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**Number:** SB 2X-30-03 R1  
**Issued:** May 4, 2009  
**Revised:** November 23, 2009

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**SNS SUBJECT:** 30-00 ICE AND RAIN PROTECTION - Alteration of TKS Anti-Ice System for FIKI Conditions

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## 1. COMPLIANCE

Recommended: Accomplish this Service Bulletin prior to flight into known ice or within the next 12 calendar months, whichever occurs first. Compliance time begins upon receipt of this Service Bulletin.

This Service Bulletin has been revised to:

- correct the Effectivity Information,
- correct indicated purge pressure psi values,
- correct specifications in tools, equipment, and supplies table, and
- clarify instructions for retention of Ground Flow Test results.

Operators who have successfully complied with the original release of this Service Bulletin dated May 4, 2009 need take no further action.

## 2. EFFECTIVITY

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

## 3. APPROVAL

FAA approval has been obtained on all technical data in this Service Bulletin that affects type design.

## 4. PURPOSE

Cirrus Design has obtained FAA approval to alter the TKS Anti-Ice System for the affected aircraft to operate under Flight Into Known Icing (FIKI) conditions.

To allow flight into icing conditions as defined by Title 14 of the Code of Federal Regulations (CFR) Part 25, Appendix C - Envelopes for Continuous Maximum and Intermittent Maximum Icing, this Service Bulletin provides the following:

- Removal of placard restricting aircraft operation in FIKI conditions
- Insertion of Airplane Flight Manual Supplement (AFMS) into the Pilot's Operating Handbook (POH)
- Installation of updated MFD checklists
- *Serials 3003, 3310, 3326, 3403 thru 3407, 3416, 3417, 3419, 3420, 3463, and 3499:* Purge/flow tests and pump replacement (as required)

## 5. DESCRIPTION

This Service Bulletin contains instructions for placard removal, insertion of AFMS into POH, installation of updated MFD checklists, and purge/flow tests and pump replacement (as required for identified aircraft).

## 6. WARRANTY INFORMATION

For aircraft under warranty at the issue date of this Service Bulletin, Cirrus Design will cover all parts and labor costs for this Service Bulletin if the work is accomplished within the Compliance time period and the work is performed at an authorized Cirrus Design Service Center.

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**EFFECTIVITY:**  
Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

**7. MANPOWER REQUIREMENTS**

Placard Removal, AFM Insertion, and MFD Checklist Update: 0.5 man-hour.

Purge/Flow Test Procedure (-30°C to 0°C): 3.5 man-hours.

Purge/Flow Test Procedure (Above 0°C): 15.0 man-hours.

Pump Replacement: 1.0 man-hour (per pump).

**8. OTHER PUBLICATIONS AFFECTED**

SR22 Airplane Maintenance Manual (p/n 13773-001)

SR22 Illustrated Parts Catalog (p/n 13774-001)

SR22 Pilot's Operating Handbook (p/n 13772-002)

**9. WEIGHT AND BALANCE**

N/A

**10. MATERIAL INFORMATION**

N/A

**11. ACCOMPLISHMENT INSTRUCTIONS**

A. Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
AFMS for the TKS Anti-Ice System	13772-134 R1	Cirrus Design	POH Supplement.
MFD Checklists	Rev 0	Cirrus Design	MFD Checklist update.

B. Remove key from ignition.

C. Set BAT1, BAT2, and AVIONICS switches to OFF positions.

**Note:** *Serials 3408 thru 3415, 3418 thru 3419, 3421 thru 3424:* The only requirements of this Service Bulletin are to remove the placard restricting aircraft operation in FIKI conditions, insert AFMS into POH, and install updated MFD checklists. Do not perform the accompanying purge and flow tests.

D. *Serials 3408 thru 3415, 3418 thru 3419, 3421 thru 3424:* Perform the following steps.

- (1) At LH edge of bolster switch panel, peel graphic overlay indicating "FLIGHT INTO KNOWN ICING IS PROHIBITED" from bolster panel. (See Figure 3)
- (2) Solvent clean installation surface of removed graphic overlay. (Refer to AMM 20-30)
- (3) Insert the AFMS into POH.
- (4) Update MFD checklists.
  - (a) Proceed online to the following website:  
[http://servicecenters.cirrusdesign.com/techpubs/mfdchecklists\\_sr22perspective.asp](http://servicecenters.cirrusdesign.com/techpubs/mfdchecklists_sr22perspective.asp)
  - (b) Save and unzip the appropriate checklist data file to your computer:  
*Serials w/o Turbo:* Click [SR22 Prspctv FIKI Rev 0.zip \(without Turbo, with FIKI\)](#).  
*Serials w/ Turbo:* Click [SR22 Prspctv FIKI Turbo Rev 0.zip \(with Turbo, with FIKI\)](#).
  - (c) Remove SD card with old checklists from MFD card slot.
  - (d) Copy chklist.ace and startup\_scrn.zip to SD card.
  - (e) In the aircraft, set BAT 1, BAT 2, and AVIONICS switches to OFF positions.

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

- (f) Insert SD card into MFD card slot.
  - (g) Set BAT 1 and AVIONICS switches to ON positions.
  - (h) After system initialization, under the Database status window on main startup screen of MFD, verify checklists files are loaded.
  - (i) Set BAT 1 and AVIONICS switches to OFF positions.
- (5) No further action in this Service Bulletin is required. Complete airplane records by noting compliance with SB 2X-30-03 R1 in Aircraft Logbook.
- E. *Serials 3003, 3310, 3326, 3403 thru 3407, 3416, 3417, 3419, 3420, 3463, and 3499:* Perform the following steps.
- (1) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
TKS Cart (or use equivalent)	T10108 or 09301	Cirrus Design  AS&T, Inc. Salina, Kansas 67401 888-865-5511	Purge porous panels.
Filter, 5 Micron, 5 gpm (part of T10108, or use equivalent)	4535K73	McMaster-Carr Robbinsville, NJ 08691 609-689-3000	Reuse purged anti-ice fluid (initial coarse filter).
Filter, 0.5 Micron, 2 gpm (part of T10108, or use equivalent)	4535K71	McMaster-Carr Robbinsville, NJ 08691 609-689-3000	Reuse purged anti-ice fluid (final fine filter).
In-Line Pressure Gauge (2) (part of T10108, or use equivalent)	-	Any Source	Indicate pressure for panels being purged.
5/16-inch to 3/16-inch Reducing Coupler (2)	18178-001	Any Source	Purge elevator tip porous panels.
Collection containers, 5-gallon (8)	-	Any Source	Collect fluid during purge.
Vertical Drain Trough	T10769	Any Source	Collect fluid from vertical during purge.
Drain Trough Wing, LH Inboard Wing, LH Outboard Wing, RH Inboard Wing, RH Outboard Horizontal/Elevator Tips, LH Horizontal/Elevator Tips, RH	T11044 T11045 T11046 T11047 T11048 T11049	Any Source	Collect fluid from wing and horizontal/elevator tips during purge.
Aluminum Foil	-	Any Source	Collect fluid from elevator tips during flow test.
Tygon Tubing, 3-ft	-	Any Source	Collect fluid from propeller during purge.

**EFFECTIVITY:**  
Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

Description	P/N or Spec.	Supplier	Purpose
Shop Towels	-	Any Source	Collect fluid during purge.
Drop Cloth	-	Any Source	Protect components from fluid.
High Density Sponge	-	Any Source	Inspect fluid flow.
Graduated Cylinder, 10mL (0.1mL divisions maximum)	-	Any Source	Measure flow quantity of elevator tips.
Graduated Cylinder, 500mL (5.0mL divisions maximum)	-	Any Source	Measure flow quantity of horizontal and vertical.
Graduated Cylinder, 100mL (1.0mL divisions maximum)	-	Any Source	Measure flow quantity of propeller and wing.
Zahn Dip Viscosity Cup	EZ, Size #2	Paul N. Gardner Company Pompano Beach, FL 33060 800-762-2478	Measure Kinematic viscosity.
Variable Power Supply 28V (50 Amp Capacity)	-	Any Source	Maintain controlled external power.
Voltage Measurement Harness (2)	T11070	Any Source	Connect in series between aircraft and pump connectors during Ground Flow Test.
Digital Volt Meter (0.01V Resolution)	-	Any Source	Maintain controlled external power.
Scotch-Blue™ Painters Tape, 2-inch	2090-2A	3M Company St. Paul, MN 55144 888-364-3577	Mask off drainage.
Crowfoot Wrench, 3/8-inch	-	Any Source	Removal/installation.
Stopwatch	-	Any Source	Maintain accurate measurements.
Cable Ties	-	Any Source	Secure.
Isopropyl Alcohol	TT-I-735 Grade A or B	Any Source	Solvent.
Clean Cloth (white, lint free)	-	Any Source	Solvent wipe.
Approved Anti-Ice Fluid	DTD 406-B	DW Davies & Company Racine, WI 53403 800-888-6133	Replenish anti-ice fluid tank.
Torque Seal	-	Any Source	Mark torque.
Compressed Air	-	Any Source	Provide pressure.

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

- (2) Remove wing access panels LW4, LW9, RW4, and RW9. (Refer to AMM 6-00)
- (3) Remove empennage access panel RE3. (Refer to AMM 6-00)
- (4) Remove LH passenger seat, carpeting, and cabin access panel CF4L. (Refer to AMM 25-10)
- (5) To protect from fluid, cover cables and electrical connections running through avionics bay with drop cloth.
- (6) Prepare TKS Cart. (See Figure 1), (See Figure 2)

TKS cart is configured as follows: The "5/16 System Output" port on TKS cart is run into an equal tee with a 5/16-inch line (terminated with a nut and olive) connected to each output leg. Each output leg contains a shut-off valve and in-line pressure gauge.

**CAUTION:** Do not place TKS cart directly underneath wing.

Pull up on all three pressure safety valves once before and after each procedure.

