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Bilstein Bushing Replacement Writeup

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1st January 2013, 23:59

#1

[infamousjim](#)

First gear

Join Date: May 2012
 Location: Central NJ
 Posts: 43

Bilstein Bushing Replacement Writeup

I've been slowly replacing the suspension in my car since I bought it last spring. The latest job I tackled was replacing the shock bushings. The factory Bilstein's on my 140k mile, '95 r-package amazingly seemed decent, but their bushings were shot. I figured spending a couple dollars on bushings was a better starting point than buying new shocks.

I went ahead and bought two of these from Summit. (\$8 total)
 BSN-E4GV1Z044A02

<http://www.summitracing.com/parts/bsn-e4gv1z044a02>

(btw, their picture isn't all that accurate)

I've been a homeless mechanic for a while, I'm not allowed to do any work to my car at my apartment complex so I've been borrowing driveways from friends to get this all done. Thanks Will (wemmons) for A: selling me the car, and B: helping me tear it up in your cozy, heated garage.

Instead of using a bench vice and press like some people suggest, I just made my own.

First off.... my old bushings were WASTED.. here's proof:



Obviously, I already pulled my shocks (btw they are shocks, not struts... struts are different). If you can get the bottom of the shocks out of their mounts on the LCA, I assume this could be done without pulling the shocks from the car. I was replacing my upper balljoint boots, with so much other stuff unbolted it was cake to just pull the shocks all the way out.

so now that they're out.... I had to prepare the surface for my home made press... I trimmed the old rubber away so the tube can fit flat on the metal of the shock.



Some people have claimed success whacking on the old bushings with a hammer, they are either crazy or liars. I didn't feel like doing that so I used a 1" pvc pipe piece, a 5 1/2" bolt, some large washers, and a nice grade 8 nut to pull it through the eye on the shock.

I spent some time in home depot and found what I thought was the best, it was a 1-1/4x1" pvc pipe piece with a slightly larger flat edge, it was from the electrical conduit pvc pipe section.





the flat edge made it easier for the tube to sit flat on the shock, if it doesn't sit flat on the shock it quickly twists sideways and slides off the shock as it tightens, no good. A regular 1" pvc section didn't have enough material on the edge and twisted very easily.

I put the bolt through the bushing. On the other side I placed the PVC pipe so it sat flat on the other side of the shock. On the far side of the pipe, I slid on a few washers than the nut. From there, I used a wrench to hold the nut, then used an impact gun on the bolt so as it tightened it would pull the bushing out of the shock (and effectively into the PVC tube)

I have photos for this... but they're a bit backwards. I got excited taking the bushing out and didn't take any pictures, but I made sure to when I was pushing the new bushings in. (It is the same process, but reversed)

Here is how the jig should be set up, (this photo is right as I installed the new one, but it's the same)



Here is the setup, spread out...



You don't "need" an impact drill, but it sure makes it pretty easy, and I assume it will be much harder to keep the setup from moving with a wrench.

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Spec Miata #313 (NASA NE)



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2nd January 2013, 00:21

#2

[infamousjim](#)

First gear

Join Date: May 2012

Location: Central NJ

Posts: 43

This bushing was in such bad shape, it came right out... here it is side-by-side with the new one...



After I pulled the old one out, I cleaned up the area where the bushing was and lubed the hell out of the area. Then I set up the puller again, with the new bushing ready to be pulled in with the bolt. The metal inside the bushing is wider than the eye on the shock so you still need to use the PVC tube.



Pull the new bushing in, click the "Easy button", do a small dance, then re-install the shock.


Shoot away if you have any questions. Maybe I did it terribly wrong and my car will explode in the next couple days, let me know.


