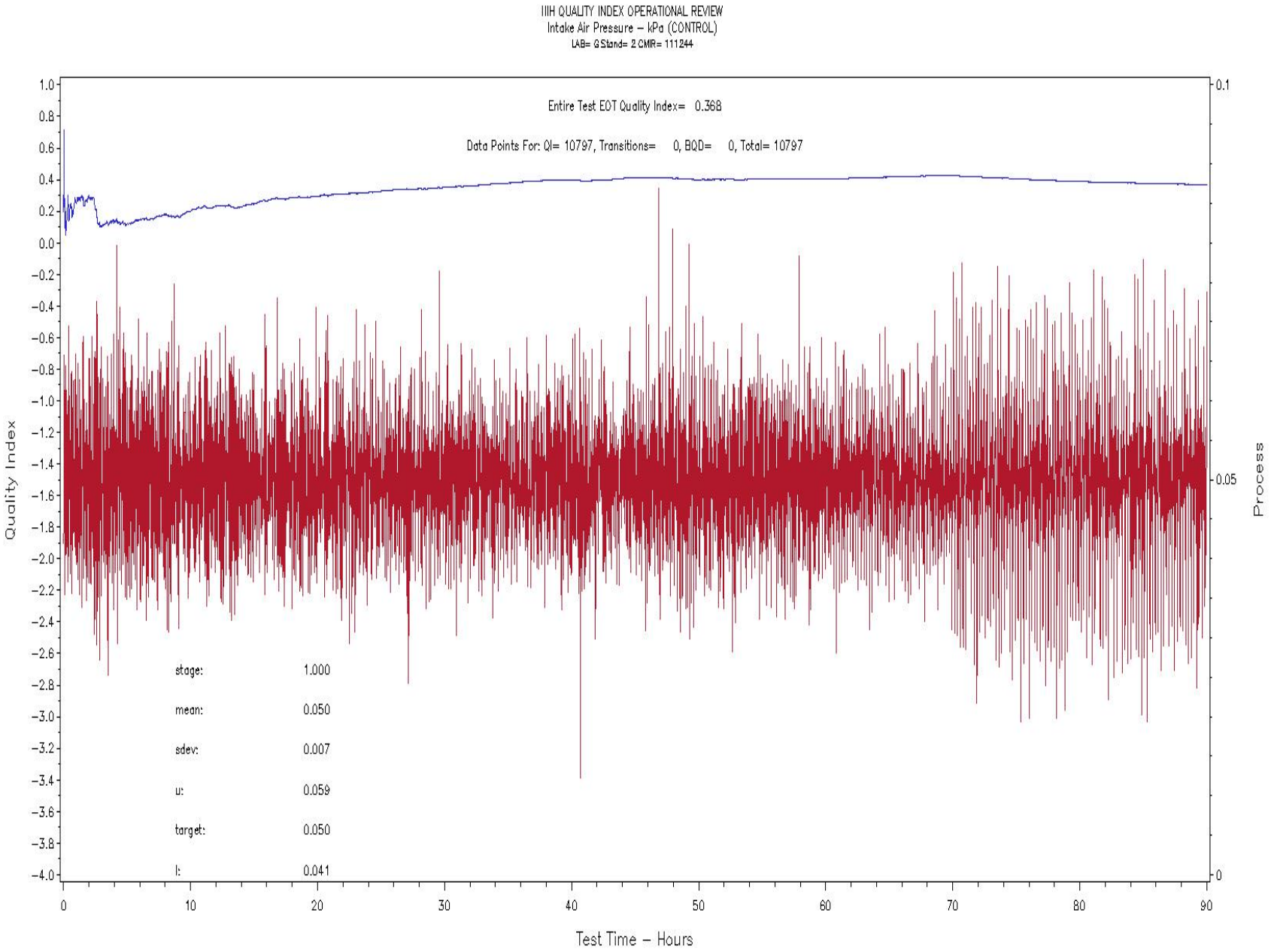
Intake Air Pressure



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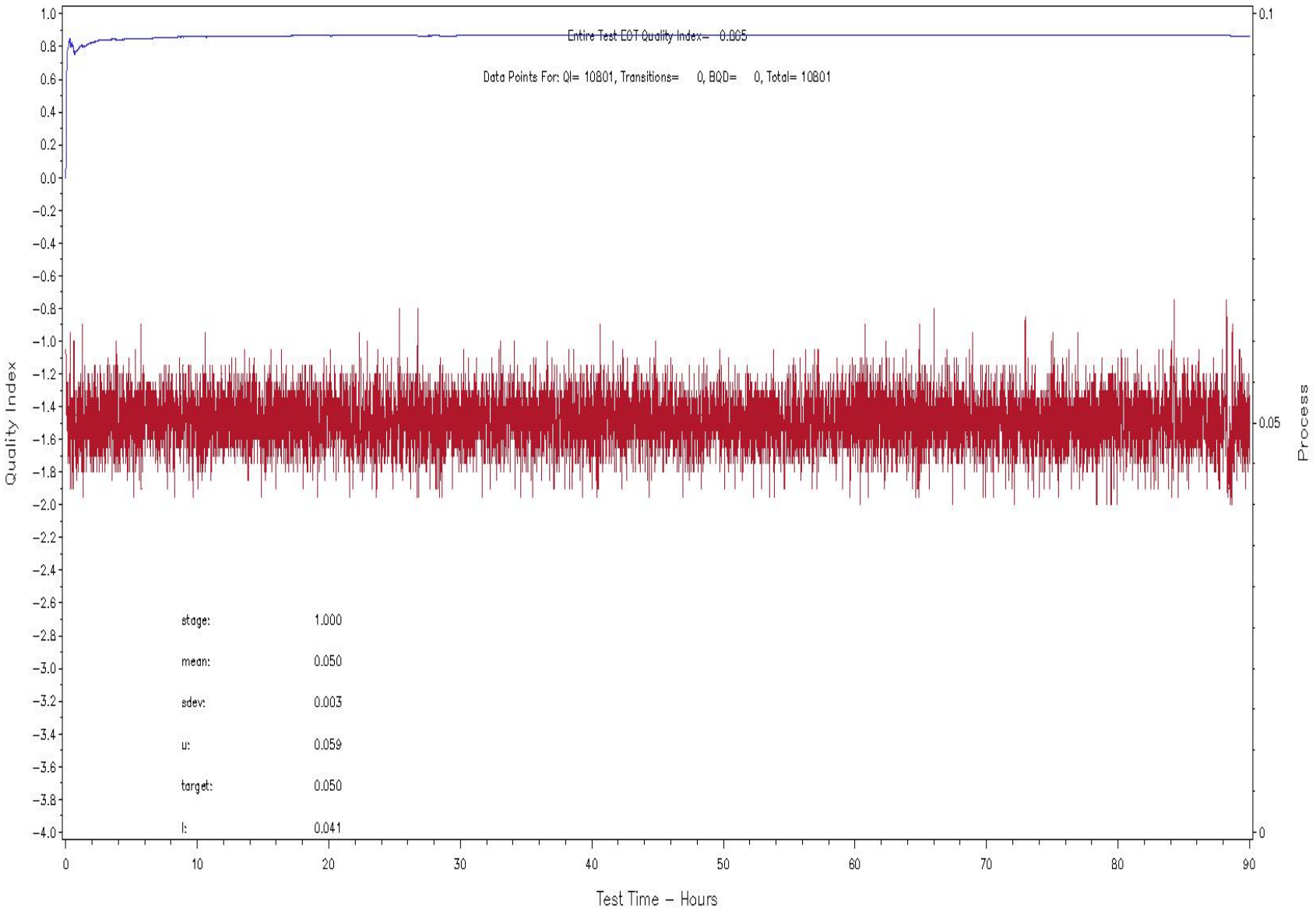
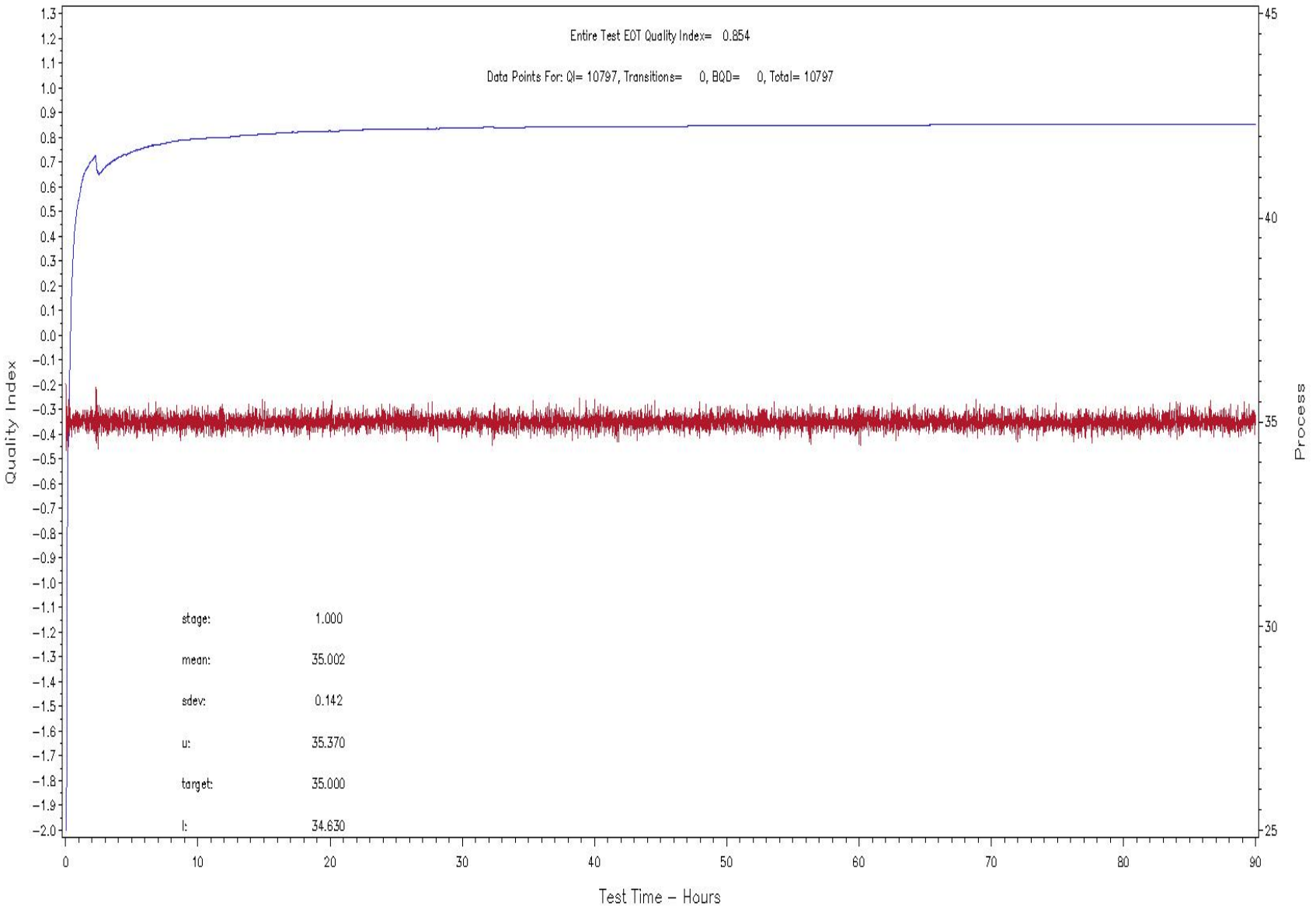
IIIH QUALITY INDEX OPERATIONAL REVIEW
Intake Air Pressure – kPa (CONTROL)
LAB= E Stand= 3 CMIR= 106783



Intake Air Temperature

IIIH QUALITY INDEX OPERATIONAL REVIEW
Intake Air Temperature – Degrees C (CONTROL)
LAB= GStand= 2 CMR= 111244



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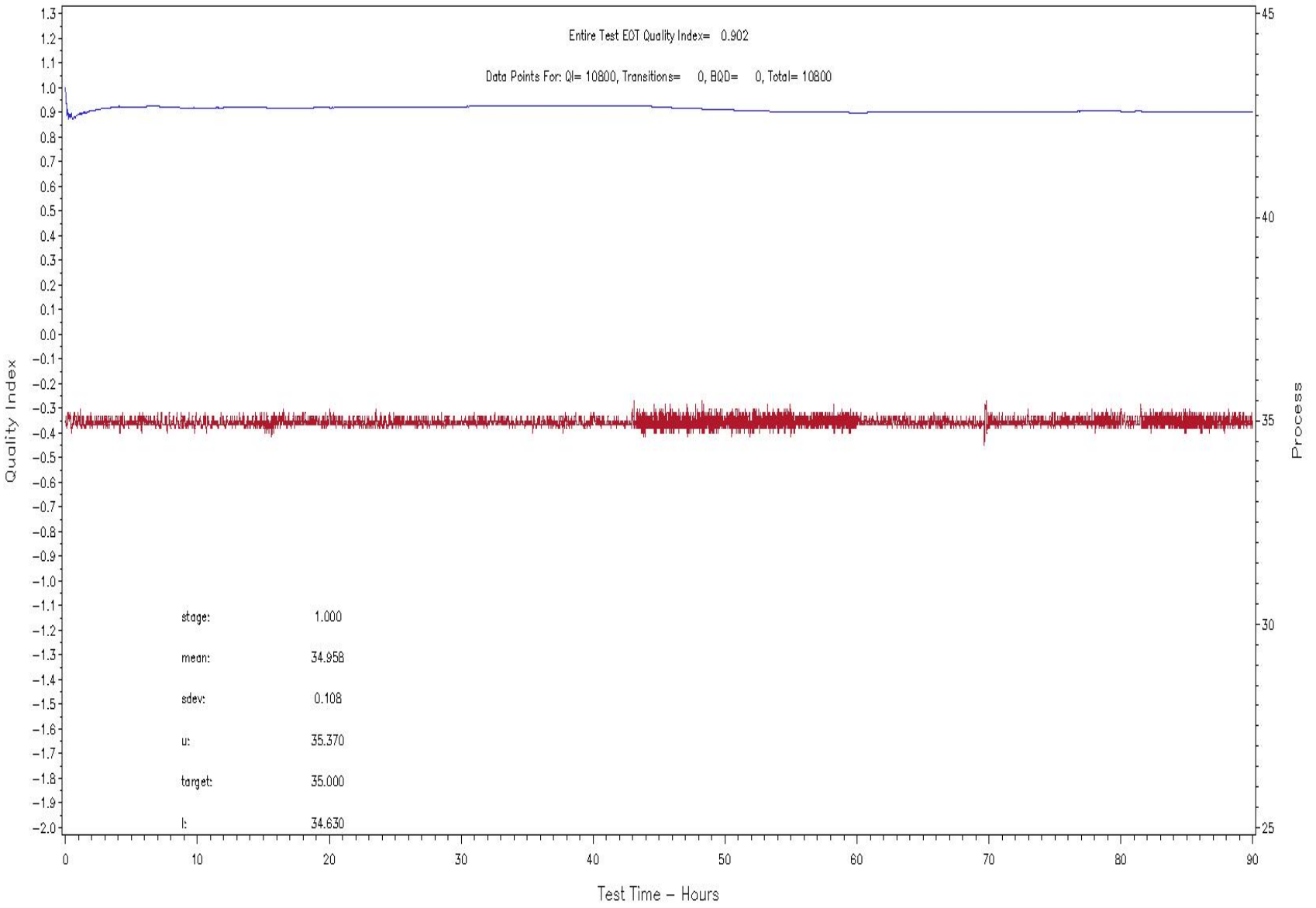
IIIH QUALITY INDEX OPERATIONAL REVIEW
Intake Air Temperature – Degrees C (CONTROL)
LAB= EStand= 3 CMIR= 108783