Always place TKS cart in upright position.

When TKS cart is not in use, keep air pressure and water regulator valves closed, and cap all lines.

- (a) Close both output leg valves.
- (b) Adjust pressure regulator to zero by turning knob counterclockwise.
- (c) Couple compressed air onto pressure vessel.

**Note:** Uncouple compressed air when making connections and repositioning TKS cart.

- (d) If using TKS cart p/n T10108, set air regulator to CLOSED position. (See Figure 1)
- (e) If using TKS cart p/n 09301, adjust TKS cart control settings. (See Figure 2)
  - 1 Set water regulator to CLOSED position.
  - 2 Set air regulator to CLOSED position.
  - 3 Set selector valve to TKS FLUID position.
  - 4 Set output selector to 5/16 position.
  - 5 Set feed valve position to DOWN - SINGLE FEED position.
- (7) Set up fluid collection locations. (See Figure 3)

**CAUTION:** Do not disconnect any fluid lines at this point.

**Note:** Each ice panel must have its own dedicated drain trough so that fluid collection is isolated to individual panels (and propeller slinger ring nozzle).

All fluid from each ice panel as well as propeller slinger ring nozzle must be captured to achieve accurate ground flow test results.

Tape may be attached to lower surface of ice panel and forward side of drain trough to prevent fluid from "weeping" past contact point of drain trough and ice panel.

Avoid taping over perforations of ice panels.

- (a) Position drain troughs below each wing porous panel to collect fluid during purging process.
- (b) Position drain troughs below each horizontal porous panel to collect fluid during purging process.

- (c) Position vertical drain trough and drain tubes around vertical stabilizer and below porous panel to collect fluid during purging process. Tape as required to hold in place.
- (d) Fabricate and position elevator tip drain troughs.
  - 1 Trim elevator in upward position (pitch up) such that leading edge of elevator is pointed down. (Refer to AMM 27-30)
  - 2 Using 6" x 6" section of aluminum foil, form a "V" shaped trough.
  - 3 Position inboard side of trough between elevator tip and horizontal stabilizer.
  - 4 Attach aft side of trough to elevator tip with tape such that fluid from porous panel is directed forward and downward.
  - 5 Repeat trough fabrication on opposite elevator tip.
- (e) Position tygon tubing on propeller slinger ring nozzle to collect fluid during purging process.
- (f) Position clean, empty 5-gallon containers at lower end outlet of each drain trough, and propeller tygon tubing.
- (g) Connect 28 ±1 VDC external power to external power receptacle.

**Note:** Do not exceed aircraft bus voltages while operating ground power supply.

- (h) Pull STARTER and FUEL PUMP circuit breakers.
- (i) Set BAT 1 switch to ON position.
- (8) Disconnect Pump#1 from J1391 connector and install Pump#1 voltage measurement harness in series between aircraft and pump connectors.
- (9) Disconnect Pump#2 from J1392 connector and install Pump#2 voltage measurement harness in series between aircraft and pump connectors.
- (10) *Serials 3003, 3310, 3403, 3405, 3417, and 3420:* Perform the following steps.

**Note:** Per aircraft temperature, subsequent purge and flow tests are also required.

- (a) *Serial 3310:* Perform Procedure - Metering Pump Flow Output for Pump#1 only. ([Refer to Section M.](#))
- (b) *Serials 3403, 3405, and 3417:* Perform Procedure - Metering Pump Flow Output for Pump#2 only. ([Refer to Section M.](#))
- (c) *Serials 3003 and 3420:* Perform Procedure - Metering Pump Flow Output for Pump#1 and Pump#2. ([Refer to Section M.](#))
- (11) *Aircraft temperature between -30°C to 0°C:* Perform the following steps.
  - (a) Fill both glycol tanks on aircraft with anti-ice fluid. (Refer to AMM 12-10)
  - (b) Fill pressure tank on TKS cart ¾ full with anti-ice fluid and replace access lid.

**Note:** Ensure access lid gasket is in place.

- (c) Perform Procedure - Porous Panel Purge. ([Refer to Section F.](#))
- (d) Perform Procedure - Ground Flow Test #1. ([Refer to Section I.](#))
- (12) *Aircraft temperature above 0°C:* Perform Procedure - Ground Flow Test #2 ([Refer to Section J.](#))
- (13) Remove voltage measurement harnesses from Pump#1 and Pump#2.
- (14) Reconnect Pump#1 to J1391 connector and Pump#2 to J1392 connector.
- (15) Remove drain troughs from wing, horizontal stabilizer, vertical stabilizer, and elevator tips.
- (16) Remove tygon tubing from propeller slinger ring nozzle.
- (17) Remove drop cloth from avionics bay.
- (18) Install LH passenger seat, carpeting, and cabin access panel CF4L. (Refer to AMM 25-10)
- (19) Install wing access panels LW4, LW9, RW4, and RW9. (Refer to AMM 6-00)

- (20) Install empennage access panel RE3. (Refer to AMM 6-00)
- (21) At LH edge of bolster switch panel, peel graphic overlay indicating "FLIGHT INTO KNOWN ICING IS PROHIBITED" from bolster panel. (See Figure 3)
- (22) Solvent clean installation surface of removed graphic overlay. (Refer to AMM 20-30)
- (23) Insert the AFMS into POH.
- (24) Update MFD checklists.
  - (a) Proceed online to the following website:  
[http://servicecenters.cirrusdesign.com/techpubs/mfdchecklists\\_sr22perspective.asp](http://servicecenters.cirrusdesign.com/techpubs/mfdchecklists_sr22perspective.asp)
  - (b) Save and unzip the appropriate checklist data file to your computer:  
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*Serials w/ Turbo:* Click [SR22 Prspctv FIKI Turbo Rev 0.zip \(with Turbo, with FIKI\)](#).
  - (c) Remove SD card with old checklists from MFD card slot.
  - (d) Copy chklist.ace and startup\_scrn.zip to SD card.
  - (e) In the aircraft, set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
  - (f) Insert SD card into MFD card slot.
  - (g) Set BAT 1 and AVIONICS switches to ON positions.
  - (h) After system initialization, under the Database status window on main startup screen of MFD, verify checklists files are loaded.
  - (i) Set BAT 1 and AVIONICS switches to OFF positions.
- (25) Retain Ground Flow Test Card or record test results in Aircraft Logbook.
- (26) Complete airplane records by noting compliance with SB 2X-30-03 R1 in Aircraft Logbook.

**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

F. Procedure - Porous Panel Purge.

- (1) If purging with anti-ice fluid, purge arterial lines and components.
  - (a) Set ICE PROTECT mode switch to HIGH position.
  - (b) Set ICE PROTECT power switch to ON position.
 

**CAUTION:** With both pumps running, flow rate will be doubled and anti-ice fluid will be exhausted in approximately 35 minutes. Do not allow glycol tanks to run dry.
  - (c) Set PUMP BKUP switch to ON position.
 

**CAUTION:** Ground operation of windshield sprayer will result in anti-ice fluid spraying over the top of the fuselage. Ensure personnel are not in path of spray.
  - (d) Prime main pumps by depressing WINDSHIELD button (energizes windshield pump for 3 seconds) every 3 to 5 seconds until fluid squirts out of both windshield nozzles.
  - (e) At filter assembly, observe tubing at filter outlets. Allow system to run until no air is seen exiting either filter.
  - (f) Set ICE PROTECT power switch to OFF position.
  - (g) Set PUMP BKUP switch to OFF position.
- (2) If purging with anti-ice fluid, bleed air from filters and purge lines to panels.
  - (a) Using crowfoot wrench, loosen bolts, washers, and nuts securing air bleed retainer clips to both filters. Rotate air bleed retainer clips as needed to access air bleed screws. (Refer to AMM 30-05)
  - (b) Position container below air bleed valves to catch fluid drip.
  - (c) Loosen air bleed screws.
  - (d) Set ICE PROTECT mode switch to HIGH position.
  - (e) Set ICE PROTECT power switch to ON position.
  - (f) Allow system to run until clear, air-free anti-ice fluid is emitted from air bleed valves.
  - (g) Tighten air bleed screws.
  - (h) Set ICE PROTECT power switch to OFF position.
  - (i) Rotate air bleed retainer clips into position and use crowfoot wrench to secure with bolts, washers, and nuts. Torque bolts to 15 in-lb (1.69 Nm) and apply torque seal. (Refer to AMM 30-05)
  - (j) Set ICE PROTECT power switch to ON position.
  - (k) Set PUMP BKUP switch to ON position.
  - (l) Verify flow is observed at all porous panels for a minimum of 10 minutes.
  - (m) Set PUMP BKUP switch to OFF position.
- (3) Purge wing porous panels.
  - (a) Position TKS cart in front of wing to be purged.
  - (b) Connect porous panels to TKS cart.
    - 1 Remove cable tie securing coupler to wing.
    - 2 Disconnect 5/16-inch supply line feeding the coupler so that coupler remains connected to line leading to porous panel.
    - 3 Connect TKS cart line to porous panel line with coupler.
    - 4 Connect short length of tubing to 5/16-inch supply line and position other end of tubing into collection container.
    - 5 Repeat for other porous panel so that both panels on wing being purged are connected to the TKS cart.
  - (c) Perform Procedure - Purge Air. ([Refer to Section G.](#))
  - (d) Perform Procedure - Panel Performance Inspection. ([Refer to Section H.](#))

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

- (e) Close shut-off valves at in-line pressure gauges corresponding to panels being purged.
- (f) Disconnect in-line pressure gauges from coupler assemblies.
- (g) Set ICE PROTECT mode switch to HIGH position.
- (h) Bleed air by energizing system on aircraft and run in "high" mode until full flow into collection containers without air bubbles is achieved.

