WARNING

AIRCRAFT TIRES CAN BE OPERATED UP TO OR AT RATED INFLATION PRESSURES ; EXTREMELY HIGH INFLATION PRESSURES MAY CAUSE THE AIRCRAFT WHEEL OR TIRE TO EXPLODE OR BURST, WHICH MAY RESULT IN SERIOUS OR FATAL BODILY INJURY.

AIRCRAFT TIRES MUST ALWAYS BE INFLATED FROM THE LOW PRESSURE SIDE, PROPERLY REGULATED, OF ANY INFLATION BOTTLE OR CANISTER.

THE HIGH PRESSURE SIDE SHOULD NEVER BE USED.

THE SAFETY PRACTICES FOR MOUNTING AND DEMOUNTING AIRCRAFT TIRES RECITED IN THE AIRCRAFT TIRE CARE AND SERVICE MANUAL MUST ALWAYS BE FOLLOWED.

General notes on operating aircraft tires

OPERATING TIRE TEMPERATURES

An aircraft tire in use is capable of generating high internal temperatures. This is a result of the natural hysteretic nature of tire materials and the relatively high tire deflections necessary for the loads carried. The fact that rubber is a poor conductor of heat accentuates this problem. The magnitude of this temperature rise is dependent on the duration of service and the speeds obtained.
Excessive heat buildup from running overloaded or underinflated as well as from high taxi speeds is detrimental to the functional life of the tire. High heat will also adversely affect the wear characteristics of the tread rubber.
It is essential that aircraft tire service be intermittent to allow for cooling periods.
Michelin tires designed for typical applications are not recommended for use in ambient temperatures exceeding 225°F (110°C), or where brake heat results in temperatures which exceed 300°F (150°C) at tire and wheel interface. For temperature conditions outside of these limits, contact your Michelin representative.
All Michelin manufactured Radial aircraft tires are certified for in-service operation to –55°C. Beginning with manufactured date, June 1999, all Michelin Bias aircraft tires are certified for in-service operation to –55°C.

TIRE INFLATION

Proper inflation pressure is essential to tire performance and long term tire life. The maintenance procedures outlined in the airframer Operators' Manual should be closely followed. In lieu of the Operators' Manual, the Michelin Aircraft Tire Care and Service Manual should be referenced.
The maximum allowable air loss for tubeless tires is five percent over a 24-hour period. This does not include possible pressure loss during the initial 24-hour period due to tire growth. A newly mounted tire inflated to rated pressure should be allowed to stabilize for a minimum of 12 hours, preferably 24 hours, in a workshop where the temperature is maintained relatively constant. Afterwards, it should be reinflated as necessary to rated pressure before beginning any pressure loss checks. In service, the pressure drop should be a maximum of five percent (5%) for any 24-hour period (constant temperature). If more than five percent pressure drop is indicated for any 24-hour period, a check should be made following the procedures described in the Michelin Aircraft Tire Care and Service Manual.

MICHELIN AIRCRAFT TIRE

RADIUS OF GYRATION

Radius of gyration for new tire and tube assemblies and new tubeless tires is calculated by using the following formulae:

$$\text{Radius of Gyration (accuracy } \pm 5\%) = \frac{D_{o\ MAX} + D_{o\ MIN}}{5.12}$$

For wheel assemblies including rotating brake parts, calculate radius of gyration values as follows:

Radius of Gyration= 0.40 x D where D is the Specified Rim Diameter (accuracy ± 20%)

MEASURING AIRCRAFT TIRES

For all BIAS tires and for MILITARY RADIAL tires, dimensional data has been given in this Data Book for "New Inflated Tires". A "New Inflated Tire" is one that has been mounted, allowed to stand for 12 hours minimum (preferably 24 hours) at a stable temperature and then reinflated to the unloaded pressure shown in the applicable table.
For all CIVIL RADIAL tires, dimensional data is given for "Grown Inflated Tires". A "Grown Inflated Tire" is one that has completed 50 TSO take-off cycles. Tires are allowed to cool to ambient temperature and are inflated to the unloaded pressure shown in the applicable table.
Having met the appropriate conditions from above, the circumference of the inflated, unloaded tire is measured. The diameter is determined by calculation using the following formula:

$$D_o = \frac{\text{Measured Circumference}}{3.14}$$

CHANGES IN PRESSURE VS. TEMPERATURE

For all aircraft applications, the range of ambient air temperature can affect tire performance. It is essential that adjustment be made as each particular case requires. As the ambient temperature increases/decreases, tire pressure also increases/decreases. It must be noted that operating inflation pressure is also a function of load. Changes in tire load must also be considered when adjusting tire pressure.

CAUTION: inflation pressures should only be measured on "cold" tires. A tire is considered "cold" when it has cooled to ambient temperature after rolling. Tires not exposed to direct sunlight will reach ambient temperature within 3 hours after landing.

LOAD AND INFLATION

Operating pressures are set by the airframe manufacturer and given in the Operators' Manual. They are based on the anticipated loads, center of gravity and dynamic forces. Inflation values are set to avoid deflecting the tire more than its design deflection.
The pressure of a loaded tire will be 4% higher than for the same tire unloaded. This is a result of the high deflections and subsequent reduction in volume which occurs when the tire is loaded. All pressure ratings for tires are based on an unloaded tire.

STANDING WAVES

At high speeds and high deflections, aircraft tires may develop a polygonal shape from the formation of standing waves in the sidewall. This condition accentuates heat buildup at high speeds and can lead to tread cracking, chunking or separations. The formation and magnitude of these standing waves is greatly influenced by tire deflection. Proper inflation pressure maintains tire deflection within design limits.