

Superficial plasma treatment process.

The surface plasma treatment with the addition of carbides or alloy steel gives the treated parts very elevated surface hardness, up to 3 – 4 times the hardness of the standard grey cast iron (max. 220 HB).

Such treatments are usually only adopted in special cases where a greater resistance is required due to the highly abrasive environment.

The treated parts are those that are more subject to wear and tear: impeller, diffuser, oil chamber, suction flange (where applicable). This treatment is applicable to the main fusion materials: Cast iron GJL, AISI 316, Bronze B10 with thickness' that vary from 0.2 mm to 2 mm. For the additino of alloy steel there are some limitations with regards to the geometry and/or the dimension of the component to be treated. The material to be added that is generally used is an alloy of steel, but in some cases where there are very abrasive liquids, tungsten carbide is used.

Abrasion Resistance tests.

Objective:

Compare the resistance of the ceramic treatment with the metalisation treatment.

Procedure:

Three 3-channel open impellers in grey cast iron GJL code: 61.09336 treated with the blasting machine were tested.

Components:

- A) Standard cast iron impeller GJL
- B) Impeller with ceramic treatment
- C) Impeller with metalised treatment.

Length of test:

Test time 60 minutes, check-up after 10 minutes..

Abrasive grit used in test:

Steel grit Ø 1 mm

Abrasion resistance test and machine used

Impellers before the test



Ceramic - Standard cast iron - metalised impeller

Impellers after the test



Ceramic - Standard cast iron - metalised impeller

Conclusions

Visual check-up	Ceramic treatment	Cast Iron.	Metalsised impeller
After 10 Minutes	On the edges the treatment came off.	No variation	No variation
After 60 Minutes	The thickness of the treatment has decreased in many points and in some points the treatment is no longer present	A rear wing of the impeller has chipped.	Only in a few points the thickness of the treatment has been reduced.

From the results we can see that the metalsised treatment gave much better results than the ceramic treatment with respect to the even distribution of the coating and the residual thickness of the coating.