**Note:** Make connections quickly to minimize introducing air into the system lines.

- (i) Remove short lengths of tubing from 5/16-inch supply lines.
  - (j) Connect coupler assemblies to 5/16-inch supply lines. Torque nuts to 48 in-lb (5.4 Nm) and apply torque seal.
  - (k) Install cable tie securing coupler to wing.
  - (l) Repeat on opposite wing.
- (4) Purge horizontal stabilizer porous panels.
- (a) Position TKS cart in front of avionics bay.
  - (b) Remove cable tie securing both 5/16-inch coupler assemblies to fuselage wall (downstream of the aft proportioning unit).
  - (c) Disconnect both 5/16-inch supply lines feeding the couplers so that couplers remain connected to lines leading to porous panels.
  - (d) Connect TKS cart lines to porous panel lines with couplers.
  - (e) Connect short lengths of tubing to the 5/16-inch supply lines and position other ends of tubing into collection containers.
  - (f) Perform Procedure - Purge Air. ([Refer to Section G.](#))
  - (g) Perform Procedure - Panel Performance Inspection. ([Refer to Section H.](#))
  - (h) Close shut-off valves at in-line pressure gauges corresponding to panels being purged.
  - (i) Disconnect in-line pressure gauges from coupler assemblies.
  - (j) Set ICE PROTECT mode switch to HIGH position.
  - (k) Bleed air by energizing system on aircraft and run in "high" mode until full flow into collection containers without air bubbles is achieved.

**Note:** Make connections quickly to minimize introducing air into the system lines.

- (l) Remove short lengths of tubing from 5/16-inch supply lines.
  - (m) Connect coupler assemblies to 5/16-inch supply lines. Torque nuts to 48 in-lb (5.4 Nm) and apply torque seal.
  - (n) Install cable tie securing coupler assemblies to fuselage wall.
- (5) Purge elevator tip porous panels.
- (a) Position TKS cart in front of avionics bay.
  - (b) Remove cable tie securing both 3/16-inch coupler assemblies to the fuselage wall (downstream of aft proportioning unit).
  - (c) Install the 3/16-inch to 5/16-inch reducer to each of the TKS cart lines.
  - (d) Disconnect both 3/16-inch supply lines feeding the coupler so that coupler remains connected to line leading to proportioning unit.
  - (e) Connect TKS cart lines to porous panel lines.
  - (f) Connect short lengths of tubing to the 3/16-inch supply lines and position other ends of tubing into collection containers.
  - (g) Perform Procedure - Purge Air. ([Refer to Section G.](#))
  - (h) Perform Procedure - Panel Performance Inspection. ([Refer to Section H.](#))
  - (i) Close shut-off valves at in-line pressure gauges corresponding to panels being purged.
  - (j) Disconnect in-line pressure gauges from coupler assemblies.

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403  
 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

- (k) Set ICE PROTECT mode switch to HIGH position.
- (l) Bleed air by energizing system on aircraft and run in "high" mode until full flow into collection containers without air bubbles is achieved.

**Note:** Make connections quickly to minimize introducing air into the system lines.

- (m) Remove short lengths of tubing from 3/16-inch supply lines.
- (n) Connect panel lines to 3/16-inch supply lines. Torque nuts to 28 in-lb (3.1 Nm) and apply torque seal.
- (o) Remove 3/16-inch to 5/16-inch reducer from each of the TKS cart lines.
- (p) Install cable tie securing coupler assemblies to fuselage wall.
- (6) Purge vertical stabilizer porous panel.
  - (a) Remove cable tie securing the single 5/16-inch coupler assembly to the fuselage wall (downstream of aft proportioning unit).
  - (b) Disconnect 5/16-inch supply line feeding the coupler so that coupler remains connected to line leading to porous panel.
  - (c) Connect one of the TKS cart lines to the vertical panel line with the coupler.
  - (d) Connect short length of tubing to the 5/16-inch supply line and position other end of tubing into collection container.
  - (e) Perform Procedure - Purge Air. ([Refer to Section G.](#))
  - (f) Perform Procedure - Panel Performance Inspection. ([Refer to Section H.](#))
  - (g) Close shut-off valve at the in-line pressure gauge.
  - (h) Disconnect in-line pressure gauge from coupler assembly.
  - (i) Set ICE PROTECT mode switch to HIGH position.
  - (j) Bleed air by energizing system on aircraft and run in "high" mode until full flow into collection containers without air bubbles is achieved.

**Note:** Make connection quickly to minimize introducing air into the system line.

- (k) Remove short length of tubing from 5/16-inch supply line.
- (l) Connect coupler assembly to 5/16-inch supply line. Torque nuts to 48 in-lb (5.4 Nm) and apply torque seal.
- (m) Install cable tie securing coupler assembly to fuselage wall.
- (7) Close air regulator by turning knob counter-clockwise, pull up on pressure vessel safety valve to relieve pressure, and de-couple compressed air supply.
- (8) Set ICE PROTECT mode switch to HIGH position.
- (9) Set ICE PROTECT power switch to ON position.
- (10) Set PUMP BKUP switch to ON position.
- (11) Leak check all fittings that were opened during the purge process.
- (12) Set PUMP BKUP switch to OFF position.
- (13) Set ICE PROTECT power switch to OFF position.

**CAUTION:** Discard any fluid that has been, or is suspected of being a mixture of test fluid and anti-ice fluid. Typically a combination of the fluids will show signs of "streaks" when one has been introduced into the other.

To reuse pure anti-ice fluid (or test fluid) collected in containers, the fluid must first be passed through fine (0.5 micron) filtration.

- (14) If reusing fluid, replenish pressure vessel on TKS cart with fluid collected in the clean containers. Use fresh fluid if there is evidence of contamination.

**EFFECTIVITY:**  
Cirrus Design SR22 Serials 3003, 3310, 3326, 3403  
thru 3424, 3463, and 3499 w/ FIKI ice protection sys-  
tem.

**SB 2X-30-03 R1**  
Page 10  
November 23, 2009

## G. Procedure - Purge Air.

**CAUTION:** Ensure pressure does not exceed 150 psi.

Do not allow pressure vessel to run dry. If vessel runs dry, isolate and purge panel individually up to 70 psi for at least 10 minutes.

To avoid clogging, all fluid must be filtered through fine (0.5 micron) filtration before purging. If porous panel membranes are clogged, panel replacement is required.

- (1) Open shut-off valves at in-line pressure gauges corresponding to panels to be purged.
- (2) On TKS cart, increase air pressure by 5 psi every 5 seconds to 60 psi by turning the air regulator knob clockwise.

**Note:** If unable to reach the minimum required pressure on both panels, isolate one panel at a time by closing shut-off valve to one of the panels.

- (3) Monitor in-line pressure gauges to panels being purged, and continue to adjust air pressure on TKS cart until each in-line pressure gauge reads at least 60 ±5 psi.
- (4) Start stopwatch.
- (5) Wipe leading edge with a high density sponge as flow becomes evident.
- (6) Allow panel to flow for at least 3 minutes or until air is no longer emerging from the panel (which ever occurs last) and it is generally wet out across the entire active area.
- (7) When air is no longer seen emerging from panels, "shock" panel by closing one of the TKS cart valves, waiting approximately 5 seconds and as quickly as possible opening it again. Perform "shock" to the other line using the other valve.
- (8) Repeat "shocking" the panels at least a second time or until all evidence of air passing though the panels are gone and even distribution is observed along the entire length of each panel.
- (9) At porous panel surface, verify all fluid dispensing holes are wetting out.

**Note:** It is permissible to have a dry area no larger than 2 rows of holes by 2 inches long.

- (10) Purge panels for at least 3 more minutes with no additional air passing though panels. If additional air bubbles are found during this time, perform additional "shocks" and check for air over an additional 3 minute period.

**Note:** Total time for a panel to purge should not exceed 15 minutes.

H. Procedure - Panel Performance Inspection.

- (1) Evaluate panel performance for panel.
  - (a) Verify flow of panel is consistent from one end to the other.
  - (b) Verify dry area of a panel is no larger than 2 rows of holes by 2 inches long.
  - (c) Verify purging has eliminated air bubbles before 15 minutes have elapsed.
- (2) If adequate panel performance is not met for a wing panel, perform the following steps:
  - (a) On TKS cart, confirm that pressure vessel is at least half-full with fluid.

**CAUTION:** Do not allow pressure vessel to run dry. If vessel does run dry, isolate that panel and purge it individually up to 70 psi for at least 10 minutes.

- (b) Purge air out of wing porous panel as described in Procedure - Purge Air with the following exceptions: (Refer to Section F.)
  - 1 Open only the shut-off valve corresponding to the single trouble panel to be purged.
  - 2 Increase pressure up to 70 psi.
- (c) Re-evaluate panel performance for wing.
- (d) If wing porous panel performance is still inadequate, replace panel and send removed panel to Cirrus Design for inspection. (Refer to AMM 30-10)
- (e) If wing porous panel performance is acceptable:
  - 1 Close shut-off valve at in-line pressure gauge corresponding to panel being purged.
  - 2 Disconnect in-line pressure gauges from coupler assemblies.
  - 3 Bleed air by energizing system on aircraft and run in "high" mode until full flow into collection containers without air bubbles is achieved.

**Note:** Make connections quickly to minimize introducing air into system lines.

- 4 Remove short lengths of tubing from 5/16-inch supply lines.
- 5 Reconnect coupler assemblies to 5/16-inch supply lines. Torque nuts to 48 in-lb (5.4 Nm) and apply torque seal.

- (3) If adequate panel performance is not met for vertical stabilizer panel, replace panel and send removed panel to Cirrus Design for inspection. (Refer to AMM 30-10)
- (4) If adequate panel performance is not met for horizontal panel, replace panel and send removed panel to Cirrus Design for inspection. (Refer to AMM 30-10)
- (5) If adequate panel performance is not met for an elevator tip panel, perform the following steps:
  - (a) On TKS cart, confirm that pressure vessel is at least half-full with fluid.

