

“Reloading Bulged Pistol Brass”

By Lee Love

Bulged brass typically falls into one of two categories; symmetrically bulged or asymmetrically bulged. Symmetrically bulged brass is typically due to an oversized chamber. The resulting bulge is more or less uniform and, depending on the dimensions of the chamber, may affect the entire length of the case above the web. Asymmetrically bulged, or “pregnant” pistol brass, is commonly caused by a chamber that is not fully supported, and certain cartridges and pistols are notorious for yielding severely bulged brass (e.g. 1911 style pistols without ramped barrels and GLOCK pistols in .40 S&W). And, in many cases, you don’t need to be firing rounds that are “loaded up” to major power factor to get bulged cases.

Reloading either type of bulged brass can be a problem, especially if you happen to have a pistol that is sensitive to cartridge dimensions. If your pistol does not produce bulged brass, the most obvious solution is to always try to pick up only your own brass. But, no matter how hard you try, a few “strange” cases will inevitably sneak into the mix ... and sorting them for bulges takes a lot of time.

Fortunately, there are several remedies for bulged brass. Which one is “best” is a matter of much debate and a solution that works for one reloader frequently won’t work for the next guy. There are also a few cartridges, like the .38 Super Auto, for which there are limited solutions due to the semi-rimmed case. Therefore, I will not attempt to rank any of the products mentioned herein, but merely list them for your consideration.

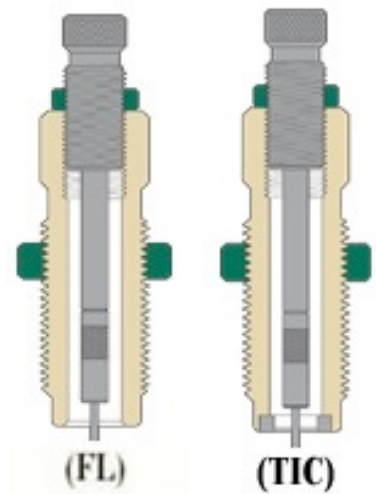
Die Selection

The full-length resize die you choose can make a difference in your ability to resize bulged brass. For instance, dies designed for use on progressive presses (e.g. Dillon Precision carbide pistol dies and Redding Reloading Pro Series Die Sets) have a more generous radius at the mouth. This radius is an advantage on a progressive press as it reduces jams. But it’s a disadvantage with bulged brass as it limits just how close to the base the case can be resized. Dies from different manufactures have varying amounts of radius on the mouth. For instance, the amount of radius on Redding dies is more conservative than on Dillon Dies. So if you are having problems you may want to test a resize die from another manufacture, or a die that was designed for single stage presses.

Carbide dies have a slight disadvantage because the steel die body is crimped around the carbide ring, which can leave a raised rim that further limits how far down the case wall the carbide can reach. Therefore, steel dies have a slight advantage over carbide dies with regards to reaching further down the case. The size of that rim will be different on dies from different manufacturers. I happened to have carbide dies for .38 Super from both Dillon and Redding. The carbide rings were recessed 0.008” on the Dillon die and 0.011” on the Redding die. But I also noticed that the recess varied depending on just where I took the measurement around the perimeter of the carbide ring. So I also suspect that the amount of recess will vary slightly among a batch of dies of the same caliber and manufacturer. So you’ll need to measure your own dies to see if this is an issue for you. (A possible solution will be discussed later.)

Steel full length resize dies are machined to the exact shape of the case including any taper between the case mouth and base. So they truly are "full length" dies. But carbide dies have just a thin ring of carbide (about 0.16" thick on a Redding .38 Super carbide die) that does the sizing (see cross-section drawings at right). On cases that are truly straight walled (e.g. .38 Super, .38 Spl., .357 Mag.) this works just fine. But the more tapered the case, the more of a compromise a carbide die becomes. It simply can't resize both the case mouth and the base to their correct dimensions. For example, 9mm is 0.380" at the case mouth and 0.391" at the base. And the carbide ring on most dies is not thick enough to resize the full length of the case. So why not make the carbide the full length of the case and grind it to the required taper? Simply put, it is cost prohibitive. Anyway, this is one more reason that steel dies can have an advantage over carbide dies when resizing bulged cases. The drawings at right illustrate the difference between a steel die (left) and a carbide die (right).*

* Drawings provided with permission from Redding Reloading.



