

Untitled

Roger Moss

Joined: 31 May 2004

Posts: 369

Location: Leicester UK

Posted: Tue Aug 21, 2007 1:56 pm Post subject: Scott cylinder head gaskets

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At 66 years of age, I have a tendency to assume that folks know what i assume is a basic level of knowledge. Richard, my son, has just reminded me of an omission that I would like to correct.

Some time ago, an owner asked what were the torque settings for securing a head. I wrote a piece and gave tightening values and sequence. We recently had a customer return an engine because of a water leak. he had asked tightening values and I had copied the info to him. The head nuts were all loose and Richard asked if I had emphasised that the nuts should be retightened after first running and for several subsequent runs. I said I had not as I assumed everybody would realise this. I admit I was wrong, but this brings me to an important point.

Cylinder head gasket compressibility.

It has been our recent experience that the current Scott head gaskets tend to compress and keep compressing much more than previous types and certainly much more than the old asbestos filled type.

I would suggest that it is well worth while pulling these down for a while longer than with older type gaskets.

There is another problem

As the gasket is softer and more compressible, then the end 3 nuts exert much more pressure than the centre nuts. In this case the end 3 nuts each end will bow down the head and warp it. All warped heads are high in the middle, so I suggest that the end 3 nuts each end should be less tight than the centre group to try and balance the load and reduce head warping. If anyone has similar experience I would be glad to hear of it.

I have discussed this matter with Gill Swan so that a note can be sent with head gaskets to remind owners that regular re tightening is necessary after fitting new head gaskets

Kind Regards

Roger

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Mike Fennell

Joined: 22 Jun 2004

Posts: 17

Location: Essex

Posted: Sat Sep 29, 2007 7:17 pm Post subject: Scott cylinder head gaskets

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Roger: I believe you used to recommend head gaskets made of thin stainless steel with water sealing provided by domestic grade silicone sealant. This would surely eliminate the gasket compression problems under discussion. You also suggested the silicone would work for exhaust, and all other engine gaskets. I am sure this was discussed on the website a couple of years ago - worth re-visiting?

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efr215

Joined: 06 Nov 2004

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Location: Leigh-on-sea, Essex

Posted: Sat Sep 29, 2007 9:49 pm      Post subject:

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A stainless "gasket" will certainly maintain the gasket thickness and keep the top of the head where it is supposed to be but is to all intents and purposes non-compressible which is why it is necessary to use gasket cement. If the mating surfaces are perfect then a thin coat of gasket "goo" will work but how many 50 plus years old heads are in that condition? Another factor is the less than ideal alloy used in the head casting.

Again the soft head alloy might not stand it but has anyone tried using wills rings? A gasket plate would still be needed but with enlarged holes around the bores and water circulation holes to accommodate the rings.

Alternatively an annealed copper or soft aluminium rather than stainless plate would be just a little more forgiving. It would be an advantage if as much metal not immediately adjacent to the bores and water holes was to be removed thereby increasing the load per unit area but it would still require the head to be very flat.

If a regular gasket is to be used and the degree of tightening is, as it would seem to be, an issue then would it not be possible to make a set of little gauges to test the distance between the head and the barrel? It would be an advantage to cut a series of small nicks at strategic places around the gasket to admit such gauges. By this way the head may be tightened down until each feeler is nipped. The advantage is that the compression of the gasket is independent of the torque used and head flatness should be maintained. The drawback is that when retightening is needed due to settlement then another set of thinner feelers would be needed for each re-tightening. On the positive side such a set would only need to be made once. What thickness should such feelers be? I don't know, I would need a well-used gasket to measure for a final size, also a once compressed one for a starting point and I have neither to hand.

It should be noted that annealed copper does not stay very soft for ever, if a copper gasket is to be used it should be annealed and used. Avoid flexing, it will work harden it even if only a little. Copper will also age harden although it is a fairly slow process. After annealing vinegar, Citric acid or a fizzy cola soft drink will clean the copper quite effectively.

Aluminium sheet may be rendered soft by the use of soft soap as a temperature marker, (other types of soap might not work as well due to additives), when the soap goes brown the right temperature has been attained and the aluminium should be quenched. Clearly this is a somewhat agricultural method and there are so many grades of aluminium but at least it gives you an even chance. Some grades of aluminium also age harden, indeed some used in the aircraft industry will age in an hour so early fitting is recommended to be safe if you are unsure of the grade.

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Posted: Mon Oct 01, 2007 3:38 pm

Post subject: Explanation

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On my race engine I have used stainless rings of 0.004" thickness and recently rings cut from brass shim stock of 0.008" thickness. It needs a head that is flat within about 0.003" as otherwise it will not pull down on the ring evenly. I put a smear of silicone on both sides of the ring and a little more round the edges of the head to seal the water. I then put the pistons in the bores upside down without rings so the skirt will centralise the head on the block and the sealing rings in a position that is concentric with the bores. I then secure the head.

This is what I do but please consider that this will bring the head much closer to the piston at top dead centre as the thin ring is much thinner than a Scott head gasket and so there could be a danger of the piston hitting the head. When assembling a sports engine, we assemble first with an extendable two piece dummy rod so we can be sure how much clearance we have. You can not assume that because the engine turns over freely that all will be OK as the total assembly stretches approx 0.027" on an average long stroke 600 at about 4500 rpm. You need a static clearance of at least a minimum of 0.035" and better to be safe use 0.050". Scotts give quite a large piston to head clearance, but there were quite a few variations according to the engine type. Unless you are going to do some careful checking prior to building, it is much safer to stay with a Scott gasket. It is always worth removing burrs and putting a straight edge or steel rule to check the flatness of the head first.