

# CYGNUS X1 Aircraft Maintenance Manual

Task 32-0000001

## 1.0 Landing Gear Tire Inspection Instructions

**WARNING:** AIRCRAFT TIRE AND WHEEL ASSEMBLIES MAY OPERATE UNDER HIGH PRESSURES IN ORDER TO CARRY THE LOADS IMPOSED ON THEM. THEY SHOULD BE TREATED WITH THE SAME RESPECT THAT ANY OTHER HIGH PRESSURE VESSEL WOULD BE GIVEN.

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

**WARNING:** AIRCRAFT TIRES MUST ALWAYS BE INFLATED WITH A PROPERLY REGULATED INFLATION SOURCE. INFLATING WITHOUT A PRESSURE REGULATOR PRESENTS A RISK OF PERSONAL INJURY AND/ OR DAMAGE TO EQUIPMENT. DIRECT HIGH PRESSURE SHOULD NEVER BE USED. EXTREMELY HIGH INFLATION PRESSURES MAY CAUSE THE AIRCRAFT WHEEL OR TIRE TO EXPLODE OR BURST, WHICH MAY RESULT IN SERIOUS OR FATAL BODILY INJURY.

**WARNING:** DO NOT PROBE CUTS OR EMBEDDED OBJECTS WHILE A TIRE IS INFLATED. SUCH ACTION COULD FURTHER DAMAGE A TIRE CAUSING IT TO RUPTURE RESULTING IN PERSONAL INJURY OR EQUIPMENT DAMAGE.

**WARNING:** A TIRE/WHEEL ASSEMBLY THAT HAS KNOWN DAMAGE SHOULD BE ALLOWED TO COOL TO AMBIENT TEMPERATURE (A MINIMUM OF 3 HOURS) BEFORE THE TIRE IS DEFLATED.

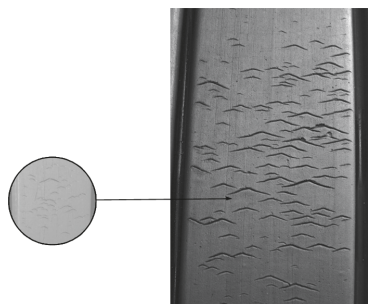
**WARNING:** USE CARE WHEN REMOVING THE VALVE CORE FROM AN INFLATED TIRE. USE OF A VALVE CORE REMOVAL TOOL IS RECOMMENDED. THE VALVE CORE OF AN INFLATED TIRE CAN BE PROJECTED AT A HIGH SPEED AND POSSIBLY CAUSE INJURY.

Perform the following steps to examine the tires:

- (1) Record all noted tire conditions including required disposition on the Tire Inspection Form.
- (2) Examine the tires for leaks, wear patterns, damages, cuts and bulges.
- (3) Examine the tires for the presence of contaminants such as petroleum products, hydraulic fluid, grease, etc.
  - a) The tire should be removed from service if the surface of the tire appears soft, spongy, or there are bulges present.
- (4) Remove tires that have any of the following conditions:
  - a) Cuts or ozone cracking in the grooves, the tread, shoulders or sidewalls that exceed the limits specified below.
  - b) Blisters, bulges, or other signs of ply separation in the tread, shoulder or sidewall area.
  - c) Flat spot which shows the tread reinforcement/cut protector.

### A. Chevron Cutting

Remove from service if the tread cut criteria are reached, if the tread reinforcing ply (bias) or protector ply (radial) is exposed for more than 6 cm<sup>2</sup> (1.0 in<sup>2</sup>), or if the cutting covers the full width of the rib.



## B. Aggressive Wear

Cause: Aggressive braking on rough runway surfaces can cause surface tearing of the tread rubber. Remove the tire if the reinforcing plies (bias) or protector ply (radial) are exposed.



## C. FOD (Foreign Object Damage) or Tread Cuts

Remove the tire if:

- 1) Cuts, embedded objects, or other injuries expose or penetrate the reinforcing plies (bias) or protector ply (radial).
- 2) Cuts, embedded objects or other injuries that do not expose or penetrate the reinforcing plies (bias) or protector ply (radial) if:
  - A cut extends entirely across a tread rib (any depth).
  - A cut undercuts at the base of any tread rib by 6 mm (1/4 in).

## D. Tread Chipping and Chunking

Remove from service if the chipping/chunking exposes the reinforcing ply (bias) or the protector ply (radial).

