INSTRUCTIONS FOR CONTINUED AIRWORTHINESS FOR THE PRATT & WHITNEY CANADA PT6A-140 ENGINE ON THE CESSNA AIRCRAFT COMPANY 208/208B CARAVAN

DOCUMENT NUMBER: 201321-30

STC NO: SA02546LA

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REVISION: IR

NOTICE

This document must be referenced on Block 8 of FAA form 337 and added to the aircraft permanent record as required by 14 CFR Part 91, §91.417 (a)(2)(vi) when the reference FAA-STC modification is accomplished on eligible aircraft. This document complies with the requirements of 14 CFR Part 23, §23.1529, in accordance with 14 CFR Part 23, Appendix G.

Aircraft Serial Number _____

Aircraft Registration Number _____

FAA ACCEPTED
10/15/15

RECORD OF REVISIONS

Always destroy superseded pages when you insert revised pages

REVISION	DATE	SECTIONS AFFECTED
IR	August 2015	ALL

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1. INTRODUCTION

THESE INSTRUCTIONS FOR CONTINUED AIRWORTHINESS WERE DEVELOPED FOR THE CESSNA CARAVAN 208/208B MODIFIED IN ACCORDANCE WITH SUPPLEMENTAL TYPE CERTIFICATE (STC) TBD. THIS STC INSTALLS THE PRATT & WHITNEY CANADA PT6A-140 TURBO PROP ENGINE WITH THE THREE BLADE HARTZELL MODEL HC-B3TN-3AF(Y)/T10890CN(K)-2 PROPELLER.

In accordance with 14 CFR Part 91, §91.417, keep these instructions with the aircraft maintenance/service information manuals or with the aircraft logbooks for reference during maintenance.

This document is a supplement to the current revisions of the Cessna Aircraft Model 208 Maintenance Manual (D2078-13), Pratt & Whitney Canada PT6A-140 Maintenance Manual (document # 3075742, dated 6/4/2012) and the Hartzell Propeller owners/maintenance manual. The instructions herein supersede the instructions of these manuals only in the areas noted and only as specifically stated.

2. REVISIONS

Each time this ICA is revised or reissued, the revised ICA will be distributed to Owners/Operators using a Service Letter/Bulletin by Blackhawk Modifications, Inc. The revision will include a new Log of Revision page along with the revised pages. The upper left hand corner of each revised page will reflect the revision letter. That portion of text or an illustration, which has been revised by the addition of or change in, information is denoted by a solid revision bar located adjacent to the area of change, and placed along the inside margin or a page. Revision bars show only the information changed within the latest revision.

3. DESCRIPTION

The following descriptions are detail changes to basic Cessna Aircraft Model 208 Maintenance Manual that are applicable to this STC installation.

Engine:

(a) Number of engines 1
(b) Engine Manufacturer ..... Pratt and Whitney Canada
(c) Engine Model Number PT6A-140
(d) Rated Horsepower ..... 867 SHP
(e) Propeller Speed (RPM) 1900

(f) Gear Box Torque Limit ..... 2397 ft-lbs
(g) Power Turbine Limit Speed ..... 38,850 RPM at 1900 RPM
(h) Engine Type ..... Free Turbine, Reverse Flow
Compressor Stages and type ..... 3 axial stages, 1 centrifugal stage
Turbine stages and type ..... 1 stage compression, 2 stage power
Combustion Chamber type annular
(i) Engine Limits ..... See Section 7 of this document

Propeller:

The following propeller is eligible for installation.

