

The Edge of the Envelope

ICING



Featuring Capt. Bill Panarello

INFLIGHT AIRFRAME ICING



Understanding the Hazards

TEMPS AND TERMINOLOGY

TBM

700 PILOT'S OPERATING HANDBOOK

SECTION 1
GENERAL

1.4 - ABBREVIATIONS AND TERMINOLOGY METEOROLOGICAL TERMINOLOGY

ISA : *International standard atmosphere*

OAT : *Outside air temperature* is the free air static temperature. It is expressed in either degrees Celsius or degrees Fahrenheit.

SAT : *Static air temperature*

IOAT : *Indicated outside air temperature*

TAT

QFE : Atmospheric pressure at the airport reference point.

QNH : QFE value corrected according to the airport altitude.

NOTE :

On the ground, the altimeter will indicate "zero" if it is set to QFE ; it will indicate airport altitude if it is set to QNH.

Standard Temperature :

Is 15°C (59°F) at sea level pressure altitude and decreases by 2°C (3.6°F) for each 1000 ft of altitude.

4.5 - PARTICULAR PROCEDURES

REMARK : The procedures and procedure elements given in this Chapter "PARTICULAR PROCEDURES" supplement the normal procedures or complete certain elements of the normal procedures described in Chapter(s) 4.3 and/or 4.4.

FLIGHT INTO KNOWN ICING CONDITIONS (1/4)

CAUTION

THE STALL WARNING SYSTEM DOES NOT FUNCTION PROPERLY IN ICING CONDITIONS AND SHOULD NOT BE RELIED UPON TO PROVIDE ADEQUATE STALL WARNING IN ICING CONDITIONS AND AFTER LEAVING ICING CONDITIONS, IF ICE ACCRETION REMAINS ON THE AIRPLANE.
MOREOVER, THE ESP AND USP FUNCTIONS MAY NOT BE CORRECTLY ENGAGED.

General

- 1 - Icing conditions exist when the OAT on the ground or in flight is + 5°C or below, and visible moisture in any form is present (clouds, fog with visibility of one mile (1.6 km) or less, rain, snow, sleet or ice crystals).
- 2 - Icing conditions also exist when the OAT on the ground is + 5°C or below and when operating on ramps, taxiways or runways where surface snow, ice, standing water or slush may be ingested by the engine or freeze on engine or cowlings.

NOTE

Refer to Figure 5.5.1 to convert OAT to SAT in flight.
 $SAT = OAT - 2^{\circ}C$ on the ground.

- 3 - Flight into known icing conditions is authorized when all airplane equipment



12.3 ICING

12.3.1 Icing Conditions

- A. Icing occurs when an aircraft enters visible moisture (clouds, precipitation or fog) with an air temperature which varies by aircraft type (see *Operating Manual*). In this regime, some moisture droplets exist in a super-cooled state. Contact with objects such as an aircraft, break down the forces responsible for keeping water in liquid form, therefore freezing on contact. The greatest percentage of super-cooled droplets and the greatest threat of icing, is between 0° and -10° C. The potential decreases as temperature decreases until at -40° C, virtually all cloud droplets exist as ice crystals.
- B. During turbine powered aircraft operations, cooling to below the ambient air temperature may occur over certain portions of the aircraft (probes, engine nacelles, etc.) due to lowering of the atmospheric pressure across these areas. As a result, icing may occur locally over these portions with an ambient air temperature above 0° C. Refer to the *Operating Manual* for specific guidelines in the operation of the aircraft anti-ice equipment.

12.3.2 Icing Terminology

- A. Types of Icing
1. Clear ice - Accumulates rapidly and is found in cumuloform clouds and freezing rain or drizzle.
 2. Rime ice - Milky in appearance, accumulates more gradually and is found in stratiform clouds.
 3. Mixed icing - Contains components of both clear and rime ice.
- B. Accumulation Rates
- The following terms are related to the type of aircraft and it's anti-icing / deicing capabilities. When reporting icing conditions, include the type of aircraft.
1. Trace - Ice becomes perceptible. Rate of accumulation is slightly greater than rate of sublimation. It is not hazardous even though deicing / anti-icing equipment is not used, unless encountered for an extended period of time (over one hour).
 2. Light - The rate of accumulation may create a problem if flight is prolonged in this environment (over one hour). Occasional use of deicing / anti-icing equipment removes / prevents accumulation. It does not present a problem if the deicing / anti-icing equipment is used.
 3. Moderate - The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing / anti-icing equipment or diversion is necessary.



4. Severe - The rate of accumulation is such that deicing / anti-icing equipment fails to reduce or control the hazard. Freezing rain or drizzle may fall into this category. Immediate diversion is necessary. A radio report to ATC and Dispatch is required.