**CAUTION:** Do not allow pressure vessel to run dry. If vessel does run dry, isolate that panel and purge it individually up to 70 psi for at least 10 minutes.

- (b) At the avionics bay, disconnect TKS cart and reassemble system lines.
  - 1 Close shut-off valves at in-line pressure gauge connected to panel being purged.
  - 2 Disconnect in-line pressure gauge from trouble line coupler assembly.
  - 3 Bleed air by energizing system on aircraft and run in "high" mode until full flow into collection containers without air bubbles is achieved.

**Note:** Make connections quickly to minimize introducing air into system line.

- 4 Remove short length of tubing from trouble line.
- 5 Reconnect coupler assembly to 3/16-inch supply line. Torque nut to 28 in-lb (3.1 Nm) and apply torque seal.

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

- (c) Remove horizontal stabilizer access panel. (Refer to AMM 55-10)
- (d) Remove cable tie securing coupler assembly to horizontal stabilizer structure.
- (e) Disconnect 3/16-inch supply line feeding the coupler so that coupler remains connected to line leading to proportioning unit.
- (f) Connect one of the TKS cart lines to elevator tip panel.
- (g) Connect short length of tubing to elevator tip panel 3/16-inch supply line and put other end of tubing into collection container.

**CAUTION:** Do not allow pressure vessel to run dry. If pressure vessel does run dry, isolate that panel and purge it individually up to 70 psi for at least 10 minutes.

- (h) Purge air out of elevator tip porous panels as described in Procedure - Purge Air with the following exceptions: (Refer to Section F.)
  - 1 Open only the shut-off valve corresponding to the single trouble panel to be purged.
  - 2 Increase pressure up to 70 psi.
- (i) Re-evaluate panel performance for elevator tip.
- (j) If elevator tip porous panel performance is still inadequate, replace panel and send removed panel to Cirrus Design for inspection. (Refer to AMM 30-10)
- (k) If elevator tip porous panel performance is acceptable:
  - 1 Close shut-off valve at in-line pressure gauge corresponding to panel being purged.
  - 2 Disconnect in-line pressure gauges from coupler assemblies.
  - 3 Bleed air by energizing system on aircraft and run in "high" mode until full flow into collection containers without air bubbles is achieved.

**Note:** Make connections quickly to minimize introducing air into system lines.

- 4 Remove short length of tubing from 3/16-inch supply line.
- 5 Reconnect coupler assembly to 3/16-inch supply line. Torque nuts to 28 in-lb (3.1 Nm) and apply torque seal.
- 6 Remove 3/16-inch to 5/16-inch reducer from each of the TKS cart lines.

**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

## I. Procedure - Ground Flow Test #1

**CAUTION:** Ensure that both aircraft and anti-ice fluid being used for ground flow test are stabilized at a temperature between -30°C and 0°C. This may require cold-soaking both for several hours to achieve representative temperatures. A complete ground flow test may require up to 8 gallons (two full tanks) of anti-ice fluid to complete.

## (1) Test panel flow rates while operating Pump#1 and Pump#2.

- (a) Record Aircraft Serial Number (ASN) and date of Ground Flow Test.
- (b) Measure and record ambient temperature of area where Pump#1 flow test is being performed.

**CAUTION:** Avoid subjecting aircraft to localized areas of elevated temperatures (high intensity lights, area heaters, etc.) as temperature gradient will cause inaccuracy in measurements.

- (c) Set System Mode switch to HIGH, and activate Pump#1 by setting System Switch to ON. (See Figure 3)
- (d) Observe voltage of Pump#1 and adjust its operating voltage to 27.85 VDC nominal via ground power supply.
- (e) Record operating voltage of Pump#1.

**CAUTION:** Ensure supplied voltage of ground power supply does not drift in excess of  $\pm 0.02$  VDC during test.

## (f) Perform Ground Flow Test:

- 1 Allow system to operate until flow rate from each collection location has stabilized. (See Figure 3)

**Note:** Stabilization is generally characterized by observing a steady stream of fluid at the collection points of horizontal panels. This is necessary because there is a slight lag time as system builds pressure, forcing panels to expel fluid, which is then directed to collection points.

To reduce time required for an observable flow rate at the horizontal panels, slowly add anti-ice fluid to horizontal drain troughs once horizontal porous panels begin "weeping". Continue adding anti-ice fluid until stream develops at trough outlet on LH and RH horizontal. This will reduce the volume of fluid that would otherwise have to be displaced from the trough before flow rate could be measured.

Once flow rates at each collection point have stabilized, equilibrium will be reached that causes each drop of fluid leaving the panel to displace another into leaving the drain trough at that collection point.

Do not add any fluid to troughs once equilibrium is obtained. To do so will inflate flow rate measurements.

- 2 To measure flow rate of propeller and each wing, horizontal, and vertical panel, use stopwatch and graduated cylinder (1.0mL divisions maximum) to take a volume measurement at each collection point for precisely 1 minute.

**Note:** Measured volume will be "Observed" flow rate of that particular panel.

**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

**SB 2X-30-03 R1**  
Page 14

November 23, 2009

Avoid making contact with drain trough as it may disrupt equilibrium of anti-ice fluid flow at that collection point.

Ensure all anti-ice fluid has been removed from graduated cylinder prior to testing the next collection point.

- 3 To measure flow rate of elevator tips, use stopwatch and graduated cylinder (0.1mL divisions maximum) to take a volume measurement at each collection point for precisely 3 minutes.

**Note:** Measured volume divided by 3 will be "Observed" flow rate of that particular panel.

Avoid making contact with drain trough as it may disrupt equilibrium of anti-ice fluid flow at that collection point.

Ensure all anti-ice fluid has been removed from graduated cylinder prior to testing the next collection point.

- (g) When Pump#1 Ground Flow Test is complete, set System Switch to OFF. (See Figure 3)  
(h) Measure and record ambient temperature of area where Pump#2 Ground Flow Test is being performed.

**CAUTION:** Avoid subjecting aircraft to localized areas of elevated temperatures (high intensity lights, area heaters, etc.) as temperature gradient will introduce inaccuracy in measurements.

- (i) Set PUMP BKUP switch to ON. (See Figure 3)  
(j) Observe voltage of Pump#2 and adjust its operating voltage to 27.10 VDC nominal via ground power supply.  
(k) Record operating voltage of Pump#2.

**CAUTION:** Ensure supplied voltage of ground power supply does not drift in excess of  $\pm 0.02$  VDC during test.

- (l) Repeat Ground Flow Test while operating system with Pump#2.

**Note:** The time necessary for system to stabilize will be dramatically reduced if Pump#2 test is repeated directly after Pump#1 test.

- (m) When Pump#2 Ground Flow Test is complete, set PUMP BKUP switch to OFF. (See Figure 3)  
(n) Perform Procedure - System Acceptance Criteria. (Refer to Section L.)

**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

J. Procedure - Ground Flow Test #2

- (1) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Glycerin, 99.5% USP min.	-	Any Source	Test fluid component (increases viscosity).
Propylene Glycol, 99.5% USP min.	-	Any Source	Test fluid component (decreases viscosity).
De-ionized (distilled) water			

- (2) Prepare test fluid.

**WARNING:** Due to differing freezing point depressant properties, do not use test fluid in place of anti-ice fluid for airborne operation of the FIKI ice protection system.

**CAUTION:** Mix test fluid at same temperature as ambient conditions of ground flow test as viscosity of test fluid is inversely related to its temperature. (For example, increasing temperature of fluid decreases its viscosity.)

All test fluids must be filtered to remove particulates larger than 0.6 microns prior to entering the aircraft to ensure that it is acceptably free from contaminants.

When switching between fluids, TKS cart and all containers must be emptied and cleaned prior to use. Discard any fluid that has been, or is suspected of being a mixture of test fluid and anti-ice fluid. Typically a combination of the fluids will show signs of "streaks" when one has been introduced into the other.

- (a) Using clean, empty container, begin test fluid mixture with a 3:1 ratio of Glycerin to De-ionized water or 1:2 ratio of Glycerin to Propylene Glycol.

- (b) Perform Test Fluid Mixing:

- 1 Perform Procedure - Measure Kinematic Viscosity. (Refer to Section K.)

**Note:** Glycerin must be "thinned" using Propylene Glycol and/or De-ionized water to reach desired viscosity in any proportion necessary. (See Figure 4)

Viscosity of 63 is desired for test fluid mixture. However, it is acceptable for fluid to vary between 53 cSt (anti-ice fluid @ -10°C) and 75 cSt (anti-ice fluid @ -15°C).

- 2 If less viscosity is required, add small amount of Propylene Glycol and/or De-ionized water.

- 3 If more viscosity is required, add small amount of Glycerin.

- (c) Repeat Test Fluid Mixing until desired viscosity reached.

- (3) Replace anti-ice fluid in system with test fluid.

- (a) Drain anti-ice fluid from both glycol tanks on aircraft. (Refer to AMM 12-10)  
 (b) Fill both glycol tanks on aircraft with test fluid. (Refer to AMM 12-10)  
 (c) Drain anti-ice fluid from pressure tank on TKS cart.  
 (d) Fill pressure tank on TKS cart ¾ full with test fluid and replace access lid.

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

**Note:** Ensure access lid gasket is in place.

- (e) Set System Mode switch to HIGH, and activate Pump#1 by setting System Switch to ON. (See Figure 3)

**Note:** If desired, Pump#2 can be activated to increase flow rate of system by also setting PUMP BKUP switch to ON. This will cause system to run in a "continuous" MAX, as opposed to standard 2 minute cycle achieved by pressing MAX Mode button.

- (f) Operate system until there is evidence of test fluid at all collection locations.

**Note:** Test fluid will have an "oily" odor as opposed to alcohol of anti-ice fluid, and will seem much more "oily" to the touch as well. Typically propeller will be first, with ice panels following in decreasing order of their respective flow rates. (For example, inboard ice panels, then outboard ice panels, then horizontal ice panels, etc.)

