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at Barrington Diesel Club

Detroit Diesel Series 53 Technical issues Discussed

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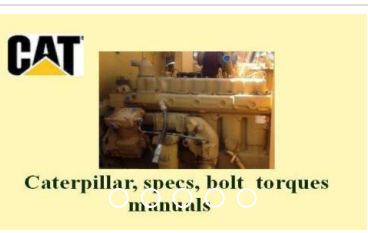
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Cases of Detroit Diesel 53 series technical issues



at
Barrington
Diesel Club

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Stop Oil coming out of the 4-53 exhaust

Oil spurting out of the exhaust on my 4-53 Detroit - We've tried everything - come and have a look!



Click to see the 4-53 run

The customer called us to stop the oil coming out of the exhaust, and it was a lot because he somehow managed to have an oil feed going into his air boxes.

The customer purchased the machine with an oil feed pipe connected to his air box drain. They got the machine cheap because the seller thought there was something seriously wrong with the engine.

The cause of the problem wasn't obvious to the customers mechanical team because the air-box pressure on start up is higher than the oil pressure so the exhaust stayed dry while the engine was idling or at low revs.

However I've tested hundreds of two stroke engines over the years, and one of the first things we checked was the air-box drains. 'Are the air-box drains open - and releasing air?'

Except for about 800 km mileage and 10 hours traveling the problem was easy to fix, just plug the source of the oil and open the air-box drain to the air.

What is the 3-53 Chamber Volume?



Image 53 series liner kit

Jeff needs to know

I'm Jeff. I'm working at the Naval Post Graduate School in Monterey, California. I'm trying to find out a rather arcane specification for a Detroit diesel 3-53, 5033-6299. Specifically I'm interested in the clearance volume between the piston and cylinder head when the piston is at TDC. I'm having a difficult time finding this and am hoping you may have this information. I appreciate any help that you can provide,

Thanks for writing.

I love these questions. The theory is basically very simple, which once gotten can be applied to all engines. You need your engine bore, stroke, and piston ratio for the calculation.

Here's the link to our 3-53 Detroit Diesel open page:

Thank you for your time.

Our website specs for 3-53 Engines::

bore = 3.875 inches

stroke = 4.5 inches

compression ratio = 21:1 (N engines)

compression ratio = 18.7:1 (T engines)

Next calculate cylinder volume:

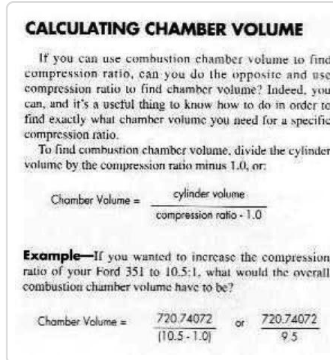
Cylinder volume = $\pi/4 * \text{bore}^2 * \text{stroke}$

$= 0.7854 * 3.875 * 3.875 * 4.5$

$= 53.07 \text{ inches}^2$

$= 53.07 \text{ inches}^2$

(guess how the 53 series got it's name!)



calculating chamber volume - image from auto math handbook, click to expand

Now Chamber volume =

Cylinder Volume / (Compression Ratio - 1)

Thus we can calculate the Chamber volume:

N engines = $53 / (21 - 1) = 2.65 \text{ cubic inches}$

T engines = $53 / (18.7 - 1) = 2.99 \text{ cubic inches}$

Sailboat - 3-53 fuel Consumption

Can you give me the GPH used by a naturally aspirated Detroit Diesel 3-53?

It is used in a 50 year old sailboat and is running around 1800 rpm.

spec sheet data
3-53N @ 2000

rpm

land engine

power = 78 hp

consumption = 0.455 lb/hp hour

consumption if constant full power is

spec sheet data

3-53N @ 2000

rpm

marine engine

power = 60 hp

consumption if constant full power is maintained:

15.1 liters per hour



Detroit Diesel 3-53 Marine engine, click to expand

Thanks,
John

maintained:
18.9 liters per hour
5.0 us gallons per
hour

4.0 us gallons per
hour

References:

[3-53 engine specs](#), [Notes on fuel consumption](#)

Oil blowing out Detroit Diesel 4-53 dipstick

Subject: 4-53 Detroit
marine application

If i could ask u a quick
question.

I have a 4-53 two stroke in
my fishing boat and I have
not lost oil pressure but it is
blowing oil out of the dip
stick and the vent off the
valve pan at an alarming
rate.

Could the oil be too thin? It
starts easily and runs fine
but the oil leaks are bad.

The crankcase pressure is
too high, could it be the
blower?

It is not turbo charged and
was rebuilt two years ago.
Any info you could provide
would be greatly
appreciated

Thanks Avery



Hi Avery,
High sump
compression sounds
like:

- * loose injector
- * blown compression
gasket.
- * broken piston
rings

I doubt the blower
has anything to do
with it.

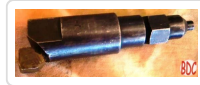
Check the basics first:

- Oil is a mono-grade SAE 30 or SAE 40 - no fancy oils for this engine
- Oil full-level is 2 inches (50 mm) below the top of the sump - and stays at that level.
- If the oil level increases by itself , it indicates an internal leak from somewhere like:
 1. Some accessory e.g. a hydraulic pump
 2. Fuel dilution - bad injector
 3. or a water leak. If your oil is still black I doubt if it is water.
- Check there are no loose injectors or injector bolts.
- Make sure air from a compressor (if you have one) is not blowing into the engine.
- If all the above are OK, remove & test injectors, if OK
- Remove and test cylinder head,

hopefully you can see a blown compression gasket & there are no cracks in the cylinder head.

How do I Check Detroit Diesel 4-53 compression?

Avery asks, how do you check 4-53 compression?



... testing 4-53 compression

Essentially you use a dummy injector with a normal high pressure compression gauge. Anyone who does DD engines should have one, but if you have your own diesel compression tester, you can buy a scrap injector somewhere & make the adaptor for it.

For Detroit 2-cycle engines you normally test compression at idle, +-680 rpm, so you must insert the dummy injector (or adaptor) first & then bridge out the fuel connections to the other injectors before you test.

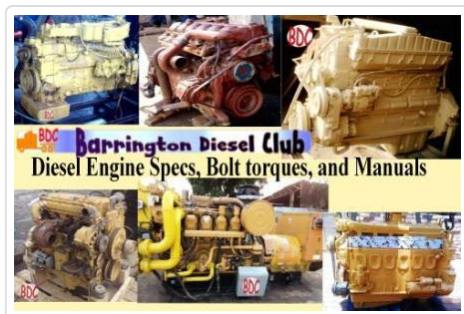
You also need a spare injector pipe to bridge the fuel connectors and two 1/2 X 1 1/2 NC bolts to block the oil flow from the pedestal bolt holes.

With new parts, at sea level, we expect a reading between 36 and 40 bar (roughly 520 to 580 psi).

For those who are at altitude doing a compression test you can derate in accord with the altitude corrections found with this link.

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Barrington Diesel Club

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