Cyclean®

Engine Wash

Lufthansa Technik's revolutionary engine washing technology Cyclean® is quick and simple, proven by more than 100,000 successful washes. Cyclean® is available at a continuously growing number of stations all around the world. It enables airlines to clean their engines quickly and very efficiently. By using Cyclean® regularly optimum performance can be achieved.

The airflow through a jet engine is enormous. But with the air being contaminated by sand, salt, chemicals and unburned hydrocarbons, amongst others, these particles adhere to the surface of engine parts leading to a phenomenon known as compressor fouling. The contaminated engine has to work harder to compress a defined amount of air. Therefore engine temperatures rise and more fuel must be injected to achieve the same thrust. This consequentially leads to faster engine deterioration.

The solution – Cyclean® by Lufthansa Technik
Washing a jet or turboprop engine on a customized cycle leads to a cleaner and therefore more efficient compressor. To achieve the minimum downtime necessary to perform the washing process as an integral part of aircraft operations, Lufthansa Technik developed completely new equipment (patent technology) which makes engine washing a quick and easy process.

Customer advantages

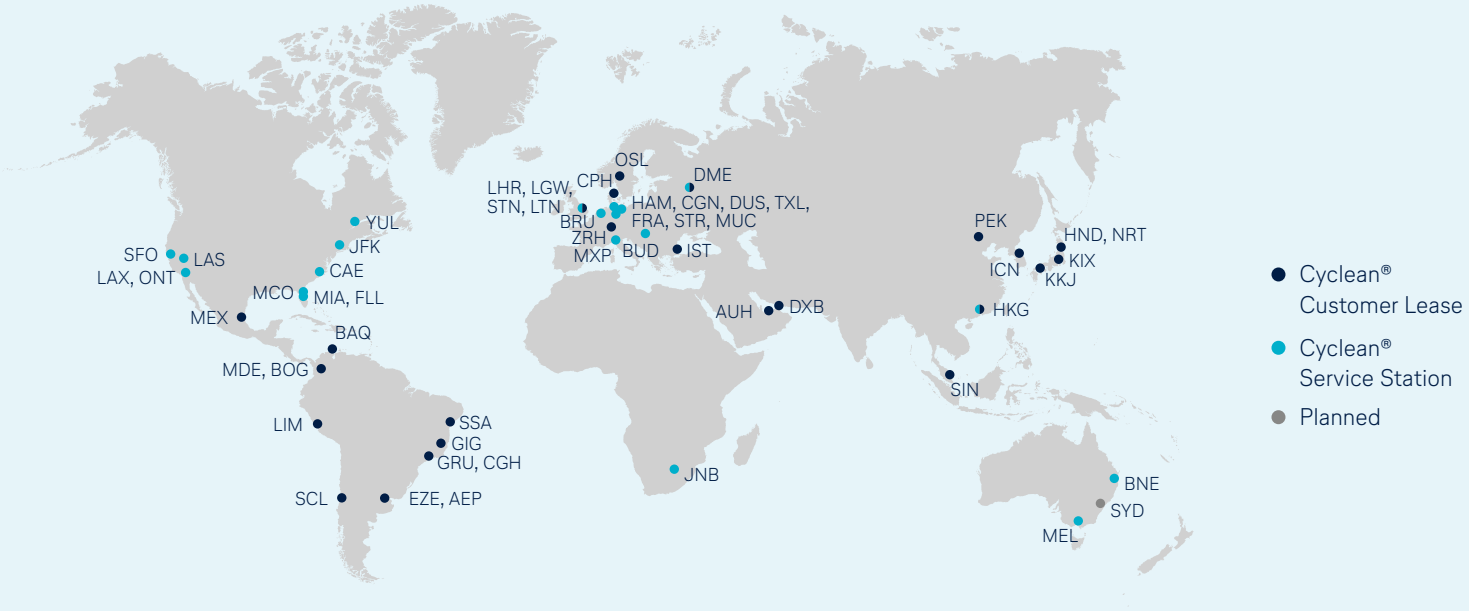
- EGT margin improvement of up to 25°C (77°F)
- Fuel flow reduction of up to 1 percent
- Quick and easy washing during stopover possible
- Maintenance costs decrease due to higher on-wing time
- Greenhouse gas emission reduction
- AMM or a faster, customized EO procedure
- Customized and flexible business models

Services

- Customized engine washing interval
- ECM data analysis of washing results
- Global wash network
- No post wash run-up required
- Overall service time for each engine less than one hour using a faster, customized EO procedure
- Options for complete wash service or for equipment lease available

Lufthansa Technik

The continuously growing Cyclean® network



A dual nozzle arrangement sprays water heated to 70 °C (160 °F) with up to 70 bar (1.015 psi) directly into the core engine. Contrary to conventional washing methods, a fine and evenly distributed water mist follows the gas path. The amount of water injected is optimized for each engine type. This ensures efficient cleaning of the compressor and at the same time minimizes the amount of residual water remaining within the engine. The advanced equipment ensures easy preparation, short washing times and washing results second to none. Cleaner engines run at lower temperatures, need less fuel and therefore emit less CO_2 and other harmful greenhouse gases. The improved overall performance achieved saves real money on MRO expenses during the engine's life cycle. Moreover, using Cyclean® for your engine wash creates less work, avoids costly and time consuming towing (engine wash at the gate is possible) and yields less waste water. Thanks to the significantly reduced amount of water and its high precision, pinpoint injection, run-ups become obsolete with night curfews not being an obstacle anymore.

Optimized washing interval

Engine washes should be performed at a defined interval. This has to be individually calculated with regard to the engine type, the operating conditions and operator-specific flight profiles to assure the optimum balance of washing efforts and resulting savings. While results vary between operating conditions and engine types, experience shows that frequent washes produce a fuel flow reduction of up to 1 percent. Lufthansa Technik supports customers with consulting services and recommendations to identify the optimum cleaning profile.

Capability

Lufthansa Technik currently offers the Cyclean® Engine Wash for the following engine types. Further engine types will be added.

CFM International
CFM56-3, CFM56-5A, CFM56-5B, CFM56-5C, CFM56-7B, LEAP-1A, LEAP-1B

General Electric
CF34-8, CF34-10, CF6-80A2, CF6-80C2, CF6-80E1, GE90-110, GE90-115, GEnx-1B, GEnx-2B

Engine Alliance
GP7200

International Aero Engines
V2500

Pratt & Whitney
PT6, PW120 Series, PW150, PW4000-94", PW4000-100", PW4000-112", PW1100G, PW1500G

Rolls-Royce
AE3007, BR715, RB211-535E, RB211-524, Trent 500, Trent 700, Trent 800, Trent 900, Trent 1000, Trent XWB

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