



Gordon Gray &lt; &gt; gmail.com&gt;

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## Issue with Rebuilt Engine w/ Pics

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Gordon Gray &lt; &gt; @ gmail.com&gt;

Fri, Apr 11, 2008 at 12:28 PM

To: "Kevin @ Rotar Resurrection" &lt; &gt; @ rotaryresurrection.com&gt;, Kevin Landers &lt; &gt; @ charter.net&gt;

Kevin, I sent this to you on the forum, but forgot to attach the pics.

Kevin, the other weekend we were replacing the turbos on the 93-95 longblock that I bought from you. We ended up taking the exhaust manifold off too. It was then that we discovered that both exhaust port sleeves had holes melted in them! No one I've talked to had ever seen this before. At first, we weren't sure if the holes belonged there or not, so we looked it up online and discovered that some of the melt pattern corresponded with where a diffuser used to be on a NA housing/exhaust sleeve. Cutting the exhaust diffuser out of the sleeve would have left rough/sharp edges as you know. Rough/sharp edges would have become super heated by the exhaust flow with respect to the rest of the sleeve. This edge would have been much more likely to ignite the unburned fuel in the exhaust - further increasing the exhaust temperature and leading to a glowing down pipe. Additionally, the sharp edge would have begun melting sooner than the rest of the sleeve. Once it began melting, it probably would have spread until a hole was melted through. Furthermore, if Mazda coated the exhaust sleeve with some other composite, cutting the diffuser out would have damaged this coating. I believe that this modification either led to my down pipe glowing red after sitting at idle (only when the air pump is plugged in) which melted the sleeve. Or it caused the exhaust sleeve to melt when it shouldn't have when combined with whatever actually caused my down pipe to glow red. I have seen others with glowing down pipe issues, but no one with melted exhaust port sleeves.

It was never disclosed to me that this long block had NA housings and exhaust port sleeves. Had this been disclosed, the engine would have likely sold for several hundred dollars less on the forum. Perhaps you forgot that you used these housings since the engine sat around for a while before you sold it. As I recall, you intended this engine to go into a roller you were selling. From reading on the forum, it is clear that you did not know there would be any problem using these housings/sleeves in this way. I hope you will agree from the pics that it is more than likely that it did cause my issue. At any rate, their use should have obviously been disclosed.

So far even though this longblock had other issues, my experience was still positive because you went way out your way to offer to tear the engine down out of warranty and because it was made clear that the engine accessories had no warranty. However, with this issue, I feel like I received something substantially different than what I paid for and that difference led to this failure. Based on my prior contact with you, I am hopeful that we can work something out. Feel free to call any time before 8AM or after 5PM CST.

Gordon  
405-

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**2 attachments**



**13B\_Exhaust\_Port\_030.jpg**  
213K



**13B\_Exhaust\_Port\_031.jpg**  
197K



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## Issue with Rebuilt Engine w/ Pics

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Kevin @ Rotary Resurrection < rotaryresurrection.com >  
To: Gordon Gray < @ gmail.com >

Thu, Apr 17, 2008 at 3:18 AM

> Kevin, the other weekend we were replacing the turbos on the 93-95  
> longblock that I bought from you. We ended up taking the exhaust  
> manifold off too. It was then that we discovered that both exhaust  
> port sleeves had holes melted in them! No one I've talked to had ever  
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> have become super heated by the exhaust flow with respect to the rest  
> of the sleeve. This edge would have been much more likely to ignite  
> the unburned fuel in the exhaust - further increasing the exhaust  
> temperature and leading to a glowing down pipe.

--Uhm...no. The exhaust sleeves only heat up and glow when under heavy load, and they do so evenly when this happens. I know, because I have pictures and videos of a rotary RUNNING with no exhaust manifold.

Additionally, the  
> sharp edge would have begun melting sooner than the rest of the  
> sleeve.

--there is no way that the rotary engine exhaust could melt the sleeve, cut or otherwise. It is all a torch can do to cut into one.

Once it began melting, it probably would have spread until a  
> hole was melted through.

--uhm...no.