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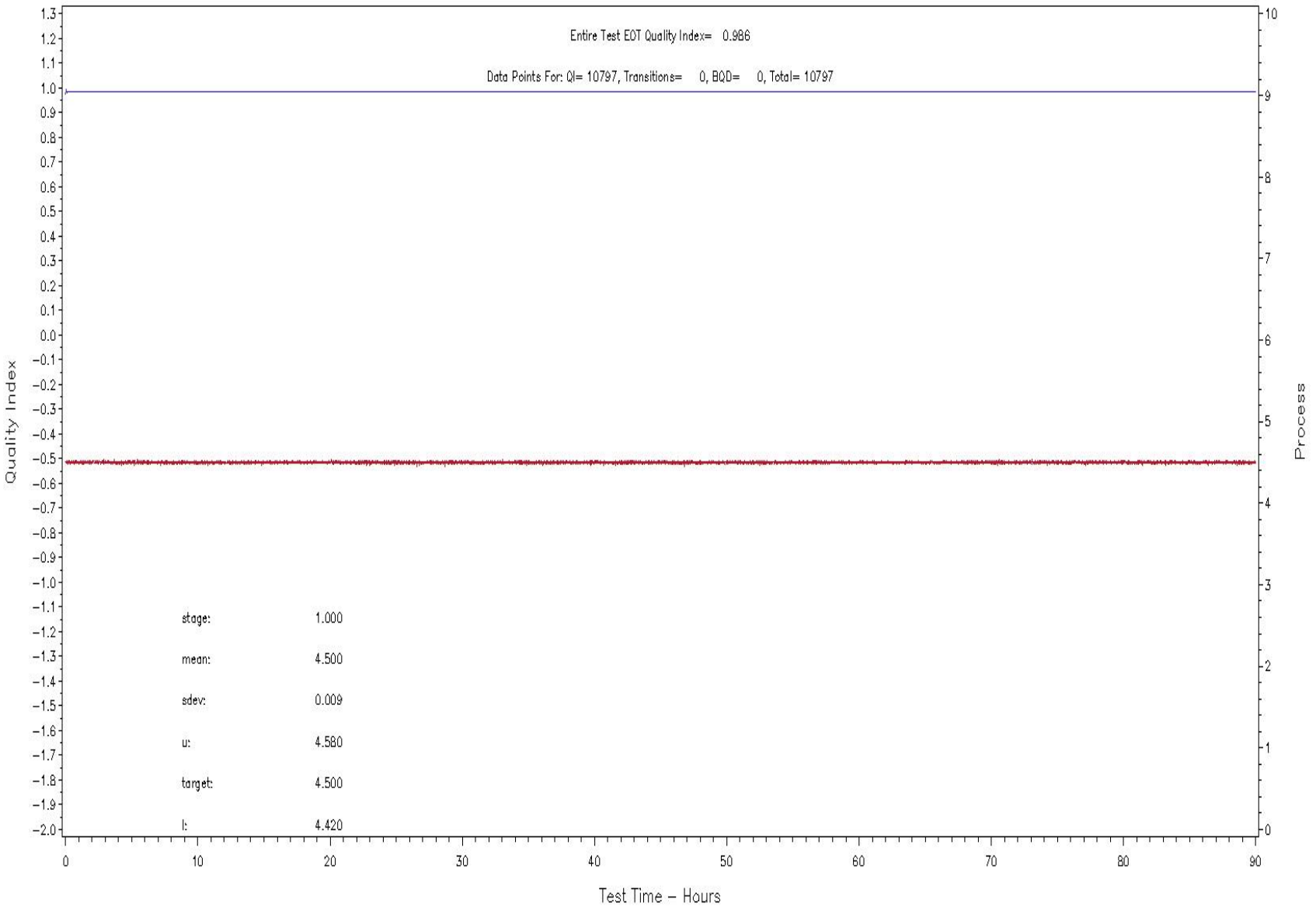
Left Exhaust Back Pressure

IIIH QUALITY INDEX OPERATIONAL REVIEW
Exhaust Back Pressure Left – kPa (CONTROL)
LAB= GStand= 2 CMR= 111244



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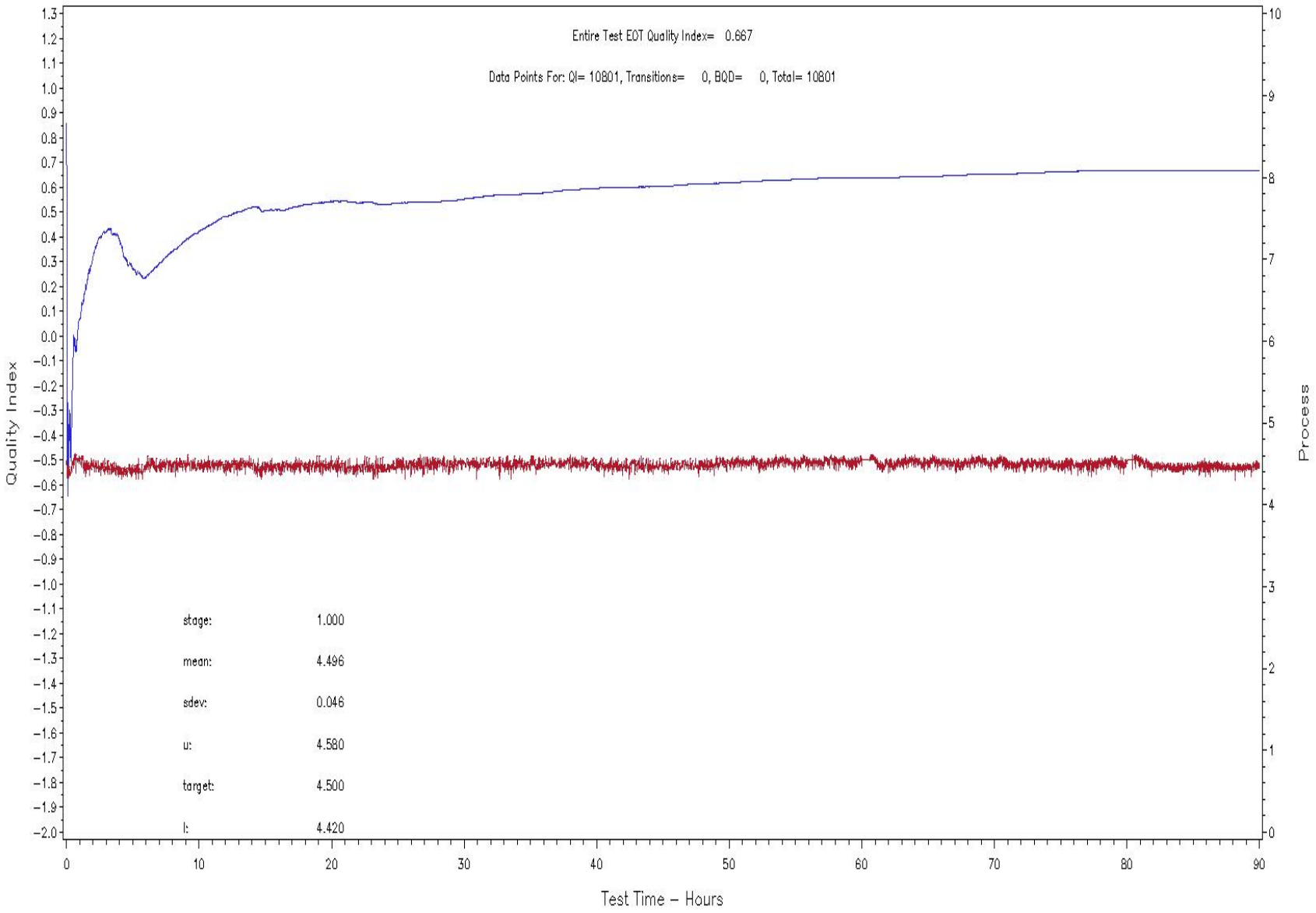
IIIH QUALITY INDEX OPERATIONAL REVIEW
Exhaust Back Pressure Left – kPa (CONTROL)
LAB= EStand= 3 CMIR= 106783



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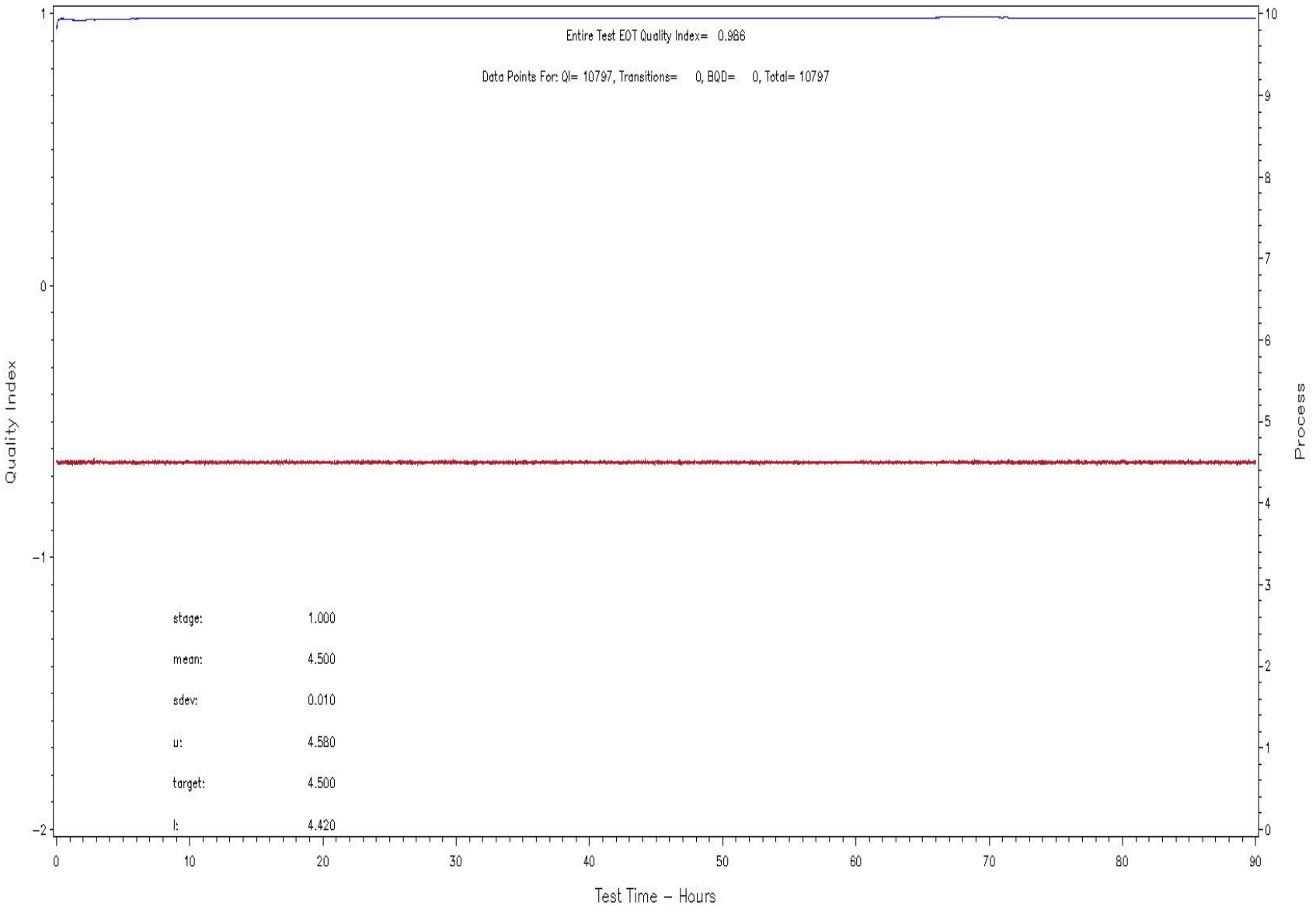
Right Exhaust Back Pressure

IIIH QUALITY INDEX OPERATIONAL REVIEW
Exhaust Back Pressure Right – kPa (CONTROL)
LAB= GStand= 2 CMR= 111244



