

Calibrate Your Powder

It would be difficult to measure the volume of one grain of powder and not very precisely. However, it is very easy to weigh a large sample of known volume and calculate the volume of a single grain.

To find the exact volume of a single grain of your powder, set your powder measure to any setting, preferably a large whole number such as 4.00 or 5.00.

Weigh a sample. Divide the micrometer setting by this weight to find volume of a single grain of the powder you're testing. Mark this number on the powder container and you'll have it for reference in the future. Average of several samples increases accuracy and confidence.

$$\frac{\text{Micrometer setting}}{\text{Grains weight of sample}} = \text{setting for one grain (cc) (VMD)}$$

In a perfect world you would never again have to weigh a charge for this container of powder. However, if anything can go wrong it will at the worst possible time. For this reason, we strongly urge you to check your charge with a scale every time you reset your measure.

Grain, Granules and Cubic Centimeters

The grain, as used to measure gunpowder, should not be confused with a granule or kernel of powder.

A **grain** was so named because it was the weight measure equal to one plump grain of wheat. A grain is a grain is a grain whether using avoirdupois, troy or apothecaries weight. The reloader uses the avoirdupois system where there are 7,000 grains or 16 ounces to one pound. The same system we use daily in the USA to buy and sell gunpowder, steak, potatoes, etc.

A **centimeter** is **.3937 of an inch**.

There are over 16 cubic centimeters to one cubic inch.

A **liter** is **1000 cubic centimeters** and will hold 1 kilo of water.

A cubic centimeter of water weighs one gram or 15.432 grains.

grams x 15.432 = grains

grains / 15.432 = grams

Lee Safety Powder Scale

Magnetically damped and Approach-to-weight



Safety and accuracy are the most important features. Easy to read and set. Calibrated with weights traceable to the UNITED STATES BUREAU OF STANDARDS. Even if you already own a combination bullet and powder scale, you will want a Lee Safety Powder Scale. **90681**

Volume Measure Density (VMD) Volume of 1 Grain of Powder

This is a term we use to describe the average volume of one grain of a specific powder when metered by the average reloader.

The chart below is that part of a cubic centimeter that is needed to hold one grain of the powder specified. Cubic centimeter was selected as a standard not only because that is what the powder companies use, but a cubic inch is a comparatively large unit. To obtain the same degree of accuracy, it would be necessary to carry the number out two extra places.

To find the volume needed for any charge, simply multiply the charge in grains by the number behind the powder you are using. It is then easy to set your measure to that number.

