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represented by  
ABM Technology  
New Zealand - Australia

**PBC TECHNOLOGY  
DRY RUN TEST  
27 April 2000**

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**RUSPROMREMONT - ABM**

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# 1. Test purpose

The purpose of the test is to check and demonstrate the PBC technology capability in extreme (zero-dry-oil) condition.

## 2. Equipment

### 2.1. Tested car

Car model .....	Honda Civic
Car type .....	hatchback
Registration Plate Number .....	KQ2283
Body Number .....	BJ 1318 /757 - 5314 - 00
Gearbox .....	manual
Engine capacity .....	1.3 litre, 4 cylinders, in-line
Car Mileage by the tests .....	220 831.1

### 2.2. Filming

Camera .....	Canon , 8 mm tape
Filming started at .....	14:35
Filming finished at .....	15:30

### 2.3. Instrumentation

Apart from common standard automotive instruments, the temperature of the main bearing No. 1 and No. 2 was monitored using semiconductor resistive temperature sensors.

Sensor reference points:

350 Ohm .....	80C
150 Ohm .....	metlting of tin soldering 305C

## 3. Pre-test treatment

Prior to test, the engine was treated by PBC **in a single session, not in three-session procedure** as generally recommended by RUSPROMREMONT.

The PBC powder dosage of treatment ..... 45 mg/litre.

The car has logged 500 km after PBC treatment, before the zero-dry test described in this Report.

## 4. Test participants

ABM Technology .....	Alexander Burduk
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ABM Technology .....	Igor Korolev
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## 5. Test site

### 5.1. Location and route

City ..... Auckland, New Zeland,  
Location ..... Northcote streets and Northcote part of  
the high-speed motorway

### 5.2. Ambient conditions

Wind ..... 3-5 m/sec  
Temperature ..... 27C  
Humidity ..... 56%  
Rain ..... no; dry weather

## 6. Procedure

This test differed of all other zero-dry run tests, as we removed crankcase bottom for all the period of test: both for idling opeartion of the engine and for on-road running.

To our knowledge, all our predecessors and competitors run their test cars with covered crankcase. They just drained oil and put the drain plug back. In their tests, the residual oil presents in the oil system and once accumulated in the crankcase cover during running, it is sucked into the oil system from time to time, making friction a lot easier than in our completely dry case.

Whole the test procedure has been video-taped and the video may be made available for RUSPROMREMONT upon its request.

### 6.1. Lub oil draining

### 6.2. Idle operation

Dry engine started ..... 14:42  
Main bearing temperature sensor reading  
No.1 ..... 25C  
No.2 (middle) ..... 25C  
After 5 min of running (14:47)  
No.1 ..... ~40C  
No.2 (middle) ..... ~45C  
After 10 min of running (14:52)  
No.1 ..... ~48C  
No.2 (middle) ..... ~53C  
  
Jacket water temperature (14:53) ..... 60C  
Jack-ups removed ..... 14:57  
On-road moving began ..... 15:02

## 6.3. On-road run

### 6.3.1. Initial conditions

On-road moving began .....	15:02
Initial mileage .....	220 831.1
Jacket water temperature (15:02) .....	70C
Main bearing temperature sensor reading:	
No.1 .....	~55C (722 Ohm)
No.2 (middle) .....	~60C (540 Ohm)

### 6.3.2. Test measurements

Time hh:mm	Mileage km	Water C	Bearing 1 C	Bearing 2 C	Speed km/hr
15:02	220 831.1	70	55C	60C	
15:03	220 833.2	65	50C	62C	20-40
15:05	220 834	65	58C	71C	80-90
15:07	220 835		69C	85C	Stop Battery
15:12			68C	84C	
15:15			70C	98C	
15:16	220 837		69C	100C	40-60
15:17		80	69C	110C	Water leakage
15:19		65	78C	305C	50
			79C	290C	
15:27	220 843.6		80C	320C	
			83C	360C	

## 7. Test Results

After 20 minutes of idling operation followed by 25 minutes of city traffic drive, after logging of 12.5 km, the engine considerably lost its power and engine seizure occurred.

## 8. After-test inspection

After the zero-dry test, all crankshaft bearings have been disassembled for after-test inspection: both crankpin and main ones.

### 8.1. Crankpin bearings

- The 1st crankpin bearing have been completely melt, loosing all white-metal (babbit) and causing scuffing in the copper substrate.
- Three other crankpin bearings were of very minor signs of melting, only in their top points and their bottom points. White-metal has not been lost in these crankpin bearings. Their white-metal surface of both split-shells had a thin whitish PBC protective film.

### 8.2. Main bearings

No one of main bearing have had any damage during zero-dry test. The white metal surface of split-shells had a thin whitish PBC protective film.

## 9. After-test run

### 9.1. Re-assembling

After the zero-dry test, the bearings were disassembled, inspected and re-assembled without repair: just the scuff was removed of copper substrate surface in the melted bearing No.1

### 9.2. PBC treatment

After the zero-dry test, the engine has been re-assembled and re-treated by PBC in a single session as described in Section 3 of this Report

### 9.3. On-road running

After the zero-dry test, the engine has been re-assembled and re-treated by PBC and the car is put into operation again.

It has logged over 2287 km since that.

The car is now in use with no repair or replacement any parts after zero-dry run test:

Zero-dry run test end mileage..... 220 843.6 km

Current mileage ..... 223 130 km

**Current after-test running mileage..... 2 287 km**