'Jim


[No Money Motorsports Blog - Racing On A Budget](#)


Spec Miata #313 (NASA NE)





<p>1995miata Fourth gear</p> <p>Join Date: Dec 2010 Location: Knoxville, TN Posts: 1,771</p>	<p>A safe and ingenious method of bushing replacement -amazing what not having everything will cause us to think up to get a job done. A friend with a garage ain't bad, either.</p> <p>Keep on truckin'...</p> <hr/> <p>Brian Patterson of Powell, TN 1995 Miata 'Black Flea' 2003 Mercedes-Benz E320 1997 Ford F-150 XLT</p> <p style="text-align: right;"> Quote</p>
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<p>2nd January 2013, 00:29 #4</p>	
<p>3MiataFamily Supporting Member</p> <p>Join Date: Jun 2008 Location: Waterbury, CT Posts: 29,622</p>	<p>Very nice write up...not too many folks have to replace shock bushings as routine..but I have had to replace a couple due to the bolt being rusted in place and having to change the bushing as a result. I have gotten them out using a socket and bench vise, but oly after slightly grinding away the portion of the shock that is turned in on each side...if you look at the lower mount area, you will see that the edges are pinched in slightly. The stock bushing has a metal sleeve around the rubber that is actually larger than the opening...hence the grinding. To get the bushing out of an old , never to be used again shock, I actually cut the lower mount to remove it intact.</p> <p>Edit: I just noticed that your replacement bushings do not have a metal sleeve around them like the stock bushing does.</p> <hr/> <p>President Nutmeg Miata Club...94 Cpkg/217k..VMAXX TracPK/RBsways/header/ex/Boss/Frog Twin 00 SE 317k RIP...99/00 hybrid w/335k on motor 30 AE #417</p> <p style="text-align: right;"> Quote</p>

<p>2nd January 2013, 00:39 #5</p>	
<p>infamousjim First gear</p> <p>Join Date: May 2012 Location: Central NJ Posts: 43</p>	<p>Thanks Brian, Ingenuity is fun, that and I love any excuse to roam around home depot looking for solutions.</p> <p>Hmm, I didn't see a metal bushing around the ones I pulled or on the replacements. Did your car have Bilsteins?</p> <hr/> <p>No Money Motorsports Blog - Racing On A Budget</p> <p>Spec Miata #313 (NASA NE)</p> <p style="text-align: right;"> Quote</p>

<p>2nd January 2013, 00:53 #6</p>	
<p>3MiataFamily Supporting Member</p> <p>Join Date: Jun 2008 Location: Waterbury, CT Posts: 29,622</p>	<p>Not Bilsteins...Illuminas</p> <hr/> <p>President Nutmeg Miata Club...94 Cpkg/217k..VMAXX TracPK/RBsways/header/ex/Boss/Frog Twin 00 SE 317k RIP...99/00 hybrid w/335k on motor 30 AE #417</p> <p style="text-align: right;"> Quote</p>

<p>2nd January 2013, 11:54 #7</p>	
<p>Unusualdesigner Moderator</p>  <p>Join Date: Aug 2012 Location: Somewhere in the L. A. area... Posts: 15,134</p>	<p>Excellent!! Necessity is the mother of invention.</p> <hr/> <p>2019 ND 30AE /ST #0908 . 2020 ND GT /ST.</p> <p style="text-align: right;"> Quote</p>

<p>2nd January 2013, 14:11 #8</p>	
<p>wemmons Fifth gear</p> <p>Join Date: Apr 2011 Location: Brooklyn, NY Posts: 3,393</p>	<p>Impact wrenches solve all of life's problems.</p> <p>...except when they break exhaust manifold bolts. Nonetheless, I was pretty shocked (please excuse the pun) that getting the bushing out this way was so easy.</p> <hr/> <p>1995: Spec Miata, 1996: TTD 1994 c: dd (sold) 1995 r: e-stock (sold)</p>

