

Chapter 12 – Cylinder: Liners

12.1 Types of coatings

Two-stroke cylinders are made of cast iron (older models) or aluminum. Cast iron cylinders allow for machining and honing directly on the cylinders themselves, resulting in lower manufacturing costs and thus being used in basic applications.

For aluminum cylinders, we need a hard coating layer, as aluminum is soft and does not have the mechanical strength for this application.

Coatings can be of several types:

Cast iron: In this case, a cast iron liner is added to the cylinder by thermal expansion and then ground and honed. The advantage of this application is that it can be reopened and a new, larger piston can be used in the event of a break.

And after finishing the grinding, a new liner can be fitted. However, cast iron doesn't have good hardness and sliding properties.



Chrome liner: The chrome liner follows the same principle of versatile application as cast iron, but adds more hardness, resistance and sliding capacity than cast iron.

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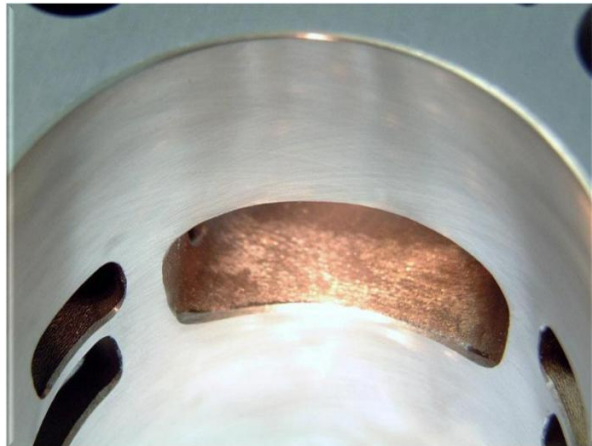
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Hard chrome: Hard chrome is a coating applied by electroplating to aluminum cylinders. It predates nykasil and has been used since the earliest aluminum

cylinders. It has good hardness and wear resistance, and better sliding performance compared to cast iron.

The disadvantage is that it cannot be ground and in case of damage to the cylinder surface, the lining needs to be replaced by a specialized company.



Nikasil: Nikasil is a silicon carbide compound (NiCom) that gives the cylinder coating very high hardness.

Like hard chrome, nikasil is applied to aluminum cylinders by electroplating. This coating is the most modern available, used in two-stroke racing cylinders and even in Formula 1. It is harder than hard chrome and has at least twice the glide properties.

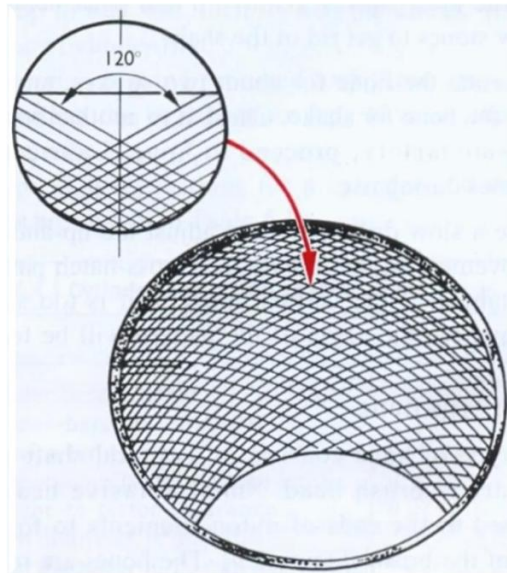
The hardness of this material is so high that grinding is done with diamond and honing is difficult to do and requires specific tools.

Like hard chrome, nikasil has the disadvantage of not being able to be ground, but it can be replaced in case of damage by a specialized company.



12.2 Burnishing

Cylinder honing is extremely important for proper engine lubrication. This procedure is already performed on cylinders with hard chrome or nikasil coatings, but it's always important to verify that it was done correctly. Understanding its importance is vital to the proper functioning of any combustion engine. Ensure that there is a 120-degree intersection between the lines, which forms an important pattern for lubricating oil deposition.



Honing serves two important functions in the engine:

The first is the deposition of oil in the negative crevices left by honing scratches. The oil deposits inside the crevices and creates a film that prevents contact between the rings and piston with the cylinder.

The second function is compression sealing, as we create an oil film between the imperfections of the cylinder and rings, creating a perfect seal and preventing pressure loss.



Chapter 13 – Crankcase

13.1 Volume

Crankcase volume is a hotly debated topic among tuners to this day. But before delving into the merits of the discussion, let's understand where this idea of compressing the crankcase might have come from. On the side, we see an old two-stroke engine with two pistons connected to the same crankshaft. Note that it has a third connecting rod at a 90-degree angle to the pistons.

In this connecting rod there was a third piston that worked inversely to the pistons, generating more pressure when they were down and generating more vacuum when they were up. This third piston did not have the function of generating power, only helping to increase and reduce the volume inside the crankcase.