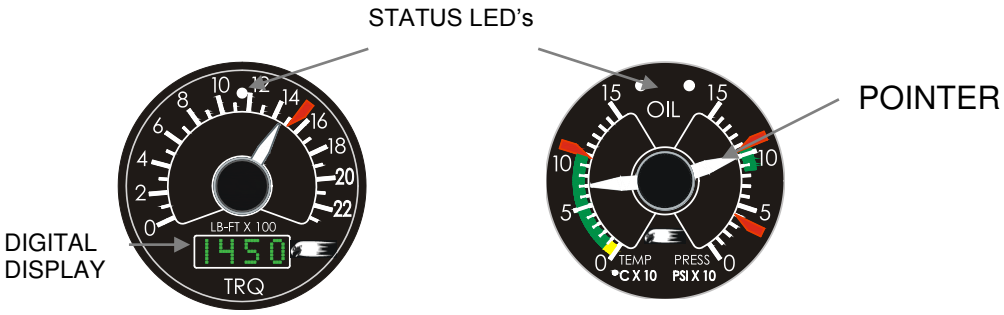
Hartzell Three Blade Propeller

(a) Number of propellers 1
(b) Propeller Manufacturer ..... Hartzell Propeller Inc.
(c) Hub Model ..... HC-B3TN-3AF(Y)
(d) Blade Model ..... T10890CN(K)-2
(e) Number of Blades 3
(f) Propeller Diameter (inches) ..... 106 inches (maximum), 104 inches (minimum)
(g) Propeller Pitch Limits (At Sta. 42) ..... 79.0°±1.0° Feather
-15.0°±0.5° Reverse
10.0°±0.1° Low Pitch
0.0°±1.0° Start Lock
h) Propeller Type ..... Hydraulically Operated Constant Speed, Full Feathering, and Reversible with option of start locks.

Engine instruments:

- GENERAL. Each original indicator has been replaced by a two-inch round electronic, micro-processor based single or dual pointer indicator (See figure next page). Each indicator
  - is electrically powered by the 28 vdc electrical bus for the engine instruments through a maximum 5 amp circuit breaker.
  - indicates the engine parameter based upon a signal from its respective signal generator, thermocouple or transducer.
  - displays the indication via the familiar rotating pointer showing power trends and limitations against a fixed scale plate, but now also provides a supplemental and secondary digital display.
  - includes a two-color (green/red) status LED.
  - is backlit and dimmable using the existing engine indicator lighting dimming circuit. Note: original post-lights have been removed.

- digital display will show a checkerboard pattern when the respective engine limitation has been exceeded. The analog needle will continue to indicate the proper value.



SINGLE INSTRUMENT DUAL INSTRUMENT
(Note – instrument markings are representative only and not actual)

Instrument markings are provided in AFMS 201321-208 & 201321-208B, Section 2.

- INSTRUMENT SELF-TEST. Upon initial power up, each indicator performs a self-test. During this test and prior to assuming normal operation,

  - the digital display initially displays all pixels for 1 second, then displays indicator name for 1 second, followed by "----" for 1 second, then all pixels until the self-test is complete, after which the actual engine indication is displayed.
  - the status LED illuminates red for 1 second then green for 1 second, then extinguishes for the remainder of the self-test.
  - the pointer is driven from its starting position to a registration point (low scale) then to the full scale position, followed by the actual indication according to the input signal.

  During normal operation each indicator is conducting a continuous self-test on the indicator and the transducer's signal. The result of this self-test is displayed using the status LED which is defined as follows:

Status LED Illumination	Description
Constant Red	Engine has exceeded a limit for more than 30 seconds and digital display is showing a checkerboard.
Flashing Red (4x per second)	An engine limitation exceedance has occurred for less than 30 seconds
Flashing Green	Sensor signal is out of expected range

NOTE

The status L.E.D. on the oil temperature/oil pressure indicators may illuminate constant red when engine is shutdown.

- POWER OFF INDICATION
  - The pointer will freeze the current indication
  - The digital display will be blank
  - The backlighting will extinguish

Torque Indicator:

- The torque indicator is now electrically powered and operates in conjunction with an electro-piezoelectric type differential pressure transducer located on the upper right engine mount truss tube.
- The transducer senses the difference between the engine internal torque meter pressure (on the right side of the reduction gear box, RGB) and the RGB case pressure of the engine (on the left side of the RGB) and supplies a corresponding DC voltage signal to the indicator.
- The torque indicator converts this information into an indication of torque in foot-pounds (ft-lbs).
- The torque indicator system is powered by 28-volt DC power through a circuit breaker, on the left sidewall switch and circuit breaker panel.
- If originally equipped with direct pressure indicator, the lines from the engine RGB to the indicator have been removed and capped at the firewall.

Oil Pressure Indicator:

- The oil pressure indicator is now electrically powered and operates in conjunction with an electro-piezoelectric type pressure transducer located on the upper right engine mount truss tube.