12.3.3 Dispatch Into Known Icing Conditions

- A. No aircraft will be dispatched through known severe icing conditions. Aircraft may be dispatched through other known or forecast icing conditions if requirements of the MEL are met.
- B. Captains and Dispatchers must recognize the limitations of anti-icing equipment in moderate or severe icing conditions. It is used as an aid in descending or ascending through icing conditions. No aircraft will be dispatched, continue to operate enroute or land when, in the opinion of the Captain or Dispatcher, icing conditions exist that might adversely affect safety.

Reference: 14 CFR 121.629

- C. Takeoffs will not be made when frost, snow or ice is adhering to the wings or control surfaces of the aircraft.
- D. Condensation frost, caused by super-cooled fuel, is permitted on the lower wing surface between the front and rear spars (bottom of fuel tank area), if the fuselage and all other control surfaces of any kind are free of contamination. If deicing is required on any other aircraft surface, the under wing condensation frost will also be removed.
- E. In those cases where there is some question as to the necessity of deicing the aircraft before takeoff, the Captain's decision will be final.

If your aircraft is cold soaked, frosted, or precipitation contaminated

ITS Time to De-Ice

TYPE 1 FLUID IS GLYCOL HEATED TO WASH OF THE CONTAMINANTES

Normally dyed **ORANGE** and is a DE-ICE/ 130-180 deg F 18-25\$ per diluted gallon/ 1-22mins

ICING HOLDOVER TIME STARTS WHEN THE DEICING STARTS for fluid type

TYPE 3 IS APPLIED COLD AND WILL SHEAR OFF AROUND 60 KTS ON ROTATION

Generally dyed **YELLOW** and is an anti-ice / 10-160 mins TYPE 4 IS **GREEN**

CONSIDER ONLY WINGS AND TAIL / OR COMPLETE CLEAN/ Flaps up for T.O. ???

WHY

DO A PRE-DEPARTURE ICE EQUIPMENT CHECK/ ICING ON FOR DEPARTURE -80% NG VS 500'/min till ICE CLIMB SPEED IS ACHIEVED, THEN SELECT IAS

WHEN PARKING ON A CONTAMINATED RAMP / SNOW, ICE , SHUT DOWN THE

ENGINE FIRST BEFORE FEATHERING/ 900/930 warn ground crew on radio

Google: FAA Holdover Time Regression Information Winter 2023-2024/ 25,000,000 gals/yr

YOUR WING



CLEAN WING CONCEPT IS VITAL WITH THIS WING!

Find your TAT readout

In **CRUISE FLIGHT** select the Aux page with the TAT display

Compare that Temp with the PFD display Temp Indicator

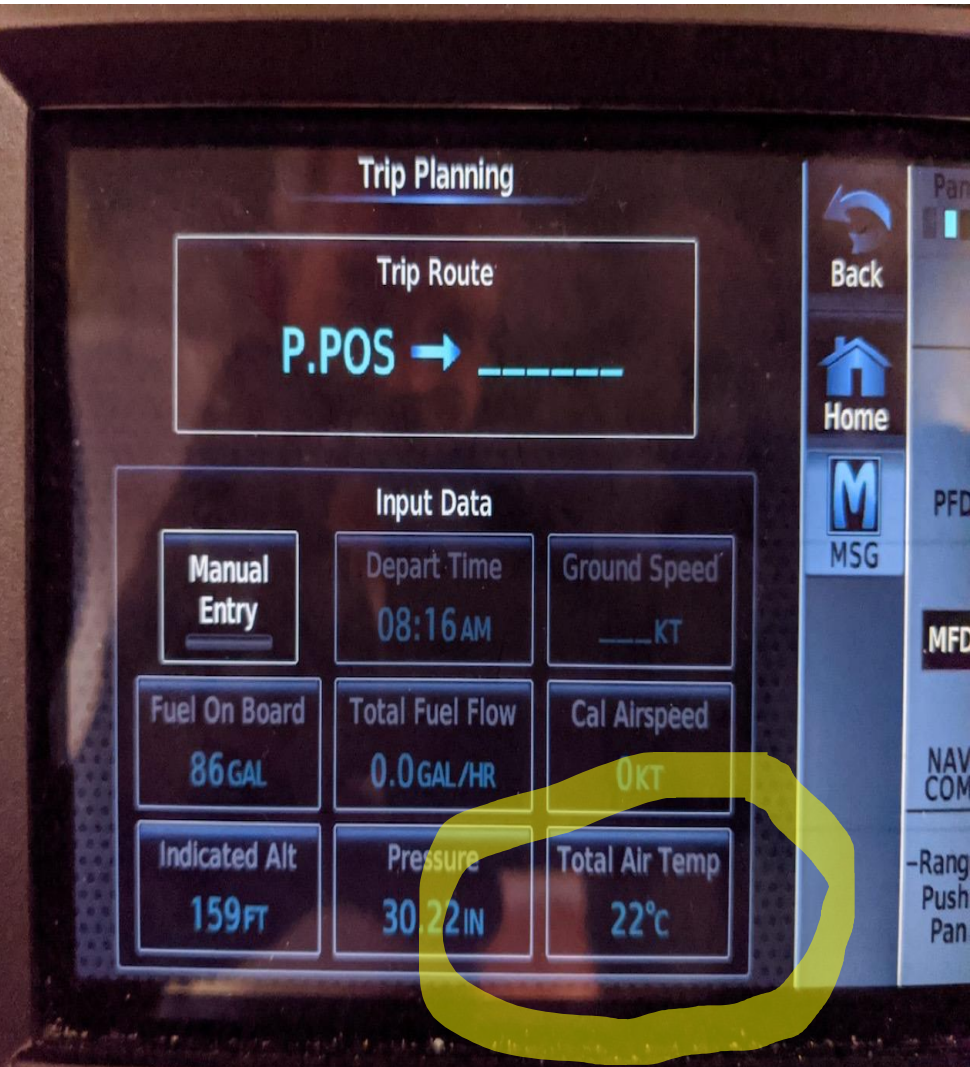
If both temperature readouts are the same then the IOAT indication can be used as a TAT readout