- (g) Set System Switch (and PUMP BKUP, if applicable) to OFF.
  - (h) Using test fluid, perform Procedure - Porous Panel Purge. (Refer to Section F.)
  - (i) Perform Procedure - Panel Performance Inspection. (Refer to Section H.)
- (4) Test panel flow rates while operating Pump#1 and Pump#2.
- (a) Record Aircraft Serial Number (ASN) and date of Ground Flow Test.
  - (b) Measure and record ambient temperature of area where Pump#1 Ground Flow Test is being performed.

**CAUTION:** Avoid subjecting aircraft to localized areas of elevated temperatures (high intensity lights, area heaters, etc.) as temperature gradient will cause inaccuracy in measurements.

- (c) Set System Mode switch to HIGH, and activate Pump#1 by setting System Switch to ON. (See Figure 3)
- (d) Observe voltage of Pump#1 and adjust its operating voltage to 27.85 VDC nominal via ground power supply.
- (e) Record operating voltage of Pump#1.

**CAUTION:** Ensure supplied voltage of ground power supply does not drift in excess of  $\pm 0.02$  VDC during test.

- (f) Perform Ground Flow Test:
  - 1 Allow system to operate until flow rate from each collection location has stabilized. (See Figure 3)

**Note:** Stabilization is generally characterized by observing a steady stream of fluid at the collection points of horizontal panels. This is necessary because there is a slight lag time as system builds pressure, forcing panels to expel fluid, which is then directed to collection points.

To reduce time required for an observable flow rate at the horizontal panels, slowly add test fluid to horizontal drain troughs once horizontal porous panels begin "weeping". Continue adding test fluid until stream develops at trough outlet on LH and RH horizontal. This will reduce the volume of fluid that would otherwise have to be displaced from the trough before flow rate could be measured.

Once flow rates at each collection point have stabilized, equilibrium will be reached that causes each drop of fluid leaving the panel to displace another into leaving the drain trough at that collection point.

Do not add any fluid to troughs once equilibrium is obtained. To do so will inflate flow rate measurements.

- 2 Collect and separate sample of fluid during each test using a small, clean and empty container.

**Note:** This will later be used to measure actual viscosity of fluid that was expelled from ice panels during the test.

Maintain a separate sample for both Pump#1 and Pump#2 tests, as the second test generally displays a higher viscosity as the remainder of less viscous anti-ice fluid is expelled from system.

- 3 To measure flow rate of propeller and each wing, horizontal, and vertical panel, use stopwatch and graduated cylinder (1.0mL divisions maximum) to take a volume measurement at each collection point for precisely 1 minute.

**Note:** Measured volume will be "Observed" flow rate of that particular panel.

Avoid making contact with drain trough as it may disrupt equilibrium of fluid flow at that collection point.

Ensure all fluid has been removed from graduated cylinder prior to testing next collection point.

- 4 To measure flow rate of elevator tips, use stopwatch and graduated cylinder (0.1mL divisions maximum) to take a volume measurement at each collection point for precisely 3 minutes.

**Note:** Measured volume divided by 3 will be "Observed" flow rate of that particular panel.

Avoid making contact with drain trough as it may disrupt equilibrium of fluid flow at that collection point.

Ensure all fluid has been removed from graduated cylinder prior to testing next collection point.

(g) When Pump#1 Ground Flow Test is complete, set System Switch to OFF. (See Figure 3)

(h) Measure and record ambient temperature of area where Pump#2 Ground Flow Test is being performed.

**CAUTION:** Avoid subjecting aircraft to localized areas of elevated temperatures (high intensity lights, area heaters, etc.) as temperature gradient will introduce inaccuracy in the measurements.

(i) Set PUMP BKUP switch to ON. (See Figure 3)

(j) Observe voltage of Pump#2 and adjust its operating voltage to 27.10 VDC nominal via ground power supply.

(k) Record operating voltage of Pump#2.

**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

**SB 2X-30-03 R1**

Page 18

November 23, 2009

**CAUTION:** Ensure supplied voltage of ground power supply does not drift in excess of  $\pm 0.02$  VDC during test.

- (l) Repeat Ground Flow Test while operating system with Pump#2.

**Note:** The time necessary for system to stabilize will be dramatically reduced if Pump#2 test is repeated directly after Pump#1 test.

- (m) When Pump#2 Ground Flow Test is complete, set PUMP BKUP switch to OFF. (See Figure 3)
- (n) For both viscosity samples, perform Procedure - Measure Kinematic Viscosity. (Refer to Section K.)
- (o) Record viscosity of test fluid.

**Note:** It is desirable for test fluid to be between 53 cSt and 75 cSt to best approximate design temperature of system.

However, test fluid viscosities between 30.5 cSt (anti-ice fluid @ 0°C) and 238 cSt (anti-ice fluid @ -30°C) are acceptable. Test results achieved using test fluid with a viscosity less than 30.5 cSt or greater than 238 cSt are invalid.

- (5) Perform Procedure - System Acceptance Criteria. (Refer to Section L.)

- (6) Replace test fluid in system with anti-ice fluid.

- (a) Drain test fluid from both glycol tanks on aircraft. (Refer to AMM 12-10)
- (b) Fill both glycol tanks on aircraft with anti-ice fluid. (Refer to AMM 12-10)
- (c) Drain test fluid from pressure tank on TKS cart.

**Note:** Any uncontaminated fluid, whether anti-ice fluid or test fluid, may be retained for later use.

- (d) Set System Mode switch to HIGH, and activate Pump#1 by setting System Switch to ON. (See Figure 3)

**Note:** If desired, Pump#2 can be activated to increase flow rate of system by also setting PUMP BKUP switch to ON. This will cause system to run in a "continuous" MAX, as opposed to the standard 2 minute cycle achieved by pressing MAX Mode button. (See Figure 3)

- (e) Operate system until there is evidence of anti-ice fluid at all collection locations.

**Note:** Anti-ice fluid will have a slight alcohol odor and seem much less "oily" to the touch as compared to the test fluid. Typically propeller will be first, with ice panels following in decreasing order of their respective flow rates. (For example, inboard ice panels, then outboard ice panels, then horizontal ice panels, etc.)

- (f) Set System Switch (and PUMP BKUP, if applicable) to OFF.

- (g) To displace all test fluid with anti-ice fluid, perform Procedure - Porous Panel Purge. (Refer to Section F.)

**Note:** If panel performance, per Procedure - Panel Performance Inspection, was found acceptable during earlier purge using test fluid, re-inspecting panel performance is not required.

**K. Procedure - Measure Kinematic Viscosity**

- (1) Ensure viscosity cup is clean and there is no residual dried material in or around the orifice.
- (2) Completely immerse viscosity cup into material to be measured in a location free from bubbles or foam, holding viscosity cup vertically using the stainless steel split key ring.
- (3) Hold viscosity cup vertically by inserting index finger into handle ring, and in a quick, steady motion, lift viscosity cup out of sample material, starting stopwatch when top edge of viscosity cup breaks the surface.

**Note:** During flow time, hold viscosity cup no more than 6 inches above level of sample material.

- (4) Stop stopwatch when first definite break in the stream at base of viscosity cup is observed.
- (5) Record number of seconds of "efflux" time.
- (6) Identify kinematic viscosity of test fluid. (For example, an efflux time of 31.1 seconds represents a kinematic viscosity of 63.1 cSt.) (See Figure 4)

**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

**SB 2X-30-03 R1**

Page 20

November 23, 2009

## L. Procedure - System Acceptance Criteria

**Note:** It is permissible to use data contained herein as an Acceptance Test Procedure (ATP) to determine acceptable performance of production aircraft, or as a maintenance procedure for field service.

- (1) Verify flow rates of all ten protected locations are greater than the minimum allowable flow rate. (See Figure 7)

**Note:** The "A/C Flow" (design flow rates) and "MAX" flow rates are provided for reference only.

- (2) While operating both Pump#1 and Pump#2, verify Total System Flow rates are within minimum and maximum allowable flow rates.

*Serials that performed Ground Flow Test #1: (See Figure 5)*

*Serials that performed Ground Flow Test #2: (See Figure 6)*

- (3) If all protected locations meet minimum allowable flow rates, but Total System Flow rate is not within the allowable range, pump pressure output of the deficient pump(s) must be measured separately.

**Note:** Measurement of pump pressure output is more accurate than Total System Flow and therefore supersedes any Total System Flow deficiencies.

- (a) Perform Procedure - Metering Pump Flow Output for Pump#1 and/or Pump#2. (Refer to Section M.)

**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

M. Procedure - Metering Pump Flow Output

- (1) Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Graduated Cylinder, 500mL (5.0mL divisions maximum)	-	Any Source	Measure flow rate of pump.
Pump Flow Test Rig	T11071	Cirrus Design	Purge anti-ice fluid from elevator tip porous panels.

- (2) Disconnect and cap tubing attached to pressure output port of the desired metering pump.
- (3) Connect 5/16-inch tubing of Pump Flow Test Rig to pressure output port of pump.
- (4) Position outlet of Pump Flow Test Rig into a clean, empty container. (See Figure 3)
- (5) Test pressure for Pump#1.
  - (a) Set System Mode switch to HIGH, and activate Pump#1 by setting System Switch to ON. (See Figure 3)
  - (b) Observe voltage of Pump#1 and adjust its operating voltage to 27.85 VDC nominal via ground power supply.

**CAUTION:** Ensure supplied voltage of ground power supply does not drift in excess of ±0.02 VDC during test.

- (c) Perform Pump#1 Flow Rate:
  - 1 Using Pump Flow Test Rig, restrict fluid flow from Pump#1 until output pressure is increased to 80 psi.
  - 2 To measure flow rate of Pump#1, use stopwatch and graduated cylinder (5.0mL divisions maximum) to take a volume measurement for precisely 1 minute.

