

LUBE

TECHNI-GRAM



LEWIS FOX
DIRECTOR OF TECHNOLOGY

FROM:

JULY 2002

WHO DETERMINES WHAT “GRADE” OF GREASE TO USE?

I recently had a question from a customer who asked if there was a specific industry standard document that provides the acceptance criteria for NLGI 2 greases. They were looking for specific criteria's such as: worked penetration (ASTM D217 @ 25° C), unworked penetration (ASTM D217 @ 25° C), and dropping point (ASTM D2265).

The National Lubricating Grease Institute (NLGI) “grade” simply defines the consistency of lubricating grease. The American Society for Testing and Materials (ASTM) method D217 is the procedure in which the consistency is measured and the results are given in penetration limits or ranges. Penetration is defined by ASTM as follows:

Penetration of lubricating grease is the depth in tenths of a millimeter, that the standard cone penetrates the sample under prescribed conditions of weight, time and temperature.

Basically, the widely used system for classifying grease according to consistency or “stiffness” was devised by the National Lubricating Grease Institute (NLGI). It is comprised of different grades defined by “penetration”. Penetration is a measure of the depth to which a standard cone-shaped die penetrates a grease sample with a standard force applied at specified conditions. Therefore, soft greases are more easily penetrated and a larger number results, while a hard or stiff grease will have a lower penetration number.

So, consistency is a measure of the relative hardness or softness of the grease determined under ASTM standards in a penetrometer at a grease temperature of 25° C. The actual penetration of the weighted cone in tenths of a millimeter is recorded as ASTM Worked Penetration. Again, the higher the number, the softer the grease. The penetration test is usually made after the grease has been “worked” in a grease worker for 60 strokes in which case the term “worked penetration” is used. Worked penetration is more representative of grease consistency under actual use. The nine currently recognized NLGI grades of grease and the penetration specifications for them are shown on the following page:



... to keep it running

NLGI Consistency Grades	ASTM Worked Penetration, mm/10	Description
000	445-475	Semifluid
00	400-430	Very soft
0	355-385	Soft-grease gun
1	310-340	Grease gun
2	265-295	Grease gun
3	220-250	Gun or cup
4	175-205	Grease cup
5	130-160	Grease cup
6	85-115	Block grease

So, NLGI grade 2 penetration limit or range is defined in ASTM method D217 from a minimum of 265 and maximum of 295 for the grease that has been worked 60 strokes. The NLGI grade is not based on the unworked penetration.

It is the choice of the author of the specification, the consumer, or the END user to call for a grease meeting NLGI grade 2 or any of the other grade or combination of grades. The same choice would apply for such requirements as dropping point...if a high temperature grease is needed perhaps the specifications would require the drop point to be a minimum of 500° F.

Thanks to Southwestern Petroleum's wide variety of greases, SWEPCO customers have a wide variety of NLGI grades, dropping points and other outstanding performance characteristics to choose from.