If the Temps are different then the PFD reading is SAT/OAT and the aux page indicates TAT/IOAT

Readings can Vary due to Calibration. Refer to POH

Temp of Aircraft Wing

All Garmin equipment has the TAT under AUX or Utilities/Trip Planning



117.95 GS 0KT DT 13.4NM ... LCL 136.975 ↔ 118.000 COM1
117.95 AUX - TRIP PLANNING 136.975 118.000 COM2

INPUT DATA



PAGE MODE - AUTOMATIC

FPL 00 LEG REM CALIBRATED AS 0KT
P.POS → G2 IND ALTITUDE 2499FT
DEP TIME 09:03LCL TOTAL AIR TEMP 0°C
GS 0KT
FUEL FLOW 0.0GL/HR
FUEL ONBOARD 0GL

TRIP STATS

DTK ---°
DIS 22.0NM
ETE 22:01
ETA 07:05LCL
ESA 3100FT
SUNRISE 13:39LCL
SUNSET 02:56LCL

FUEL STATS

EFFICIENCY 10.0
TOTAL ENDUR 00:00
REM FUEL -2GL
REM ENDUR 00:00
FUEL REQ 2.2GL
TOTAL RANGE 0NM

OTHER STATS

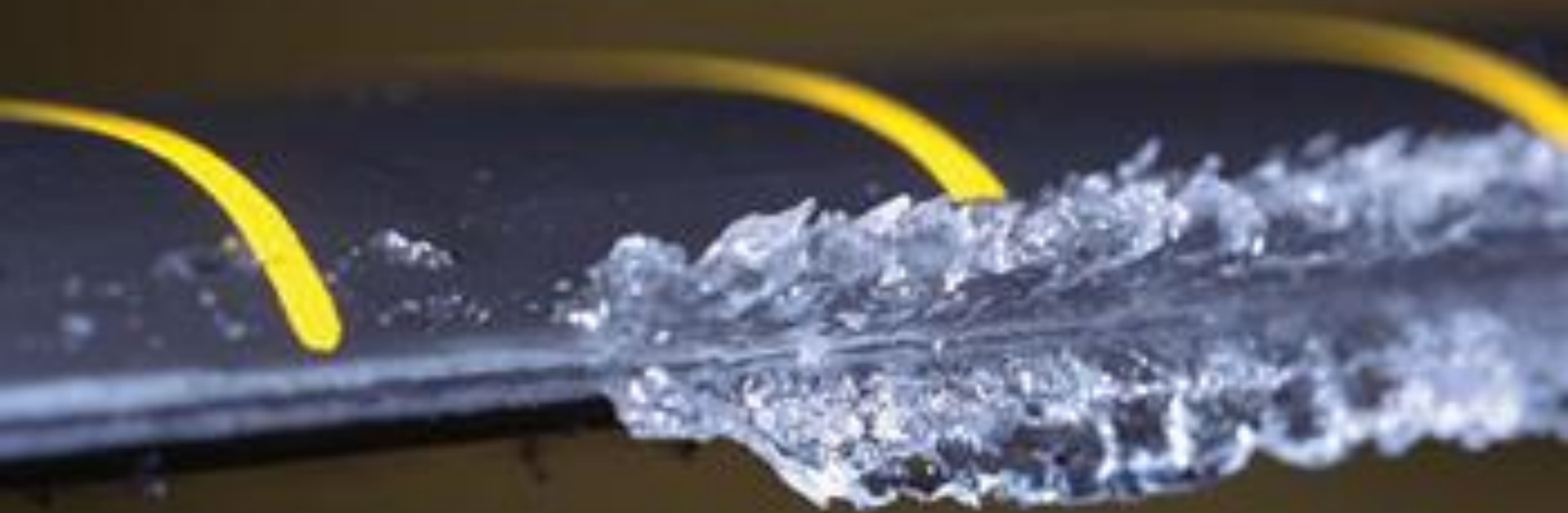
DENSITY ALT -----FT
TRUE AIRSPEED 0KT

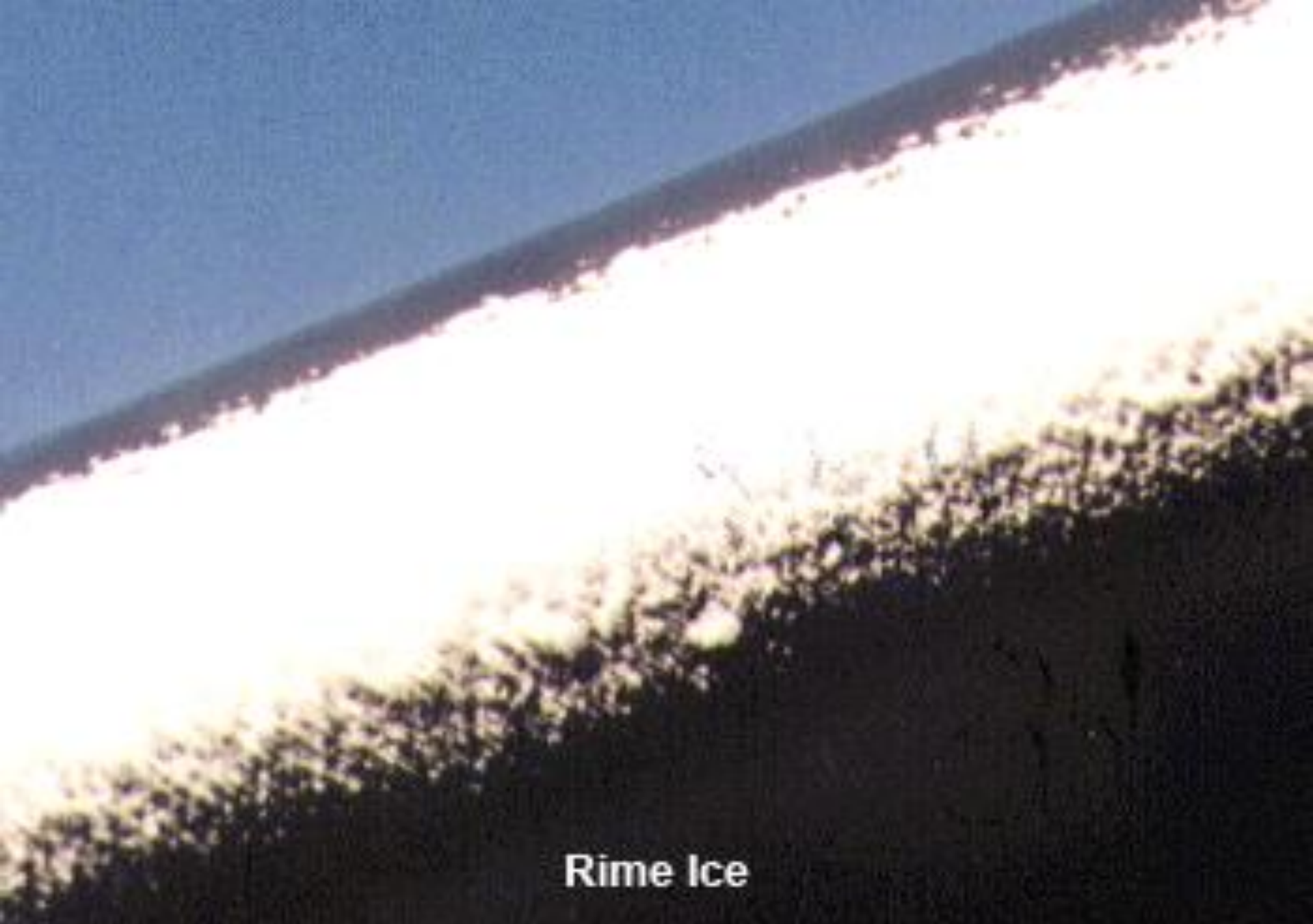
Temp of Aircraft Wing
All Garmin equip has the TAT
under AUX or Utilities/Trip Planning

MAP WPT AUX NRST

MAP WPT AUX NRST CHKLIST

At what Rate is the Tail Picking up ICE vs Wing?





Rime Ice

NASA - Lewis Research Center

Difference between “Flight into Known Icing Conditions”

And “Known Ice”

Similar Concepts that have different Regulatory Affects

“Known icing Conditions” involve circumstances where a “reasonable” Pilot would expect a substantial likelihood of Ice Formation on the Aircraft based on all information available to the pilot and plan to avoid the ice conditions.

“Know Ice” involves the situation where Ice Formation is Actually Detected or Observed

Read the Handout Letter in the TBM PRO TRAINING manual for complete details on Far’s 91.9 , 91.13, and 91.103

4.5 - PARTICULAR PROCEDURES

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FLIGHT INTO KNOWN ICING CONDITIONS (1/4)

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- 2 - Icing conditions also exist when the OAT on the ground is + 5°C or below and when operating on ramps, taxiways or runways where surface snow, ice, standing water or slush may be ingested by the engine or freeze on engine or cowlings.