	
#9	
<p>2nd January 2013, 19:40</p> <p>infamousjim First gear</p> <p>Join Date: May 2012 Location: Central NJ Posts: 43</p>	<p>nah, the impact gun didn't break the manifold bolt, the rust did.</p> <p>No Money Motorsports Blog - Racing On A Budget</p> <p>Spec Miata #313 (NASA NE)</p> <p style="text-align: right;"></p>
#10	
<p>4th January 2013, 06:26</p> <p>Bender-san Fifth gear</p> <p>Join Date: Jul 2005 Location: Tualatin, Oregon Posts: 4,554</p>	<p>I was actually talking with one of the vendors about the possibility of polyurethane or delrin shock bushings. I'll have to check and see what he came up with for solutions.</p> <p>2009 SCCA Solo E-Stock National Champion (tire warmer)</p> <p style="text-align: right;"></p>
#11	
<p>18th October 2015, 21:07</p> <p>ScottieMac New-tral</p> <p>Join Date: Oct 2015 Location: Adelaide, Australia Posts: 6</p>	<p>😊 Thankyou for the walkthrough</p> <p>Hey, thought I'd say thankyou to all for having this write up. This helped me a lot.</p> <p>On the weekend I finally got all the bits together and pulled my suspension out to fix up a persistent squeak that was coming from the struts.</p>  <p>After I pulled it out I could see it had started to go metal on metal, hence the squeak.</p>



Anyway I used the long bolt method, I wont go into it here as that has been covered heaps of times. Needless to say after I put the new ones in, good as gold.



While I had the struts out I decided to change the boots as well as give everything a good clean and grease.

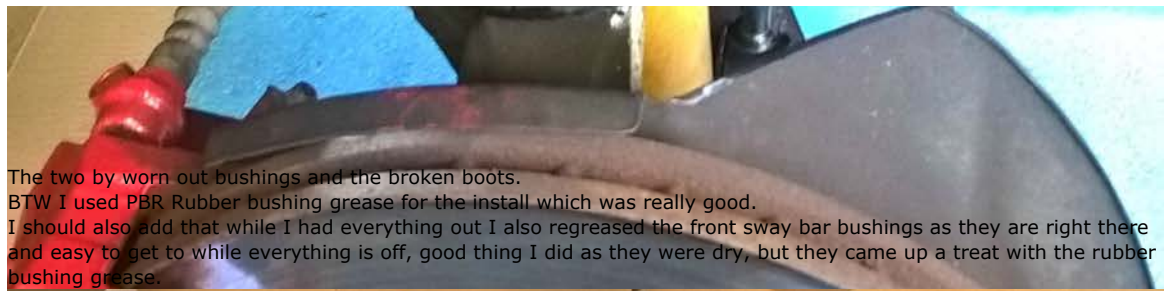


So they came up looking good as new.



Very Happy!





The two by worn out bushings and the broken boots.
 BTW I used PBR Rubber bushing grease for the install which was really good.
 I should also add that while I had everything out I also greased the front sway bar bushings as they are right there and easy to get to while everything is off, good thing I did as they were dry, but they came up a treat with the rubber bushing grease.



Last edited by ScottieMac; 18th October 2015 at 21:24. Reason: fixing broken images

Quote

18th October 2015, 21:36

#12

ScottieMac

New-tral

Join Date: Oct 2015
 Location: Adelaide, Australia
 Posts: 6

Forgot to add:
 I got new boots from here:
<http://mx5mania.com.au/product1520.htm>
 and the bushings from here:
<http://www.summitracing.com/int/part...4a02/overview/>

Quote

19th October 2015, 02:32

#13

ScottieMac

New-tral

Join Date: Oct 2015
 Location: Adelaide, Australia
 Posts: 6

Great cheap, cost efficient suspension refurbish assuming you don't need to do the actual struts of course.

Time: 4 hours for both left and right front.
 Cost: 2 x \$2 bushing + \$30 postage to Oz
 2 x \$45 dust & bump stop boot
 1 x tube rubber grease \$10
 Total = \$134
 Difficulty = 5/10, mostly it's taking bolts apart so not difficult but time consuming.

Tools used: Good jack and car stands, impact wrench, spring compressors, impact socket set, sockets and a socket wrench, spanner set.

