



TIB #: 21-001

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TECHNICAL INFORMATION BULLETIN

Technical Information Bulletin: TIB 21-001

Dated: April 1, 2021

Part Number: APS164-02504

Subject: APS164-02504 disc fractures installed on Cirrus SR22 Aircraft

Aviation Products Systems, Inc. (APS Brakes) has performed an extensive investigation and evaluation on several fractured APS164-02504 brake discs that were installed on Cirrus SR22 aircraft having Cleveland Wheels and Brakes part number 40-406 wheel and 30-233B brake assemblies. All of the fractures were located above radius of the three hole mounting flange that attaches the brake disc to the wheel. The brake disc specifications, material, and dimensions, were confirmed to be correct as per the FAA approved data, drawings, and prints.

The APS164-02504 brake disc is also used on aircraft such as the Beechcraft 33, 35, 36, 76; Cessna 337, and other aircraft for which there has not been any reported issues since the FAA/PMA approval in 2005.

The design of the SR22 landing gear with the enclosed wheel pants along with a free castering nose wheel which relies on the brakes for directional ground control, lends itself to high brake temperatures during taxi, take-off, and landing operations. There are several Cirrus Advisories and Bulletins that address brake heat Issues.

Owner Service Advisory SA05-04 – Proper Braking Practices,

Owner Service Advisory SA06-03 – Discussion of Brake System Condition and Actions Taken

Service Bulletin SR2X-32-14 – Installation of Low Temperature Sticker to Brake Caliper

AD 2006-21-03 – Installation of Improved O-Rings, Installation of Temperature Indicator stickers and Inspection Interval

Through a third party engineering investigation and evaluations of the fractured discs, it was concluded that the fractures were a cause of a side load of push/pull forces on the friction flange of the brake disc in conjunction with high thermal temperatures causing excessive stress



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loads to the area above the radius on the 3 hole mounting flange resulting in metal fatigue causing aforementioned fractures. These side load forces can be caused by one or a combination of the following:

- 1) Improper installation of the brake disc into the wheel
- 2) Improper conditioning of brake lining and disc
- 3) The improper installation or maintenance of the brake caliper

Installation of Brake disc into Wheel :

It is critical when inserting the disc into the wheel, that the recess in the wheel is free of any debris and the disc is inserted squarely into the recess in the bottom of the wheel. The wheel tie bolts must be torqued in accordance with current Cleveland Wheels and Brakes Technician's Service Guide AWBTSG0001-21 and the current Cleveland Wheels and Brakes Component Maintenance Manual AWBCMM0001.

Improper Brake Lining and Disc Break-In:

When replacing the brake linings and disc it is critical that the proper Break-In procedures are completed. Failure to follow the published Break-In procedures will cause an uneven deposit of friction material on the friction flange of the brake disc. An uneven deposit of friction material will cause higher than normal friction heat and will cause flange vibration which results in a side load on the friction disc putting high stress to other points of the disc structure.

Improper Installation or Maintenance of the Brake Caliper Assembly:

When reinstalling the brake caliper assembly, after removal, to the landing gear, or during routine maintenance checks, pay special attention that the flexible hydraulic brake line does not interfere with the movement of the brake caliper assembly on the anchor bolts (Slide Pins). With restricted movement on the anchor bolts (slide pins), the Brake Caliper Assembly will cause un-natural side loads and friction heat to the friction flange resulting in high stress points to other parts of the brake disc. Anchor Bolts (Slide Pins) must be cleaned and lubricated as per the current Cleveland Wheels and Brakes Component Maintenance Manual AWBCMM0001, or current Cleveland Wheels and Brakes Technician's Service Guide AWBTSG0001-21, or The Airplane Maintenance Manual for the Cirrus Design SR22.



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Inspection of the brake linings and discs are required every 100 hours as published in The Airplane Maintenance Manual for the Cirrus Design SR22, within Chapter 5, Time Limits and Maintenance Checks.

Conclusion:

Fracturing of the APS164-02504 when installed on the Cirrus SR22, has been determined to be caused by un-natural side loads and high thermal temperatures to the friction flange of the brake disc creating excessive stress points above the radius of the three hole mounting flange that attaches the brake disc to the wheel. To ensure correct installation and maintenance of the Cirrus SR22 wheel and brake assembly refer to the following publications:

Cleveland Wheels and Brakes Component Maintenance Manual AWBCMM0001

Cleveland Wheels and Brakes Technician's Service Guide AWBTSG0001-21

The Airplane Maintenance Manual for the Cirrus Design SR22

APS Lining and Rotor Break-In Information – APS Brakes Website: www.apsbrakes.com