Die Adjustment

Regardless of the resizing die brand or type you use, proper die adjustment is equally important. Referring to both the die manufacturer's and the press manufacturer's instructions on die installation and adjustment is always a good place to start.

Single Stage Presses:

Generally, with full length resizing dies, the shell holder needs to bottom firmly against the die when the ram "cams over" at the top of the press stroke. However, this is NOT true when using carbide dies. With carbide dies, the shell holder should never touch the die. Carbide is very hard, but also very brittle. If the shell holder is pressed against the die with enough force, the carbide can shatter.

Progressive Presses:

Because of the rotating shellplate, progressive presses (e.g. Dillon 550/650/1050) are a bit more sensitive to die adjustment. You NEVER want the die to pinch the shellplate, regardless of it being a steel or carbide die. Pinching the shellplate can result in cartridge OAL variations ... and possibly other problems.

Modifying Dies

As previously mentioned, carbide dies have a carbide ring pressed into the bottom of the steel die body. The base of the die body is crimped inward around the carbide ring to prevent it from pulling out. The die body often extends slightly below the carbide ring, limiting how far down the case wall the die can resize. You can extend the reach of a carbide die by grinding off some of the excess metal from the bottom rim of the die body where it is crimped around the carbide ring. It may not look like much but, combined with all your other efforts, it could make a critical difference.

If you are handy with tools, you can accomplish this yourself using a sharp file or Dremel Tool. Place a layer or two of masking tape over the carbide ring to prevent accidentally damaging the carbide ring. If you know a good machinist, he can chuck it in a lathe and do a much cleaner, and faster job. Don't grind off the crimp completely as this may result in the carbide ring pulling out of the die body during use. As mentioned earlier, the rim may not be uniform and simply "cleaning up" the high spots may be sufficient.

Steel dies don't have this ring of excess metal below the base of the die opening so they can't be similarly modified. There isn't really anything you can do to modify a steel die that will help with regards to resizing bulged cases.

Modifying The Shellplate

I've also heard of a few progressive press owners who have machined down the top of the shellplate at each position. This does allow the die to reach a bit further down the case wall ... but it also weakens the shellplate. I've never tried this but in combination with trimming the base rim of a carbide die, it could add up to a significant difference. However, machining the shellplate will be expensive and there is a risk of the shellplate bending or cracking during use. I'd recommend exhausting all other options before attempting this!

Please keep in mind that modifying dies and shellplates is a non-reversible procedure. If it doesn't work, you won't be able to return them to the manufacturer.

Undersized Dies

Evolution Gun Works (EGW) offers custom designed carbide sizing dies that are 0.001" smaller in diameter than typical dies. The EGW dies also flair lower than some other sizing dies and are thus able to size the case closer to the base. They are Lee dies that have been manufactured to EGW's specifications by Lee Precision, Inc.

Available for: 9mm, 38 Super, 40 S&W/10mm, 45 ACP and 38 Special.

MSRP = \$29.00

<http://egw-guns.com/>

There is much discussion in the forums regarding undersized dies. It appears that roughly half of the users swear by them, and the other half swear at them. One of the common complaints is that the undersize die can push a ring of brass ahead of itself and deposit it at the case web. I'm not certain if this explanation is correct, or even possible from a metallurgical view. What I think is being observed is simply the end of the undersized portion of the case. Another frequent comment with undersize dies is that, once loaded, the cases frequently look "narrow-waisted" or "Coke bottle" shaped. This may not necessarily be a problem, but one wonders if this could be overworking the brass to the point of early failure. A likely indicator of this would be if you see split cases where the split starts at the middle of the case instead of at the case mouth.

Even if the undersize die is carbide (all EGW undersize dies are carbide), the use of a good quality high-pressure case lube is highly recommended. Undersize dies are doing a bit more work compared to a standard die ... plus the extra work being done removing the bulge. If you are having problems, try using a case lube (or a different case lube if you are already using one) and see if it makes a difference.* Even when using carbide dies, I always lube my pistol brass. It makes the press operate smoother and with less effort.

