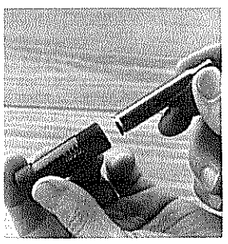
GENERAL INFORMATION (CONT.)

The RCBS Precision Mic consists of a body, a freebore tool assembly, a hex key wrench and two nuts. One nut is called a headspace nut assembly and the other is simply a land nut. At first glance they may look similar but they are different in appearance and function. The headspace nut assembly is the shorter of the two and is stamped with a number (1 through 6) close to the knurled end. The land nut is slightly longer and is stamped with the caliber. Be certain you are using the correct nut for each measurement.

To obtain accurate measurements with your Precision Mic, *do not use excessive force*. For accurate results unscrew the headspace nut from the body, place a fired case (base first) into the body, screw the headspace nut back onto the body until *light* (2 lbs. or less pressure) contact is made with the shoulder of the case. If the shoulder of the case is marked with a ring, then too much force is being used. Practice will result in consistent, accurate readings.

Each line on the body equals .050 inches. Each line on the headspace nut equals .001 inches.



Place a fired case into the body.

Replace the headspace nut.

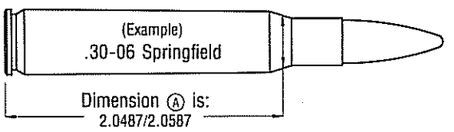
DETERMINING THE HEADSPACE OF YOUR GUN

Headspace is defined in the Speer Reloading Manual as follows:

"The distance from that surface of the barrel or chamber that positions the cartridge and prevents its further forward movement into the chamber, to the face of the bolt or breech block, when the latter is fully back against its supporting surface. This is the most important dimension governing the safety of the shooter. In handloading, the combination of cartridge case and gun must be considered when talking of headspace. To the handloader, a more useful definition of headspace is: The linear endplay of a cartridge in the chamber, with the bolt closed. To a handloader, no gun need have excessive headspace, since he can adjust the cartridge case to the chamber, even though the chamber may have excessive headspace when measured by SAAMI standards."

Chamber headspace is measured in different ways depending on the type of cartridge. In rimless cartridges and cartridges with rebated rims it is the distance from the base of the cartridge case to the datum point on the shoulder. Headspace in rimmed cartridges is measured by the rim thickness. Headspace in belted magnums is determined by the distance from the case head to the front edge of the belt.

Although chamber headspace is determined in different ways for various types of cartridges, to the reloader the important measurement is the base of the case to the datum point on the shoulder as shown below as Dimension A. This dimension has a major effect on accuracy and safety.



The zero on the headspace gauge represents the minimum number of dimension A.

CALIBER	DIMENSION A
.22-250	1.5749/1.5849
.220 Swift	1.8060/1.8160
.222 Remington	1.2936/1.3036
.223 Remington	1.4636/1.4736
.243 Winchester	1.6300/1.6400
6mm Remington	1.7767/1.7867
.25-06	2.0487/2.0587
.257 Roberts	1.7937/1.8037
6.5mmx55 Swedish Mauser	1.7794/1.7894
.270 Winchester	2.0487/2.0587
.280 Remington	2.1000/2.1100
7mm Remington Magnum	2.1253/2.1353
7mm Thompson/Center Ugalde	1.4600/1.4650
7mm-08 Remington	1.6300/1.6400
7mmx57 Mauser	1.7947/1.8047
.30-06 Springfield	2.0487/2.0587
.300 Winchester Magnum	2.2791/2.2891
.308 Winchester	1.6300/1.6400
.338 Winchester Magnum	2.1253/2.1353
.375 H&H Magnum	2.4700/2.4800

The first thing your new headspace gauge will do for you is determine the linear endplay of a cartridge in the chamber of **your** gun with the bolt closed. You then can compare the headspace of **your** gun to ANSI* standards. Your gauge will allow you to adjust your resizing die to produce cartridges with the correct headspace for **your** gun.

