



# Grease Storage Life

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Grease gets thicker with age. Some of the oil separates from the thickener and the remaining grease is thicker.

Some greases bleed more than others. Complex greases, such as CenPeCo Double Duty, which is a lithium complex, tend to hold their oils tighter. They bleed less than lithium greases, such as CenPeCo Syntho Lube.

The question is, “How much bleeding is excessive?” When should we begin to worry that the grease is too old?

This article describes a case study in an attempt to answer that question.

Bleeding during storage in a cartridge or bulk container is minimal. Heat and pressure accelerate bleeding. The worst-case scenario is an automatic lube system where grease is held under pressure and pushed through a long line on a piece of hot equipment. If too much oil is lost, the grease thickens up to the point where it plugs the line, which is sometimes called “cake lock.”

So, bleeding can have a downside, but it is kind of how grease works. Heat and pressure cause the grease to release some of its oil to lubricate the bearing. Equipment operators may notice some bleeding around the bucket pins or other lubrication points,

especially in hot weather.

Grease is forced into its lubrication point under pressure, which is why several of our greases include the old-fashioned term “pressure lube” in their names. The grease in grease guns is under spring pressure and oil can bleed out from the hose

Figure 1.



(Continued on page 2)

Figure 2.



and plunger, especially in hot weather. You do not want to store your grease gun in a tool box, unless you like cleaning oil off your tools.

Oil bleeding from the grease gun is what started this case study investigation. Please see two pictures of the puddles of oil on the work bench (Figure 1 and Figure 2). It is my bench. I loaded a cartridge of Syntho Lube three years ago to grease two small U-joints in a sportscar.

The grease gun had hung there ever since. Occasionally, I would wipe the oil off the bench. My garage is not heated, so it barely dripped in the winter. On the other hand, it gets darned hot in the summer, and I wiped up similar amounts of oil as in the pictures three times this summer. So, how much did the grease thicken up, and is it still okay to use?

## Measuring Grease Consistency

Grease consistency or thickness is measured with a Cone Penetrometer (see Figure 3). A cone of specified weight and dimensions is dropped into a sample of 25°C (77°F) worked grease, and the depth of the cone's penetration is measured in tenths of millimeters. So, a higher number indicates a thinner grease.

Some greases change significantly in consistency when worked. Since we are more concerned with a grease's consistency while working than when it is on the shelf, the NLGI classification numbers for consistency are based on worked penetration.

Cone Penetrometer  
Figure 3.



Grease Worker  
Figure 4.



A standard laboratory worker (see Figures 4 and 5) is used to work the grease 60 double strokes prior to taking the penetration measurement. The worker forces the grease sample through holes in a plate, resembling a shower drain. Although motorized workers are available, ours is manual. We send samples off for testing at 100,000 strokes.

NLGI numbers are assigned based on worked penetration according to the table shown as Table 1. Notice that there are gaps between the grades. Grease with a penetration falling between grades

is sometimes indicated by adding “½” to the grade below it. For example, grease with a penetration between NLGI #1 and NLGI #2 may be marketed as NLGI 1½.

CenPeCo’s thinnest grease is Quick Flo Pressure Lube. It is the consistency of pudding and has an NLGI classification of 00. We do not have a corn-head grease, but most corn-head greases are NLGI #0. CenPeCo 5<sup>th</sup> Wheel Grease and Winter Syntho are NLGI #1. All the rest of our greases are NLGI #2, which practically defines “multi-purpose grease.”

Grease gets stiffer with each NLGI number, with #6 being the highest. Greases stiffer than NLGI #6 are available, but are not defined by an NLGI number. NLGI 6 is a “block grease” that is almost like paraffin wax. Generally, pieces are cut

Grease Worker  
Figure 5.



off the block and put into a cup where heat causes the grease to melt into place.

Test Results

With background information out of the way, we will return to the test of the grease that dripped onto my bench. I pumped roughly 9½ ounces from the gun into the 290 ml test cup, nearly emptying the cartridge.

The worked penetration was 281, which is near the middle of the NLGI #2 range. I wanted to compare it with the original measure, but could not. You see, if you are a CenPeCo employee asking for a free tube of grease, you are going to get the oldest stuff they can find left over from a damaged case. The batch number from the cartridge that has been dripping in my garage for more than three years indicated it was made in October 2008. We keep our Certificates of Analysis on every batch of grease, but not always for 10 years. Even if that batch of Syntho Lube was at the upper limit of the penetration, its consistency changed less than 5% over a 10-year period.

Grease Shelf Life

Early this year, ExxonMobil announced that they have extended the shelf life of Mobilgrease 33, a lithium complex aviation grease, to ten years<sup>1</sup>. We are not recommending a competitor’s product, but are showing that we are not out on a limb,

Table 1.

<b>Worked Penetration</b>	<b>NLGI Grades</b>
<b>445-475</b>	<b>000</b>
<b>400-430</b>	<b>00</b>
<b>355-385</b>	<b>0</b>
<b>310-340</b>	<b>1</b>
<b>265-295</b>	<b>2</b>
<b>220-250</b>	<b>3</b>
<b>175-205</b>	<b>4</b>
<b>130-160</b>	<b>5</b>
<b>85-115</b>	<b>6</b>

by claiming a long storage life. And we know ExxonMobil is really sure of that extended shelf life because the litigation after a plane crash can be financially devastating, even to a large company.

Considering the results of our case study where Syntho Lube was stored for seven years, then held under pressure in a grease gun for three years, and remained near the middle of NLGI #2, we should be safe claiming a ten-year shelf life. If bleeding bothers you or your customer, a lithium complex grease such as CenPeCo Double Duty or Mega Moly will bleed a little less. They may even have a longer shelf life, if ten years is not long enough.

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References:

1. "Aviation Grease Life Prolonged," *Lubes 'N' Greases*, 1/18 p47.

*Lubricating Grease Guide*. Fourth ed., National Lubricating Grease Institute (NLGI), 1996