



Committee D-2 ON PETROLEUM PRODUCTS AND LUBRICANTS

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GUIDE FOR TEST DEVELOPMENT

To: Engine Oil Performance Test Developers and Users

The ASTM Technical Guidance Committee (TGC) identified the need for a check list to be used as a guide when developing new tests to assure a uniform quality process is followed. The TGC thus authored the two "Test Development Flow Plans" attached. One is for use when a Surveillance Panel or ASTM Task Force is the test developer and the other is for use when an OEM is the test developer. The documents are constructed in a check list format.

The Technical Guidance Committee recommends that all new test development activity use the appropriate Test Development Flow Plan. A conscious effort should be made to address each item in the flow plan. The use of the plan is not an ASTM requirement but rather a recommended technical guide. Thus, for a quality process, a test development report should detail the technical reasoning when check list items are not incorporated. In fact some Technical Guidance Committee members suggest that the development plans would make a good table of contents for test development research reports.

The Technical Guidance Committee encourages all engine oil test developers to use the attached flow plans. The committee would also like to receive any comments generated during the use of these documents as they will be periodically updated as needed. Such input should be directed to the Technical Guidance Committee Chairman.

Very truly yours,

Gordon R. Farnsworth

GORDON R. FARNSWORTH, Chairman
ASTM Technical Guidance Committee

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Attachments

**ASTM D.02
SUBCOMMITTEE B
TEST DEVELOPMENT FLOW PLAN
WHEN SURVEILLANCE PANEL IS TEST DEVELOPER**

The following document was proposed at the September 17, 1992 Technical Guidance Committee meeting as a checklist to be used by Section Chairmen in Subcommittee B of ASTM Committee D.02 when bringing new test procedures on-line as ASTM Test Methods and ASTM Monitored Tests. It breaks the test development process down into tasks to be completed by the Surveillance Panel or Task Force, Subcommittee B and Oil Classification Panel.

This Flow Plan was designed to be used by the Surveillance Panel or Task Force where there is no OEM acting as Test Developer, or where an OEM limits their participation.

ITEMS TO BE CHECKED DURING TEST DEVELOPMENT

Need for Test

- Identify need for new test in conjunction with SAE, AVMA, EMA, etc.. This need may be as simple as replacing a test with obsolete hardware, or as involved as attempting to simulate a known field problem(s) or avoid a potential field problem.
- Collect field test data or run field tests, as necessary, to document current or potential problem.
- Assure that no existing test or oil category will satisfy the performance need.

Hardware

- Identify test hardware platform. This should be a platform in which the OEM intends to support all major components for a minimum of five years after the test is included in a performance category.
- Identify critical parts (Parts known to affect test severity and/or precision).
- Establish specifications and processes for assuring consistent hardware quality.
- Obtain commitments for long-term (5-year) supply of hardware and critical test components (fuel, solvents, cleansing agents).
- Release hardware to Industry for matrix testing.

ITEMS TO BE CHECKED DURING TEST DEVELOPMENT, continued

- | | | |
|------------------|-------------------------------------|--------------------------------------------------------------|
| <i>Procedure</i> | <input checked="" type="checkbox"/> | Establish test procedure. |
| | <input checked="" type="checkbox"/> | Establish rating/parts evaluation methods. |
| | <input checked="" type="checkbox"/> | Establish pass/fail parameters. |
| | <input type="checkbox"/> | Establish success criteria (precision, discrimination). |
| | <input type="checkbox"/> | Establish data acquisition requirements. |
| | <input checked="" type="checkbox"/> | Assure that number of pass/fail parameters is not excessive. |
| | <input type="checkbox"/> | Establish test stand design requirements. |
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ITEMS TO BE CHECKED BY SURVEILLANCE PANEL

- | | | |
|-------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Procedural Development</i> | <input type="checkbox"/> | Establish test development time goals and create Gantt Chart. |
| | <input checked="" type="checkbox"/> | Establish source and specification for fuel. |
| | <input type="checkbox"/> | Develop rating/parts evaluation methods. |
| | <input type="checkbox"/> | Establish consistent assembly practices among test facilities. |
| | <input type="checkbox"/> | Select reference oils of different performance levels which primarily use current chemistry, and can be blended in five-year supplies. |
| | <input type="checkbox"/> | Select at least one reference oil which yields passing results in all tests for the category which the proposed test is destined to be a part. |
| | <input type="checkbox"/> | Develop test procedure to meet ASTM standard Blue Book requirements. |
| | <input type="checkbox"/> | Perform laboratory visitation to assure equivalency of test stands and that Surveillance Panel has resolved any variations found in test stand configurations. |
| | <input type="checkbox"/> | Assure that pass/fail parameters are related to field experience or potential field problems. |
| | <input type="checkbox"/> | Document correlation of pass/fail parameters with field experience. |

ASTM SUBCOMMITTEE B -- TEST DEVELOPMENT FLOW PLAN
SURVEILLANCE PANEL AS TEST DEVELOPER

ITEMS TO BE CHECKED BY SURVEILLANCE PANEL, continued

Reference Requirements

- Maintain on-going quality improvement program to identify and handle new critical parts
- Establish calibration requirements (frequency, control charting, etc).
- Develop operational validity requirements.
- Conduct statistically designed matrices on reference oils to quantify precision, discrimination and field correlation.
- Obtain commitment and participation of ASTM Test Monitoring Center.