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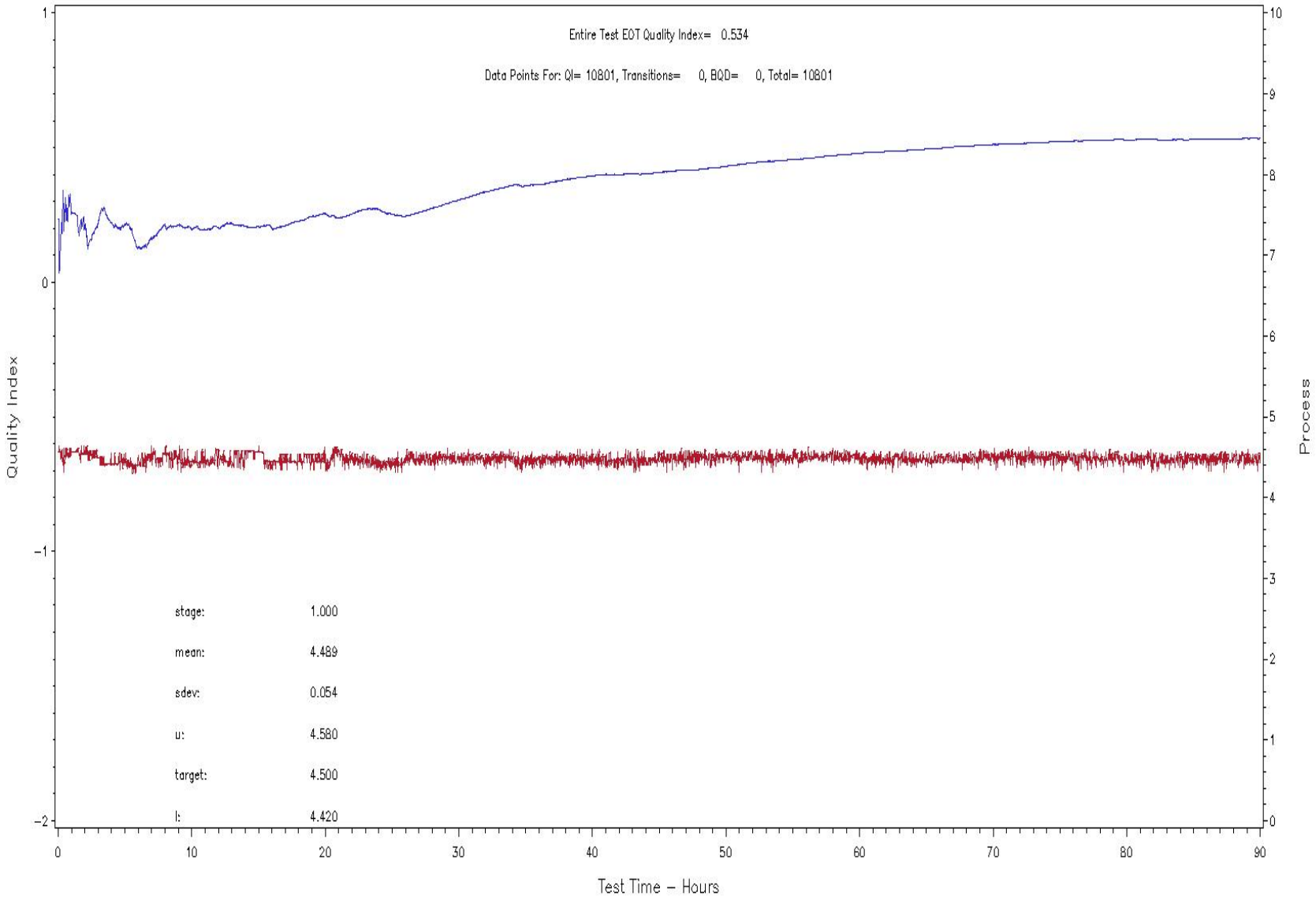
IIIH QUALITY INDEX OPERATIONAL REVIEW
Exhaust Back Pressure Right – kPa (CONTROL)
LAB= EStand= 3 CMR= 106783



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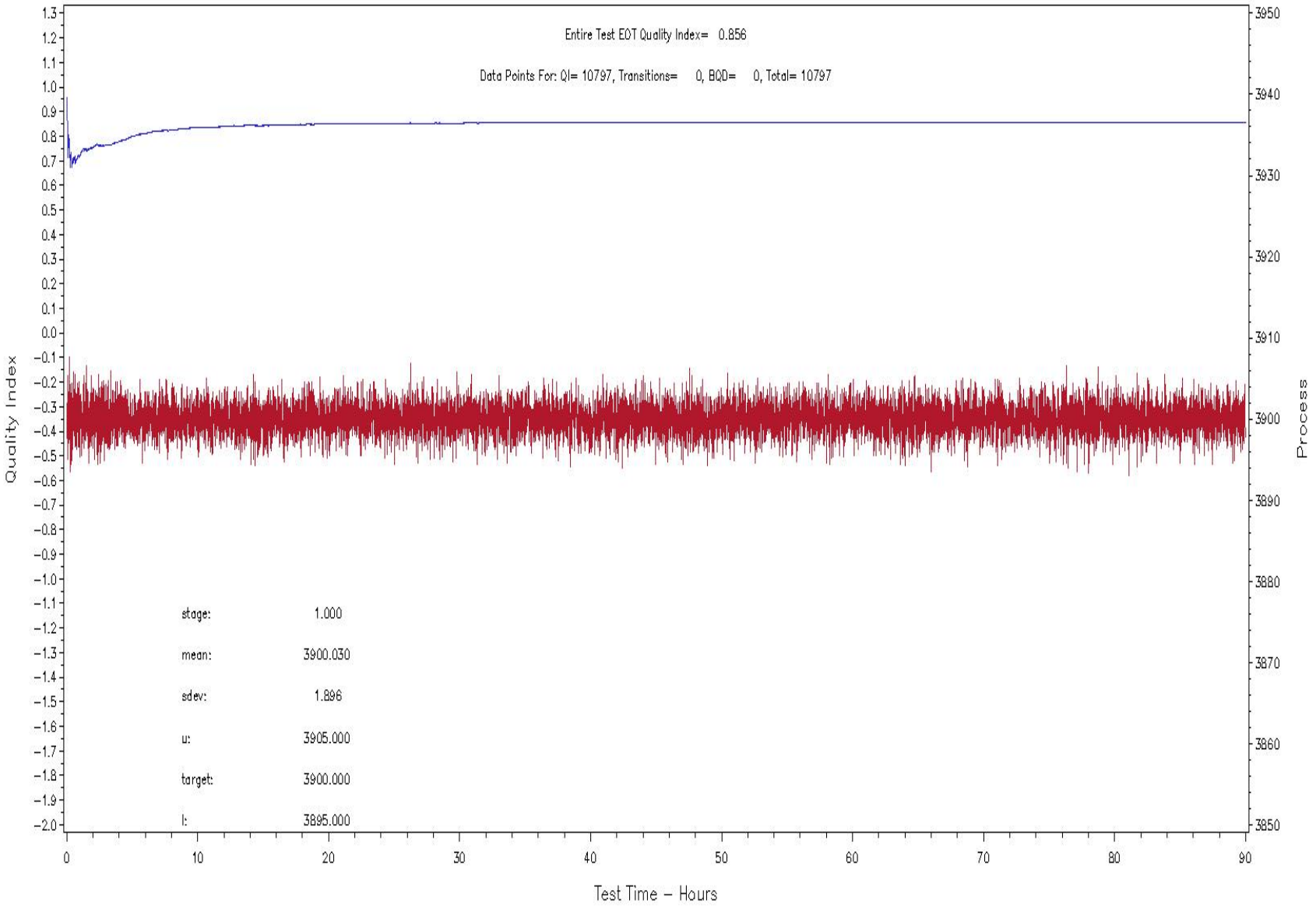
Speed

IIIH QUALITY INDEX OPERATIONAL REVIEW
Engine Speed – r/min (CONTROL)
LAB= GStand= 2 CMR= 111244



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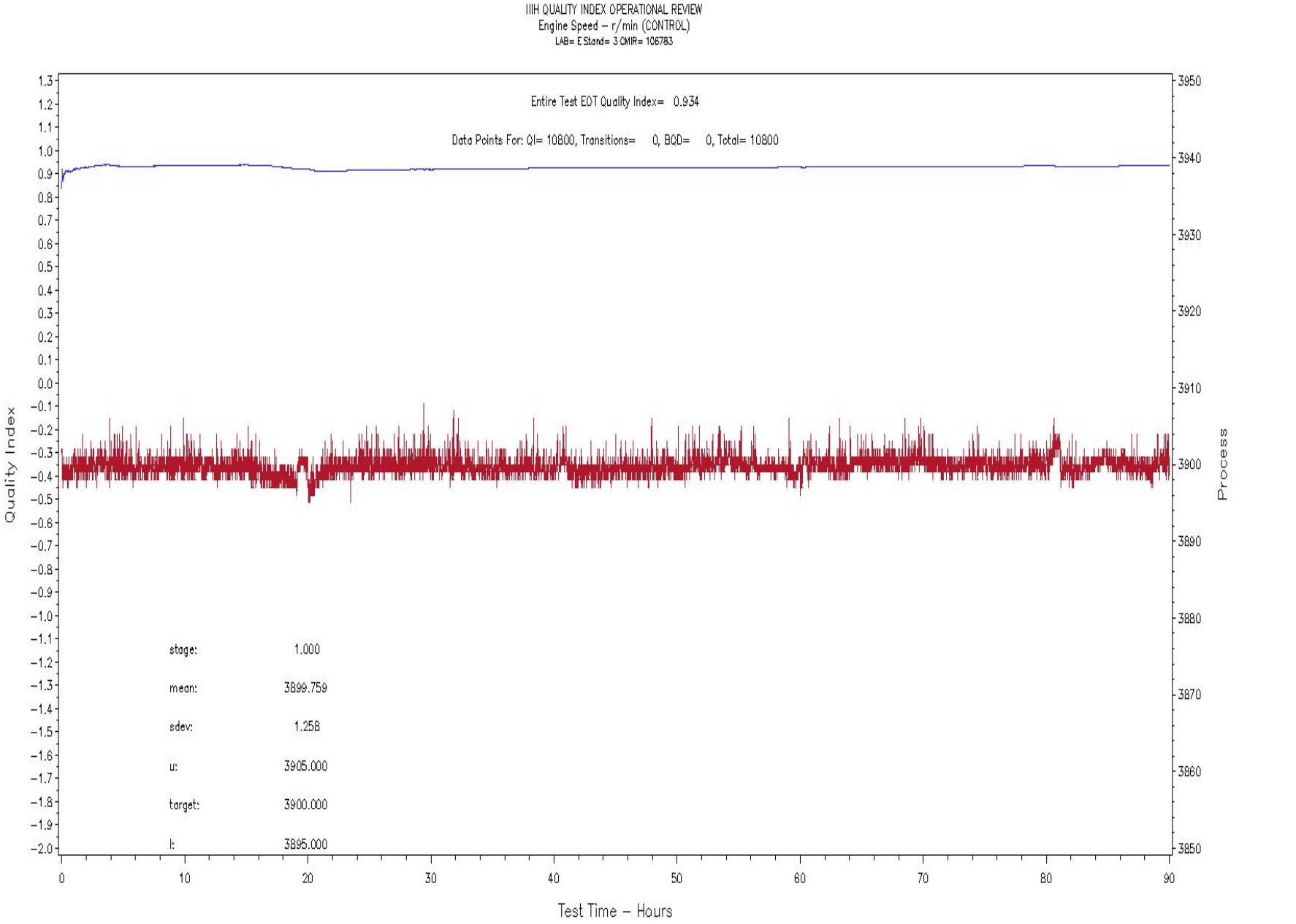
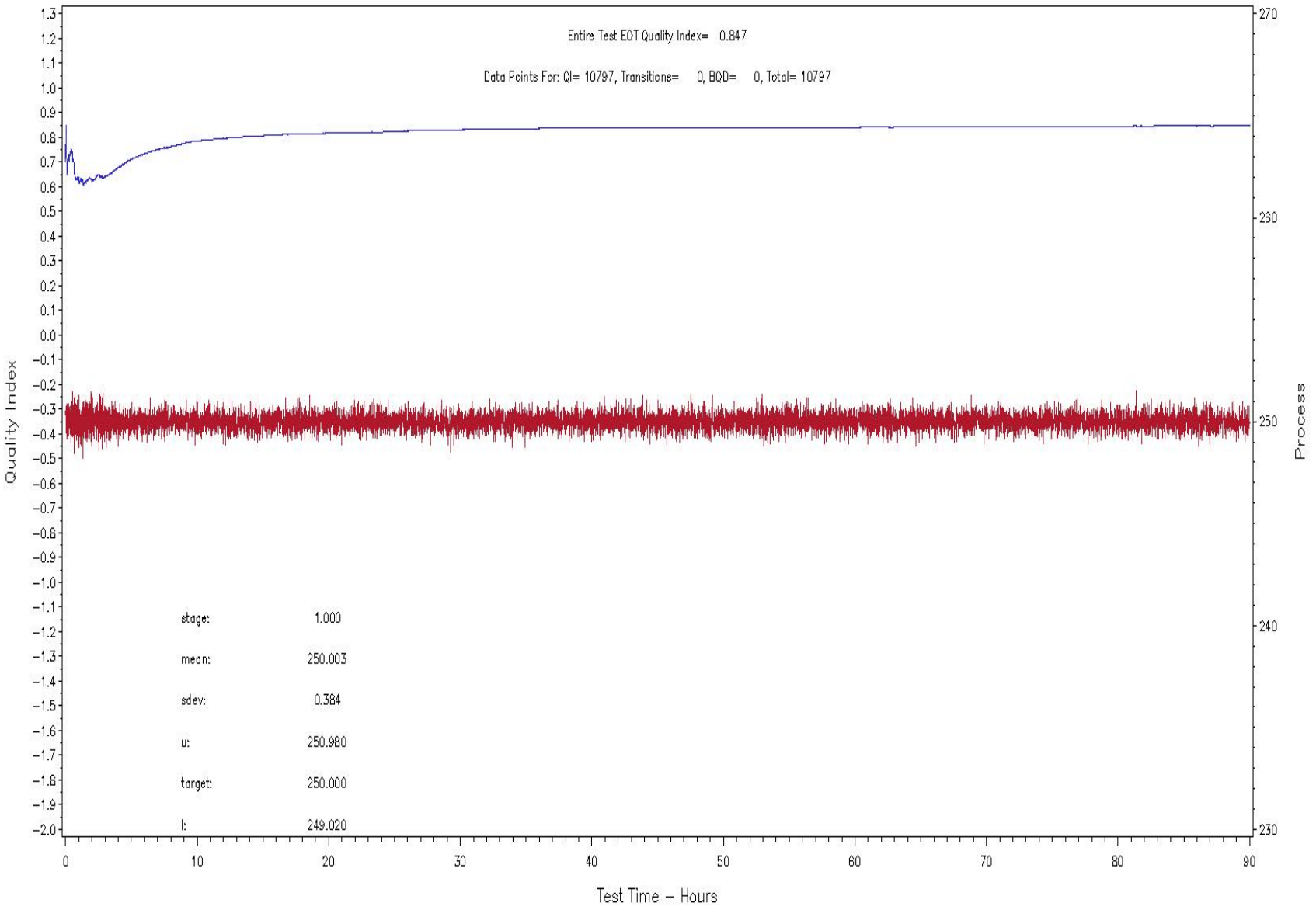