*American National Standards Institute

Using the .30-06 Springfield as an example, the following steps will demonstrate how to determine headspace in a particular rifle and how to use the Precision Mic to correctly set your full length resizing die for that rifle:

Step 1: Checking ANSI specifications for the .30-06 Springfield shows the chamber headspace range to be from 2.0487/2.0587 or 0.010" (ten thousandths). The zero on the headspace nut is set at the minimum ANSI level of 2.0487".

Step 2: Using factory ammo or reloads with new brass, fire five cartridges in the rifle you are testing for headspace. Every chamber is different. The data is not interchangeable between guns.

Step 3: Before resizing, remove the headspace nut and measure the 5 fired cases in the gauge and determine the average headspace value. (Using the same example, the value could be +.006 or +6 lines on the nut.)

Step 4: Using the value found in Step 3 (+.006), calculate the chamber headspace dimension of the gun tested by adding the value to the ANSI minimum value. Example: 2.0487 + .006 = 2.0547. This value would indicate the rifle has a headspace dimension within ANSI specifications, but on the long side. NOTE: ANSI specifications are recommendations, not mandatory. Some chambers may exceed the ANSI recommended length.

Knowing the headspace is very important to obtain the best accuracy from your rifle, to extend the life of your brass and to produce safe handloads. The correct fit of cartridge to chamber gives the best accuracy. Setting your sizer die based on the headspace of your rifle prevents moving the case shoulder back too far and overworking the brass. This increases the number of times your cases can be reloaded. Not setting the shoulder back too far also helps avoid potentially dangerous case separation due to excessive headspace.

SETTING YOUR FULL LENGTH SIZER DIE FOR THE CORRECT HEADSPACE

With the headspace dimension in the example known, the next step is to determine the correct setting for the sizer die.

Step 5: Set the sizer die for full length resizing according to normal directions provided by the manufacturer.

Step 6: Lube and resize 2 of the fired cases used in Step 3. Measure the resized cases in the gauge to determine the headspace. To continue the example, the reading is -2 line or -.002 under ANSI minimum. This is a typical reading that confirms your resizing die sets the headspace correctly to chamber in any gun with headspace dimensions within the ANSI range.

The results of Steps 5 and 6 confirm the sizer die performs its function of sizing cases to fit any chamber within the ANSI range. But, in the example given, the normal setting is not the best for the particular rifle. If the normal setting were used, the shoulder would move out .008 with each firing and be set back .008 with each resizing. Such excessive shoulder movement prevents optimium accuracy and can lead to case head separation. The next step therefore is to set the sizer die correctly for the rifle used as an example. The correct sizing for the rifle would set the shoulder back .001-.002 from the fired case dimension to allow proper function and feeding under field conditions.

Step 7: Back the sizer die out ½ turn and secure with the lock ring. Lube and resize one of the remaining 3 cases from Step 3 and measure in the gauge. If no change has occurred from the +.006 fired condition, screw the die further into the press in small adjustments and recheck until a reading of +.004 is found on the gauge. Then set the lock ring to hold that setting. The sizing die is now set to produce cases with the correct headspace for the rifle in the example. Load a few dummy rounds and cycle them through the rifle to confirm that feeding and chambering are smooth and normal.

As a brief review of what has been gained by using the RCBS Precision Mic in the example:

1. Cases fired in the test rifle are .006 over ANSI minimum and need *not* be resized to original factory dimensions if they are to be fired again in the same rifle.
2. The sizer die in the example, when set to normal instructions, resizes correctly to factory ammo headspace.
3. Once the headspace for a rifle has been determined, the sizer die can be adjusted by using the gauge to produce cases properly sized for that rifle.
4. Loaded cartridges with unknown headspace dimension can be checked with the gauge to see 1.) if they were sized to factory dimension or 2.) if they are suitable for use in a particular rifle with known headspace.

