

Recent Developments on Air Liquide Advanced Technologies Turbines

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Air Liquide Advanced Technologies has developed for more than 40 years turbo-expanders mainly for hydrogen and helium liquefiers and refrigerators and has in total more than 600 references of cryogenic turbo-expanders and cold compressors.

The latest developments are presented in this paper. The key motivation of these developments is to improve the efficiency of the machines, and also to widen the range of operation. New impellers have been designed for low and high powers, the operation range is now between 200W and 200kW. The thrust bearings have been characterized in order to maximize the load which can be withstood and to increase the turbo-expander cold power. Considering low power machines, 3D open wheels have been designed and machined in order to increase the adiabatic efficiencies. A new type of machine, a turbo-booster for methane liquefaction has been designed, manufactured and tested at AL-AT test facility.