Load

IIIH QUALITY INDEX OPERATIONAL REVIEW
Engine Torque – Nm (CONTROL)
LAB= GStand= 2 CMR= 111244



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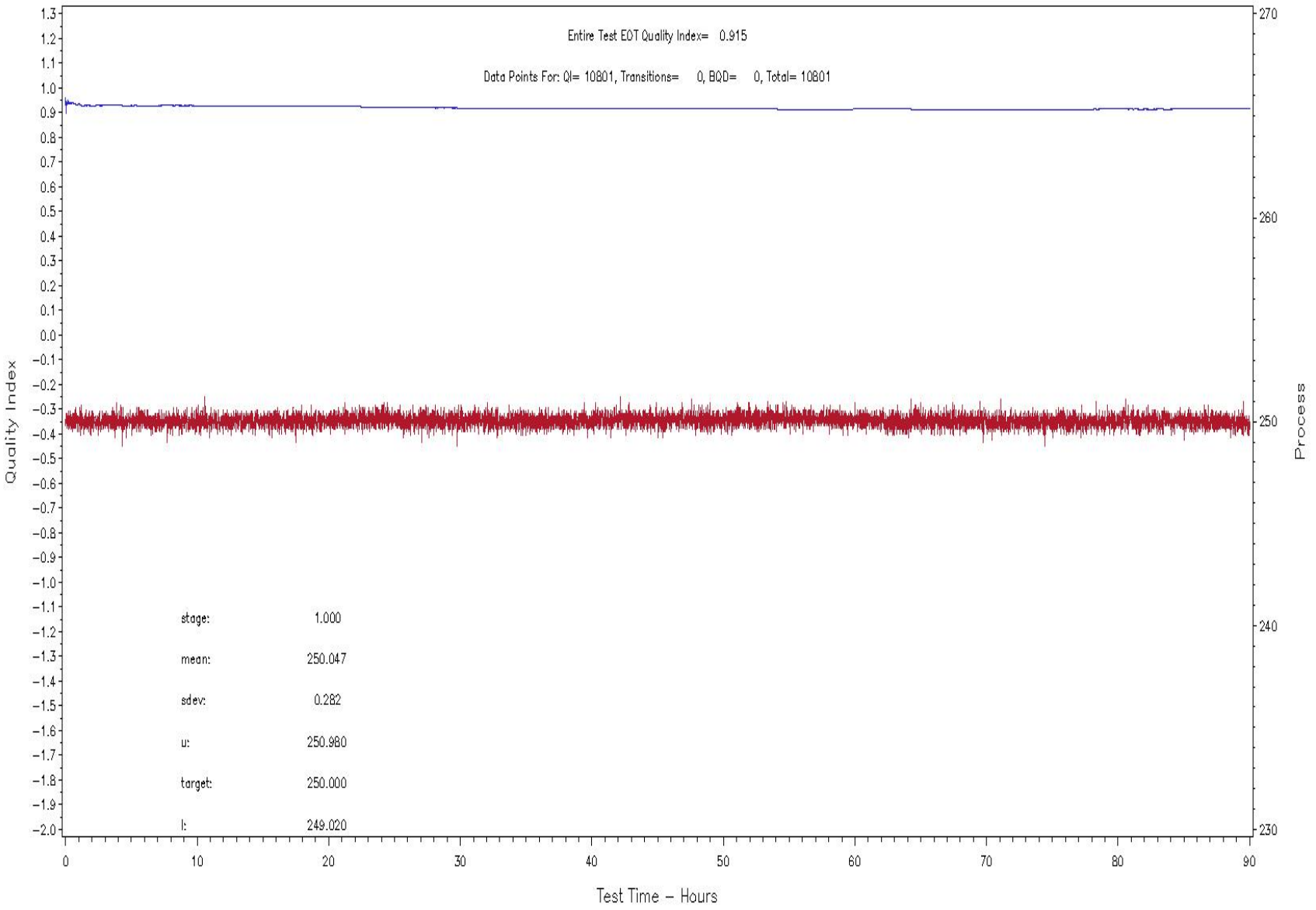
IIIH QUALITY INDEX OPERATIONAL REVIEW
Engine Torque – Nm (CONTROL)
LAB= E Stand= 3 CMR= 108783



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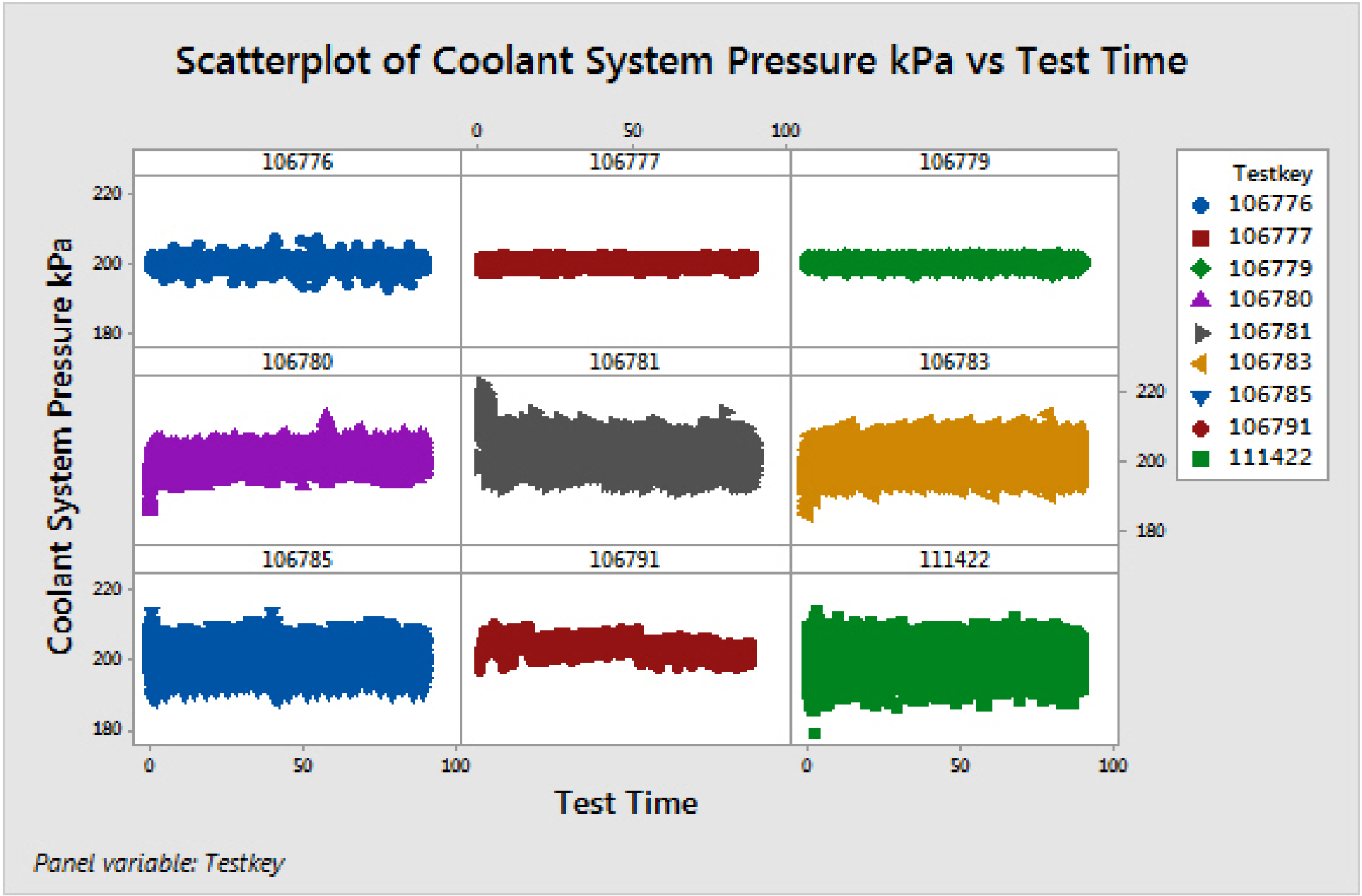
Scatterplot of Coolant System Pressure kPa vs Test Time
106776
106777
106779
106780
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106783
106785
106791
111422
Coolant System Pressure kPa
Test Time
Testkey
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106780
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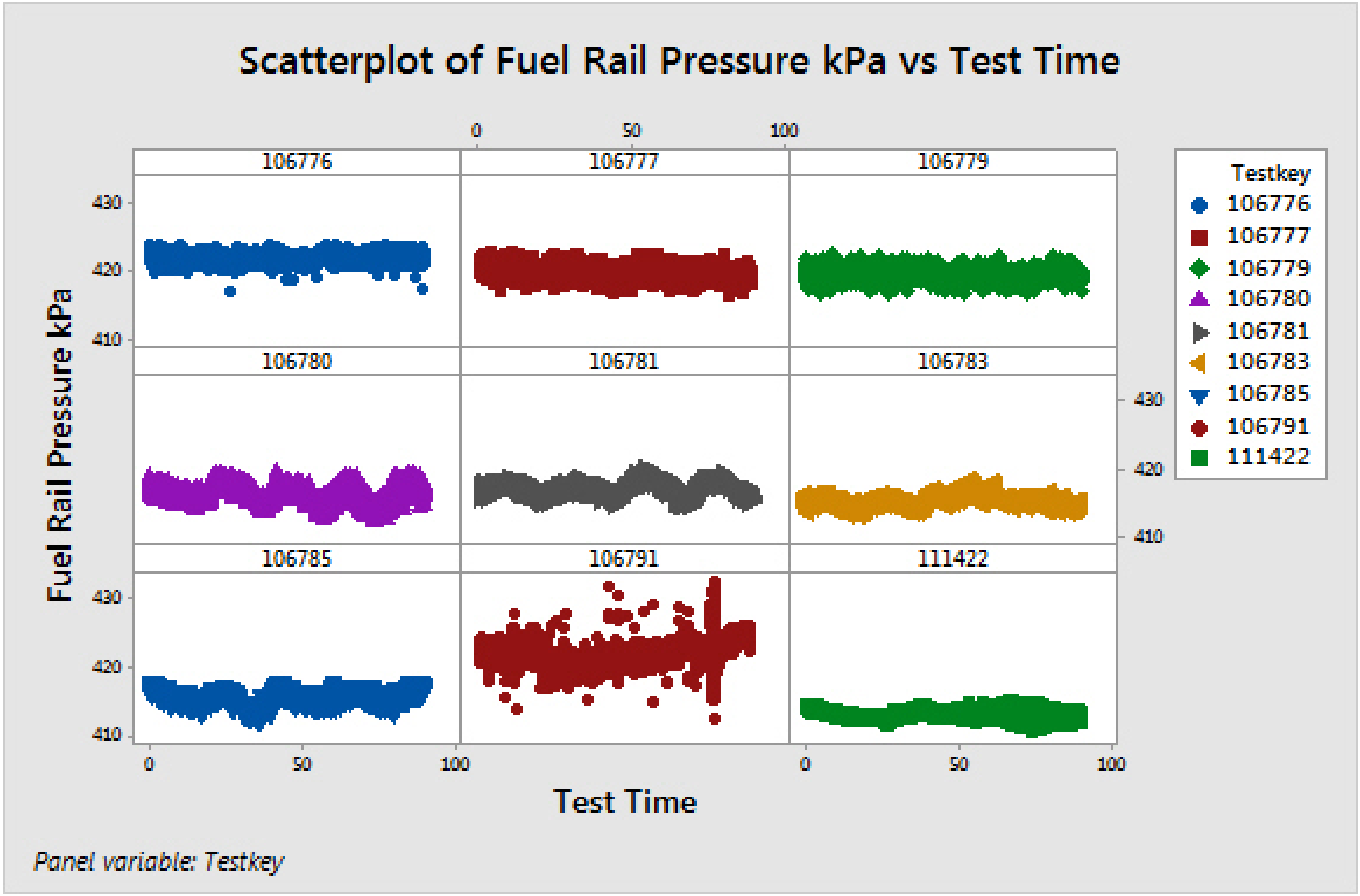
106785
106791
111422
Panel variable: Testkey