Extras: Liberal amounts of WD40 on bolts and as a cleaner and lubricant.
 About 3-4 Beers worth and one more while you stand back and admire your hard work.

Quote

19th October 2015, 03:08

#14

gtxhawaii

Wheels flew off

Join Date: Jan 2005
 Location: Kahuku, HI
 Posts: 38,745

A few items others new to Miatas and wrenching might try as improvements on some of the above (Long time wrenchers will already have their preferences and habits):
 What appear to be OEM bumpstops/boots may be the most expensive and least satisfactory available option. ANY modern foam bump stop is an improvement on the hard rubber Mazda NA bump stops. Civic 6th gen run \$7ish, several widely used are ~\$12@, KYB, FM and a few others. Gold standard FCM bumps are now in the \$17-\$19 range, less than OEMs. Boots, if you want them (Few shock workers and designers currently seem to feel they are needed) are \$7 at Summit.
 WD40 is a Great Water Displacer. And amazingly, by test, the best corrosion preventative, for less than a week. Then, it's Gone. It's a Terrible lubricant and almost as bad of penetrant. (Not shabby, however as a Hydro Carbon solvent/cleaner.) Even the falsely advertized PB Blaster is better. Independent tests identified Liquid Wrench better than either. Kroil topped the test. DIY 50/50 ATF/Acetone is preferred by one member's shop, and they have all the above.
 Missing in all the above, anti-seize. Suspension fasteners are prime candidates for this, as well as any exposed chassis fastener. You Will be back! Particularly if neglecting to anti-seize.

92 auto red HT Sensens NB2 seats

96 red project, HT

It isn't what you know, it isn't what you don't. It's what you know that isn't so.



19th October 2015, 07:12

#15

ScottieMac

New-tral

Join Date: Oct 2015
 Location: Adelaide, Australia
 Posts: 6

Good to know. I was using the wd40 to help get the bolts undone. Bump stops are a good idea though. What boots do you use? Or do you run both?



19th October 2015, 21:33

#16

gtxhawaii

Wheels flew off

Join Date: Jan 2005
 Location: Kahuku, HI
 Posts: 38,745

Bump stops now come in several options. All preferable to OEM solid rubber bump stops. (NBs are a firm foam rubber or polyurethane, as best I can determine, Not sized well for NA shock use with NA top shock mounts.) FM, KYB and a few others are similar. All in the \$12@ range. KYB has integrated fit boots and bumps for \$15 on Amazon. 6th gen Civic bumps are the cheapest if you shop carefully at local Honda dealers.
 FCM bump stops are the only ones with different sizes and hardnessess available, and are promoted as superior material to the market standard.
 Boots are now optional in the opinion of a number of shock workers. Modern shaft seals seem far more durable in dirty situations than previously. If you want them, Amazon is cheap, Summit is next, at ~\$7@.

92 auto red HT Sensens NB2 seats

96 red project, HT

It isn't what you know, it isn't what you don't. It's what you know that isn't so.



21st October 2015, 06:41

#17

ScottieMac

New-tral

Join Date: Oct 2015
 Location: Adelaide, Australia
 Posts: 6

I see said the blind man, that makes sense. Cheers. Good info 😊



17th October 2016, 10:49

#18

pontiac69

New-tral

Join Date: Aug 2016
 Location: Pa
 Posts: 29

I found this thread and thought i would ask here. I need to know what the lower strut bushing in my Megan coilovers. Megan doesnt sell new bushings. I need to know what the inside diameter of the bilstien shocks are. If they are the same as the megan coilovers i will buy the bushings off the linked website and press them in. Also are the bilstein hole where the buching goes, is it shaped the way the bushing is or is it straight through?



17th October 2016, 11:18

#19

infamousjim

First gear

Join Date: May 2012
 Location: Central NJ
 Posts: 43

Hey,
 I'm not a big expert, but I'd guess if the lower strut bushing is bad enough on those coilovers... the socks are most likely blown too.

The info on the bushing (From the link above) is all on summit racing.... but unless they copied the bilstein design exactly i doubt it would work on yours.