NOTE

**Refer to Figure 5.5.1 to convert OAT to SAT in flight.
SAT = OAT - 2°C on the ground.**

- 3 - Flight into known icing conditions is authorized when all airplane equipment provided for ice protection is operating correctly. This includes :
 - Pneumatic deice system for inboard and outboard wing, for stabilizers and for elevator horns.
 - Propeller electrical deice system.
 - Electrical heating system for both pitots and for the stall warning incidence sensor.
 - Windshield electrical deice system.
 - Inertial separator.

Description of deice systems is presented in Chapter 7.13.

High Cirrus

Play (k)

Would you use the Separator at FL310. Temp -35c. No TRW's



1. You're at 14,000', Temp OAT +5c. Ice On?
2. Speed 210, TAT?
3. Speed 160, TAT?
4. You're at FL300, Temp ISA +0c. (-45c) ICE ON? Cirrus only
5. Same, with TRW's in Area. What Equip ON?



1. IMC at FL300 , STD DAY, ISA +0c. WHAT EQUIP ON?
2. IMC at 25000, ISA . Should we use the boots?





Descending for Approach, you had picked up ICE Enroute, Temp at Airport is -2c. Wings look clean, should You Adjust the Vapp for ICE?
What flap setting is appropriate?





DESCENT

INERTIAL SEP <200KT.....AS REQ
850 Mode.....OFF
POWER.....(50-80%)
PRESSURIZATION.....SET
ANTI-ICE.....AS REQUIRED
FUEL QUANTITY/BAL.....CHECK
LANDING DATA/Vapp.....SET

TRANSITION ALT 18,000 FT

ALTIMETERS.....XX.XX and SET

10,000 FT AFL

LANDING LIGHTS.....ON
PASSENGER BRIEFING.....COMPLETE
CAUTION BELOW 40% TORQUE
WHEN LEVELING OFF

BEFORE LANDING

APPROACH BRIEFING.....COMPLETE
ALTIMETERS.....SET
FUEL QUANTITY/BAL.....CHECK
PROP.....MAX RPM

GIFTY TO GO

END
-5-

AFTER LANDING

LIGHTS.....SET FOR TAXI
OXYGEN SWITCH.....OFF
BLEED VALVE.....OFF
FLAPS.....UP or TO
INERTIAL SEP.....ON
ANTI ICE/PITOT HEATS.....OFF
TRIMS.....RESET

PARKING

POWER LEVER IDLE.....2 Mins
PROP.....FEATHER 15 SECS
PANEL FLOW CHECK
CONDITION LEVER.....CUTOFF
FLIGHT TIME/HOBBS.....RECORD
GENERATOR.....OFF BELOW 15%
SOURCE.....OFF
CRASH BAR.....DOWN

BRAKES.....OFF
VERIFY O2 QUANTITY.....OFF

END
-6-

PRESSURIZATION EMERGENCY

OXYGEN MASK.....ON/100%
INTERPHONE VOL.....DECREASE
MICRO SWITCH.....MASK
COMMUNICATIONS.....ESTABLISH
DECLARE EMERGENCY

**Advise ATC – CHICAGO CENTER
N999TA DOING AN EMERGENCY
DESCENT TO 10,00FT, ALTIMETER
SETTING**

OXYGEN SWITCHES.....BOTH ON
IGNITION.....ON
AP MODE CONTROLLER...ALT OFF
ALTITUDE SELECTOR.....10,000 FT
POWER LEVER.....FLIGHT IDLE
AUTO PILOTDISCONNECT
PITCH ATTITUDE.....12-15 DEG DN
IAS.....266 KTS MAX
CHECK ON PASSENGERS
FD,YD,FLC.....ENGAGE

ICING CONDITIONS IMC OAT 5C
IF CLIMBING, VS 500 TILL 160- IAS
IGNITION ON, THEN ALL ON RIGHT
TO LEFT. THEN BACK TO FLYING
WHEN CLEAR OR IN 10 MINS
REEVALUATE NEED AND CLEAN UP
FROM LEFT TO RIGHT AND IGNITION
OFF LAST

MIN SPEED 160 CLIMB AND CRUISE
IF MODERATE ICE DO NOT USE FULL
FLAP ON APPROACH

POH ICE SPEEDS

FLAPS UP MIN APP SPEED 130 KTS
FLAPS T.O. MIN APP 110 KTS
FLAPS DN MIN APP 90 KTS

6800 LBS TORQUE NO ICE

180 KTS CLEAN level 70%
150 KTS CLEAN OR T.O. 45%
120 GR DN FLP DN LEVEL 70%
120 GR DN FLP LDGN G/S 45%
100 GR DN FLP LDGN G/S 30%
85 GR DN FLP LDGN G/S 20-25
65kt Tchdwn/TRQ 50' no wnd 10