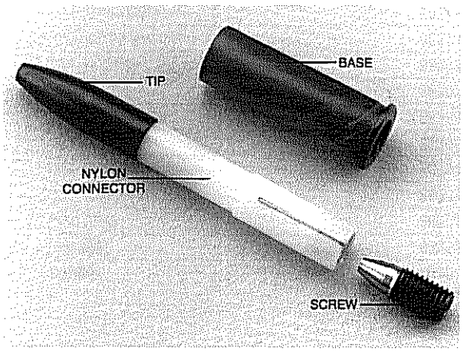
The RCBS Precision Mic will not benefit all shooters or all situations. Some of the circumstances when it should not be used are the following:

- For rifles that require full length resizing or the use of small base sizer dies for proper feeding such as some auto feed or lever action.
- Ammunition which is not exactly the same as the cartridge designation on the Precision Mic unit.

FINDING THE BEST BULLET SEATING DEPTH FOR YOUR RIFLE

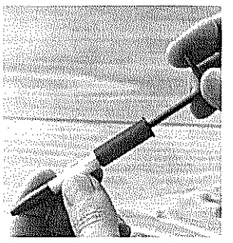
Bullet Seating Depth is a critical factor contributing to accuracy. The correct seating depth must be found individually for **each** rifle experimentally. The critical factor is the amount of freebore or bullet travel before the bearing surface of the bullet contacts the lands of the bore. This distance is related only indirectly to the overall length (OAL) of the cartridge due to the dramatic variation in OAL caused by bullet shape, i.e., spitzer vs. round nose.

The Precision Mic provides an accurate and **convenient** way to determine the seating depth at which the bullet contacts the lands and to check or set your seater die for the correct depth. To determine the seating depth at which a bullet will contact the lands in your rifle a freebore tool has been provided. The freebore tool consists of a screw, a base and a tip mounted in a nylon connector. Adjust the screw so the nylon connector can be slipped into the base with a slight friction fit.



These parts make up a freebore tool assembly.

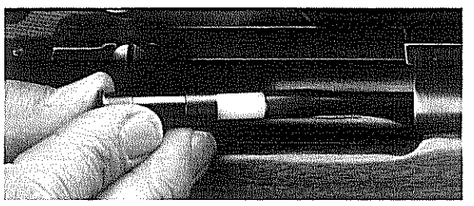
Insert the nylon connector about ¼ inch into the base.



Tighten the screw with the hex key wrench.

There is considerable variation in freebore between rifles. This variation requires the Precision Mic be used in a two-step method to get a final reading. To obtain the rough setting do the following:

1. With the nylon connector approximately ¼ inch into the base, place the freebore tool in the Precision Mic. Install the land nut and check the length. Adjust the tool length to obtain a reading of approximately .300 of an inch.
2. Remove the tool from the Precision Mic. Holding the tool by the nylon connector, firmly tighten the screw through the hole with the hex key wrench provided. (Note: If the screw is not sufficiently tightened, the extractor of some rifles may not grasp the rim and the tool will remain in the chamber.) The rim must be grabbed by the extractor. Use a rifle cleaning rod to help remove a freebore tool if it remains in the chamber.



Chamber the freebore tool in the test rifle.

3. Chamber the freebore tool in the test rifle while guiding it carefully to avoid catching on the edges of the chamber.
4. Extract the tool carefully. Avoid dropping it on a hard surface.

Insert the freebore tool into the body.

Thread the land nut onto the body.

5. The freebore tool now represents the distance at which the bearing surface of a bullet will contact the lands of your rifle. To obtain a useable reading of that measurement, slip the tool into the Precision Mic and screw the land nut onto the body until light contact is made. Note: Use of excessive pressure will push the connector further into the base resulting in a false measurement. Each line on the body represents .050 of an inch. Each line on the land nut is .001. If the measurement has not changed from the reading obtained prior to chambering the tool, it indicates your rifle has a very long leade and it will not be possible to seat bullets near the lands. For our example we will use a reading of .150. Record the reading for future reference.
6. Repeat the test to assure consistant readings. Correctly done, the reading should not vary by more than .002.

