

D6082 (High Temperature Foaming Characteristics) TMC Calibration Requirements
Surveillance Panel Approved Version 20180807

The following are the specific D6082 (HT Foam) TMC calibration test requirements as approved by the ASTM D02.B0.07 Volatility Surveillance Panel by Teleconference vote on 20180301, 20180807 and effective 20180807.

A. Reference Oils and Critical Parameters

1. The critical pass/fail parameters are Foam Tendency (immediately before air disconnect) Static Foam, ml, and Foam Stability (one-minute after air disconnect) Static Foam, ml. The reference oils, performance targets and acceptance criteria required for the test stand calibration with the TMC are listed in Table 1 and have been approved by the ASTM D02.B0.07 High Temperature Foam Surveillance Panel. **Note that ‘Option A’ in the test method, specifically requiring the sample to be blended prior to testing, is mandatory, and not an ‘option’ for TMC calibration or discrimination tests.**

Table 1
D6082 (HT Foam) Reference Oil Targets and Acceptance Bands Effective 20080807

Test	Oil Code	Parameter	n	Mean	sR	Acceptance Bands*	
						95%	
						Lower	Upper
High Temp. Foam By D6082	FOAMB18	Foam Tendency, ml	18	54	9	36	72
	FOAMB18	Foam Stability, ml	18	0	0	0	0
	1007	Foam Tendency, ml	28	66	19	29	103
	1007	Foam Stability, ml	28	0	0	0	0
	66**	Foam Tendency, ml	--	---	---	>100	---
	66**	Foam Stability, ml		---	---	0	0

*95% Acceptance Bands = Mean +/- (1.960 x sR)

**Oil 66 is a severe performing foam tendency discrimination reference oil

B. Test Stand Defined

1. A test stand is defined as a bath (using heated air or oil medium) that is set up and approved for D6082 testing regardless of the number of individual cylinder openings. The bath (stand) may have multiple cylinder openings for testing multiple samples simultaneously or concurrently.

C. Acceptance Criteria

1. New Laboratory/Test Stand(s)

- a. The TMC calibration system calibrates individual test stands (individual temperature baths regardless of the number of cylinder openings) at individual laboratories. There are no special requirements to bring a LAB into TMC calibrated status, there are only requirements to bring individual test stands into TMC calibrated status, as follows:

- b. A minimum of two (2) operationally valid tests (one calibration and one discrimination), both which meet the acceptance criteria for the oils assigned, are required to calibrate a stand for the first time. These must be concurrent runs on the same test stand.
- c. **Option A (requiring the test sample to be blended as specified in the test method) is mandatory for TMC calibration runs!**
- d. Passing a concurrent TMC calibration and discrimination places the new test stand in TMC calibrated status. Both tests must pass on operational and statistical criteria.
- e. TMC calibrated status of a test stand is valid for no more than 90 days from date completed of a valid TMC calibration (that is, the day the sample is evaluated for static foam levels). To renew the calibration at the end of the calibration period, see Item 2 for Existing Laboratory/Test Stand(s).

2. Existing Laboratory/Test Stand(s)

- a. An existing TMC calibrated test stand, or one where the TMC calibrated status had expired within the past 90 days, can renew its TMC calibrated status by demonstrating a successful calibration on another single TMC blind calibration audit. The test must pass on both operational and statistical criteria.
- b. In addition to a calibration run, labs must also pass a discrimination run on the approved discrimination oil. The discrimination run is to be run concurrently with the calibration test sample. The discrimination run is valid for not more than 180 days from date completed. The discrimination run does not calibrate the instrument, but rather confirms that the discrimination oil test result can be discriminated from the calibration oil test result when run concurrently. Because the discrimination is due only once every 180 days, and concurrent with a TMC calibration, a discrimination run is due every other 90-day calibration cycle. For labs with multiple test stands, only one discrimination run is due every 180 days, but the discrimination runs must be rotated equally among the test stands. A failing discrimination run voids the concurrent calibration run and both runs must be repeated per Section 2 of this document.
- c. **Option A (requiring the sample to be blended as specified in the test method) is mandatory for TMC calibration and discrimination runs!**
- d. TMC calibrated status of an existing test stand is valid for no more than 90 days from date completed of a valid TMC calibration (that is, the day the sample is evaluated for static foam levels). Test stands that exceed these time/run specifications are considered to be out of calibration for TMC monitoring purposes.
- e. A stand that has been out of TMC calibration for more than 90 days from the prior TMC calibration expiration date will require New Test Stand calibration as listed in C.1.b through C.1.e. of this document.

- f. A stand must pass the TMC calibration within two operationally valid test runs. If a stand cannot produce a calibration test that falls into the acceptance bands for the assigned oil within two operationally valid runs, renewing calibration on that stand will require the two-test calibration as listed in C.1.b through C.1.d.

3. Tracking and Reporting Stand ID's

- a. Tracking a stand's calibration status will be effected by tracking and reporting to the TMC the instrument (bath) serial number. The cylinder position in a bath is not tracked by the TMC. Instrument ID shall be the instrument serial number and shall not change for the entire history of a TMC monitored test stand (instrument ID variations will be allowed for existing instruments that were calibrated prior to the serial number ID requirement).

4. Reference Oil Assignment:

Of the two tests required to bring a new stand into TMC calibrated status, the calibration test shall be conducted on either reference oil 1007 or oil FOAMB18, and the discrimination run on oil 66, or reblends, or new formulations, as approved by the surveillance panel. Once a stand has attained TMC calibrated status (existing test stand), 100% of the scheduled calibration tests shall be conducted on an assigned blind reference oil sample from the currently accepted set of calibration oils, and the discrimination run on an approved TMC discrimination oil.

5. Calibration Test Evaluation:

The calibration status of the stands will be based on a review of operational parameters for compliance with the test method, followed by a statistical evaluation of the critical parameters test result against the acceptance ranges in Section A (commonly referred to as a Shewhart severity evaluation). Unless otherwise noted, the acceptance bands in Section A are based on a 95% confidence treatment of round robin test results with data exclusions as approved by the surveillance panel. Due to poor test precision on oils above 100 ml Foam Tendency, the severe performing discrimination oil results are not charted but must exceed 100 ml Foam Tendency and have 0 (zero) ml Foam Stability. (The Foam Tendency lower limit is set match the maximum allowable GF-5/6 limit for Foam Tendency, after establishing by round robin and ongoing testing that the oil performance should always exceed that limit.)

6. Removal of Test Stands from the System

The laboratory must notify the TMC when removing a stand from the system. No reference oil data shall be removed from the TMC's data base of prior TMC calibrations or calibration attempts. Return of the stand to the system will be evaluated based on section C.1.b through C.1.e above.

7. Introduction of New or Re-Blended Reference Oils

Introduction of new or replacement reference oils will be conducted at the discretion of the surveillance panel. Participating laboratories may be asked to donate tests on the new oil(s) to establish baseline performance in the D6082 test. The number of tests requested will be sufficient to rigorously evaluate the oil's performance. Preliminary statistical performance targets and acceptance criteria will be established by the surveillance panel, and those values will be re-assessed as the TMC collects additional calibration data.