ICING CONDITIONS

ICE FORMS BETWEEN 5 AND -25 CELSIUS IF YOU ARE @ 200KTS TAT IS +12 FROM OAT. AT 0 TAT NO ICE WILL ACCUMULATE AND AT TAT+3 ICE WILL SHED THE PLANE REMEMBER 2 DEGREE PER THOUSAND FEET INCREASES IN TEMP GENERALLY

BEFORE TAKEOFF

SURFACE CLEAN, CHECK THE FREEZING LEVELS AND WHERE TO GO TO SHED THE ICE IF NEEDED, CHECK PIREPS, CHECK ICE EQUIPMENT @80NG BOOTS 7 SECS EACH/ PROP/1:30 WATCH THE BLINKING LIGHT

TAKEOFF

IF 5 CELSIUS OR LESS AND GOING INTO VIABLE MOISTURE

IGNITION ON, SEPARATOR ON ALL ICE PROTECTION ON

IF RUNWAY IS CONTAMINATED ROTATE 95KTS NO FLAPS LEAVE GEAR DOWN AN EXTRA 10 SECONDS TO CLEAN

CLIMB 10 DEGREES TO 1000AGL THEN 5 DEGREES TO 160KTS AND CLIMB @ 160 KTS

CLIMB

MAINTAIN 160KTS IN THE CLIMB AND BETTER THAN 750 FPM. IF YOU CANNOT, LEVEL OFF TO GET MORE SPEED AND THEN STEP CLIMB. IF YOU ARE STILL ACCUMULATING ICE THEN GO DOWN TO WARMER AIR. AFTER LEVELING OFF, IF NOT ACCUMULATING INCREASE SPEED LOOKING FOR 180 KTS OR BETTER, IF YOU ARE 15 KTS OFF YOUR NORMAL INDICATED SPEED FOR THE POWER SETTING YOU NEED TO GO TO WARM AIR. ALWAYS MAINTAIN 160KTS OR BETTER EVEN IF YOU NEED TO DESCEND TO GET THE SPEED.

CRUISE

IN CLOUDS BETWEEN 5 AND -25 KEEP ALL ICE PROTECTION IGNITION AND SEPARATOR ON. IF COLLECTING ICE AND YOU LOSE MORE THAN 10 KTS GO TO THE WARM AIR OR COLDER AIR IF YOU CAN CLIMB AT 160KTS OR GREATER THAN 750FPM

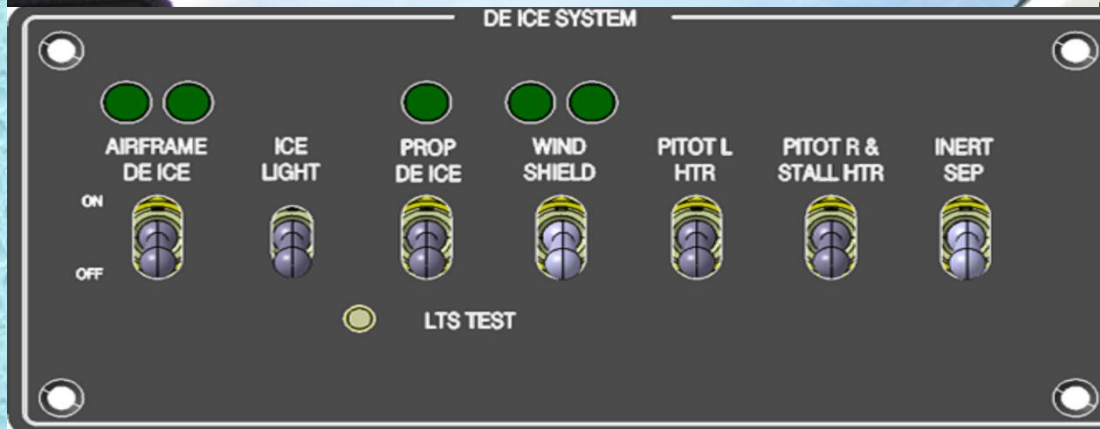
LANDING

BEST FORWARD SPEED TO GET TAT TO +3 200 KTS TO MARKER GET 12 DEGREES ADDED TO OAT FOR TAT. IF CONTAMINATED WITH TRACE ICE FULL FLAPS ADD 10 KTS /MODERATE ICE AUTOPILOT OFF 120 KTS TAKEOFF FLAPS TO THE GROUND/ SEVERE ICE 135 KTS + NO FLAPS

MISSED APPROACH FULL POWER/TOGA/GEAR UP/@135KTS MIN/FLAPS UP/ 5DEGREE UP CLIMB @160KTS KEEP BANK LESS THAN 20 DEGREES

180 KTS 60%TRQ---150 KTS 35%TRQ---120 KTS GR DOWN FLAPS DOWN 65%TRQ

If going IMC climbing, do an ICE TEST **BEFORE** T,O.
Turn on Ignition first, then right to left on ice panel
Start the timer – boots 7secs each/ dwell 57 secs
Prop light at 90 secs will blink off and on.
Turn off lighted anti-ice equip left to right then IGN off



4.5 -- PARTICULAR PROCEDURES

FLIGHT INTO KNOWN ICING CONDITIONS (1/5) General

+5 OAT 850's + 900's

1 – Icing conditions exist when the IOAT on the ground or TAT inflight is +13°C or below, and visible moisture in any form is present (clouds, fog with visibility of one mile (1.6 km) or less, rain, snow, sleet or ice crystals).