**Note:** The measured volume will be the flow rate of Pump#1.
- (d) Repeat Pump#1 Flow Rate a minimum of two times and average the results. The result is the Pump#1 Output flow rate.
- (e) When Pump#1 Output Flow Test is complete, set System Switch to OFF. (See Figure 3)
- (f) Disconnect tubing of Pump Flow Test Rig from Pump#1.
- (g) Reconnect aircraft tubing to pressure output port of Pump#1. Torque nuts to 48 in-lb (5.4 Nm) and apply torque seal.

- (6) Test pressure for Pump#2.
  - (a) Disconnect and cap tubing attached to pressure output port of Pump#2.
  - (b) Connect 5/16-inch tubing of Pump Flow Test Rig to output port of Pump#2. (See Figure 3)
  - (c) Set PUMP BKUP switch to ON. (See Figure 3)
  - (d) Observe voltage of Pump#2 and adjust its operating voltage to 27.10 VDC nominal via ground power supply.

**CAUTION:** Ensure supplied voltage of ground power supply does not drift in excess of ±0.02 VDC during test.

- (e) Perform Pump#2 Flow Rate:
  - 1 Using Pump Flow Test Rig, restrict fluid flow from Pump#2 until output pressure is increased to 80 psi.

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

- 2 To measure flow rate of Pump#2, use stopwatch and graduated cylinder (5.0mL divisions maximum) to take a volume measurement for precisely 1 minute.

**Note:** The measured volume will be the flow rate of Pump#2.

- (f) Repeat Pump#2 Flow Rate a minimum of two times and average the results. The result is the Pump#2 Output flow rate.
  - (g) When Pump#2 Total System Flow test is complete, set PUMP BKUP Switch to OFF. (See Figure 3)
  - (h) Reconnect aircraft tubing to pressure output port of Pump#2. Torque nuts to 48 in-lb (5.4 Nm) and apply torque seal.
- (7) Verify measured pressure output of either (or both) pumps are within minimum and maximum allowable flow rates. (See Figure 7)  
If required, replace metering pump(s). (Refer to AMM 30-05)