The reading determined in steps 1-5 above is the point at which the bearing surface of a bullet will contact the lands and remains relatively constant even with changes in bullet shape, weight and manufacturer (except for bore riding designs). The reading is important as a reference point. The next step is to determine the *best* bullet seating depth for your rifle relative to the depth at which the lands are contacted as determined above. Note: Before proceeding further, load a dummy round (no primer or powder) with the bullet you plan to use seated at the depth obtained in steps 1-5 and check for proper function and feeding in your rifle's magazine. If you are a hunter, there is not much sense in making the effort to find the best seating depth only to find out it is too long to function in your magazine. If a round with the bullet seated to contact the lands will function properly, then a shorter round certainly should.

To find the optimum bullet seating depth for **your** rifle, load nine rounds varying only in bullet seating depth (the same cases, primer, and powder charges). Using the gauge to set your seater die, load three of the rounds with the bullet .010 off the lands (in our example the reading would be .140). Load three rounds with the bullet .020 off the lands (.130) and load three rounds with the bullet .030 off the lands (.120). At a shooting range, compare the groups obtained with each depth setting. If, for example, .020 freebore produced the best accuracy, you might then try .005 on either side to gain more accuracy or confirm that .020 is ideal. Once the best seating depth is discovered, the gauge will let you adjust or check the adjustment of your seater die to produce the most accurate ammunition possible for your rifle. RCBS Competition Seater Dies feature a micrometer bullet seating head for precise adjustments.

As noted earlier, the bullet seating depth may be limited to less than optimum by the dimensions of the rifle's magazine. Another obvious restriction can be bullet length. Lighter weight bullets may be too short to seat at the optimum depth, particularly if the throat is long. If the throat of your chamber is too long for the optimum seating depth, then a compromise is necessary. **Bullets should be seated in the case neck to a depth at least equal to the bullet diameter to provide correct alignment with the bore.**

In semi-automatic or lever action rifles, proper feeding is more important than maximum accuracy and the bullet seating depth gauge may not be helpful.

SAFETY

Reloading is an enjoyable and rewarding hobby that can be conducted safely. But carelessness or negligence can make reloading hazardous. This product has been designed from the beginning with the user's safety in mind.

When reloading, safety rules must be followed. By observing these rules, the chance of a hazardous occurrence causing personal injury or property damage is minimized.

GENERAL

- Use all equipment as the manufacturer recommends. Study the instructions carefully and become thoroughly familiar with the operation of the product. Don't take short cuts.
- Observe "good housekeeping" in the reloading area. Keep tools and components neat, clean and orderly. Promptly and completely clean up primer and powder spills.
- Reload only when you can give your undivided attention. Do not reload when fatigued or ill. Develop a reloading routine to avoid mistakes. Avoid haste – load at a leisurely pace.
- Always wear adequate eye protection. You assume unnecessary risk when reloading without wearing safety glasses.

LOADING DATA

- Use only laboratory tested reloading data. We highly recommend the use of the SPEER Reloading Manual.
- OBSERVE ALL WARNINGS ABOUT THE USE OF MAXIMUM LISTED LOADS.

PRIMERS AND POWDER

- Store primers and powder beyond the reach of children and away from heat, dampness, open flames and electrical equipment.
- DO NOT use primers of unknown identity. To destroy unwanted primers, soak in oil for a few days and then bury.
- Keep primers in original factory container until ready to use. Return unused primers to the same factory packaging for safety and to preserve their identity.
- DO NOT store primers in bulk. The blast of just a few hundred primers is sufficient to cause serious injury to anyone nearby.
- DO NOT force primers. Use care in handling primers.
- DO NOT use any powder unless its identity is positively known. Discard all mixed powders and those of uncertain or unknown identity.
- If you use a Powder Measure, replace the lids on both the Powder Hopper and powder can after the Powder Hopper has been filled.
- Before charging cases, settle the powder in the Powder Hopper. Throw and check the weight of at least ten charges. This will assure you that the correct powder charge is being thrown.
- After a reloading session ends, pour the remaining powder back into its original factory container. This will preserve the identity and shelf life of the powder.
- DO NOT smoke while handling powder or primers.