- The transducer senses the engine oil pressure at the gas generator section just downstream of the main oil filter & pressure relief valve and supplies a corresponding DC voltage signal to the indicator.
- The oil pressure indicator converts this information into an indication of oil pressure in pounds per square inch (psi).
- The oil pressure indication system is powered by 28-volt DC power through a circuit breaker, on the left sidewall switch and circuit breaker panel.

Propeller & Gas Generator Tachometer

- Both tachometers are now electrically powered by 28-volt DC power through a circuit breaker, on the left sidewall switch and circuit breaker panel.
- Both tachometers receive a frequency signal from the original equipment tachometer generator same as the original indicators
- The tachometer converts this frequency signal to relevant speed indication; Propeller speed is actual RPM, Gas Generator speed is a percent RPM

New Engine Break-in and Operation:

- There is no specific break-in procedures required. The engine may be safely operated throughout the normal ranges authorized by the manufacture at the time of delivery of your airplane.

Engine Lubrication System:

- A larger capacity oil cooler (Cessna part number 9910636-1 or AeroClassics P/N 8002068) has been installed in the same location as the original factory oil cooler in order to increase cooling margins.
- The engine's oil tank capacity is still 9.5 U.S. quarts and the total system capacity is 14.5 U.S. quarts.
- For engine oil grades, refer to Section 7 of this document.

Exhaust system:

- The exhaust system consists of the OEM exhaust stub attached to the engine exhaust port flange and single augmenter extension pipe attached to the right lower cowl.

Torque Limiter:

- The engine is equipped with a torque limiter designed to prevent over-torqueing the engine in an uncontrollable engine emergency event.

- This limiter is installed at the engine torque meter pressure boss on the reduction gear box.
- When an over-torque pressure is sensed, near 2530 foot-pounds, the limiter bleeds off Py air to the atmosphere thus reducing the fuel supply to the engine and thereby limiting the engine torque produced.

Chip Detector:

- Two chip detectors (one on each gear box) are now required and not optional.

Oil (or EPA) Drain Can:

- All airplanes are now equipped, if not previously, with an oil (or EPA) drain can mounted on the right lower engine mount truss. This can collects any engine oil discharges coming from the accessory pads for the alternator drive pulley, starter/generator, air conditioner compressor (if installed), the separated oil from the engine breather air/oil separator can and hoses, and the propeller shaft seal.
- This can should be drained before or after any flight. A drain valve on the bottom right side of the lower engine cowling enables someone to drain the contents of the can into a suitable container.
- The allowable quantity of oil discharge per hour has increased to approximately 20 cc for airplanes with air conditioning and 17 cc for airplanes without air-conditioning. If the quantity of oil drained from the can is greater than specified, the source of leakage should be identified and corrected.

Fuel System:

- The fuel system is unchanged from original except that different firewall to engine hoses have been used.
- The motive flow return and fuel supply pressures have increased.
- A motive flow shut-off solenoid valve has been added and is mounted on the engine accessory section. This valve shuts off the fuel return flow to the motive flow fuel pump to provide more fuel volume for starting only. Fuel pressure during the engine start is provided by the electric boost pump. The solenoid valve opens after starting sequence is complete.

4. SPECIAL PROCEDURES

Refer to the following sections of Blackhawk Modifications AFMS Document No. 201321-208 or 201321-208B, Rev. IR, Dated July 2015, or later approved revision,

for information on the Normal and Emergency operating procedures for this STC installation:

- Normal Procedures: Section 4
- Emergency Procedures: Section 3

5. SERVICING INFORMATION

Oil Grades: Oil grades conforming to Pratt and Whitney Engine Service Bulletin No. 1001, and all revisions or supplements thereto, must be used and these oil grades are limited to
CPW202 (7.5 centistokes)

- Aero Shell Turbine Oil 750
- Castrol 98
- BP or Eastman Turbo Oil 274
- Turbonycoil 35 M

MIL-PRF-23699F-Type II (5 centistokes)

- Aero Shell Turbine Oil 500 or 560
- Royco Turbine Oil 500
- Mobil Jet Oil II
- Castrol 5000
- BP or Eastman Turbo Oil 2380
- Turbonycoil 600

Oil Quantity and Operating Range: This engine now includes a visible site gage on the left side of the compressor inlet case. When oil indication is within the green range, the oil level is sufficient for safe operation. When oil indication is below the green range, the dipstick must be used to obtain and accurate indication of oil level.

