OIL ADDITIVE EVALUATION
FOR THE EVIDENCE OF ADDITIVE
ON OR IN THE SURFACE OF THE CYLINDER BORE
AND CONNECTING ROD CAPS

Performed by

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CONTENTS

1. DEFINE THE TEST SAMPLES AND PREPARATION

In order to evaluate the oil additive 2 separate engines were used. One to run without the additive and the other to run with the additive in the crankcase oil.

The engines used were Briggs and Stratton 3.5 hp single cylinder engines comparable to the engines found on individual home lawnmowers with:
Aluminum engine block and bore,
Aluminum rod caps and pistons,
Steel rings and crankshaft.

Both engines were run simultaneously for a period of 10 (ten) hours total. 2 hours at idle for break-in, and 7+ hours at maximum RPM. The unspecified time was checking harmonics of the engines in the mid-range RPMs.

At the end of the 10(ten) hours, the engines were stopped, let cool and were dis-assembled and the components of each identified with a number "1" or "2" etched in the material specifying from which engine they were disassembled.

The cylinder blocks were also identified then cut (sawed) in half through the centerline of the cylinder and crankshaft.

All the parts were cleaned by wiping with clean rags, no solvent was used

2. DEFINE THE TEST PARAMETERS

The purpose of the tests is to affirm the presence of the additive in/on the wear surfaces of the engine where the additive was in the lubricating oil.

The non-additive engine is being tested in the same method to establish a known baseline for comparison.

SEAL Laboratories at 250 N. Nash Street in El Segundo, Ca. 90245 is performing the tests for presence of the additive in/on the surface of the cylinder block halves, rod caps and the outside edge of the compression ring from the piston. The tests was conducted on an EDX (Energy Dispersive X-Ray) scanning microscope.

The cylinder block will be sectioned to yield a 3/4" X 1-1/2" test coupon containing samples of the contact and non-contact surfaces for testing. The rod caps and rings were tested in one (1) spot only due to the small size of the complete sample.

Dimensional Inspection Laboratories is conducting non-destructive dimensional tests on the remaining halves of the cylinder blocks.

These tests consist of a profilometer reading of surface roughness on the contact and non-contact areas of both cylinder bores and a diameter reading on the same surfaces.

3. PRESENT THE TEST RESULTS

A. Letter and supporting pictures from Seal Laboratories. 29pages
B. Definition of the data from Dimensional Inspection Laboratories 1 page
C. Data from Dimensional Inspection Laboratories 4 pages

Definition of data submitted by Dimensional Inspection Laboratories

The pages submitted by DIL are profilometer printouts with hand written diameters of the same area as tested in the `RESULTS' section.

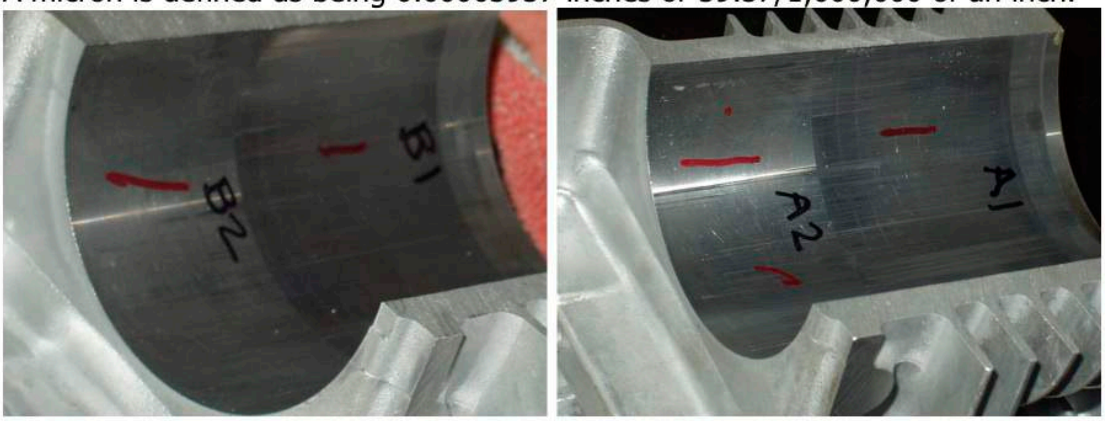
The sample definition is written in the `Comments' section in bold figures

In these samples the TREATED engine is denoted as `B'. The UN-TREATED engine is denoted by the letter `A'. The number `1' represents the TREATED area and the number `2' represents the UN-TREATED area.

The findings denoted on these pages are presented below:

	TREATED ENGINE	UN-TREATED ENGINE
SURFACE ROUGHNESS avg.	.5 micron	1.0 micron
PEAK ROUGHNESS after	3.5 micron	4.5 micron
PEAK ROUGHNESS before	21.5 micron	10.0 micron
DIAMETER after	2.5620 inches	2.5620 inches
DIAMETER before	2.5618 inches	2.5618 inches

A micron is defined as being 0.00003937 inches or 39.37/1,000,000 of an inch.

