

'Providing Tribological Solutions'

TECHNICAL NOTE: GREASE DROPPING POINT MOV LONG LIFE

1. Introduction: The dropping point of grease is measured as the adjusted temperature at which a drop of grease falls when tested under specified conditions. It is an indication of how well the grease retains its fluid components. By comparing the dropping points of the same grease after different times in service it can be used as a service life indicator or to show contamination. Similarly, if tested on samples from shipments, it can be used as one measure for quality assurance purposes.

There are two ASTM methods. D2265 uses an aluminum block for heating and D566 uses an oil bath. D2265 is preferred because the D566 has slightly worse reproducibility and it is not recommended by ASTM for use with bath temperatures above 288°C. Use only D2265 for MOV Long Life. The current version is D2265-15.

According to D2265 the dropping point is as follows; "9.7 When the first drop of material falls free of the cup orifice and reaches the bottom of the test tube, record both the temperature of the cup and of the oven to the nearest degree. Certain greases, for example, some simple soap compositions, or those containing some types of polymers can form a drop with a tailing thread which can hold until the drop reaches the bottom of the test tube. The temperature in the cup when the drop reaches the bottom of the test tube is recorded as the observed dropping point."

The dropping point to be reported is grease thermometer reading plus one third of the difference between thermometer reading and block temperature. For dropping points up to 304°C the procedure recommends a block temperature of 316°C. Note that for D2265, the block is stabilized at the set temperature before the grease sample is put in. For D566, the oil bath and the grease sample heat up at the same time – but they don't mention what that starting temp should or should not be.

1.1 Common Test Procedure Issues

1.1 Low because ASTM D566 was used instead of D2265.

1.2 Low because the grease sample did not drop originally at a lower setting and batch/block temperature was raised and then there was a drop. This increases the test time and makes it more of an oil separation test. The results are not valid. Use a new grease sample in such cases and let the temperature stabilize.

1.3 With a stringy or tacky grease the end point is when the grease drop touches the bottom of the test tube not when it looks like the grease will drop.

1.4 Low because the observed dropping point was not adjusted for the block temperature reading.

1.5 Low because the block or the oil bath was heated up too slowly. ASTM D566 specifies a heating rate. To quote: Stir the oil bath and heat at a rate of 4 to 7°C/min until the bath reaches a temperature of approximately 17°C below the expected dropping point of the grease. At this point reduce the rate of heating so that the temperature difference between the test tube and the oil bath is maintained between 1 and 2°C. This condition is established when the oil bath is heated at a rate of about 1 to 1.5°C/min. See Section 9.6 of D566.

1.6 The dropping point was not calculated per the procedure. In ASTM D566 it is the average of the observed temperature on the grease thermometer and the oil bath while in D2655 it is the observed temperature of the grease thermometer plus 1/3 of the difference between the observed and the block temperatures.

1.7. The test was too long so it becomes partly an oil separation test. It is important to use the heating rates given in D566 and the recommended block temperature in D2655. With an expected dropping point of about 300°C the block temperature should be 300°C. See Section 9.2 of D2655. D2655 test reportedly takes 5-7 minutes

2. Limits

2.1 Manufacturing, °F (°C)

	ACCEPTANCE	TYPICAL	REJECT
GRADE 0	≥525 (274)	572 (300)	<525 (274)
GRADE 1	≥525 (274)	600 (316)	<525 (274)
GRADE 2	≥525 (274)	600 (316)	<525 (274)

2. 2 Reject Limits 3rd Party

ASTM D2265 precision statements valid 19 out of 20 times for measured dropping points ranging from 277- 316°C;

Repeatability (same operator, same sample) within 7°C

Reproducibility (different labs, same sample) within 12°C.

Consequently, a high and low can be different by 24°C (43°F).

	ASTM D2265 °F (°C)
GRADE 0	<482 (<250)
GRADE 1	<482 (<250)
GRADE 2	<482 (<250)

3. Limitorque Specification: For SMB actuators the dropping point must be above 316°F (157°C). MOV Long Life is well above this value.

4. Significance: The dropping point test is one of a few that might be used to confirm that the correct grease was supplied. Calcium sulphonate complex greases tend to have high dropping points but a but a slightly lower one does not mean that other important characteristics are compromised.