Scatterplot of Fuel Rail Pressure kPa vs Test Time
106776
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111422
Fuel Rail Pressure kPa
Test Time
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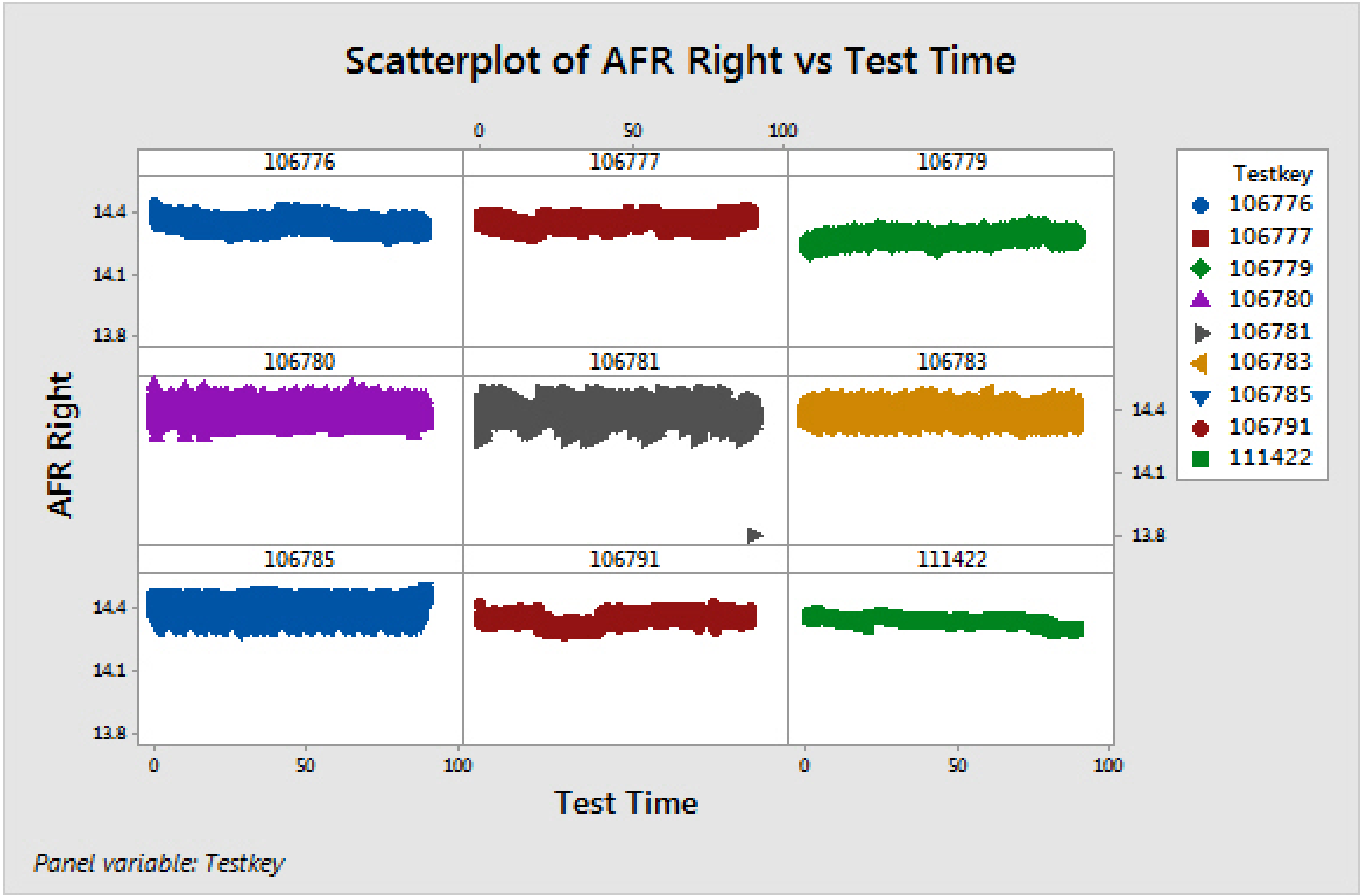
111422
Panel variable: Testkey


Scatterplot of AFR Right vs Test Time
106776
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AFR Right
Test Time
14.4
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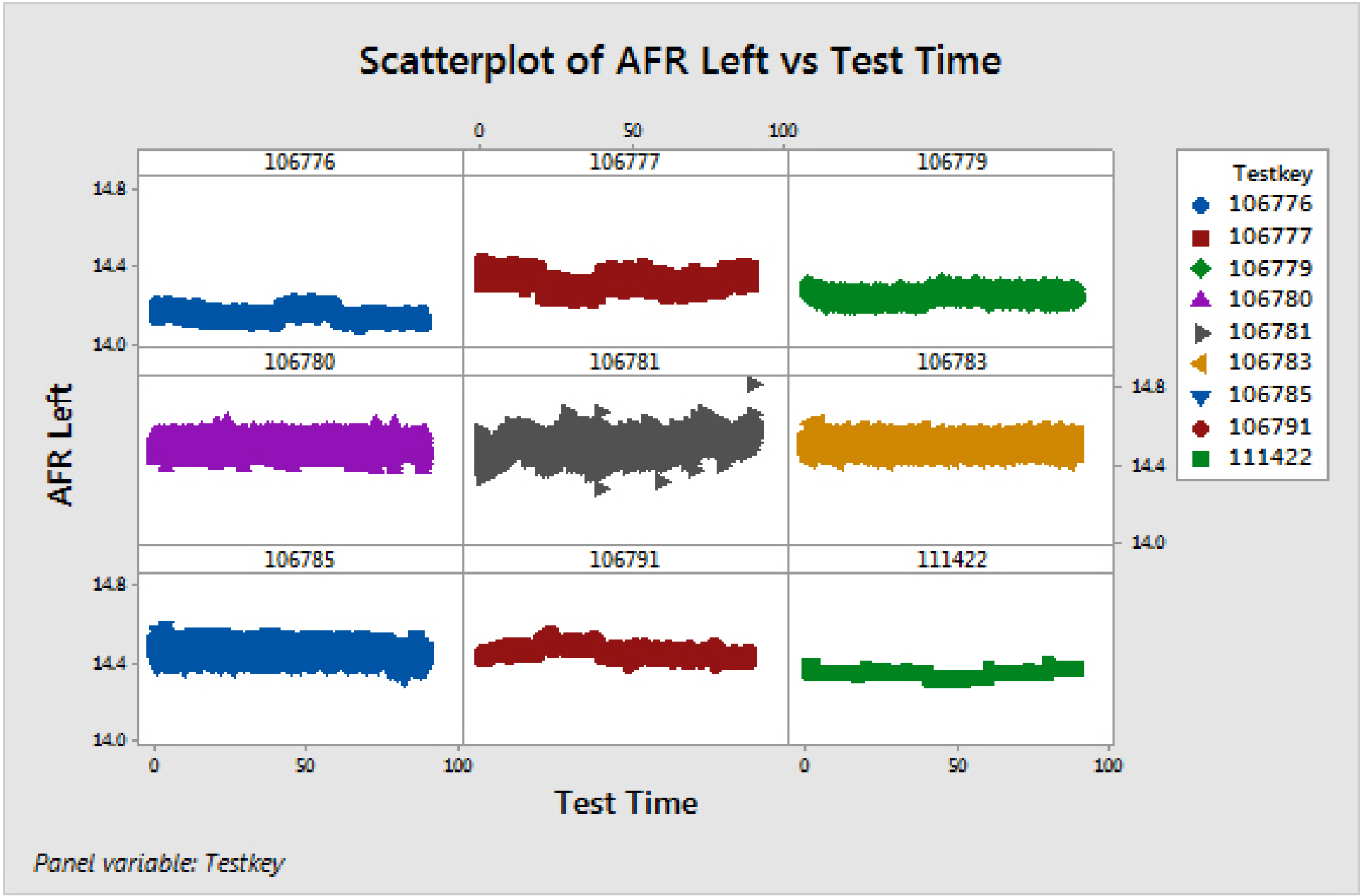
Panel variable: Testkey


Scatterplot of AFR Left vs Test Time
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111422
AFR Left
Test Time
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Testkey
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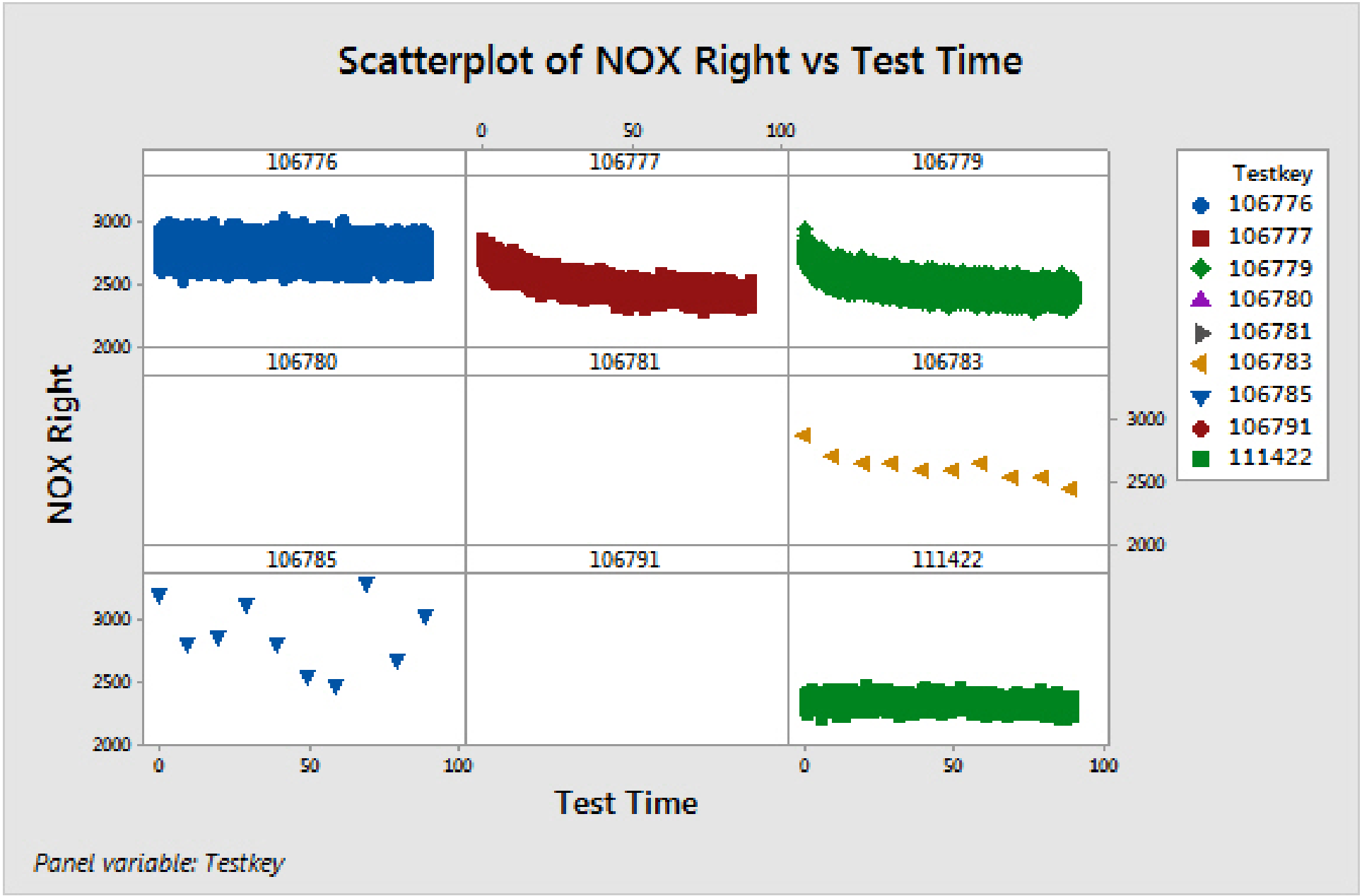
106791
111422
Panel variable: Testkey


Scatterplot of NOX Right vs Test Time
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106791
111422
NOX Right
Test Time
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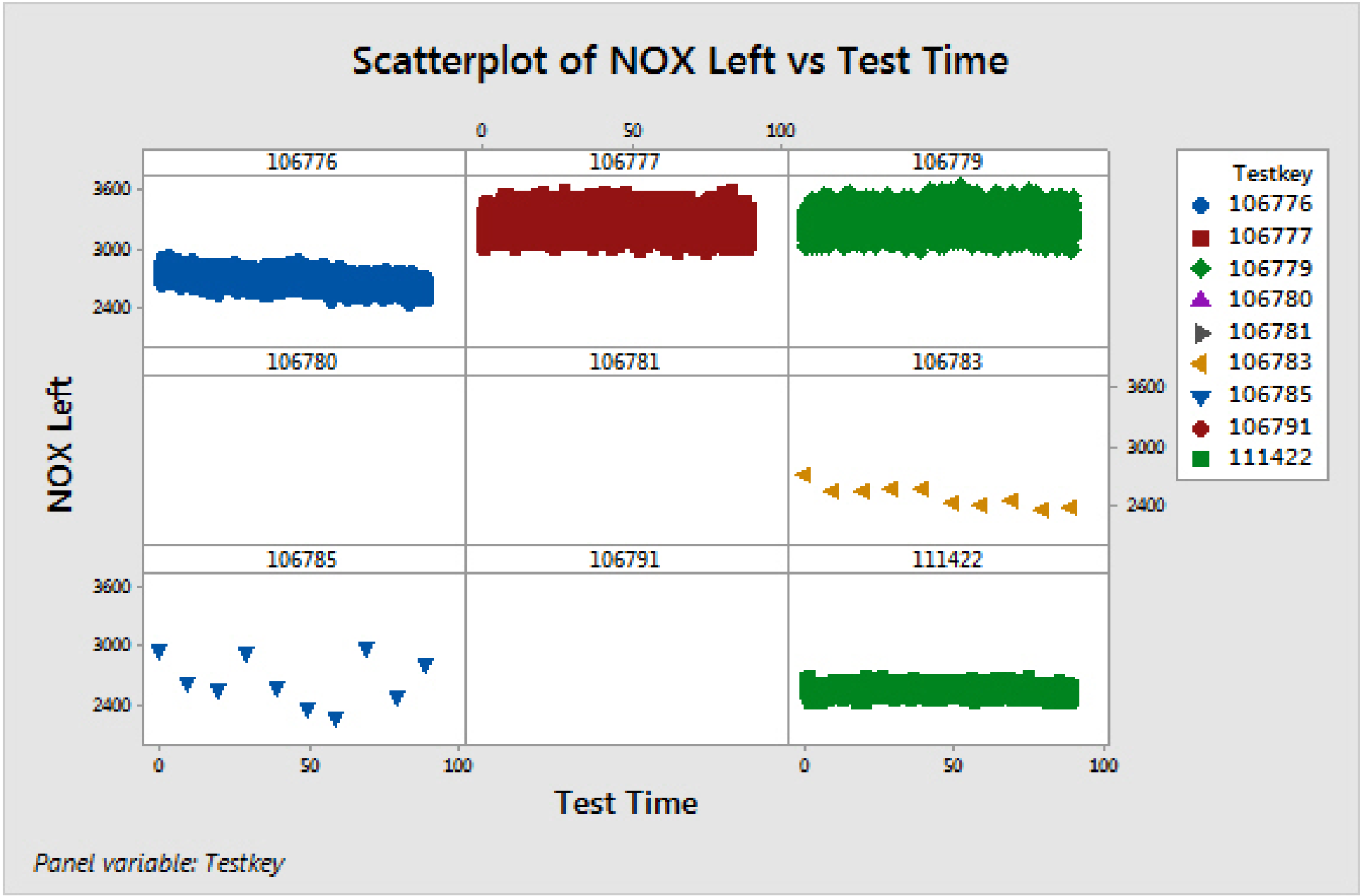
111422
Panel variable: Testkey