Furthermore, if Mazda coated the exhaust  
> sleeve with some other composite,

--they didn't to my knowledge....on new rotor housings they are just bare metal, standard steel from what I can tell. Think about it...the aluminum exhaust port that the air hits as soon as it comes off the chrome surface would melt LONG before the exhaust sleeve. But it doesn't, does it? Housings temps are controlled locally by coolant flow.

cutting the diffuser out would have

- > damaged this coating. I believe that this modification either led to
- > my down pipe glowing red after sitting at idle (only when the air pump
- > is plugged in) which melted the sleeve. Or it caused the exhaust
- > sleeve to melt when it shouldn't have when combined with whatever
- > actually caused my down pipe to glow red. I have seen others with
- > glowing down pipe issues, but no one with melted exhaust port sleeves.

--downpipes glowing at idle indicate timing issues 99% of the time, although it could be a restriction in the airflow path in the exhaust or possibly a lean fuel condition (it would have to be VERY lean). Downpipes glowing at idle after normal driving is normal. Downpipes glowing at idle when idle is raised above 1000rpm is normal as well. I assume we are discussing a night time glow, as it would be hard to see a glowing exhaust in the day.

There is ZERO chance that the exhaust port sleeves have ANYTHING to do with the glowing. What you've theorized is along the lines of saying that when you press the brakes on your car, the brakes draw vacuum from the engine, making it idle up and go faster, and thus the brakes cause the engine to make more power. Sounds plausible in theory but it doesn't work that way in reality.

- >
- > It was never disclosed to me that this long block had NA housings and
- > exhaust port sleeves. Had this been disclosed, the engine would have
- > likely sold for several hundred dollars less on the forum. Perhaps you
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- > housings/sleeves in this way. I hope you will agree from the pics that
- > it is more than likely that it did cause my issue. At any rate, their
- > use should have obviously been disclosed.

--Honestly it has been long enough that I do not recall, but that engine was built several months prior to being sold, so yes I probably did just forget. I do, after all, build a LOT of setups (1 per week) so it all runs together at a certain point. But, the 89+ housings are identical to FD housings, only the sleeves vary. Often times FD cores come in trashed and so FD housings are hard to keep. But series 5 NA/t2 housings are sometimes on hand and are identical otherwise and in good shape, so they get used. If it is for a paying customer, then they get to make the call after being notified of their options. If it is for me or a close friend I don't think anything of it.

I ran an FD engine with s5 NA rotorhousings and cut diffusers for 1.5 years with zero issue. I then sold that engine to another guy who has run a single turbo on it for the last 3 years making 350+rwHP. Bottom line, it has NOTHING to do with how the engine runs. You're overanalyzing the effect. Most of the flow of the exhaust under load is directed at an upward angle similar to that of the top of the sleeve, it does not shoot out level with the bottom of the port so the minor edges sticking up do not affect flow.

So I would definitely, hands down, no doubt about it, have to disagree that

this mod caused any problems (or will do so in the future).

Bottom line, if the engine holds coolant and oil, and makes good enough compression to start and idle, then it is doing it's job. Let it run until there is a real reason to take it apart. Nothing can be done about the sleeves at this point, the engine has to be apart. Hypothetically let's say I were to give you some money to make you happy...it wouldn't have anything to do with the engine still, and it would still run the same, so I see it as pointless. IF you ever do have the engine apart, then you can send the housings to me and I will put in a set of smooth sleeves for you at no cost.

>  
> So far even though this longblock had other issues, my experience was  
> still positive because you went way out your way to offer to tear the  
> engine down out of warranty and because it was made clear that the  
> engine accessories had no warranty. However, with this issue, I feel  
> like I received something substantially different than what I paid for  
> and that difference led to this failure. Based on my prior contact  
> with you, I am hopeful that we can work something out.

--I'm not sure what you're looking for, but I get the impression you expect some sort of compensation. I am not really sure what needs to be, or can be "worked out". I obviously feel that nothing has changed, and again if the engine holds oil, coolant, and makes compression, I define it as good. If the engine had the exhaust diffusers still in place, this could affect spool of the turbos and would be a legitimate complaint. Or if it had a series 4 and a series 5/6 housing mixed together with different timed plugholes, or something similar. None of which is the case. I do not agree that the engine is substantially different than advertised. It will still make 100% of the power it should. Sure, a lot of armchair engineers/builders would get all up in arms about it if it were posed to them, but if you talked to some people who knew a lot about what they were doing and/or had built similar setups before, they'd tell you the same thing. It may not be cosmetically pretty but it won't change how it runs.