ACCURATE		VMD		VMD		VMD	
A NITRO100	.1349	A-XMR-2015	.0730	A-XMR-2495	.0748	A-XMR-3100	.0748
A-XMR-4064	.0755	A-XMR-4350	.0740	ACC MAG PRO	.0663	ACC XMP5744	.0751
ACCUR #2	.0838	ACCUR #5	.0623	ACCUR #7	.0653	ACCUR #9	.0657
ACCUR 1680	.0655	ACCUR 2200	.0694	ACCUR 2230	.0657	ACCUR 2460	.0656
ACCUR 2520	.0683	ACCUR 2700	.0685	ACCUR 8700	.0688	PEARL SCOT	.1333
ROYAL SCOT	.1587	SOLO 1000	.1331	SOLO 1250	.1220	SOLO 1500	.1099
ALLIANT		VMD		VMD		VMD	
ALLIANT STEEL	.1063	ALNT 410	.0804	ALNT E3	.1489	AMER-SELECT	.1341
BLUE DOT	.0865	BULLSEYE	.1064	GREEN DOT	.1262	HERC 2400	.0742
HERCO	.1122	POWER PISTOL	.0889	RED DOT	.1413	RELODER 10	.0746
RELODER 25	.0707	RELODER 7	.0728	RELODER12	.0691	RELODER15	.0706
RELODER19	.0706	RELODER22	.0697	UNIQUE	.1092		
HODGDON		VMD		VMD		VMD	
BENCHMARK	.0715	BL-C(2)	.0645	CLAYS	.1482	H 50 BMG	.0694
H LIL GUN	.0678	H RETUMBO	.0721	H TRAP100	.1171	H-PYRDX RS	.0811
H-PYRDX P	.0823	H-VARGET	.0731	H1000	.0713	H110	.0656
H322	.0725	H335	.0645	H380	.0691	H414	.0661
H4198	.0750	H4227	.0769	H4350	.0725	H450	.0653
H4831	.0725	H4895	.0728	H870	.0686	HO US869	.0651
HP38	.0926	HS6	.0712	HS7	.0680	HYBRID100	.0726
INTERNATIONAL	.1266	LONGSHOT	.0824	PYRODEX CTG	.1014	TITEGROUP	.0847
TITWAD	.1300	UNIVERSAL	.1099				
IMR		VMD		VMD		VMD	
IMR 4007 SSC	.0725	IMR 700X	.1343	IMR 800X	.1071	IMR PB	.1205
IMR TRAIL BOS	.2172	IMR3031	.0762	IMR4064	.0745	IMR4198	.0792
IMR4227	.0769	IMR4320	.0716	IMR4350	.0735	IMR4831	.0735
IMR4895	.0728	IMR7828	.0725	SR4756	.1100	SR4759	.0993
SR7625	.1046						
MULWEX		VMD		VMD		VMD	
AR2205	.0741	AR2206	.0714	AR2207	.0759	AR2208	.0725
AR2209	.0713	AR2213	.0686	AS50	.1208		
NORMA		VMD		VMD		VMD	
NORMA 200	.0677	NORMA 201	.0691	NORMA 2010	.1434	NORMA 2020	.1208
NORMA 203	.0691	NORMA 204	.0677	NORMA 205	.0672		
RAM SHOT		VMD		VMD		VMD	
R COMPETITION	.1278	R ENFORCER	.0693	R SILHOUETTE	.0796	R TRUE BLUE	.0684
RAM BIG GAME	.0708	RAM MAGNUM	.0661	RAM TAC	.0671	RAM ZIP	.0816
X-TERMINATER	.0681						
SOUTH AFRICA		VMD		VMD		VMD	
MP200	.0892	MS200	.1061				
VECTAN		VMD		VMD		VMD	
VEC AO	.1196	VEC BA10	.1350	VEC BA9	.0919	VEC SP10	.0668
VEC SP3	.0682	VEC SP7	.0658	VEC SP8	.0682	VEC SP9	.0682
VEC TU2000	.0762	VEC TU5000	.0720	VEC TU7000	.0704	VEC TU8000	.0704
VIHTAVUORI		VMD		VMD		VMD	
v-3N37	.0913	v-N105	.0900	v-N110	.0833	v-N120	.0776
v-N130	.0754	v-N133	.0770	v-N135	.0777	v-N140	.0733
v-N150	.0746	v-N160	.0734	v-N165	.0712	v-N170	.0713
v-N310	.1214	v-N320	.1210	v-N330	.1079	v-N340	.1066
v-N350	.0977	v-N540	.0701	v-N550	.0692	v-N560	.0690
WINCHESTER		VMD		VMD		VMD	
AUTOCOMP	.0787	SUPRM780	.0684	WIN 231	.0931	WIN 296	.0656
WIN 452AA	.1171	WIN 473AA	.0975	WIN 540	.0683	WIN 571	.0680
WIN 630	.0666	WIN 680	.0655	WIN 748	.0655	WIN 760	.0666
WIN AA LITE	.1266	WIN AA PLUS	.1296	WIN ACTION PI	.0810	WIN MAG RIFLE	.0718
WIN SUPER HAN	.0859	WSUPER-FLD	.0840	WSUPER-LIT	.0847	WSUPER-TAR	.1205

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These numbers are approximate. To find out the exact volume of any powder see **CALIBRATING YOUR POWDER**. It is so very easy to do and saves a great deal of time when setting your measure.