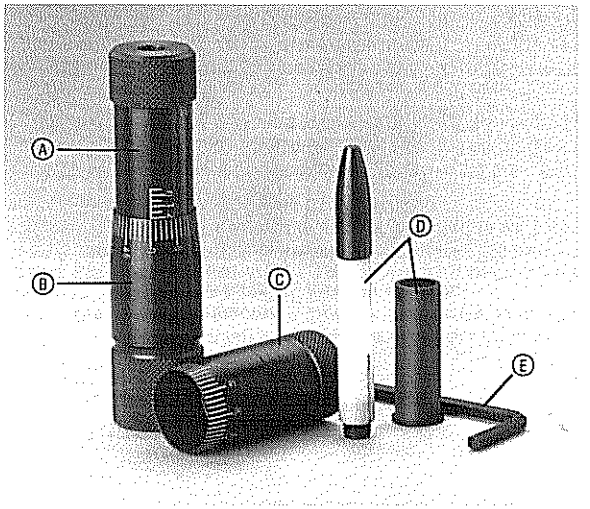
RECORD KEEPING

- Keep complete records of reloads. Apply a descriptive label to each box showing the date produced, and the primer, powder and bullet used. Labels for this purpose are packed with SPEER bullets.

Since RCBS has no control over the choice of components, the manner in which they are assembled, the use of this product, or the guns in which the resulting ammunition may be used, no responsibility, either expressed or implied, is assumed for the use of ammunition reloaded with this product.

GENERAL INFORMATION

The RCBS "Precision Mic" Micrometer Headspace and Bullet Seating Depth Gauge provides several very valuable measurements and comparisons. Valuable for safety as well as improved performance from your handloaded ammunition. Each measurement and comparison will be discussed individually and the application will be explained.



A	Body
B	Land Nut
C	Headspace Nut Assembly
D	Freebore Tool Assembly
E	Hex Key Wrench, 3/32

SPECIAL NOTES:

- Bullets should not be seated so they contact the lands. Such cartridges can develop excessive and potentially dangerous pressures.
- Be sure the gun is clean before determining bullet seating depth.
- Be sure the Precision Mic is clean. Any debris inside the Mic will give false headspace and bullet reading.

CARE

The Precision Mic features a black oxide finish for corrosion resistance and white markings for good color contrast and visibility. The only care required is wiping with a clean, soft cloth. CAUTION: The use of organic solvents to clean the Precision Mic will remove the white markings. They can be re-applied with a paint stick or lacquer marker, or, if you prefer, the Precision Mic can be returned to RCBS for re-marking.

The headspace nut assembly on the Precision Mic is two pieces that have been bonded together. NOTE: Acetone or similar products will dissolve the bonding material and should be avoided. If the bonding material dissolves, return the Precision Mic to RCBS for repair and adjustment.

When not in use, store the Precision Mic in the original plastic box.

Precision Mic Part Number List

Caliber	Complete Unit	Body and Headspace Nut Assy.	Land Nut	Freebore Tool Assy.
.22-250	88302	88352	88402	88452
.220 Swift	88301	88351	88402	88451
.222 Remington	88303	88353	88402	88453
.223 Remington	88304	88354	88402	88454
.243 Winchester	88305	88355	88403	88455
6mm Remington	88306	88356	88403	88456
.25-06	88307	88357	88404	88457
.257 Roberts	88308	88358	88404	88458
6.5mmx55 Swedish Mauser	88314	88364	88405	88464
.270 Winchester	88316	88366	88406	88466
.280 Remington	88317	88367	88407	88467
7mm Remington Magnum	88319	88369	88407	88469
7mm Thompson/Center Ugalde	88320	88370	88407	88470
7mm-08 Remington	88322	88372	88407	88472
7mmx57 Mauser	88323	88373	88407	88473
.30-06	88324	88374	88408	88474
.300 Winchester Magnum	88327	88377	88408	88477
.308 Winchester	88329	88379	88408	88479
.338 Winchester Magnum	88331	88381	88410	88481
.375 H&H Magnum	88337	88387	88415	88487