Scatterplot of NOX Left vs Test Time
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NOX Left
Test Time
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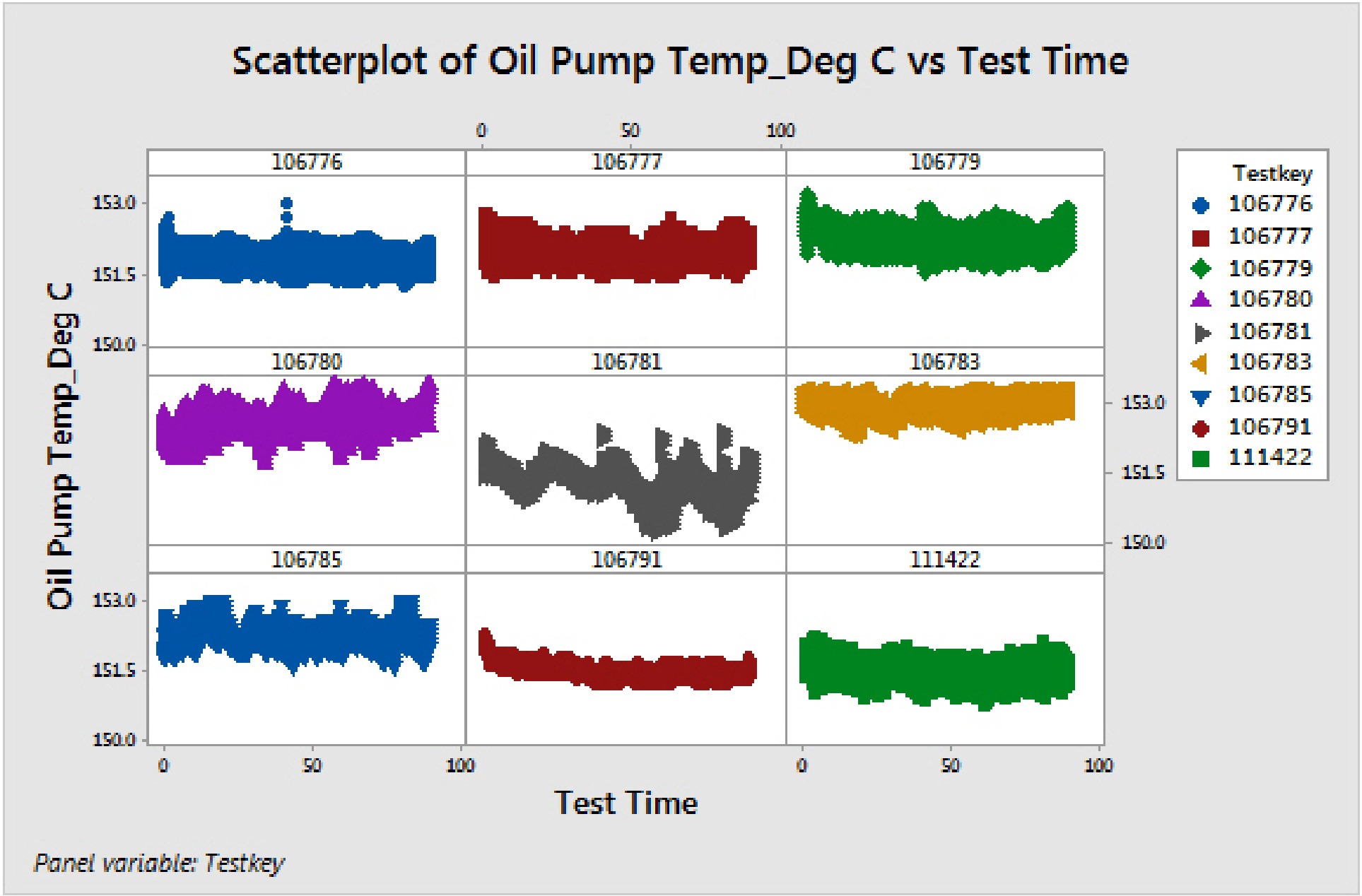
111422
Panel variable: Testkey


Scatterplot of Oil Pump Temp_Deg C vs Test Time
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106777
106779
106780
106781
106783
106785
106791
111422
Oil Pump Temp_Deg C
153.0
151.5
150.0
0
50
100
Test Time
Testkey
106776
106777
106779
106780
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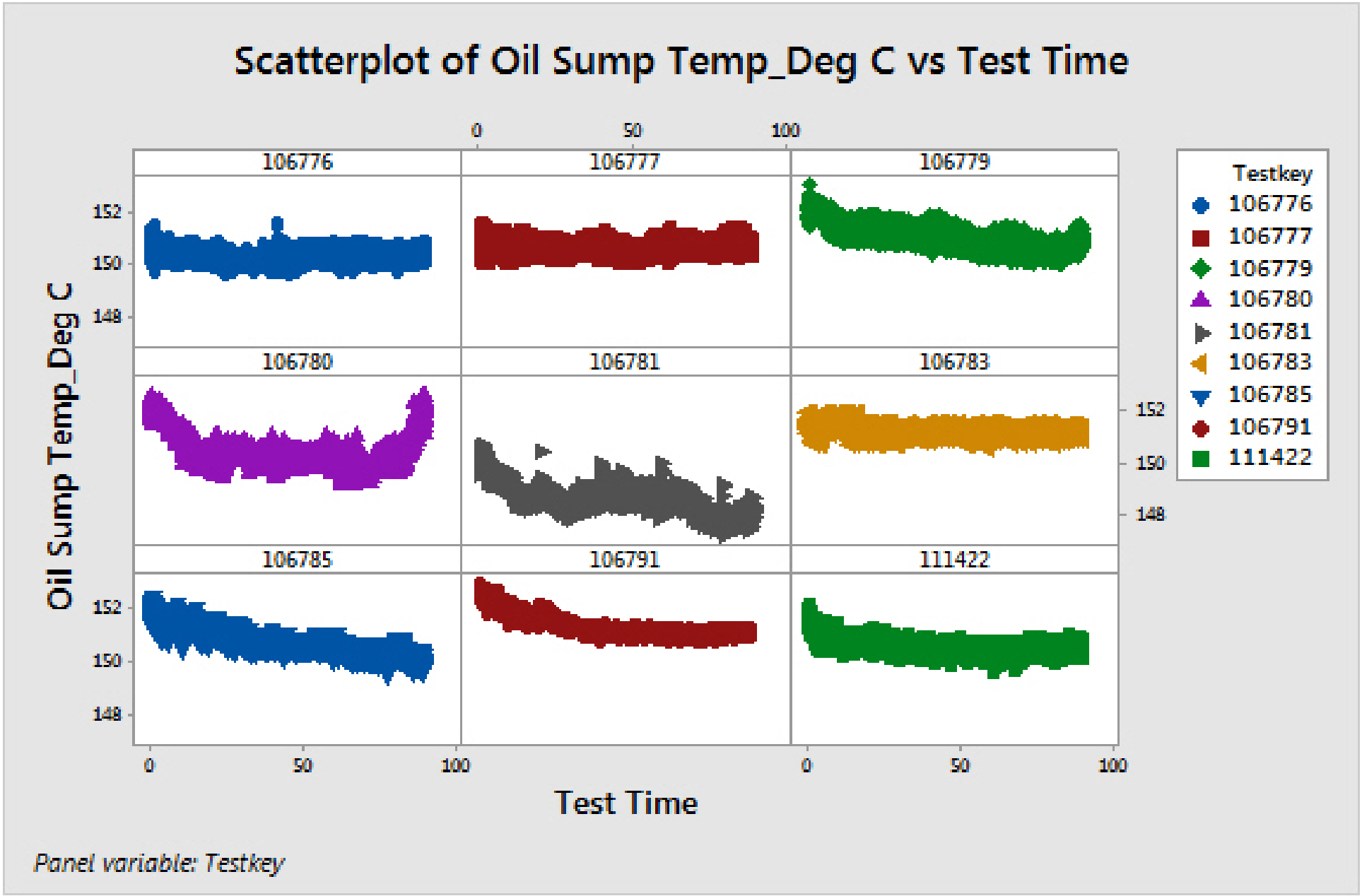
106783
106785
106791
111422
Panel variable: Testkey


Scatterplot of Oil Sump Temp_Deg C vs Test Time
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106779
106780
106781
106783
106785
106791
111422
Oil Sump Temp_Deg C
Test Time
Testkey
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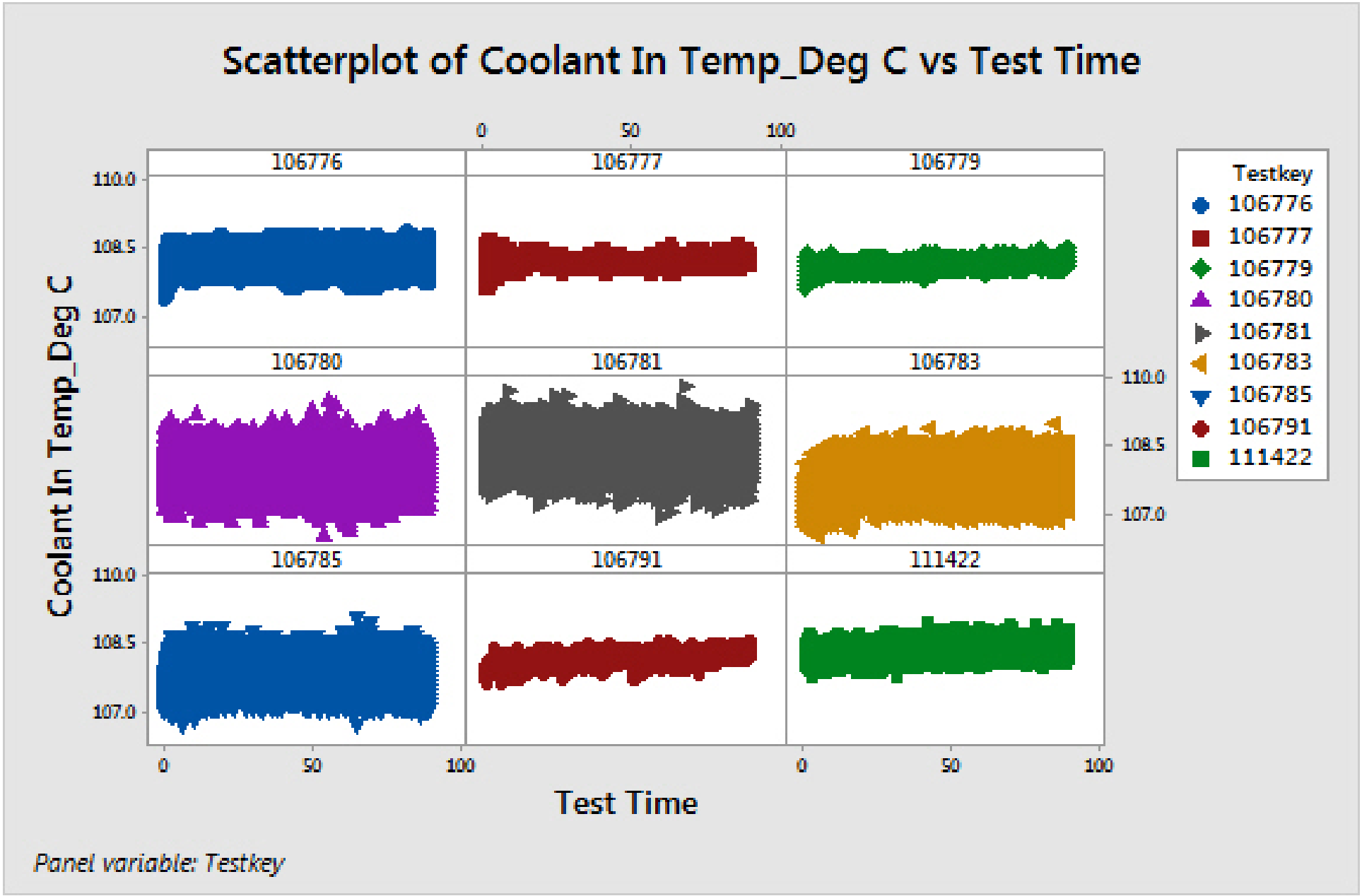
106780
106781
106783
106785
106791
111422
Panel variable: Testkey


