NEWS 11/09

TITAL®

THE VERY BEST IN CASTINGS

TITAL® - NEWS-FLASH

The titanium and aluminum investment casting specialist TITAL GmbH has recently been recertified to comply with the EN / AS 9100 standard which has been elaborated by the IAQG (International Aerospace Quality Group). Since 2001 TITAL is one of only two investment casting foundries worldwide who have been certified and audited according to the strict regulations of NADCAP (National Aerospace and Defense Contractors Accreditation Program) as well as the IAQG. NADCAP certifications concentrate on the accreditation of "special processes" during production and quality control. At TITAL, all five existing special processes are NADCAP approved.

TITAL® - STATEMENT

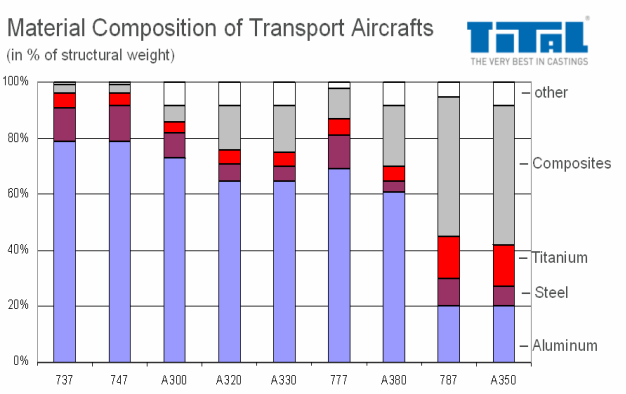
Why is the combination of CFRP and Aluminum particularly critical for the aircraft industry?

Philipp Jerusalem, Director Sales and Marketing: "Due to the extreme temperature gradient between the outer skin of an aircraft and the inner cabin, condensed water accumulates. While the temperature in the cabin is around 68 degrees Fahrenheit (20° C) it can be minus 40 degrees Fahrenheit (-40° C) outside during cruising altitude. This condensed water accumulation accelerates the corrosion process at the CFRP-aluminum joints which can be avoided by using titanium alloys."

philipp.jerusalem@tital.de

Titanium alloys prevent corrosion
Growing demand for Titanium Castings

Due to the consistently growing proportion of carbon fiber reinforced plastics (CFRP) in the aerospace industry, the German titanium casting expert TITAL was able to further expand its market position over the last few years. Titanium is the only light metal that can be directly attached to the CFRP structures without the risk of developing corrosion defects. The next generation of long range jets will have the outer aircraft skin completely made from CFRP (see table). The brackets between the skin and the inner aircraft structure are preferably made from titanium alloys. TITAL has experienced approximately 50% growth in their titanium business segment over the last three years. Investments in new production facilities fostered TITAL's market position which today is one of only three titanium foundries worldwide that is capable of producing titanium castings with a size of 60 inches (1500 mm) and a weight of 660 lbs (300 kg).



Strong demand: CFRP structures and Titanium in aerospace industry

The aircraft structures of the Airbus A350XWB or its rival Boeing 787 contain up to 50 % of CFRP (see table). The advantages of these composite materials are clearly found in their stiffness, energy absorption capability and low specific weight. But CFRP has one downside, when it is directly connected with aluminum, corrosion will occur and most of the stringers and beams in the aircraft structure are made out of aluminum.

As soon as humidity comes into play, electrolytic corrosion is inevitable. By using titanium alloys this can be avoided. Titanium is for example used for the rear pressure bulkhead. It is located in the back of the aircraft behind the galley and separates the cabin from the rear end of the aircraft where the same pressure prevails as in the outer atmosphere.

Beta Annealing - Probably not necessary

TITAL GmbH was able to prove with a pilot batch that beta annealing as a special heat treatment for titanium investment castings is probably not necessary. In doing so, TITAL takes up an adverse stance against the prevailing requirements of the aerospace industry. The industry requires the beta heat treatment for titanium components made of TiAl6V4 in order to achieve improved material properties especially regarding fracture toughness and crack propagation. The idea of beta annealing itself is good. Through the special heat treatment an extended durability of structural components shall be achieved with respect to crack propagation. Thus, inspection intervals shall be extended and costs shall be saved. However, for the castings in question it does not offer any additional effect. TITAL now showed that already during the investment casting process itself a structure can be generated that has very comparable properties regarding fracture toughness and crack propagation. Thus, beta annealing could be avoided which would lead to considerable cost savings.