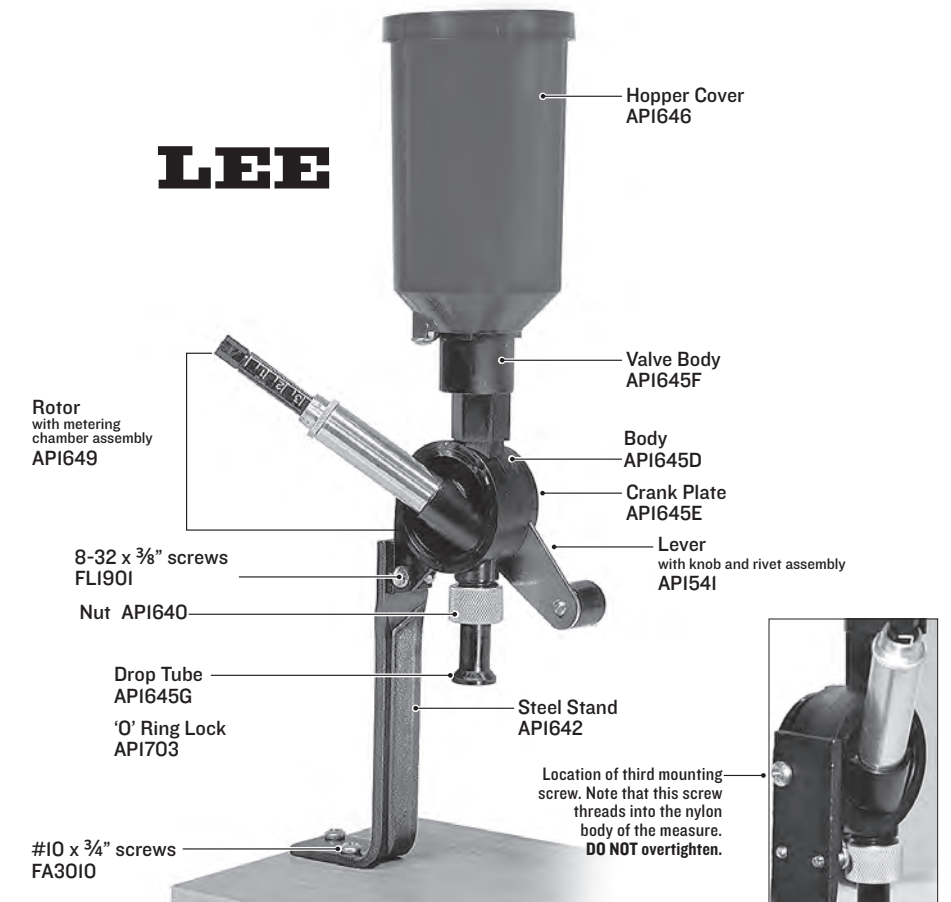
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COMPLETE INSTRUCTIONS FOR THE

LEE PERFECT POWDER MEASURE



LEE Guarantee

LEE RELOADING PRODUCTS are guaranteed not to wear out or break from normal use for two full years or they will be repaired or replaced at no charge if returned to the factory. Any Lee product of current manufacture, regardless of age or condition, will be reconditioned to new, including a new guarantee, if returned to the factory with payment equal to half the current retail price.

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Lee Precision, Inc.

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API704 PERFECT POWDER MEASURE INST.

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IMPORTANT! YOU MUST DO THIS BEFORE USE

If using the measure for the first time, you must process at least one hopper full of powder through the measure to coat the nylon parts with graphite from the powder. This conditioning is important so static electricity will be bled off. Otherwise, you'll find the measure continues to dispense charges progressively heavier. This need only be done once.

The lever should be turned at a uniform, slow to moderate speed to a full stop in both directions. If using a large charge you must pause in both directions to permit the metering tube to fill and empty. You will be able to see the powder move in the hopper while the tube is filling.

You have purchased the best powder measure made. Don't let the bargain price fool you. There has never been a powder measure made with as many features as the Lee Perfect Powder Measure. It is built to give you a lifetime of unmatched accuracy. Unlike other powder measures, you can use any type of powder. Most powders will be dispensed in such uniform charges that you will think your scale is stuck. Extruded powders, such as most IMR powders, work just fine. They do not meter quite as well but you can expect charges more uniform than possible with any other measure. This is possible because of the elastomer wiper which levels the metering chamber without cutting the powder. The charge is more uniform and the measure operates much smoother.

The housing, rotor and adapter are all made from nylon. The metering tube is aluminum. These materials are non sparking, low friction and light weight so the measure is easily case operated with the optional charging die.

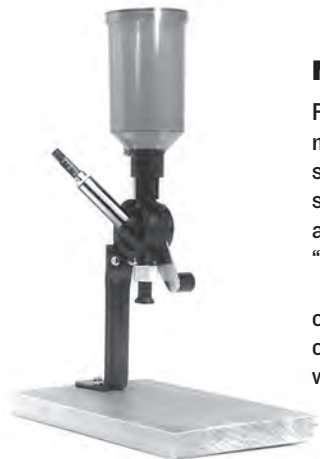
CAUTION

Ammunition reloading can be dangerous if done improperly and should not be attempted by persons not willing and able to read and follow instructions exactly. Children should not be permitted to reload ammunition without strict parental supervision. Always wear safety glasses when reloading and shooting. Ammunition loaded with these tools and data should only be used in modern guns in good condition. We do not accept responsibility for ammunition loaded with these tools or data as we have no control over the manufacture and storage of components or the loading procedure and techniques. Primers and gun powders, like gasoline and matches, can be dangerous if improperly handled or misused.

Mounting Your Powder Measure

For bench mounting, attach the powder measure to the stand with the screws supplied. Attach the base to your bench or suitable base for portable use. Use an ample size base. You may also "C" clamp the stand to your bench.