* See Tips File #8, "Cartridge Case Lubrication" for more information on case lubes.

Tip: Dillon 1050 Users can use a standard Dillon full-length resize/decap die in Station 1 and an undersize die (with decapping pin removed) in Station 2.* Since the brass is being resized in two steps, it reduces the force required to operate the press as well as reducing stress on the brass.

* The Swage Rod must be removed.

Pass-Through Resizing Dies

With pass-through sizing dies, the case is pushed completely through and out the top of the die. This makes it possible to restore bulges all the way to the bottom of the case. But pass-through dies can't be used with rimmed or semi-rimmed (e.g. .38 Super Auto) cases due to the rim.

Pass-through dies also can't be used on a progressive press. Bulged brass must first be resized using the pass-through die on a single-stage press, and then reloaded as normal on your progressive press. This may sound like a lot of extra work, but it does provide you the opportunity to visually inspect the bulged brass both before and after bulge removal. So, when you transfer them to your progressive press for reloading, you will be less likely to encounter a bad case that will slow down the process.

Keep in mind that a lot of work is being done to the brass, so a sturdy press is recommended. Using a good quality high-pressure case lube is also highly recommended. Redding Reloading recommends using their Imperial Sizing Die Wax and a free sample is included with the steel version of their G-Rx pass-through resizing die. But I strongly recommend that you use a case lube even if with a carbide pass-through die.

Lee Precision, Inc. – Bulge Buster Kit

The Bulge Buster Kit includes only an extension sleeve, push through punch and catch container. It is used with the appropriate Lee Factory Crimp Die (with the crimp sleeve and adjusting screw removed from the die). Since it utilizes a Lee Factory Crimp Die (with standard 7/8"-14 threads), it can be used on any single-stage press. Below is a list of the cartridges that can be resized with the kit and the appropriate Lee Factory Crimp Die.

Cartridge	Lee Factory Crimp Die
380 ACP	#90867 (380 Auto)
40 S&W/10mm/357 Sig	#90862 (40 S&W)
400 COR-BON/45 ACP/45 GAP/45 Win Mag	#90864 (45 ACP)
41 AE	#90416 (41 Magnum)

You will notice that 9mm is not included in the list. The Lee web site states, "9mm cases are not able to be used in the Bulge Buster because it has a slightly tapered case and the rim is not completely flush with the case". (This will be covered in more detail later in this article.)

Bulge Buster Kit: MSRP = \$19.98

Lee Factory Crimp Dies: MSRP = \$22.98

<http://www.leeprecision.com/html/catalog/bulgebuster.html>

There is not much bell on the mouth of the Lee Factory Crimp die and some forum postings complain that it is difficult to get cases started. The Redding G-Rx die (described later) has more bell and case alignment was not a problem when I gave it a "test drive" when it was introduced at Shot Show 2009. But I have not personally tested the Lee Bulge Buster Kit.

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- 4 -

Rev. 2 07/12

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Strangely enough, although the Bulge Buster Kit lists the 40 S&W cartridge, the instructions also include this warning.

"Do not use the Bulge Buster Kit to reload for the 40 S&W Glock or similar guns with chambers that do not fully support the cartridge due to the intrusion of the feed ramp."

And the following statement regarding the Bulge Buster Kit is on the Lee Precision web site.

"Glock Cases: We do not recommend "fixing" cases fired in pistols with unsupported chambers, because there is no way to make them safe once they have bulged. The case wall is thinned where it bulges, and resizing the outside of the case back down to the correct diameter does not restore the case back to its original thickness. If this case is fired in a pistol with an unsupported chamber again, and this thinned section of brass happens to line up with the unsupported part of the chamber, there is a high probability that the case will rupture."

This seems to be more than a warning ... maybe it relates only to their particular tools or it's just something their lawyers had them add. Regardless, I think they do have a valid point. In order for the case to bulge, the brass must be stretched thinner. A point to consider when dealing with severely bulged brass!