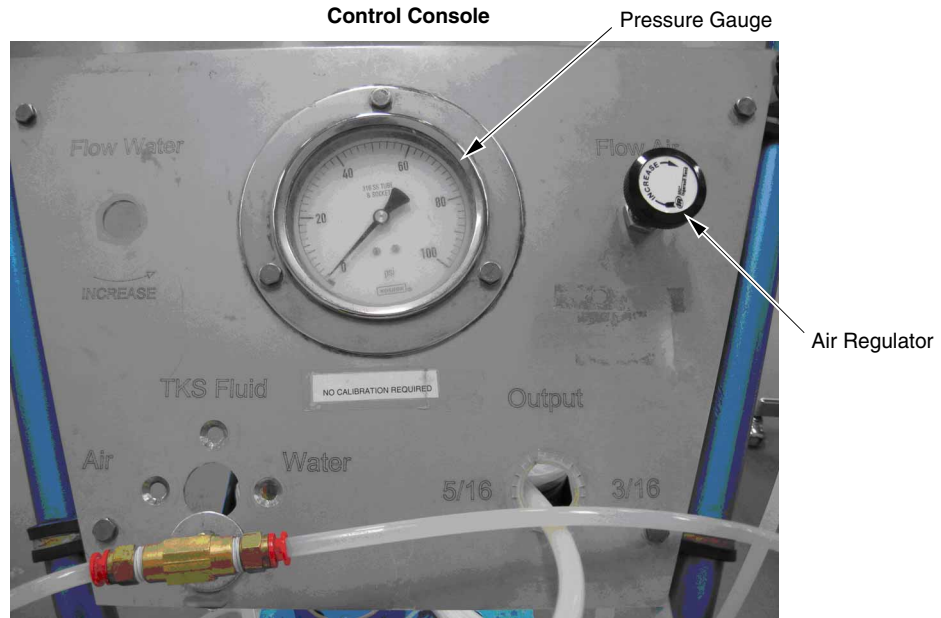
**EFFECTIVITY:**

Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

**SB 2X-30-03 R1**

Page 23

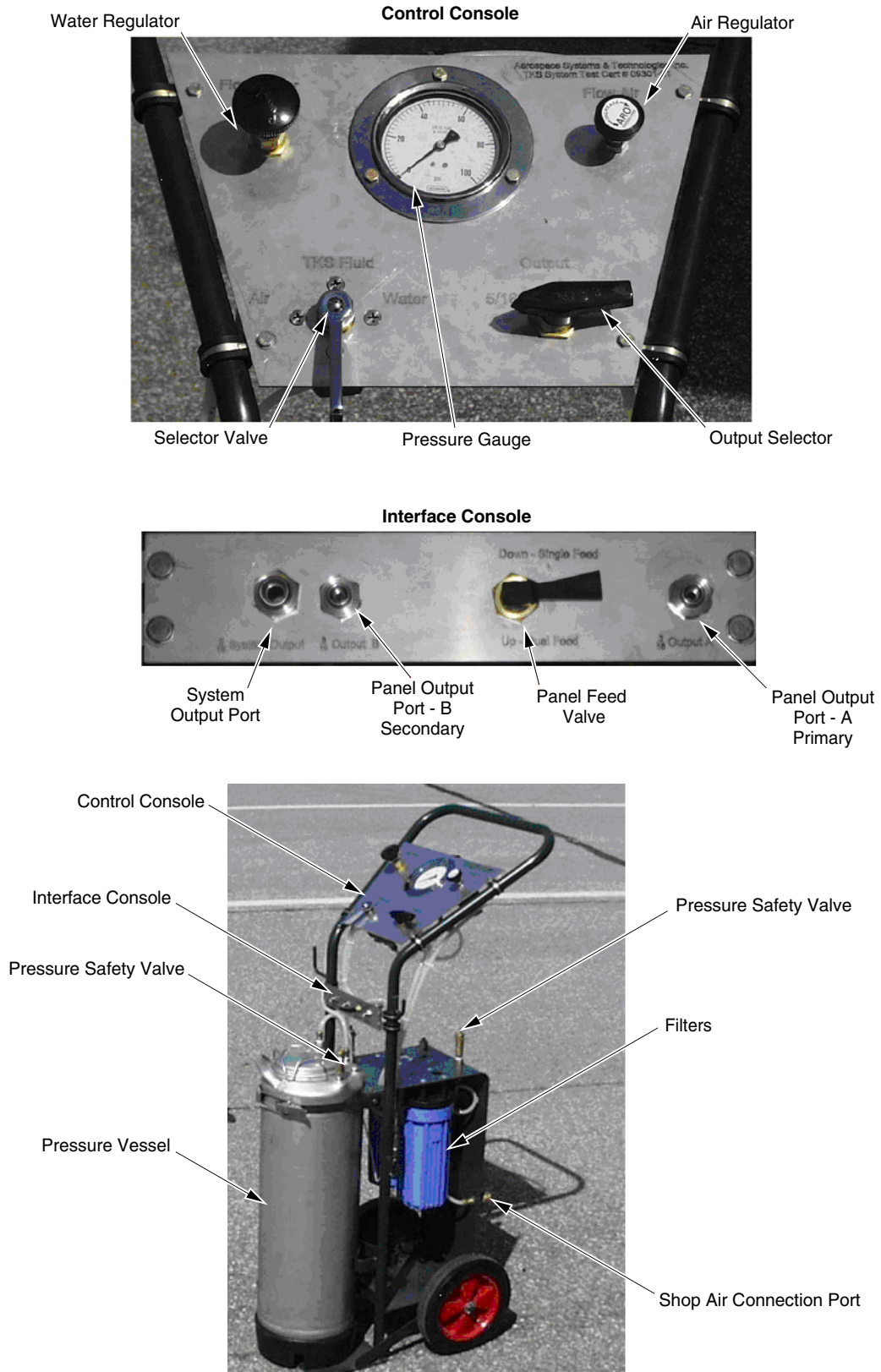
November 23, 2009



**Figure 1**  
**TKS System Cart - Cirrus Design**

SR2\_SB30\_1296

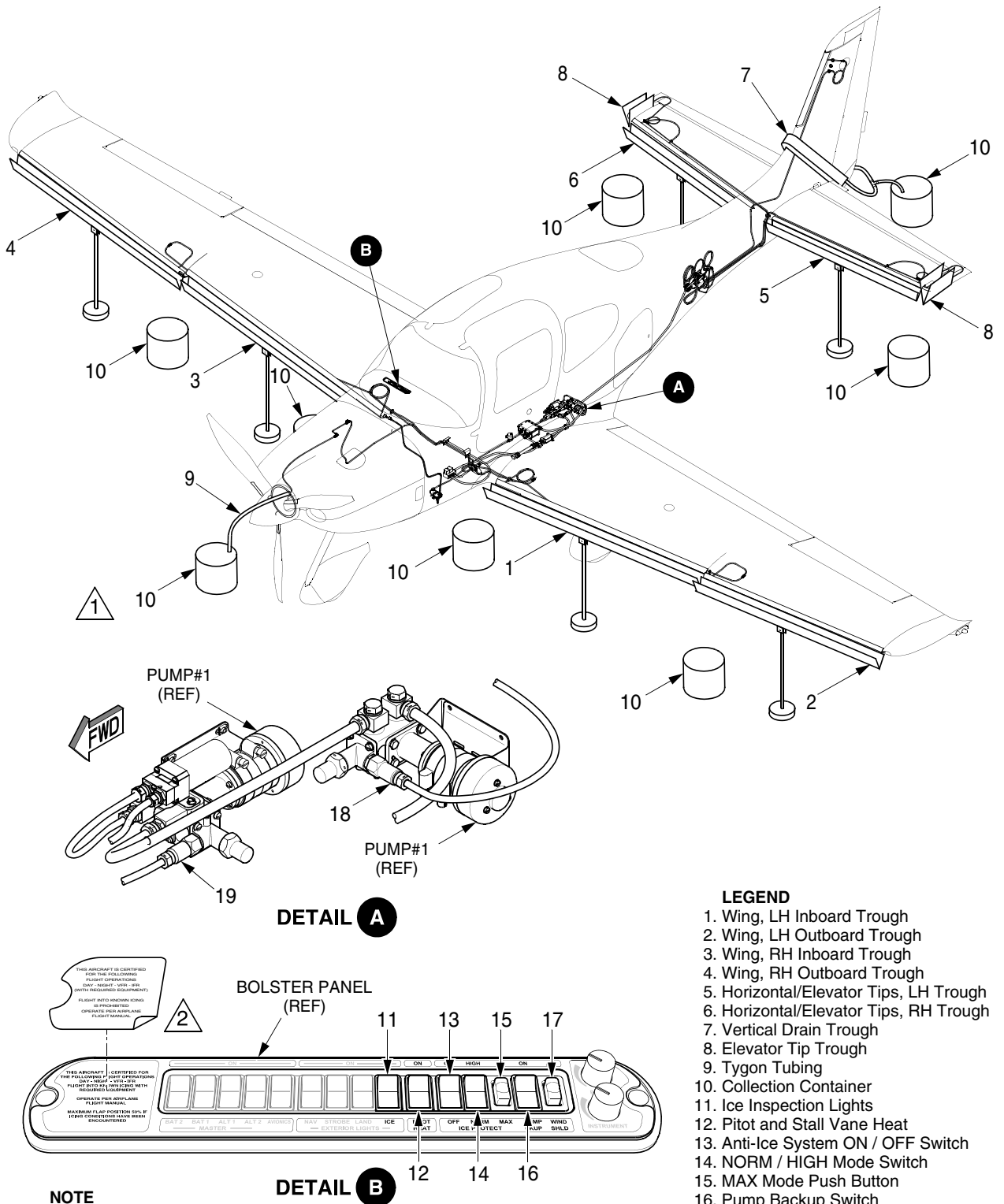
**EFFECTIVITY:**  
Cirrus Design SR22 Serials 3003, 3310, 3326, 3403  
thru 3424, 3463, and 3499 w/ FIKI ice protection sys-  
tem.



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**Figure 2**  
**TKS System Cart - AS&T**

**EFFECTIVITY:**  
Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.



**LEGEND**

- 1. Wing, LH Inboard Trough
- 2. Wing, LH Outboard Trough
- 3. Wing, RH Inboard Trough
- 4. Wing, RH Outboard Trough
- 5. Horizontal/Elevator Tips, LH Trough
- 6. Horizontal/Elevator Tips, RH Trough
- 7. Vertical Drain Trough
- 8. Elevator Tip Trough
- 9. Tygon Tubing
- 10. Collection Container
- 11. Ice Inspection Lights
- 12. Pitot and Stall Vane Heat
- 13. Anti-Ice System ON / OFF Switch
- 14. NORM / HIGH Mode Switch
- 15. MAX Mode Push Button
- 16. Pump Backup Switch
- 17. Wind Shield Push Button
- 18. Pump#1 Pressure Output Port
- 19. Pump#2 Pressure Output Port

- NOTE**
- 1. Position clean, empty 5-gallon containers at lower end outlet of each drain trough, and propeller tygon tubing.
  - 2. At LH edge of bolster switch panel, peel graphic overlay indicating "FLIGHT INTO KNOWN ICING IS PROHIBITED" from bolster panel.

SR2\_SB30\_1289

**Figure 3**  
**Collection Locations, Controls, and Pressure Output Ports**

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.

## EZ™ VISCOSITY CUP #2 EFFLUX TIME - CENTISTOKES CONVERSION TABLE®

10/95 (Accurate for True Liquids Only)

SECONDS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
	----- VISCOSITY IN CENTISTOKES -----									
20	18.7	19.1	19.6	20.0	20.5	21.0	21.4	21.9	22.3	22.8
21	23.2	23.7	24.1	24.6	25.0	25.5	25.9	26.3	26.8	27.2
22	27.6	28.1	28.5	28.9	29.4	29.8	30.2	30.7	31.1	31.5
23	31.9	32.3	32.8	33.2	33.6	34.0	34.4	34.8	35.3	35.7
24	36.5	36.9	37.3	37.7	38.1	38.5	38.9	39.3	39.7	
25	40.5	40.9	41.3	41.7	42.1	42.5	42.9	43.3	43.7	
26	44.1	44.5	44.8	45.2	45.6	46.0	46.4	46.8	47.2	47.6
27	47.9	48.3	48.7	49.1	49.5	49.8	50.2	50.6	51.0	51.3
28	51.7	52.1	52.5	52.8	53.2	53.6	54.0	54.3	54.7	55.1
29	55.4	55.8	56.2	56.5	56.9	57.3	57.6	58.0	58.4	58.7
30	59.1	59.5	59.8	60.2	60.5	60.9	61.3	61.6	62.0	62.3
31	62.7	63.1	63.5	63.8	64.1	64.5	64.8	65.2	65.5	65.9
32	66.3	66.6	67.0	67.3	67.7	68.0	68.4	68.7	69.1	69.4
33	69.8	70.1	70.5	70.8	71.2	71.5	71.8	72.2	72.5	72.9
34	73.2	73.6	73.9	74.3	74.6	74.9	75.3	75.6	76.0	76.3
35	76.7	77.0	77.3	77.7	78.0	78.4	78.7	79.0	79.4	79.7
36	80.1	80.4	80.7	81.1	81.4	81.7	82.1	82.4	82.7	83.1
37	83.4	83.7	84.1	84.4	84.7	85.1	85.4	85.7	86.1	86.4
38	86.7	87.1	87.4	87.7	88.1	88.4	88.7	89.1	89.4	89.7
39	90.0	90.4	90.7	91.0	91.4	91.7	92.0	92.3	92.7	93.0
40	93.3	93.7	94.0	94.3	94.6	95.0	95.3	95.6	95.9	96.3
41	96.6	96.9	97.2	97.6	97.9	98.2	98.5	98.8	99.2	99.5
42	99.8	100.1	100.5	100.8	101.1	101.4	101.7	102.1	102.4	102.7
43	103.0	103.3	103.7	104.0	104.3	104.6	104.9	105.3	105.6	105.9
44	106.2	106.5	106.9	107.2	107.5	107.8	108.1	108.4	108.7	109.1
45	109.4	109.7	110.0	110.3	110.7	111.0	111.3	111.6	111.9	112.2
46	112.6	112.9	113.2	113.5	113.8	114.1	114.4	114.8	115.1	115.4
47	115.7	116.0	116.3	116.6	117.0	117.3	117.6	117.9	118.2	118.5
48	118.8	119.1	119.5	119.8	120.1	120.4	120.7	121.0	121.3	121.6
49	122.0	122.3	122.6	122.9	123.2	123.5	123.8	124.1	124.4	124.8
50	125.1	125.4	125.7	126.0	126.3	126.6	126.9	127.2	127.5	127.8
51	128.2	128.5	128.8	129.1	129.4	129.7	130.0	130.3	130.6	130.9
52	131.2	131.5	131.8	132.2	132.5	132.8	133.1	133.4	133.7	134.0
53	134.3	134.6	134.9	135.2	135.5	135.8	136.1	136.4	136.8	137.1
54	137.4	137.7	138.0	138.3	138.6	138.9	139.2	139.5	139.8	140.1
55	140.4	140.7	141.0	141.3	141.6	141.9	142.2	142.5	142.9	143.2
56	143.5	143.8	144.1	144.4	144.7	145.0	145.3	145.6	145.9	146.2
57	146.5	146.8	147.1	147.4	147.7	148.0	148.3	148.6	148.9	149.2
58	149.5	149.8	150.1	150.4	150.7	151.0	151.3	151.6	151.9	152.2
59	152.5	152.8	153.1	153.4	153.7	154.0	154.3	154.6	154.9	155.2
60	155.6	155.9	156.2	156.5	156.8	157.1	157.4	157.7	158.0	158.3