Scatterplot of Coolant In Temp_Deg C vs Test Time
106776
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106780
106781
106783
106785
106791
111422
Coolant In Temp_Deg C
Test Time
Testkey
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106780
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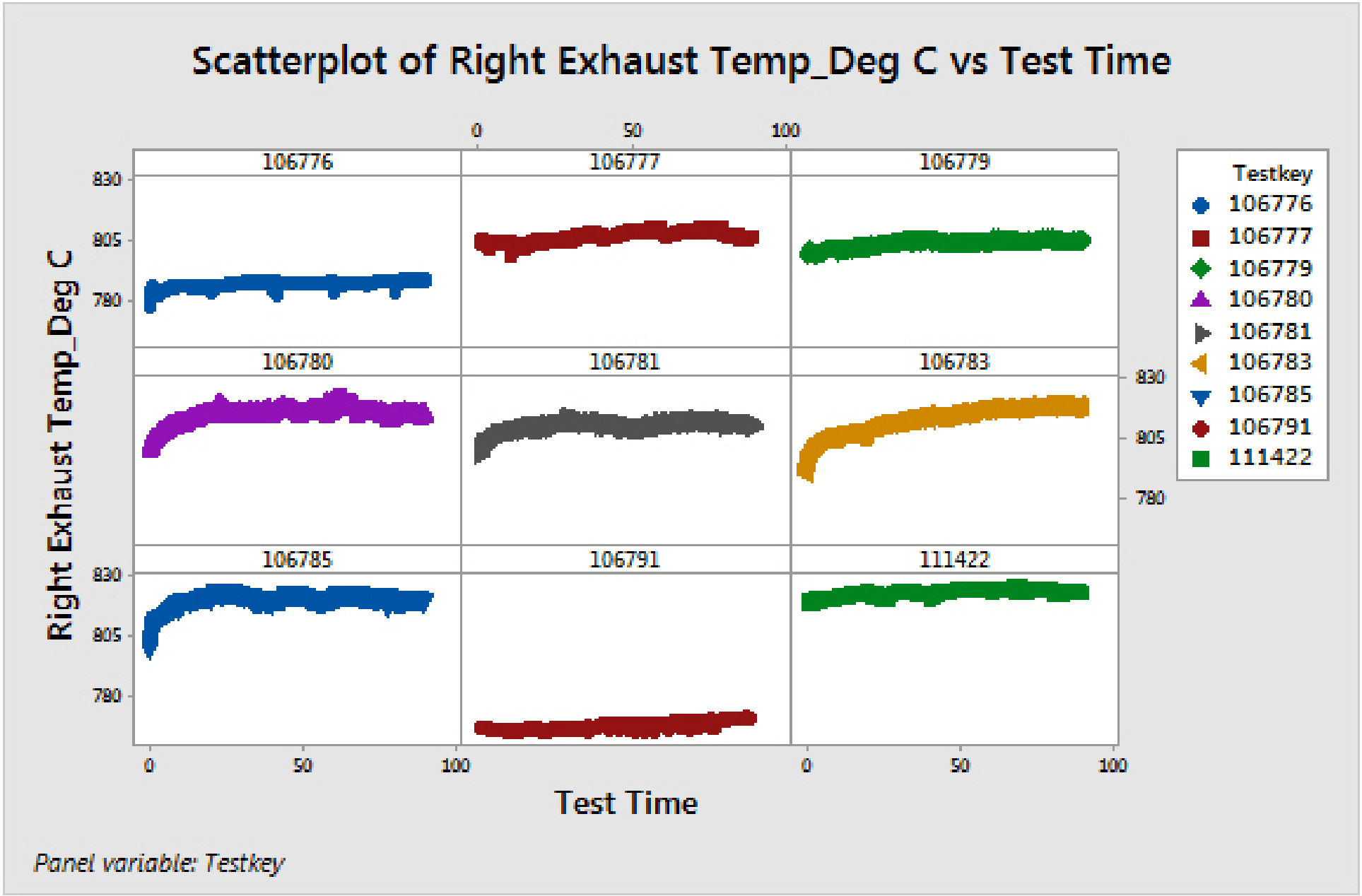
106785
106791
111422
Panel variable: Testkey


Scatterplot of Right Exhaust Temp_Deg C vs Test Time
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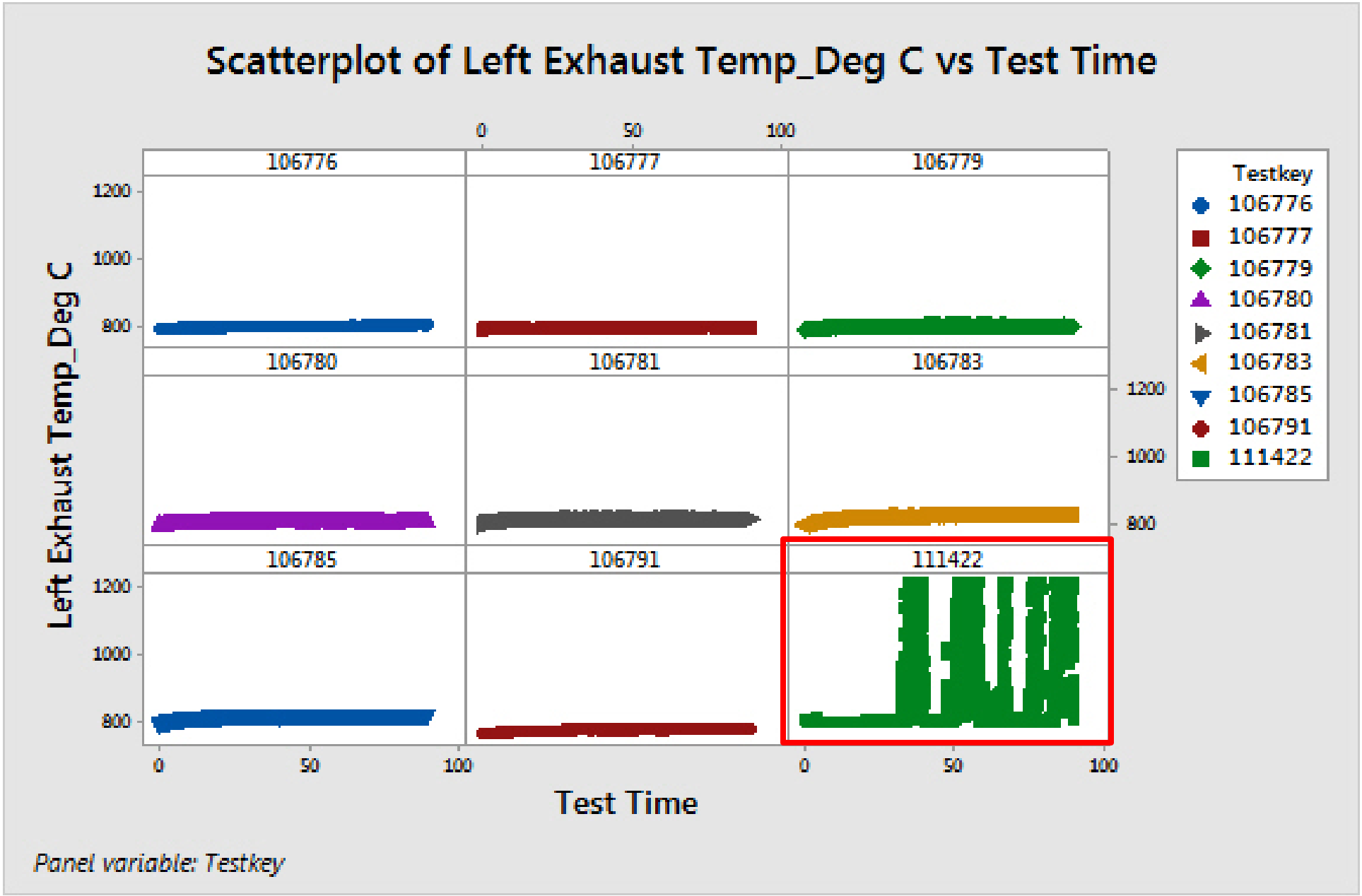
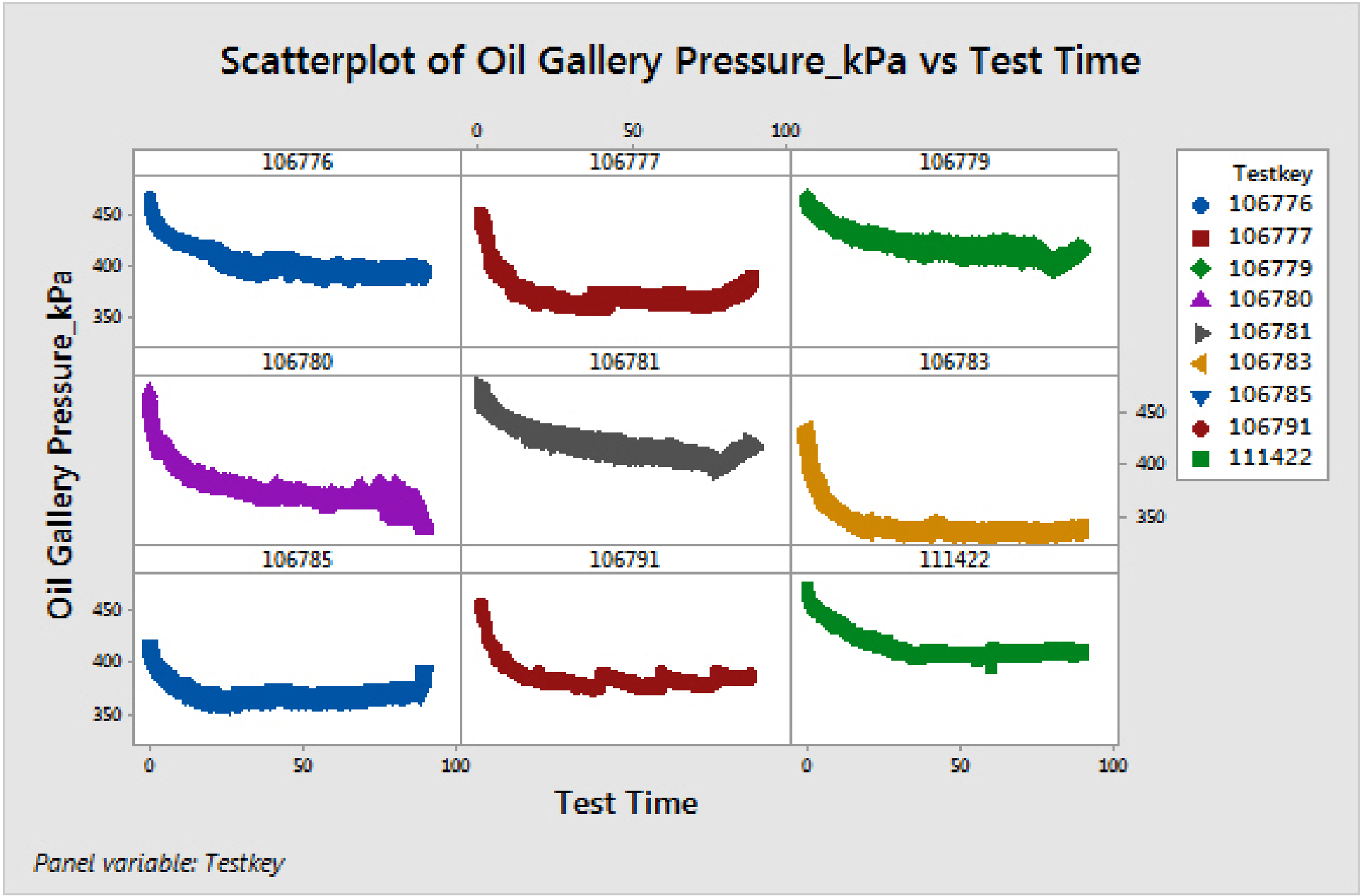
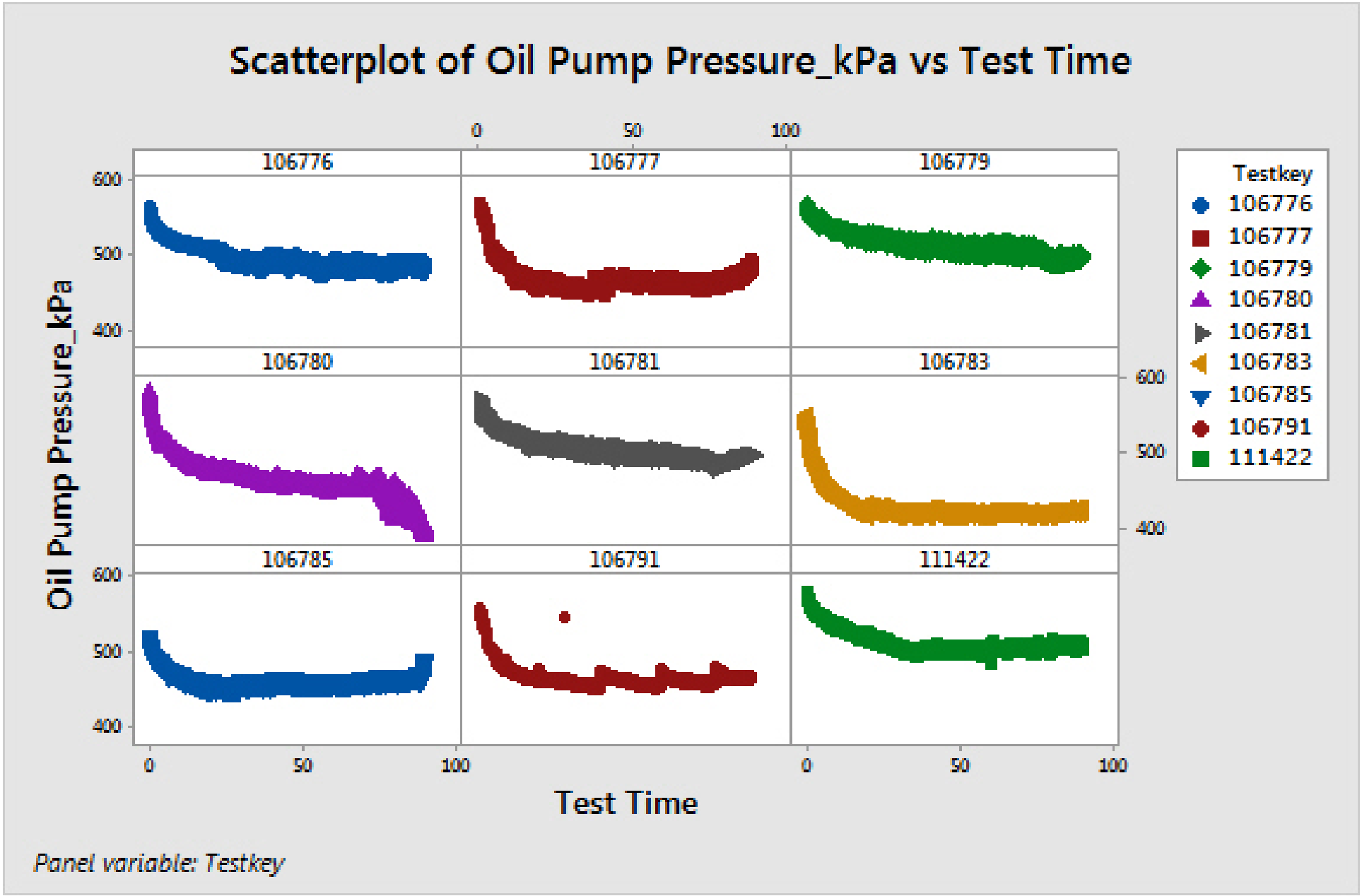
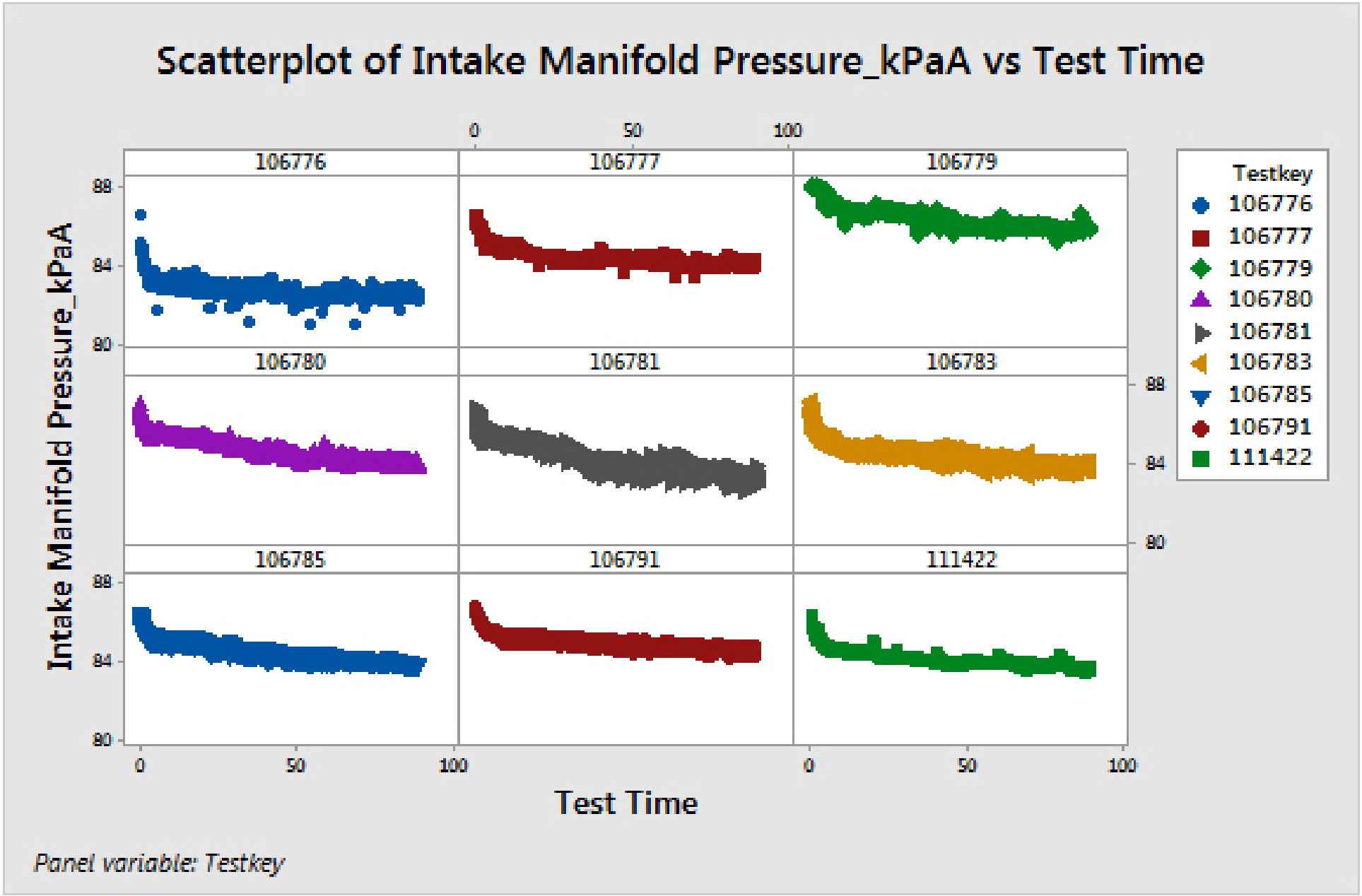
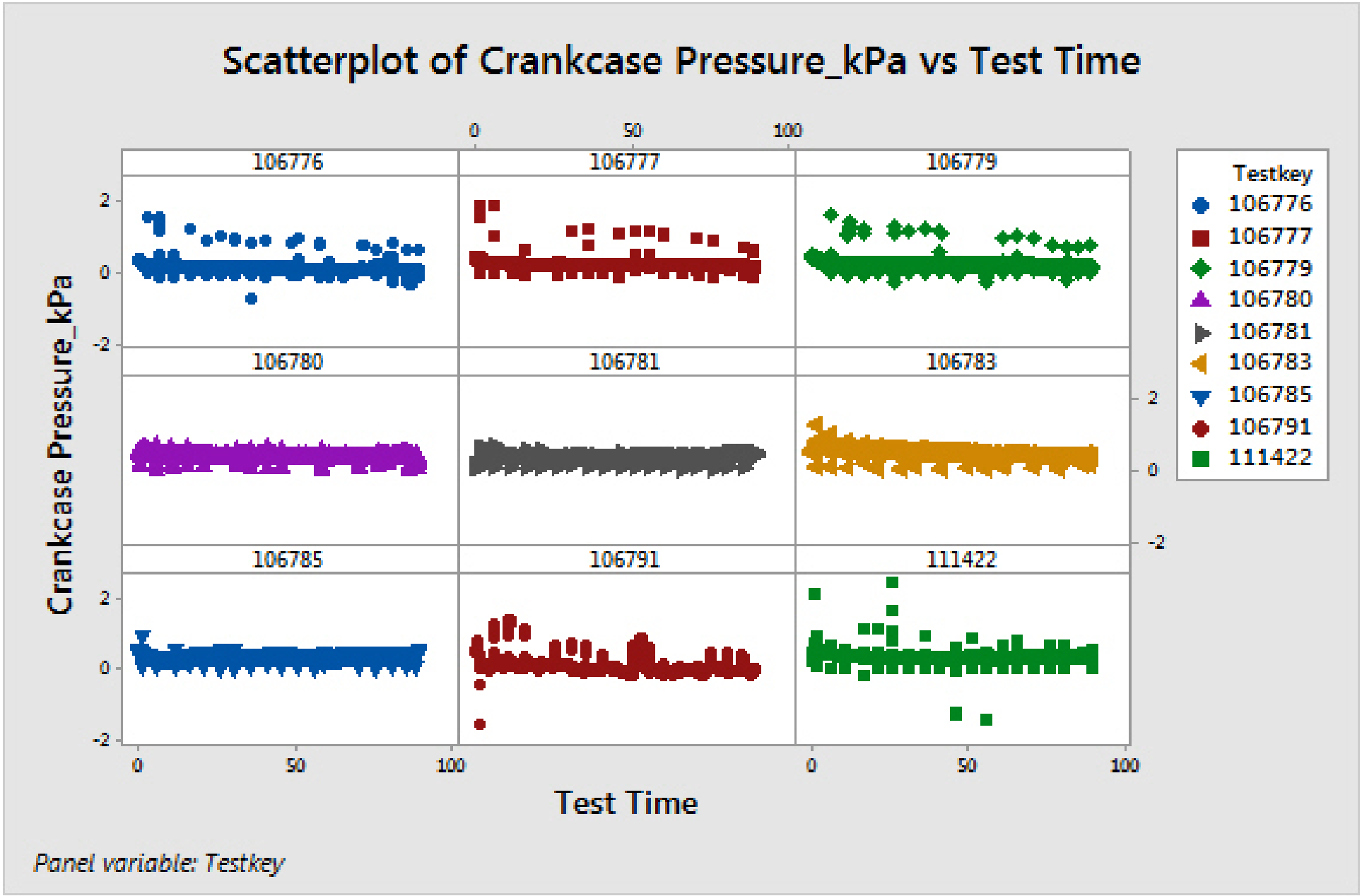
106779
106780
106781
106783
106785
106791
111422
Testkey
106776
106777
106779
106780
106781
106783
106785
106791
111422
Right Exhaust Temp_Deg C
Test Time
830
805
780
0
50
100
Panel variable: Testkey