+5 OAT 850's + 900's

2 -- Icing conditions also exist when the IOAT on the ground is + 13°C or below and when operating on ramps, taxiways or runways where surface snow, ice, standing water or slush may be ingested by the engine or freeze on engine or cowlings.

2c to -10c

Clear Ice

Cumulus

Large Drops

-10c to -15c

Mixed

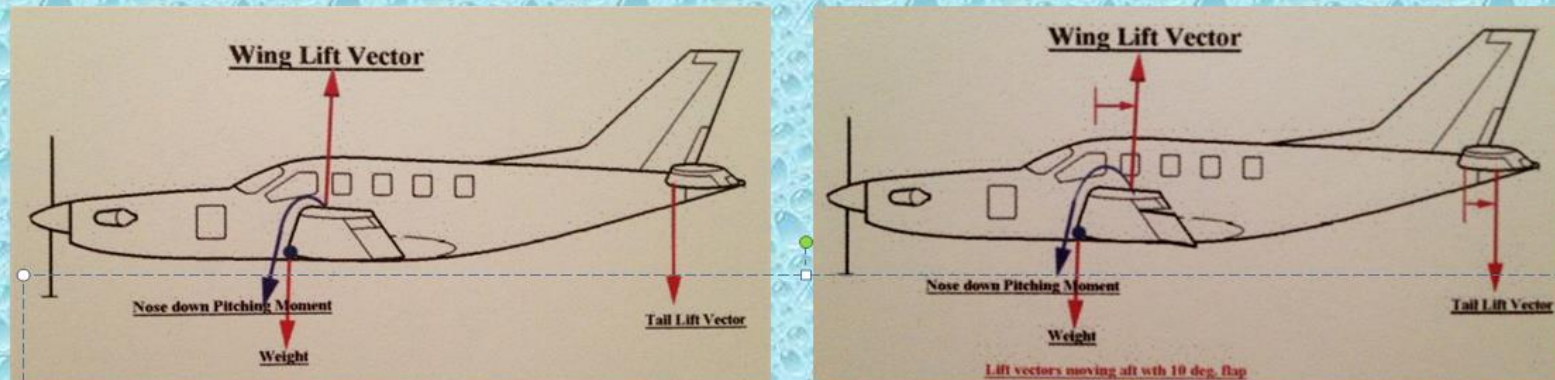
-15c to -20c

Rime

Stratus

Small Drops

Losing the Stabilizer Tail Lift Vector from heavy Ice buildup



Flap deployment moves the Tail Lift Vector rearward on the Wing and the Stabilizer. Ice accumulation adds aft movement.

When the Lift Vector reaches the Ailerons or the Elevator the result will be uncontrollable roll or nose down force.

Do not deploy the Flaps Full DN with Moderate or Greater Ice Accretion.

Recovery- Pull Nose **UP**. If stall occurs on Flap Extension, bring Flaps to **previous Position**
Activate the Deicing Equipment

Actions to take **Before** Building Ice Flow Right to Left "ON" Flow Left to Right "OFF"

- IGNITION ON
- Verify your Inertial Separator, Pitots, Windshield, Prop Heat, and Boots, and are on and operating properly.
- MOD ICE - Turn Off the Autopilot and hand fly
- Increase your TAT to above Zero Celsius if possible – Max Power is 10 c above OAT
- Descend to find warmer air and exit the Ice accretion layer- Get 2c / Thousand Feet

FLIGHT INTO KNOWN ICING CONDITIONS (2/3)

Ice protection procedures

1 - Prior to entering IMC, as an ANTI ICE preventive :

If OAT / SAT \leq 5°C : or IOAT / TAT \leq 13C

"IGNITION" SWITCH ON

"PITOT R + STALL HTR

"PITOT L HTR

"INERT SEP" SWITCH ON

"WINDSHIELD DE ICE" SWITCH ON

"PROP DE ICE" SWITCH ON

"AIRFRAME DE ICE" SWITCH ON

NOTE : When OAT is below - 35°C, or TAT below -25c avoid operations of the "AIRFRAME DEICE SYSTEM" for a too long period because the boots could be damaged. The "INERT SEP" switch must be left ON while the airplane remains in icing conditions.