Data Handling

- Develop severity adjustment system.
- Establish logical Test Result Acceptance Requirements based on distribution of data. **MTAC**
- Complete writing the first draft of the test method in ASTM format.
- Presentation of Test Development report and all data to Oil Classification panel.

ITEMS TO BE CHECKED BY SUBCOMMITTEE B / OIL CLASSIFICATION PANEL

Test Acceptance

- Establish proposed performance limits
- Ballot in affected Subcommittee.
- Resolution of negative ballots.

ITEMS TO BE CHECKED BY TEST SPONSOR / SURVEILLANCE PANEL /
OIL CLASSIFICATION PANEL

Test Maint.

- Monitor Test Severity and Precision
- Provide a process for the continual improvement of the test.
- Develop a process for the tracking (use or reject), identification and improvement of critical test parts.
- Maintain test lab equivalency

ASTM D.02
SUBCOMMITTEE B
TEST DEVELOPMENT FLOW PLAN
WHEN OEM IS TEST DEVELOPER

The following document was proposed at the September 17, 1992 Technical Guidance Committee meeting as a checklist to be used by Section Chairmen in Subcommittee B of ASTM Committee D.02 when bringing new test procedures on-line as ASTM Test Methods and ASTM Monitored Tests. It breaks the test development process down into tasks to be completed by the Test Developer, Surveillance Panel or Task Force.

This flow plan was written from the perspective that the Test Developer is an OEM who desires to have a lubricant test developed around their hardware. It should be noted that the Test Developer's input is not necessarily limited or confined to any specific area on this flow plan. Their input is integral throughout the test development process.

ITEMS TO BE CHECKED BY TEST DEVELOPER

Need for Test

- Identify need for new test in conjunction with SAE, AAMA, EMA, etc.. This need may be as simple as replacing a test with obsolete hardware, or as involved as attempting to simulate a known field problem(s), or avoid a potential field problem.
- Collect field test data or run field tests, as necessary to document current or potential problem.
- Assure that no existing test or oil category will satisfy the performance need.

Hardware

- Identify test hardware platform. This should be a platform in which the OEM intends to support all major components for a minimum of five years after the test is included in a performance category.
- Identify critical parts (Parts known to affect test severity and/or precision).
- Establish specifications and processes for assuring consistent hardware quality.
- Obtain commitments for long-term (5-year) supply of hardware and critical test components (fuel, solvents, cleansing agents).
- Establish test procedure.
- Release hardware to Industry for matrix testing.

ITEMS TO BE CHECKED BY TEST DEVELOPER, continued

Procedure

- Establish specification and source for test fuel.
- Develop rating/parts evaluation methods.
- Establish pass/fail parameters.
- Establish success criteria (precision, discrimination).
- Establish data acquisition requirements.
- Establish test stand design requirements.
- Develop consistent assembly practices among facilities.
- Establish correlation or relationship to field generated data or field performance requirements.

ITEMS TO BE CHECKED BY SURVEILLANCE PANEL (or Task Group) IN
COOPERATION WITH THE TEST DEVELOPER AND ASTM TMC

Procedural Development

- Establish test development goals and create Gantt Chart.
- Establish rating/parts evaluation methods.
- Select reference oils of different performance levels which primarily use current chemistry, and can be blended in five-year supplies.
- Select at least one reference oil which yields passing results in all tests for the category which the proposed test is destined to be a part.
- Develop test procedure to meet ASTM standard Blue Book Requirements.
- Perform laboratory visitation to assure equivalency of test stands and that Surveillance Panel has resolved any variations found in test stand configurations.
- Assure that pass/fail parameters are related to field experience or potential field problem.
- Assure the test procedure can discriminate between failing and acceptable oils in the field

ITEMS TO BE CHECKED BY SURVEILLANCE PANEL (or Task Group) IN
COOPERATION WITH THE TEST DEVELOPER AND ASTM TMC, continued

Reference Requirements

- Maintain on-going quality improvement program to identify and handle new critical parts
- Establish calibration requirements (frequency, control charting, etc).
- Develop operational validity requirements.
- Conduct statistically designed matrices on reference oils to quantify precision, discrimination and field correlation.
- Obtain commitment and participation of ASTM Test Monitoring Center.

Data Handling

- Develop severity adjustment system.
- Establish logical test result acceptance requirements based on distribution of data.
- Complete writing of first draft of the test method in ASTM format.
- Presentation of Test Development report and all data to Oil Classification panel.

ITEMS TO BE CHECKED BY SUBCOMMITTEE B / OIL CLASSIFICATION PANEL

Test Acceptance

- Establish proposed performance limits
- Ballot in affected Subcommittee.
- Resolution of negative ballots.

ITEMS TO BE CHECKED BY TEST DEVELOPER / SURVEILLANCE PANEL (or
Task Group)/ OIL CLASSIFICATION PANEL/ASTM TMC

Test Maint.

- Monitor Test Severity and Precision
- Provide a process for the continual improvement of the test.
- Develop a process for the tracking (use or reject), identification and improvement of critical test parts.
- Maintain test lab equivalency