<https://www.summitracing.com/parts/bsn-e4gv1z044a02>

Did you call Megan directly to ask or just look around online? I'd definitely call them and if they won't sell you one (which would be very surprising to me) I would at least ask them for tips for dimensions or on what would work as a replacement. I personally wouldn't support any company that wouldn't help you out on such a simple replacement part.

To be honest, I don't remember the inside shape (I did this almost 4 years ago)... I believe it's tapered in but I'm not sure.

[No Money Motorsports Blog - Racing On A Budget](#)

Spec Miata #313 (NASA NE)



17th October 2016, 11:45

#20

pontiac69

New-tral

Join Date: Aug 2016
Location: Pa
Posts: 29

I hear you. I already called Megan Racing and they dont sell just the bushing. I would have to buy the complete lower bracket. It would cost me 200 bucks to replace all 3 that are missing the bushings. They arent old coilovers. It was the bolt was seized in the bushing and they had to be cut out of the old car. So the bushing got trashed. I attached a few pics of the strut opening. Would be nice to just pick up some of these bushings and press them in if they would fit.

Attached Thumbnails



17th October 2016, 12:03

#21

infamousjim

First gear

Join Date: May 2012
Location: Central NJ
Posts: 43

That sucks, sounds like grrreat customer service. Look for a part number anywhere on the one remaining bushing and try to find it from there... maybe call up somebody like energy suspension. good luck!

[No Money Motorsports Blog - Racing On A Budget](#)

Spec Miata #313 (NASA NE)



5th February 2019, 21:26

#22

davidb72

Fifth gear

Join Date: Sep 2000
Location: Pennsy
Posts: 3,347



Quote:

Originally Posted by **infamousjim**

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<http://www.summitracing.com/parts/bsn-e4gv1z044a02>

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First off.... my old bushings were WASTED.. here's proof:



Obviously, I already pulled my shocks (btw they are shocks, not struts... struts are different). If you can get the bottom of the shocks out of their mounts on the LCA, I assume this could be done without pulling the shocks from the car. I was replacing my upper balljoint boots, with so much other stuff unbolted it was cake to just pull the shocks all the way out.

so now that they're out... I had to prepare the surface for my home made press... I trimmed the old rubber away so the tube can fit flat on the metal of the shock.



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have enough material on the edge and twisted very easily.

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I have photos for this... but they're a bit backwards. I got excited taking the bushing out and didn't take any pictures, but I made sure to when I was pushing the new bushings in. (It is the same process, but reversed)

Here is how the jig should be set up, (this photo is right as I installed the new one, but it's the same)



Here is the setup, spread out...



You don't "need" an impact drill, but it sure makes it pretty easy, and I assume it will be much harder to keep the setup from moving with a wrench.

Thanks for posting this! Just used your method to replace my bushings!

Quote:

Originally Posted by **Wulf Zendik**
War is the insane death dance of a paranoid society- Would you join the dance?



5th February 2019, 22:20

infamousjim
First gear

Join Date: May 2012
Location: Central NJ

I'm glad it's still helping!

I actually used this setup again on something unrelated just a couple weeks ago.

#23

Posts: 43	No Money Motorsports Blog - Racing On A Budget
	Spec Miata #313 (NASA NE)

9th February 2019, 05:50		#24
<p>gtxhawaii Wheels flew off</p> <p>Join Date: Jan 2005 Location: Kahuku, HI Posts: 38,745</p>	<p>Since the thread has revived, the least expensive decent NA bumpstop currently seem the Rock Auto sourced MINI Cooper 2002 bump stop (ÜRO 31336756663) at about \$4@. They are on a friend's ExcellGs in a NB1, and I've put them on NAs. No problems, work as intended. They trim shorter if desired, same as any other urethane foam bump stop.</p> <hr/> <p>92 auto red HT Sensens NB2 seats 96 red project, HT It isn't what you know, it isn't what you don't. It's what you know that isn't so.</p>	

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