

High Strength Beta Titanium Alloy

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In news- Defence Research and Development Organisation (DRDO) has indigenously developed a High Strength Metastable Beta Titanium Alloy on industrial scale for applications in aerospace structural forgings.

Key updates-

- The alloy contains **Vanadium, Iron and Aluminium (Ti-10V-2Fe-3Al)**.
- It has been developed by **Defence Metallurgical Research Laboratory (DMRL)**, a Hyderabad based laboratory of DRDO.
- These alloys are **already being used by many developed nations** in recent times as a beneficial substitute for the relatively heavier traditional Ni-Cr-Mo structural steels to achieve weight savings.
- The high strength beta titanium alloys are unique due to their **higher strength, ductility, fatigue, and fracture toughness**.
- Its **lower lifetime cost, owing to superior corrosion resistance** in comparison to steels, is an effective trade-off to justify its use in aerospace structural forgings
- The Aeronautical Development Agency (ADA) has identified over 15 steel components that may be replaced by Metastable Beta Titanium alloy forgings in the near future with a potential of 40 percent weight savings.

About Titanium alloy-

- Titanium alloys are alloys that contain a mixture of titanium and other chemical elements.
- Such alloys have very high tensile strength and

toughness.

- They are light in weight, have extraordinary corrosion resistance and the ability to withstand extreme temperatures.
- The high cost of both raw materials and processing limit their use to military applications, aircraft, spacecraft, bicycles, medical devices, jewelry, highly stressed components such as connecting rods on expensive sports cars and some premium sports equipment and consumer electronics.
- **“Commercially pure” titanium has acceptable mechanical properties and has been used for orthopedic and dental implants.**
- For most applications titanium is alloyed with small amounts of aluminium and vanadium, typically 6% and 4% respectively, by weight.
- This mixture has a solid solubility which varies dramatically with temperature, allowing it to undergo precipitation strengthening.