The hopper has a valve which can be closed by turning the hopper clockwise. Fill the hopper with whichever powder you will be using.



Adjusting The Micrometer

Loosen the thimble so the metering rod can be turned freely to any setting you desire. Snug up the thimble after setting and the "O" ring within will hold the setting with no fear of it moving when in use.

Reading The Micrometer

The metering bar is calibrated in cubic centimeters. Don't worry if you hate the metric system, this is simply a volume measurement that is convenient to work with. If you prefer, think of them as cubic powder units.

On the metering rod you'll be able to see one through a little over seven and one half. If you have been loading with Lee Dippers you can easily set the powder measure to your favorite load by setting to the dipper number.

It requires 10 full turns to move one cc., therefore one turn is $\frac{1}{10}$ (.1) cc.

The micrometer thimble has 10 graduations. Each is $\frac{1}{10}$ of a turn so it is $\frac{1}{100}$ (.01) cc. You can see that a very precise adjustment is standard.

A typical powder such as 4895 needs more than one full line to change the charge by $\frac{1}{10}$ (.1) grain.

Setting The Micrometer

Multiply the charge in grains by the volume of 1 grain (see chart on rear) of the powder you are using. The answer is in cubic centimeters and this is the setting for your measure.

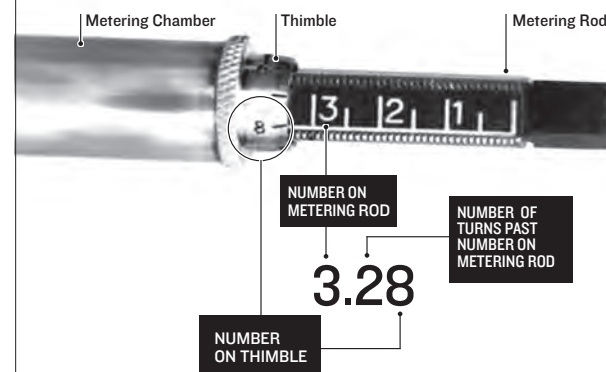
Example: Desired charge is 43 grains of IMR3031.

Check the chart to find the volume of 1 grain is .0762.

Then $.0762 \times 43$ grains = 3.28 (rounded off) cubic centimeters.

- Turn the thimble to the number 3 on the metering rod for the whole number to the left of the decimal point. The #3 indicator line must be visible when the thimble is at zero.
- Turn two extra turns for the first number to the right of the point.
- Turn 8 marks on the thimble for the second number to the right of the point.

Now weigh your charge and you'll be very close to the correct charge. Chances are that it is not exact because the volume of one grain is not precisely the same for your particular batch of powder as that which we tested. This is because the powder manufacturer can't make every batch exactly the same.

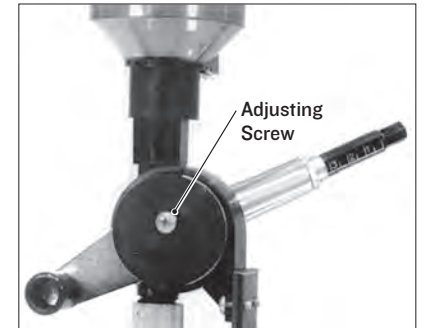


Empty The Measure

This is one of the nicest features of the Lee Perfect Powder Measure. Simply rotate the hopper to the left to turn off the powder flow. Then work the lever a few times to empty the powder below the valve. Be sure to catch the powder. Now you can pull off the hopper and empty into the original powder can. Don't forget to turn the valve on before starting to reload the next time. The powder valve is positioned to also act as a powder baffle to enhance the accuracy of your measure.

Rotor Tension Adjustment

When the measure leaves the factory the adjusting screw is set so 16 oz. of pressure is required to operate the lever. This setting is optimum for most powders. Extremely fine powders may leak very slightly at this setting. This causes no harm. Should you find it objectionable you may tighten the adjusting screw slightly. The rotor should never be so tight that more than four pounds are required to rotate the lever.



Universal Powder Charging Die

This die permits the case to operate the measure, which not only makes the charging operation automatic, but prevents powder spilling if no case is present. It will work with most cases from the 218 Bee to the large 300 Win. Magnum. It will also work for pistol cases 380 ACP and longer. It will not expand the case mouth so the regular expanding die must still be used.

Because of the long travel needed to operate the rotor, this measure will not work with the Lee Powder Through Expanding dies that are supplied with Lee pistol dies. The Lee Auto-Disk Powder Measure should be used with these dies.