Magma Engineering Company - Case Master Jr. Rimless Case Sizer

The Case Master Jr. is based on an industrial 1/2-ton arbor press and uses pass-through dies. The dies are Dillon Precision carbide dies that have been honed to custom specifications and modified specially for use in the Case Master Jr. press. The cases are supported from the inside by a push rod and pressed downward, base end first, through the die. The dies can only be used in the Case Master Jr. press. As you must buy an entire press and not just a die, this is a more expensive option.

Available for: 380 Auto, 9mm, 40 S&W/10mm, 45 ACP and 30 Carbine.

Case Master Jr.: MSRP = \$325.00

Dies: MSRP = \$56.00 (any caliber)

Caliber Conversions: MSRP = \$23.40

<http://magmaengineering.com/products/case-master-rimless-case-sizer>

Redding Reloading – G-Rx Push-Thru Base Sizing Die

The Redding G-Rx die comes with the push-thru die and a push rod/shell holder. Redding makes the G-Rx die for .40 S&W (it also works for 10mm and .357 SIG), and it is available in both steel and carbide. It uses a standard 7/8"-14 die body so it can be used on any single stage press.

Steel (MSRP = \$54.00) / Carbide (MSRP = \$109.50)

<http://www.redding-reloading.com/new-products/3-g-rx-push-thru-base-sizing-die>

I asked Redding why they don't make the G-Rx die for other rimless cartridges. They explained that it is because of the amount of taper and/or rim diameters and they don't want to offer a product that alters the case from SAAMI specifications in even the slightest way.

Although we call them "rimless" cartridges, many have rim diameters slightly larger than the base diameter. If you check the SAAMI specifications for case dimension, the .40 S&W varies only 0.001" between case mouth and rim ... close enough that using a pass-through die is feasible. But, for example, the 9mm case varies by 0.011" between case mouth and base, plus

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- 5 -

Rev. 2 07/12

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the rim diameter is 0.003" larger than the base diameter ... which would seem to make it a poor candidate for a pass-through base sizing die.

The table below shows the SAAMI specifications for most popular pistol cartridges. SAAMI lists cartridge dimensions as maximum and specifies a minus (-) tolerance to the dimension. Based on maximum rim dimensions, those in **bold** do not appear to be good candidates for a pass-through base sizing die.

SAAMI Pistol Cartridge Dimensions			
Cartridge	Mouth Δ	Base \dagger	Rim \wedge
380 Auto (ACP)	.373	.374	.374
9mm	.380	.391 -.007	.394
38 Super	.384 \ddagger	.384	.406
357 Sig	.424 (shoulder)	.424 -.005	.424
40 S&W	.423	.424 -.008	.424
10mm	.423	.425 -.005	.425
400 COR-BON	.4739 (shoulder)	.476	.480
45 ACP	.473	.476	.480
45 GAP	.4729	.476	.470
45 Win Mag	.473	.476	.480
41 AE	.434	.435 *	.394 *
Δ Reference Dimension \dagger Unless otherwise noted, body diameter tolerance -.006" \wedge Unless otherwise noted, rim diameter tolerance -.010" \ddagger .38 Super has a cylindrical body, therefore mouth and body diameter tolerance are the same -.006" * Not listed on the SAAMI web site but presumed to have the same base and rim dimension tolerances.			

Similarly, the .45 ACP, 400 Cor-Bon and .45 Win Mag rims are 0.004" larger than the base. Again, based on maximum rim dimensions, a pass-through die that is sized to maximize the ability to reduce a bulge that occurs immediately above the web, will inevitably alter the rim diameter.

I visited Magma Engineering and talked with Gene Nemeth, who demonstrated the Case Master Jr. Gene explains that the SAAMI specifications for rim diameter have more minus tolerance than the other case dimensions. He also suggested that the actual rim diameters tend to the smaller end of the SAAMI specifications. So there is no real problem with cycling all rimless cases through a pass-through die ... including 9mm.* The dies are honed to size just the critical base diameter ... thus the ability to remove the bulge from the largely tapered 9mm.

* If you refer to the SAAMI Pistol Cartridge Dimension Chart for 9mm, you will see that this is true because .391-.007 and .394-.010 have the SAME minimum diameter (.384).