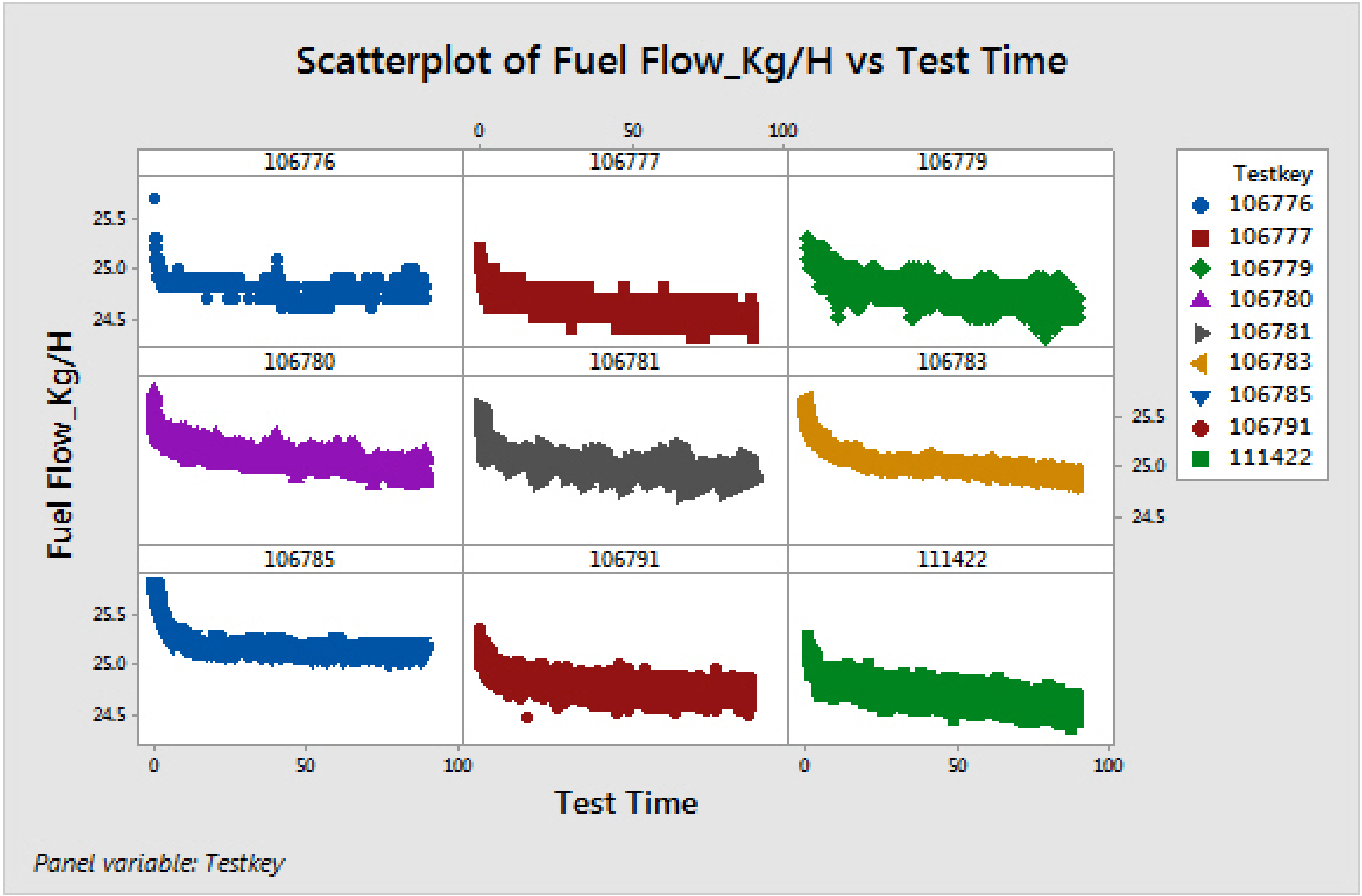

Scatterplot of Left Exhaust Temp_Deg C vs Test Time
106776
106777
106779
106780
106781
106783
106785
106791
111422
Left Exhaust Temp_Deg C
Test Time
Testkey
106776
106777
106779
106780
106781
106783
106785
106791
111422
Panel variable: Testkey


Scatterplot of Oil Gallery Pressure_kPa vs Test Time
106776
106777
106779
106780
106781
106783
106785
106791
111422
Oil Gallery Pressure_kPa
Test Time
0
50
100
350
400
450
Testkey
106776
106777
106779
106780
106781
106783
106785
106791
111422
Panel variable: Testkey


Scatterplot of Oil Pump Pressure_kPa vs Test Time
106776
106777
106779
106780
106781
106783
106785
106791
111422
Oil Pump Pressure_kPa
Test Time
Testkey
106776
106777
106779
106780
106781
106783
106785
106791
111422
Panel variable: Testkey


Scatterplot of Intake Manifold Pressure_kPaA vs Test Time
106776
106777
106779
106780
106781
106783
106785
106791
111422
Intake Manifold Pressure_kPaA
Test Time
Testkey
106776
106777
106779
106780
106781
106783
106785
106791
111422
Panel variable: Testkey


Scatterplot of Crankcase Pressure_kPa vs Test Time
106776
106777
106779
106780
106781
106783
106785
106791
111422
Crankcase Pressure_kPa
Test Time
Testkey
106776
106777
106779
106780
106781
106783
106785
106791
111422
Panel variable: Testkey


Scatterplot of Fuel Flow_Kg/H vs Test Time
106776
106777
106779
106780
106781
106783
106785
106791
111422
Fuel Flow_Kg/H
Test Time
25.5
25.0
24.5
0
50
100
Testkey
106776
106777
106779
106780
106781
106783
106785
106791
111422
Panel variable: Testkey