Department of Transportation

Federal Aviation Administration

Subject: Pilot Guide: Flight in Icing Conditions

Advisory Circular

Date: 10/8/15 **AC No:** 91-74B **Initiated by:** AFS-800 **Change:**

This advisory circular (AC) contains updated and additional information for the pilots of airplanes under Title 14 of the Code of Federal Regulations (14 CFR) parts 91, 121, 125, and 135. The purpose of this AC is to provide pilots with a convenient reference guide on the principal factors related to flight in icing conditions and the location of additional information in related publications. As a result of these updates and consolidating of information, AC 91-74A, Pilot Guide: Flight in Icing Conditions, dated December 31, 2007, and AC 91-51A, Effect of Icing on Aircraft Control and Airplane Deice and Anti-Ice Systems, dated July 19, 1996, are cancelled. This AC does not authorize deviations from established company procedures or regulatory requirements.

PILOT'S OPERATING HANDBOOK

Page 4.5.3

FLIGHT INTO KNOWN ICING CONDITIONS (3/3)

3 - Procedures for holding, approach and landing in icing conditions :

- **Minimum recommended speeds are :**

Weight < 6579 lbs > 6579 lbs

Flaps UP 130 KIAS 135 KIAS

Flaps TO 110 KIAS 110 KIAS

Flaps LDG 90 KIAS 95 KIAS/ more than trace up to light **DO NOT** use full flaps

Particularly stall speeds may **INCREASE** by up to :

- Flaps UP, +20 KIAS / flaps up stall , 30 deg bank, 6600 lbs is 80 kts, WING CLEAN, NO ICE

- Flaps TO, +15 KIAS / flaps T.O. stall, 30 deg bank, 6600 lbs is 75 kts, LDG DN, NO ICE

- Flaps LDG, +10 KIAS / flaps dn stall, 30 deg bank, 6600 lbs is 66 kts , LDG DN, NO ICE

Most Common Error- Slowing over the Threshold too early- Hold speed to touchdown.

LANDING WITH ICE ON THE AIRFRAME

- 1. REVIEW POH 4.5 PARTICULAR PROCEDURES
- 2. DO AN ICE EQUIPMENT TEST AT A TEMP LESS THAN 10C ON GROUND OR AIRBORNE BEFORE ENTERING ICING CONDITIONS PER
- POH SECTION 4, NORMAL PROCEDURES, AMPLIFIED PROCEDURES,
- AFTER STARTING ENGINE PAGE 4.4.39
- 3. AT CRUISE GET ATIS AND DETERMINE **VAPP** USING POH 4.5
- PARTICULAR PROCEDURES PAGE 4.5.4 FOR FLAP, RUNWAY LENGTH AND CONDITIONS. NOTE: SPEEDS ARE **MINIMUM** RECOMMENDED
- 4. FLY APPROACH WITH AUTO PILOT OFF AND HOLD VAPP TILL TOUCHDOWN WITH MODERATE OR GREATER ACCUMULATION
- 5. DO NOT RETRACT FLAPS AFTER LANDING UNTIL AFTER SHUTDOWN WALK AROUND AND FLAPS ARE CLEAR OF ICE.

WWW.AVIATIONWEATHER.GOV

SELECT on the FORECAST Column-

SELECT ICING

In Layers Select- Severity w/SLD-PIREP-SIGMET-G-AIRMET

Altitude Dot on Left- Time and Legend on bottom

Use Cross Section Tool to Enter Route- then Path

In Select Variable – Select Icing-Cross-Section

Did you do the **Ice Test** correctly? **Set brake on** ground or airborne in **clear air** at 10,000' and 10c or below. Equip is all treated as Anti-Ice now, on before ICE

Max prop RPM in the ice. USE 850 Mode. Cycle prop if vibration / 200 rpm

Don't just turn on the ice equip in the climb, VS to 500 fpm to accelerate to 160 IAS then select IAS

Can't climb at 160-**Don't**, Level off, accelerate, or descend. **Auto pilot OFF** - Don't wait for the warm fuzzy feeling or stall the warning horn that might not sound

Highest accumulation of ice in tops. Usually 3,000 to 4,000 feet thick. Top worse

Make a note, use a speed bug set at **Cruise IAS** and do not allow **more than 20kts drop or 160 min** cruise speed.

You can get **2c per 1000'** warmer in descent generally.

TAT will also rise with **speed increase in the Descent.**

ICE TEST CAPT'N BILL 11-2016

What piece of icing equipment do you turn on 1st when approaching IMC? _____
2ND _____

What color dye is used to identify type 1 fluid? _____ TYPE 3?

Type 1 Fluid is a _____-ice and Type 3 is an _____-ice

In the TBM, Ice equipment is turned on at _____ OAT and _____ IOAT

IF using OAT for ICE, on what MFD page can you find the TAT? _____

When doing an ICE TEST, the MIN time to TEST all the green lights, is? _____ secs

The ICE TEST can be found in the POH under _____ procedures, _____ procedures,
_____ Engine Checklist

The minimum climb speed in icing conditions is? _____ kts

The change in temperature climbing from S.L to 10,000' is _____ Deg C

The Freezing Level on a Standard day is at _____ feet

How much may the ground roll be multiplied in some melting and not tamped snow ___X's