



The Advantages Temet 25 Shaft Material

1. **IMPROVED CORROSION RESISTANCE**
2. **IMPROVED FATIGUE RESISTANCE**

What is Temet 25 ?

Temet 25 is a special high strength duplex stainless steel alloy. It has outstanding resistance to corrosion in seawater which makes it an ideal material for pleasure boat shafts.



History & Technical Advantages

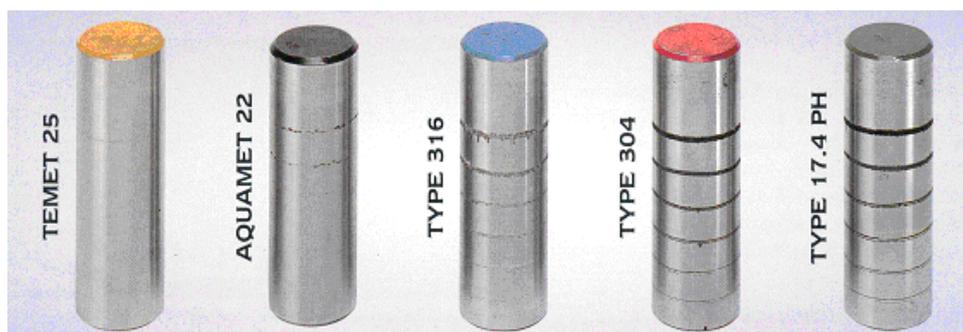
Temet 25 was developed in the late 1980's, when the Teignbridge Technical Department was challenged to find a stainless steel that had a combination of toughness, strength and resistance to corrosion. With more high powered diesels being fitted to motor yachts and workboats alike, the objective was to develop a product superior to other materials used for boat shafting. Not only did Teignbridge achieve this goal in the production of Temet 25, a High Performance Duplex Steel, but we successfully introduced Temet 25 into the market at highly competitive price compared to materials such as Monel K500 and Aquamet 22.

Once its development was complete, Teignbridge Propellers contracted Lloyds Register of Shipping (Lloyds) and Exeter University to undertake two studies with respect to the suitability of Temet 25 in the marine environment. The first part of the study investigated the corrosion resistance of the material and the second part of the study was a fatigue test of the material. In each test a representative sample of shafting materials were presented. The samples included Temet 25, Aquamet 22, Type 316, Type 304 and Type 17-4PH stainless steels.

In the corrosion test the samples were stamped with an identification code and were fitted with a series of tight fitting 'O' rings. The specimens were then exposed to 5% ferric chloride solution at room temperature over a period of 48 hours. The 'O' rings were removed at time intervals of 1, 2, 4, 8, 24 and 48 hours.

This test was carried out under the supervision of a Lloyd's Register of Shipping (LRS) surveyor.

The results show that the Temet 25 sample had only a trace amount of pitting, followed by Aquamet 22, Type 316, Type 304 and finally Type 17-4PH, making Temet 25 material clearly superior in reducing the premature failure due to crevice corrosion.



CORROSION FATIGUE TESTING

The basis used by Lloyd's Register of Shipping for calculating the required shaft diameter in stainless steel is by using corrosion fatigue data.

In order to validate that Temet 25 was better than other readily available shaft materials, a series of tests was carried out to establish the performance of various materials.

Samples of each material were machined and sent to Exeter University for testing. In these tests each sample was subjected to a rotating bending load by suspending a load from a rotating cantilevered beam. The beam was rotated rapidly by an electric motor. The motor was run until each sample failed, recording the number of cycles at which each sample broke. To simulate the marine environment the samples were kept in contact with synthetic salt water. The results confirmed that Temet 25 performed significantly better than the other materials offered for testing by a considerable margin, the fatigue loading at 10^8 cycles was recorded for each material :-

TEMET 25	320 N/mm²
AQUAMET 17	240 N/mm ²
AQUAMET 22	225 N/mm ²
TYPE 316 SS	210 N/mm ²

This would indicate that either reduced shaft diameters could be used or that greater longevity should result when using Temet 25 at the same diameter as the other materials.

