TPE331 Advantages

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TPE331 Advantages

The following discussion lists the many advantages for using a fixed shaft TPE331 engine – especially in single engine applications.

1. Immediate Power Response

Since the TPE331 is a fixed shaft engine, the rotating group is always at 100% RPM for takeoff and landing and 96% for cruise. No waiting for engine spool up - move the power lever and the propeller blade angle immediately reacts. The power you need is available -- right now -- as fast as you move the power lever.

This feature gives the pilot added confidence and security whether you're completing a normal landing, a balked landing, or require immediate reverse thrust on your landing roll.

The fixed shaft TPE331 puts you in control by providing power when you need it - never too late - so you can concentrate on flying the aircraft.

2. Highest Installed Performance

With the engine inlet at the front of the engine, the TPE331 benefits from the "ram rise" effect on the engine inlet as the aircraft increases airspeed. The use of either a single or split exhaust system serves to maximize the engine residual thrust while minimizing drag.

Since a TPE331 doesn't require the bulky presence of an inertial separator and protruding exhaust stacks, the frontal cross sectional area of the installation is minimized which also contributes to higher installed performance - speed, range and more nm/lb of fuel. And, there's one further benefit of the TPE331 -- no unsightly exhaust stains on the nacelle.

3. No Ground Cooling Problems

Whether you utilize a single exhaust or a split exhaust arrangement, the opportunity exists to use an eductor (jet pump) system which continually moves cooling air throughout the nacelle - insuring that the engine oil temperature remains acceptable even on the hottest days. No need to hold the brakes and advance power levers to obtain air flow over the oil cooler, the eductor does the job -- simply and effectively.

4. Simple Engine Anti-Ice System

Engine anti-icing is easy on the TPE331. Since bleed air is readily available, an anti-ice valve and hot air manifold are all that is required to keep the engine inlet free of ice. There’s no need for bulky inertial separators that add weight and complexity. The anti-ice valve is actuated and hot air flows to the manifold underneath the engine inlet and also to the nacelle inlet area.

5. Minimum Flyover Noise

The 1591 RPM gearbox output speed contributes to the TPE331 having one of the lowest aircraft fly-over noise signatures. With ever-increasing legislative initiatives on aircraft noise profiles, the TPE331 can meet the most stringent of these related noise requirements.

6. Long Engine TBOs

For non-commercial operators, the -10,-11 and -12 engines have a 5000 hr. TBO with only one mid-term (hot section) inspection required. For commercial operators, a 7000 hr TBO with a mid-term at 3500 hrs is recommended. The -14GR/HR turboprop engines are essentially “on-condition” with a required major inspection at 9000 hrs.

7. The Right Size for Replacing Piston Engines

The TPE331 has replaced numerous piston engines from six cylinder Continental 360s to 520s, Lycoming 540s to the eight cylinder 720, PW R985 and R1340, Wright 1820s and everything in between. With the exception of the much heavier radial engines, the adaption of the TPE331 into the aircraft usually results in maintaining the original location of propeller rotation. Because of its relatively compact size (nominal 42" length by 21" width), the TPE331 approximates the density of the flat engine that it replaced. See TPE331 Applications for a complete listing of OEM, retrofit and kit plane applications.

8. TPE331 Engine Family Commonality

Because of the engine's external architecture commonality (-1 thru -12), there is the potential to easily take advantage incorporating higher performance TPE331s in a given aircraft. In general, since the location of the motor mounts are identical, a TPE331-1 (715 SHP) engine could be replaced by a TPE331-12 (1100 SHP).

Again, as a result of the engine's evolutionary development, engines can easily be reconfigured to produce a nominal 17-20% SHP improvement. For example, a TPE331-1/-2 (715 SHP) engine can be easily upgraded to 840 SHP by incorporating an improved compressor section. Likewise, an original 840 SHP engine (-3,-5,-6) can be upgraded to 1000 SHP by incorporating a newer technology -10/-11 hot section.

Examples of OEMs progressing from one engine model to another are Swearingen/Fairchild who began with a -3U in the original Metro, then to a -10U/-11U, and then to a -12U in the Metro 23.

Likewise, the CASA 212 began with a -2 (pre-series A/C), proceeded to a -5, a -10, and then a -12 in the 400 series aircraft. Mitsubishi's first MU-2 used a 575 SHP Pre-Century engine, prior to the incorporation of the -1 engine in the F&G models. This was followed by the -6 in the J,K,L,M, the -5 in the N and P versions, and ultimately the -10 in the Solitaire and Marquise models.

TPE331 Engine Performance Ratings

Model	Thermodynamic Rating (SHP)	(ESHP)	RPM
Pre-Century	**575**	**605**	**2000**
-1/-2 (Century)	715	755	2000
-3U	840	904	2000
-5	840	904	1591
-6	840	904	2000
-8/-9	865	907	2000
-10/-10T	1000	1045	1591
-10A/AV/UA/N	1000	1045	2000
-11U	1000	1045	1591
-12U	1100	1151	1591
-12B	1100	1151	2000
-14A/B/F	1645	1712	1540
-15AW	1645	1705	1390
-14GR/HR	1759	1822	1522