Bear in mind again that this was not just thrown together for the purpose of being sold, but I put it together for my own use. Yeah, sometimes I will do something with my own stuff that I would not do with a customer's setup, because I don't mind experimenting on my own time/parts. But in this case there is nothing experimental about it, I have run this setup many times in the past. I would not have done it (for myself, no less) if it would not have worked perfectly fine. When I put this together I used some of the best stuff I had laying around at the time, even though it worked out that some of the parts were not as good as they appeared. And, when I put it together, I didn't intend on selling it to anyone and having the parts critiqued 2 or 3 years down the line, either. But, I figured rather than letting it sit and go to waste, or tearing it apart and trying to sell it piece by piece, I would let someone else get some use out of it at a fair price.

I'll be totally honest, as you have already mentioned I have went out of my way time after time to try and comfort you and try to make up for deficiencies that came about as a result of this transaction, whether actual or perceived. But it is time for the deal to come to a conclusion and all claims to be finalized and dismissed for good. I certainly feel for you and your situation, but considering the amount of time that has passed, I have to find a point to cut my ties and draw the line against further claims, and

be done with it. I hope you don't take this the wrong way, and I hope you can see things from my point of view.

For this one last time, I am willing to hear your expectations out and perhaps we can bring this transaction to an amicable conclusion once and for all. I hope things do not end on a sour note, but none of this is in my hands any longer so there is a limit to what I am willing to do.

I look forward to your thoughts.

Kevin

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## Issue with Rebuilt Engine w/ Pics

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Gordon Gray < @ gmail.com>

Mon, Apr 21, 2008 at 10:00 PM

To: "Kevin @ Rotary Resurrection" < @ rotaryresurrection.com>

I have recently learned of all the deficiencies of the NA housing compared to the FD housing. They are clearly a lower quality part. So I am glad that you qualify this engine as good. It makes the solution simple. I'll send the core back to you for a refund of the part of the purchase price that is attributable to the core, approx \$1900 minus 8% since the engine has ~8000 mi on it now. You get a good core that holds coolant and oil, and has good compression - a core that you had originally intended for your own use anyway. I get the means to find an FD core. I have no expectation to be able to get a refund for any external engine accessories.

Here are the differences between the S5 NA housing and the FD housing that are unacceptable:

-The FD rotor housing is thicker so it does not flex as much as the FC. The flexing puts strain on the dowel pins which try to then push out of the plates. The FD is reinforced from the factory so they have a lot less problems. The first turbo motors, S4 had a big problem with cracking rear plates w/ "ping" or just from too much hp.

-The FD rotor housing is about \$100 more expensive ea, new.

-The FD rotor housing has a better internal coating. The coating change was made for a reason. To increase life. The chrome is more pourous than the previous. And the extra oil is a good thing.

-S4 rotor housings do not have the same spark plug hole location as S5/6. The S4 has different spark plug locations which is not ideal to mix series of parts. S5/6 have knock sensor hole above "T" plug. The bathtub was optimized for the plug location. Although these housings appear to be S5 NA.

If you cut corners there, and you don't remember doing it, where else could you have cut corners? Used n/a side seal springs instead of FD ones at 4x the price? Does it have the FD rotors w/ the chromed apex seal grooves?

You disagree that these differences are substantial. Yet they are substantial enough for you to make this statement:

"I do not do this for customer engines unless they know up front the differences and agree to the mod."

9-21-04

You disagreed with my assessment on how the exhaust sleeves may have melted. But you did not offer any alternative theories. Also I don't feel I took my explanations far enough because it didn't sound like you understood what I was trying to say. So I did some more research and fleshed out a couple of my responses a little below. I kept these short and to the point. Read these responses and try to still tell me that there is absolutely unequivocally no possibility that your

modification contributed to the holes melting through the sleeve. If anything comes out of this, you should at the very least stop doing this mod.

