

Researches On The Improvement Of Effective Force And Effective Torque Of The Engines With Sparking Ignition

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Abstract: Studying the internal combustion engines tendencies and direction it is noticeable that the major effort must be directed towards finding new constructing and energetic solutions aimed to improve the thermic efficiency and implicitly to diminish fuel consumption.

Key Words: ceramic, engines, piston, torque.

For the development of high tech technologies is necessary the existence of materials with proprieties and performances according with the new demands, possible to group in the next categories: recent developed metallic alloys, high performance polymers technical ceramics, composites. Among this materials an important place it is represented by the technical ceramics.

The word ceramics comes from the Greek “keramicos” witch means burn material.

The unusual performances refers to the keeping of the mechanic resistance at very high temperatures – unlike metals, even those with refractoriness and with an almost total absence of distortions, the breaking appearing suddenly at a certain value of challenge.

Another feature characteristic is a very high hardness meet at the majority of those materials, maintain with the increase in temperature, witch allows very special utilizations in various branches of cars engineering, like processing through splintering, tribologic protections etc, adding also a remarkable chemical resistance, plus, some ceramics can be used in the making of friction and antifricition organs.

The disadvantages of the materials are a consequence of reduce deformities, witch drives a wick resistance to shocks and vibrations.

The thermo isolated engine makes the objective through witch it is been searched to obtain in the future the most advanced solution of the main desiderates in the field of internal combustion engines as: the reduction of fuel consumption, the reduction of sound and chemical pollution, the increase in lasting and viability, the reduction of the engine and auxiliary installations sizes, the cut in production costs.

There is a development in the manufacturing of pieces made from two parts: a metallic part and a ceramic part. The metal remains at a low temperature and develops a mechanic resistance; the ceramics works at high temperatures and makes a thermo barrier.

There are been used oxides with a medium thermo level under 1200° C, with a low breaking load and with a very

Tab.1 Offspring for standard engine

Nr. crt.	Engine speed n, rot/min	Force P _e , kW	Torque M _e , daN·m
1	1500	12,75	8,11
2	2000	17,79	8,49
3	2250	20,76	8,81
4	2625	25,14	9,14
5	3000	29,20	9,29
6	3375	31,78	8,99
7	3750	34,54	8,79
8	4125	36,70	8,49
9	4500	38,15	8,09
10	4875	39,07	7,65
11	5250	39,10	7,11
12	5500	36,88	6,40

Tab.2 Offspring for engine with ceramics elements

Nr. crt.	Engine speed n, rot/min	Force P _e , kW	Torque M _e , daN·m
1	1500	13,10	8,33
2	2000	18,42	8,79
3	2250	21,22	9,00
4	2650	26,07	9,39
5	3000	29,82	9,49
6	3375	32,75	9,26
7	3750	35,37	9,00
8	4125	37,70	8,72
9	4500	38,94	8,26
10	4875	39,43	7,72
11	5250	39,72	7,22
12	5500	38,37	6,66

reduce dilatation coefficient and so with an excellent conduct for the thermo shock.

It has been accomplished two types of measurements. First type of measurements it was accomplished with the standard engine and the second with the modified engine with ceramics elements.

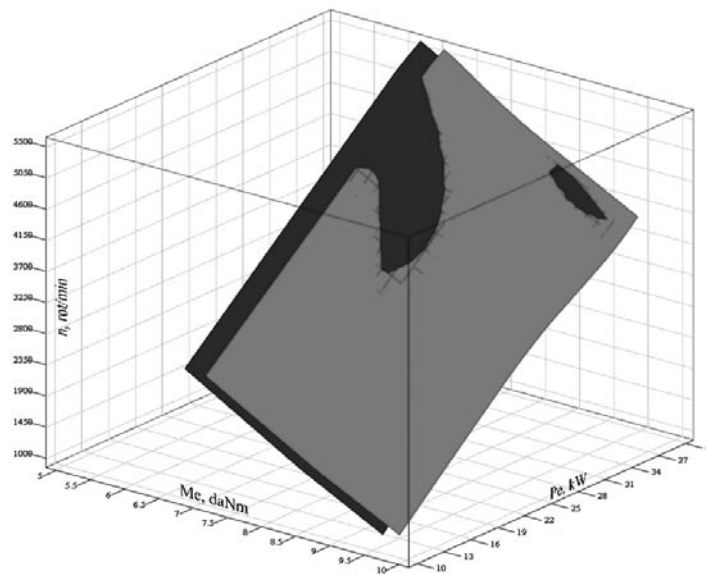


Fig. 1. Torque and force to engine speed for standard engine and ceramic engine

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Conclusion

- The present phase regarding the use of ceramic materials in the construction of internal combustion engine refers in essence to the technology of elaborating technical ceramics which will be used to isolate pistons, head cylinders, cylinders and valves.
- The application of ceramic materials seems ideal: they have a high resistance to high temperature and thermo shocks, they are lighter than the alloys used usual in the engineering of engines, they have better mechanical features in certain working conditions.
- The ceramic materials can't be a universal substitutes for metals, the main deficiency being their frailty.
- In the case of covering with ceramic material of the piston's head, through the increase of covering thickness the heat stream from the head cylinder and the piston drops and the one from the cylinder remains constant to an increase in power of up to 5 %.

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