I brought back a few samples of .45 ACP brass and inspected the rims before and after sizing. Passage through the die definitely shaved some metal from the rim, forming a burr on the extractor groove side of the rim. Is this enough to be a problem? According to Magma Engineering, it is not. To get a second opinion, I asked a friend who is an ICORE Master and USPSA Master. He shoots .45 ACP and uses the Case Master Jr. on all his .45 ACP brass. He has never experienced a problem due to the little bit of rim being shaved off. I expect that if you have a well-designed and tuned extractor claw, you are unlikely to have any problems.

Other Types of Case Resizers

Case Pro-100

The Case Pro-100 is unique in that it uses two parallel plates and rolls the case between the plates. The case is full length sized all the way to the web, removing any bulges. Because the "die" is a pair of parallel plates, it is also possible to restore the extractor groove and rim. This design also gives it the unique advantage of being able to resize 38 Super cases, which pass-through dies simply cannot do because of the large rim. This is the most expensive of all the solutions currently available but it is also the only one that can resize semi-rimmed, as well as rimless cases, with absolutely no alteration to the rim.

Available for: 10mm/40 S&W, 9mm (9x19, 9x21, 9x23), .38 Super, 38 Super Comp and 45 ACP.

Case Pro 100: MSRP = \$645.75 (includes 1 set of dies)

Dies: MSRP = \$179.11

<http://www.casepro100.com/>

Note: The Case Pro 100 was unavailable for a while, but Mike Fleury started it up again in early 2009. For a while, the only way to contact and order was through a forum thread on the Brian Enos forum. — <http://www.brianenos.com/forums/index.php?showtopic=80965&st=0>

But Mike sent me an email saying that he is now taking orders and emails through the casepro100 web site. — <http://www.casepro100.com/>

Collet Resizing Die

Although not available for pistol cartridges, I thought I'd mention this one ... just to be thorough. The Collet die was invented by Larry Willis to deal with resizing belted magnum rifle cartridges. The belt prevents conventional full length dies from traveling far enough down the case, limiting the ability to resize the base. Collet dies are two-piece arrangements. You place a metal sleeve (the "collet") around the case then run it into the customized die. Although this is acceptable for single-stage presses and rifle cartridges where you may need to load only a dozen or two to last the hunting season, it is impractical for reloading hundreds of pistol cartridges on a progressive press.

<http://www.larrywillis.com/>

Additional Considerations

Inspect The Brass

It is important to inspect bulged brass before loading! If the bulge is excessive or you can see a sharp line or crease in the brass at the edge of the bulge, it is probably not worth reloading. A crease is an indication that the brass may have been weakened at that point and thus prone to failure when loaded and fired. It simply isn't worth the risk to you, your valuable handgun and innocent bystanders. If you do decide to try removing the bulge from a case that you aren't quite sure about, inspect it again after bulge removal. If you can still see a crease mark, you should scrap the case.

Case Gages

Case gages are the most convenient way of checking your success with correcting bulged cases ... or just checking any completed cartridges. Case gages allow you to quickly check all critical dimensions of your loaded ammunition, including maximum overall cartridge length and base

diameter. If they fit these gages, they should run in your gun ... unless you have an unusually tight chamber.

[Dillon Precision Handgun Case Gauges](#): MSRP=\$15.25

[L. E. Wilson Pistol Max Gauges](#): MSRP=\$28.00

[Lyman Pistol Maximum Cartridge Gauges](#): MSRP=\$16.50

Note: Dillon Handgun Case Gauges are sized to minimum SAAMI chamber dimensions. L. E. Wilson Pistol Max Gauges and Lyman Pistol Maximum Cartridge Gauges are sized to SAAMI maximum cartridge dimensions.

The two most basic types of case gauges are "Maximum Cartridge" and "Minimum Chamber". As the names imply "Maximum Cartridge" gauges are cut to SAAMI maximum cartridge dimensions and "Minimum Chamber" gauges are cut to SAAMI minimum chamber dimensions. To get an idea of the difference, lets look at the specifications for .40 S&W.

SAAMI Maximum Cartridge / Minimum Chamber Specifications			
.40 S&W	Mouth	Base	Rim
Cartridge †	.423	.424	.424
Chamber ^	.424	.4274	.4284
† Unless otherwise noted, body diameter tolerance $-.006''$			
^ Unless otherwise noted, rim diameter tolerance $-.010''$			

You will notice that, with the .40 S&W cartridge, a maximum cartridge gauge is 0.0034" tighter at the base than a minimum chamber gauge. If you are dealing with bulged cases, a maximum cartridge gauge will be a more stringent test of your success than a minimum chamber gauge.