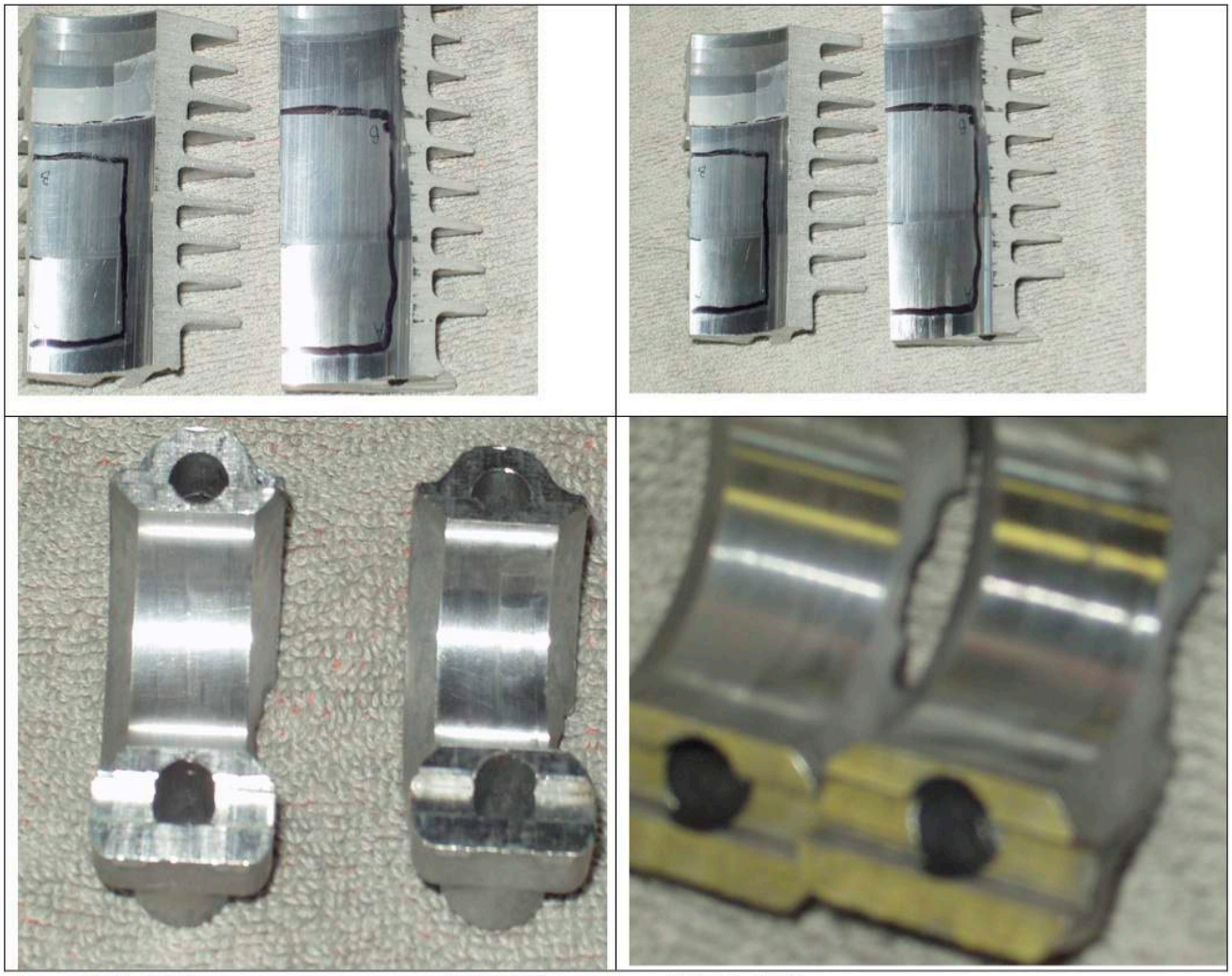


4. OBSERVATIONS AND OPINIONS

In the DIL data the consistent diameter growth of 0.0002 inch each cylinder is expected. However, the reduction of the roughness after running the engines is indicative of the additive's ability to coat and protect the contacting surfaces.

In Seal Labratories report, figure 6:
The vertical striations (A) are the machine marks from the manufacturing process. The movement of the piston is from left to right (B). Note is taken of the tears and gouges that indicate the end of the piston stroke on the un-protected sample in (b), while this anomaly is not visible on the protected sample (a). This is also substantiated by the appearance of aluminum particles on the un-protected ring figure 26 and not on the protected ring figure 24.

Pictures of the magnified area.



Rod cap 1 rod cap 2 oblique angle

In the above pictures the differences between the protected (rod cap 1) and the un protected (rod cap 2) are visible to this writer.