SUMMARY

In the oil industry,after the extraction process,there are used or they appear,real important water amounts with a powerful corrosive character wich contain both salts with high concentration and sand particles which make the installations and equipments they handle,to be subjected to a wear process mostly through erosion and corrosion.

Single-stage centrifugal pumps are often used in these waters circulation in the injection stations of deposit water and their components , especially the rotors and the sealing rings made traditionally of gray cast iron or cast carbon steels do not satisfie the durability resistance wear required.

The use of austenitic stainless steel for manufacturing rotors, shafts and sealing rings , largely solve the problem of wear corrosion , but to reduce the effects of wear erosion it requires the application of thermochemical treatments that lead to increase hardness of the supericial layer of these steels without dropping their resistance to corrosion . Treatments in gas nitriding and ion nitriding , lead to obtain such properties of the superficial layer . Two of the most commonly used stainless steel , AISI 304 and AISI 316 were subjected to two types of nitriding and after that there have been made experimental studies on the behavior of the wear by erosion both in untreated condition and in treated condition , and compared with the behavior in the same conditions of carbon steels and cast irons .

For experimental studies to be carried out in conditions as close to those from the centrifugal pump impellers , a study was performed on the main components of centrifugal pumps from both geometrically and especially the fluid flow velocities in different points and angles of impact with the pump components .

To achieve a correct interpretation of the experimentally obtained resultsthere has been performed a bibliographic study on the phenomena of wear by corrosion , erosion and cavity , and an experimental study on the properties of the layers therochemical treated , such as thickness of the treated layer,the variation of chemical composition of the treated layer on its depth and especially the maximum hardness obtained and hardness variation on depth.

All the experimental studies presented in this thesis led to the conclusion that the life of pump components that come into direct contact with chemically aggressive fluids and with high content of hard particles, can be extended significantly through the use of austenitic stainless steels , ion nitrided and gas nitrided.