L.E. Wilson actually makes four different types of case gauges. In addition to the Max Cartridge gauge, they also make a "Case Gauge" that checks only overall length and headspace of empty brass, either fired or sized. This is handy if you want to check cases after using a push-through base sizing die, before committing them to being reloaded. A detailed discussion of the remaining types of gauges is getting a bit outside the purview of this article and may be good material for another "Tips" file on case gauges.

An "old school" trick for gauging pistol rounds is to remove the barrel from your pistol and use the chamber to gauge your rounds.* If a completed round drops easily into the chamber, it should chamber when at the range. But there are several limitations to this technique.

*** NEVER use a fully assembled pistol for gauging rounds! It is just asking for an accident. Remove the barrel and use ONLY the barrel.**

- 1) If the barrel does not have a fully supported chamber (and therefore potentially the same barrel that created the bulge), there is a chance that you will drop the loaded round into the chamber with the bulged area aligned with the unsupported part of the chamber. So you would need to rotate the round and insert it again to be certain.
- 2) Using a barrel checks only one barrel/ammo combination. If you use the same ammo in more than one firearm, you would need to gauge the ammo in each barrel to be certain. For example, Glock chambers tend to run larger than Sig chambers for the same cartridge.
- 3) Using a barrel compares the chamber, which has it's own SAAMI specification, to cartridges which are manufactured to their own specification (which is smaller). The SAAMI specifications are set up this way so that all ammo that is manufactured to SAAMI specifications will fit any firearm that has a chamber manufactured to SAAMI

specifications. Therefore, using a barrel tends to gauge ammo that is larger than the SAAMI specifications for that cartridge.

Therefore, a case gauge is always the better option ... as well as being more convenient. To provide a "real world" example of just how important combining case gauging with bulge removal can be, below is a quote from a customer who experienced problems loading .357 Sig.

"My reloading was causing as much as 1/4" variations in headspace as shown on the L.E. Wilson 'case gage' until I used the Redding G-RX Push-Thru die. After that, all cartridges were PERFECT on headspace both in sized cases and loaded cartridges. A small variation on the setting of the sizing die (Dillon die and press), would cause a corresponding variation in headspace, EVERY TIME. This die solved my problem completely. My feeling is that if someone is loading .357sig (this may also apply to .40 and 10MM) and not checking every loaded round individually, that they should be using some solution to fix the bulge."

Don't Forget Case Trimming

Removing the bulge may result in more brass stretching than occurs on cases that are not bulged. So, especially with bulged brass, it is wise to check the case length (after removing the bulge) and trim if needed. There are so many options for case trimming (including trim dies, case trimming lathes and press-mounted electrically powered trimmers) that I will not list them all here ... but it might be good material for a future "Tips" file!

Final Thoughts

Don't feel that you must forge ahead on your own struggling with bulged brass. Your shooting buddies may have already dealt with bulged brass and found a solution that works for them. Ask them what they have done. You may even get them to demonstrate their solution on some of your own bulged brass so you can test it in your own firearm. This way, you will save a lot of time and money trying solutions that may not work for you.

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- Thanks to Robert T. (a long time UniqueTek customer) for using a “fresh eye” to find typos I missed. Thanks also for providing an expanded description of the problems associated with using a firearm’s chamber as a case gauge, and for suggesting the need for more details regarding case gauges in general. Lastly for insisting I add tolerances to the SAAMI Specification tables. Robert requested that his contribution either not be listed or that his last name not be given. But I feel strongly that this document was significantly improved by his effort and it should not go unmentioned.
- Thanks to Walter C. (another long time UniqueTek customer) for providing the “TiP” on using an EGW Undersize die in series with a standard Dillon resize die for resizing pistol brass on his 1050 presses.

Note: All prices mentioned herein are based on manufacturer’s MSRP as listed at the date of this publication. MSRPs may change without notice. Street prices may vary significantly.

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