Table of Contents

Go To Technical Menu

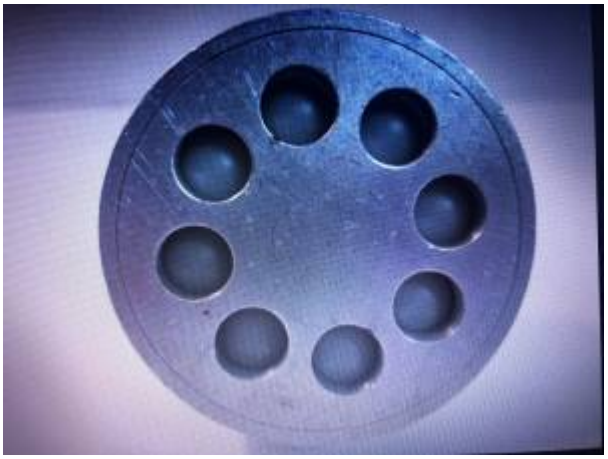
REF: Engine Mechanicals - Sub-07S

XR-750 8-Ball Breather Valve

The earliest alloy XR's put a vent to the back of the crankcase with a big one-way valve on it. [1)]
The idea was, when the pistons go down it pushes the oil into the camcase and scavenge pump.
But when the pistons go up, it creates a vacuum in the crankcase that sucks some of that oil back in.
By putting a one-way (valve) into the crank area, they were trying to suck air in from the outside on the upstroke, then push it into the cam case on the downstroke.
(more of a continuous flow of air/oil mix to the scavenge system than a backy-forthy one. Get the oil out of the crank area was the idea.
They quit doing that when they went to the mini-sump, since that's a different system entirely.

The 8-ball breather was designed to handle 45 cu. in. of volume. [2)]


3)


4)

The first pic below shows the 3/4“ tapped hole in the case behind the rear cylinder where the 8-ball breather assembly is fitted.


5)

6)


7)

Notes from XLForum Members on the 8-Ball Breather

From mrmom9r [8]

> Ahh, the famous 8 ball breather. Opinions on them were all over the place. I ran one drag racing and people who couldn't run within a half second of me used to come up and ask me ” why do you run that thing , they don't work you know? “ Like everything to do with a motor , you had to have, as barefoot said , the whole combination. They wouldn't do anything for an engine without modified breather timing. It was also important to think about the application. So the engine is displacing just as much air under the pistons as on top. In the stock application we're trying to inhale 750cc through that breather 117 times per second at 7000 rpm. It's a little small , actually a lot, for that according to the flowbench. But they did help, two was even better. Now double the engine size to 1500cc -90 cu. in.- You can see where we're going. Larger units had to be built. Barefoot is absolutely right, there is more HP in the oiling system on these engines than there is in the valve train or just about anywhere else. It's a foreign concept to us because we learned on more conventional designs. I stated this on here several years ago and I'll do it again, from countless hours on the dyno and race track I feel this style system is the best bandaid for these as race motors. I'm talking non-sump motors only. And every

> time you increase the intake flow capacity of the one way valve and every time you increase the flow capacity and area of the downstroke side of breathing , you will make more HP. There does not seem to be a point at which it stops helping. Please understand that this was an engine with a sealed off top end . Any effects involving scavenging oil from the top end by crankcase negative pressures were not considered. In other words , no oil going up or coming down from the rocker boxes. At the start of the day we just removed plugs from the r. boxes and soaked the valve stems and springs (probably more important than the stems) with a Kal Gard Moly chain lube that was really good stuff. Barefoot mentioned the throttle chop oil measurements and it's an important step in development. we found the same thing ,if there's more than 2 ounces of oil in the crank compartment you're running with your brakes on. Once we'd maxed out breather timing and flow capacity , if there was more than 2 ounces in there, it was time to start jetting down the oil feed from the pump to the crankcase at the cam cover mating surface. .090” seems to be about right.

Go To Technical Menu

1)
barefoot of the XLFORUM
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2)
mrmom9r of the XLFORUM
https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/191349-probably-going-to-be-arrested-today/page3?t=2041173&page=3
3) , 4)
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5)
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6)
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8)
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stroker/page7?t=1982389&page=7