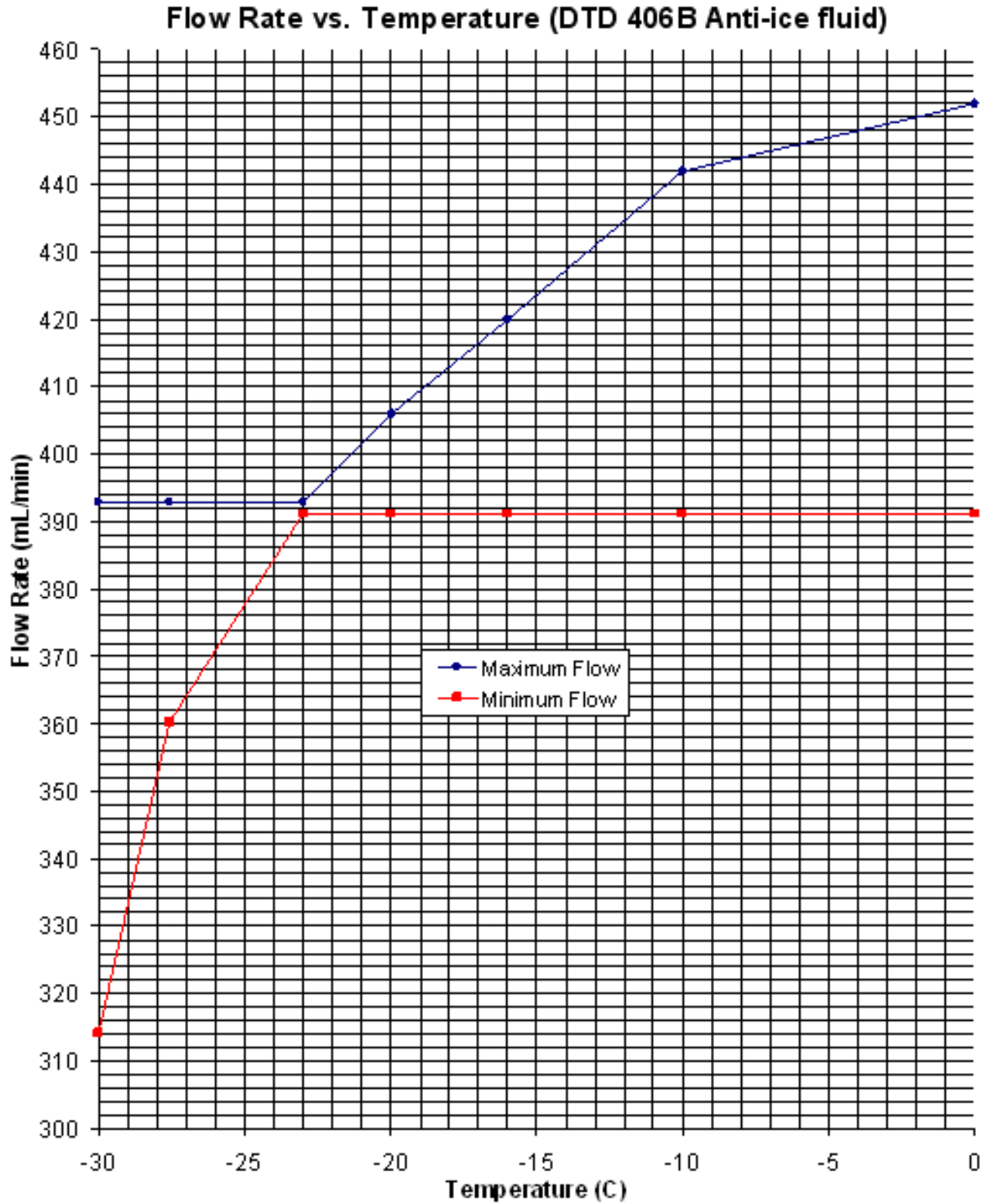
Example: 53.8 Seconds = 136.8 Centistokes.

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**Figure 4**  
**Efflux Time - Centistoke Conversion Table**

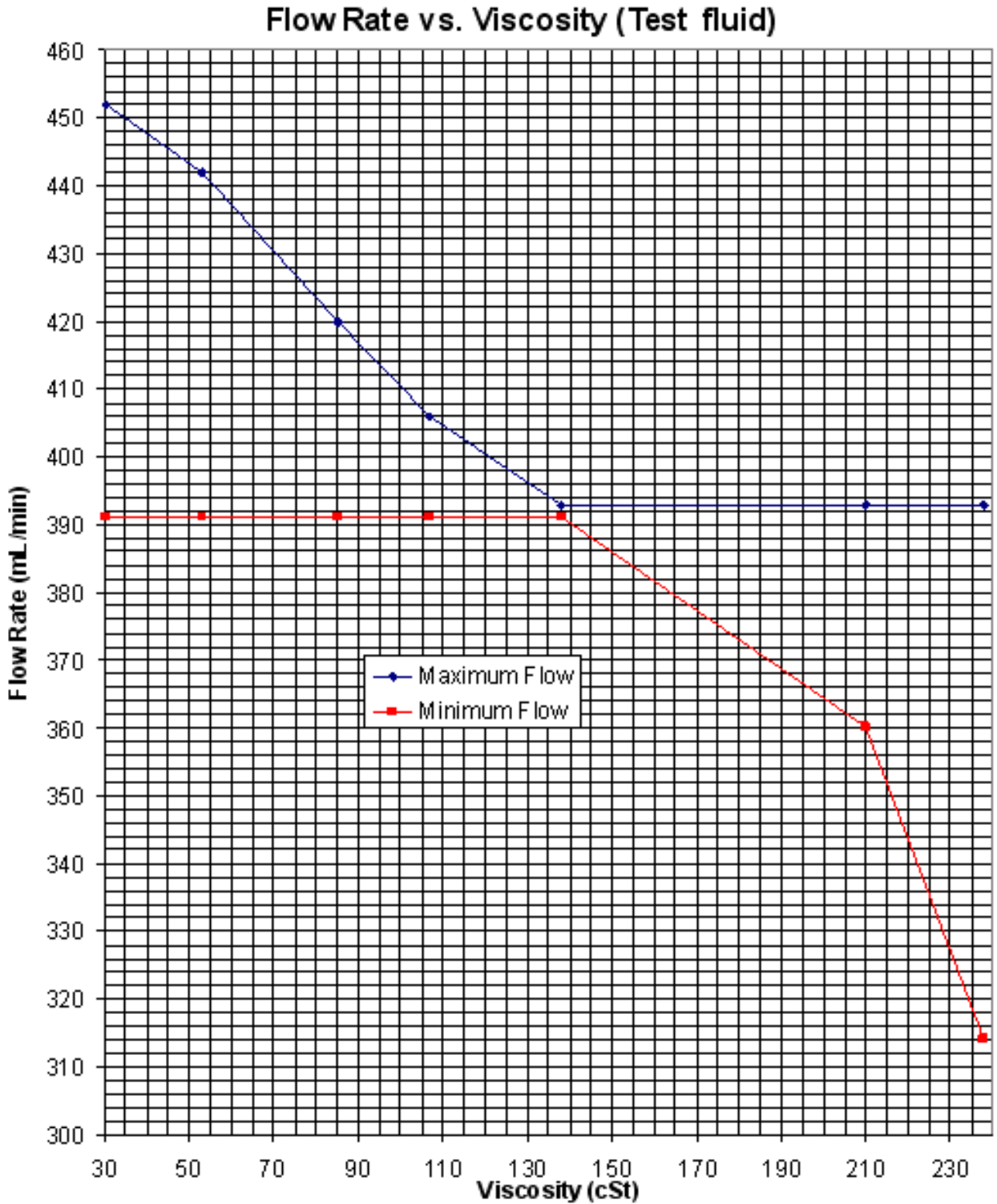
**EFFECTIVITY:**  
Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.



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**Figure 5**  
**Total System Flow Rate Criteria (Freezing Temperatures: -30°C to 0°C)**

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.



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**Figure 6**  
**Total System Flow Rate Criteria (Temperatures above 0°C)**

**EFFECTIVITY:**  
 Cirrus Design SR22 Serials 3003, 3310, 3326, 3403  
 thru 3424, 3463, and 3499 w/ FIKI ice protection sys-  
 tem.

Pump No. <u>1 (HIGH)</u>	Temperature _____ (C)	Viscosity _____ (cSt)	Voltage _____			
Note: All flow rates (mL/min)						
POSITION	CDC P/N	A/C Flow	MIN	MAX	TEST	OBSERVED
Wing Outboard, Left	19700-003	(51.50)	41.7	(61.30)	Pass/Fail	_____
Wing Inboard, Left	19700-001	(77.18)	62.2	(92.12)	Pass/Fail	_____
Propeller	-	(37.50)	30.5	(44.50)	Pass/Fail	_____
Wing Inboard, Right	19700-002	(77.18)	62.2	(92.14)	Pass/Fail	_____
Wing Outboard, Right	19700-001	(49.90)	40.4	(59.38)	Pass/Fail	_____
Horizontal, Right	19703-002	(31.47)	25.7	(37.26)	Pass/Fail	_____
Vertical	19701-001	(14.56)	12.1	(16.97)	Pass/Fail	_____
Horizontal, Left	19703-001	(31.47)	25.7	(37.26)	Pass/Fail	_____
Elevator Tip, Left	19702-001	(2.0)	1.65	(3.45)	Pass/Fail	_____
Elevator Tip, Right	19702-002	(2.0)	1.65	(3.45)	Pass/Fail	_____
<b>Total System Flow:</b>	-	-	Figure 5/6	Figure 5/6		
					#1	#2
<b>Pump#1 Output (@80 psi)</b>	21950-003	-	388.5	394.5	<input type="text"/>	<input type="text"/>
Pump No. <u>2 (BKUP)</u>	Temperature _____ (C)	Viscosity _____ (cSt)	Voltage _____			
Note: All flow rates (mL/min)						
POSITION	CDC P/N	A/C Flow	MIN	MAX	TEST	OBSERVED
Wing Outboard, Left	19700-003	(51.50)	41.7	(61.30)	Pass/Fail	_____
Wing Inboard, Left	19700-001	(77.18)	62.2	(92.12)	Pass/Fail	_____
Propeller	-	(37.50)	30.5	(44.50)	Pass/Fail	_____
Wing Inboard, Right	19700-002	(77.18)	62.2	(92.14)	Pass/Fail	_____
Wing Outboard, Right	19700-00_	(49.90)	40.4	(59.38)	Pass/Fail	_____
Horizontal, Right	19703-002	(31.47)	25.7	(37.26)	Pass/Fail	_____
Vertical	19701-001	(14.56)	12.1	(16.97)	Pass/Fail	_____
Horizontal, Left	19703-001	(31.47)	25.7	(37.26)	Pass/Fail	_____
Elevator Tip, Left	19702-001	(2.0)	1.65	(3.45)	Pass/Fail	_____
Elevator Tip, Right	19702-002	(2.0)	1.65	(3.45)	Pass/Fail	_____
<b>Total System Flow:</b>	-	-	Figure 5/6	Figure 5/6		
					#1	#2
<b>Pump#2 Output (@80psi)</b>	21951-201	-	388.5	394.5	<input type="text"/>	<input type="text"/>

SR2\_SB30\_1295

**Figure 7**  
**Ground Flow Test Card**

EFFECTIVITY:  
Cirrus Design SR22 Serials 3003, 3310, 3326, 3403 thru 3424, 3463, and 3499 w/ FIKI ice protection system.



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