On Thu, Apr 17, 2008 at 3:18 AM, Kevin @ Rotary Resurrection

<[\\_\\_\\_\\_\\_@rotaryresurrection.com](mailto:_____@rotaryresurrection.com)> wrote:

>

>> Kevin, the other weekend we were replacing the turbos on the 93-95  
>> longblock that I bought from you. We ended up taking the exhaust  
>> manifold off too. It was then that we discovered that both exhaust  
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> --Uhm...no. The exhaust sleeves only heat up and glow when under heavy load,  
> and they do so evenly when this happens. I know, because I have pictures and  
> videos of a rotary RUNNING with no exhaust manifold.

>

I guess I didn't explain HOW a sharper edge would become hotter than the surrounding smooth metal. First, a sharper edge has more surface area exposed to the exhaust gas flow. Second, a sharp edge has less mass to absorb the heat. Third, the tip of the edge is physically further away from the main heat exchanging source, the coolant.

Here is a pic showing some jagged edges on one of the exhaust port sleeves that you modified for a customer.

<http://www.rx7club.com/attachment.php?attachmentid=74321&d=1095661656>

See next response.

[Quoted text hidden]

I wasn't sure if the glowing was the chicken or the egg. But my main concern now is the remaining metal that didn't melt. The metal protrusions that remain are bendable by hand. It could fall off and get sucked into the engine or fall off and take my expensive turbos out on their way out. The sharp metal CAUSING the glowing is only a secondary concern and just a possibility.

I have learned that the exhaust port sleeve is not made of steel, but rather Inconel, a Nickel-Iron-Chromium super-alloy. Here is a quote from a peer-reviewed scientific journal on how Inconel's chemical structure changes in the HAZ (Heat Affected Zone of a weld (or in this case, a torch cut). (Emphasis added)

"The increased HAZ microfissuring in higher B and P 718 Plus alloy, HC 49, can be attributed to the increased segregation of B, as was observed in earlier studies on Inconel 718 [6, 8]. It was observed that the increased non-equilibrium segregation of B DEPRESSED THE MELTING POINT of the



grain boundary material which increased the temperature range over which the B segregated grain boundaries remained liquated."

<http://www.allvac.com/allvac/718plus/PDFs/637.pdf>

pg 645

The Wiki on Inconel agrees with the above statement. Although the wiki hardly has the credibility of a scientific paper published in a peer-reviewed journal.

"Welding inconel alloys is difficult due to cracking and microstructural segregation of alloying elements in the heat affected zone."

<http://en.wikipedia.org/wiki/Inconel>

Also note:

"When heated, Inconel forms a thick, stable, passivating oxide layer protecting the surface from further attack."

<http://en.wikipedia.org/wiki/Inconel>

After the alloying elements are segregated, they are not going to form the same oxide layer to protect from heat.

[Quoted text hidden]

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## Issue with Rebuilt Engine w/ Pics

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Kevin @ Rotary Resurrection <@rotaryresurrection.com>  
To: Gordon Gray <@gmail.com>

Wed, Apr 23, 2008 at 3:28 AM

As clearly stated both on my website warranty page and the warranty outline that accompanied the engine, there are never cash refunds in part or full, even for engines under warranty, and certainly not for those out.

Most of what you posted is incorrect regarding the housing comparison, at one point you even start comparing castings of irons which are irrelevant to rotor housings. Honestly I have neither the time nor patience to dissect it and go over each technical point one by one just to satisfy you, which is most likely not possible anyway. At this point I see nothing else I can do or say to make you happy, so I am just going to have to leave it alone for the most part.

I will however continue to correspond with you as time allows should you have further thoughts or realistic suggestions.

Kevin

----- Original Message -----

From: "Gordon Gray" <@gmail.com>

To: "Kevin @ Rotary Resurrection" <@rotaryresurrection.com>

Sent: Monday, April 21, 2008 11:00 PM

Subject: Re: Issue with Rebuilt Engine w/ Pics

[Quoted text hidden]

> --

> No virus found in this incoming message.

> Checked by AVG.

> Version: 7.5.524 / Virus Database: 269.23.2/1389 - Release Date: 4/21/2008

8:34 AM

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