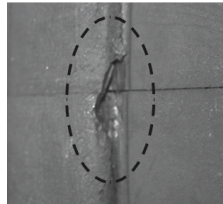
## E. Groove Cracking

Remove from service:

- 1) If the groove cracking exposes the reinforcing ply (bias) or the protector ply (radial) for more than 6 mm (1/4 in).
- 2) If the cracking extends laterally under a rib by 6 mm (1/4 in).

## F. Rib Undercutting

Remove from service if the undercutting extends under a rib by 6 mm (1/4 in).



## G. Open Tread Splice

Description: An opening in the tread rubber that is orientated radially or at an angle to the ribs. It usually extends across several or all ribs.

Remove the tire from service.



**H. Stripped Rib**

A partial or full loss of the tread rubber between adjacent grooves. The tire should be removed immediately from service when the peeled section, regardless of length, is exposing fabric or has fully detached.



**I. Tread Bulges or separations**

A bulge usually indicates a separation of internal tire components. During high speed rotation, even small areas of separation can grow into partial or full tread rubber loss.

Remove the tire from service.

**J. Thrown Tread**

Remove the tire from the aircraft without additional service.

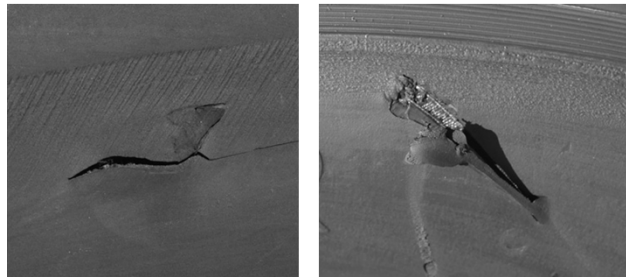
**K. Rib Tearing**

The tire should be removed immediately from the aircraft if cords are exposed for more than 1.0 square inch (6.45 cm<sup>2</sup>) or the damage extends the full width of the tread rib.

**L. Cuts or penetrations to the Sidewall rubber**

Remove the tire from service if sidewall cords are exposed or damaged.

Cuts that do not reach the cord may remain in service but should be monitored at subsequent inspections

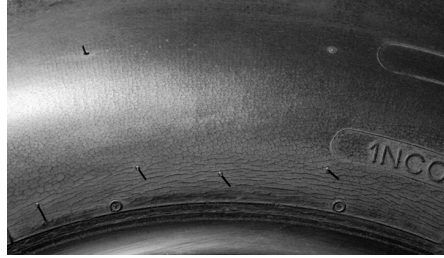


**M. Sidewall bulge, blister or separation**

Remove the tire from service.

**N. Sidewall Rubber Cracking (Ozone Exposure or Weather Checking)**

Remove from service only if the cracking exposes ply cords.



- (5) Examine the tires for worn areas:
- a) Measure the depth of each tire tread groove at the shallowest section of the tire. Use the shallowest depth for the removal criteria.
  - b) If the shallowest tread depth is:
    - 1)  $> 1\text{mm}$  the tire can remain in service
    - 2) between  $1\text{mm}$  and  $1.5\text{mm}$  a maintenance log entry should be made indicating the tire will require removal within 5 days
    - 3)  $< 1\text{mm}$  the tire should be removed from service. If necessary the tire can remain in service to return to a maintenance base.

**NORMAL REMOVAL WEAR LIMIT:** Remove the tire when the wear level reaches the bottom of any groove at one point or up to  $1/8$  of the circumference.

**NOTE:** When the NORMAL REMOVAL limit is reached, the tire should be replaced. If it is necessary to continue the tire in service beyond the normal wear limit, the tire should be removed either at the next maintenance base or upon reaching the RETURN TO BASE WEAR LIMIT (Exposed Cord Limit), whichever occurs first.

At the RETURN TO BASE LIMIT (Exposed Cord Limit), the tire should be removed and replaced. In such a case however, the subject tire might not be suitable for retreading.

**RETURN TO BASE WEAR LIMIT (Exposed Cord Limit):** Remove the tire if either the protector ply (radial) or the reinforcing ply (bias) is exposed at any location over the tread surface. Continued operation of a tire after the top belt plies (radial) or top casing plies (bias) have been exposed, increases the possibility of chunking of the tread and rib stripping.