NOTE

The sight gage is intended for quick reference only and does not supersede the dipstick when determining how many quarts of oil to add.

Oil Drain Period: Per the latest revision of PWC SB3001 no scheduled oil change interval is specified but is stated as ‘as needed on condition’.

Fuel: All approved fuel grade, fuel additives and alternate/emergency fuels in the basic AFM are acceptable. Aviation gasoline is limited to 150 hours of use during each overhaul period, refer to PWC SB1244. When using Grade 80 aviation gasoline as an alternate/emergency fuel, the aircraft's fuel system must be flushed when operations are complete.

Landing Gear: Main and Nose Wheel Tire Pressures are unchanged from those listed in the OEM AFM and Maintenance Manual.

6. STANDARD PRACTICES

Standard practices used on aircraft modified per this STC shall be performed in accordance with Cessna Aircraft Company Maintenance Manual D2078-13, or later approved revision.

7. MAINTENANCE INSTRUCTIONS

NOTE: The airplane is modified for this STC only to the extent described herein. All other maintenance instructions and requirements are covered by their respective manufacturer's Maintenance/Service Manuals and are to be adhered to according to their requirements.

Aircraft modified per this STC shall be maintained in accordance with the scheduled time limits and standards outlined by the current revision of the following documents:

- Airframe: Cessna Aircraft Company Maintenance Manual D2078-13, or later approved revision.
- Engine: Pratt & Whitney Maintenance Manual 3075742 Rev 4 Dated 03/16/15, or later approved revision. See below for rigging.
- Propeller: Hartzell Propeller Owner's Manual 139, Rev 12, Dated March 2013, or later approved revision for Model HC-B3TN-3AF(Y)/T10890CN(K)-2. See below for rigging.
- Engine and Propeller Rigging: Blackhawk Modifications Drawing No. 201321-800, Rev. IR, Dated May, 2015 or later approved revision.
- Engine Instrumentation: Instrument accuracy checks for torque, ITT, or Np indications can be conducted from the following:

a. Torque Indication:

1. Remove the transducer from the engine torque limiter. Re-attach the wire connector but leave the case vent line off
2. Using a dead weight tester or shop air with a calibrated pressure regulator apply the following pressures to the high pressure port of the transducer. Leave the low pressure side (case vent) open to atmosphere.
3. Stabilize at each pressure, and compare the analog and digital indications to the tolerances provided.

TEST POINT (psig)	INDICATION (ft-lbs)	TOLERANCE (ft-lbs)
0.0	0	±20
9.3	500	±20
28.0	1500	±10
46.6	2500	±10

Note: The pointer reading should be within ±10 ft-lbs of the digital display Torque indication (ft-lbs) equals 53.65 x Test Point pressure (psig).

4. If tolerances are outside the following ranges, contact the STC holder.
5. Re-install the transducer when completed.

b. ITT Indication:

1. Check the analog and digital indications using the procedures for the "Airplane Check" in Chapter 77-21-00 of the basic Cessna Aircraft Model 208 Series Maintenance Manual except ignore indicator pin call-outs, (A & B) and use the following table of ITT set points and tolerances.

TEST POINT (°C)	TOLERANCE (°C)
0	0 to 20
750	740 to 760
800	790 to 810
850	840 to 860
1100	1090 to 1110

Note: The pointer reading should be within 10°C of the digital display

2. If tolerances are outside the following ranges, contact STC holder.

c. Propeller RPM (Np) Indication:

1. Set engine RPM at the following test point and use a calibrated hand-held propeller RPM vu-thru or strobe type measurement device and compare the analog and digital indications the tolerances provided.

TEST POINT (RPM)	TOLERANCE (RPM)
1200	1160 to 1240
1600	1580 to 1620
1900	1880 to 1920

Note: The pointer reading should be within 10 RPM of the digital display

2. If tolerances are outside the following ranges, contact STC holder.

8. INSPECTION PROGRAM

Aircraft modified per this STC shall be inspected in accordance with the inspection information outlined by the latest revision of the following documents:

Cessna Caravan 208B airplanes modified per this STC are to be subjected to additional inspections as follows:

Engine:

- The engine will be inspected in accordance with the latest revision of the Pratt & Whitney Maintenance Manual 3075742 Rev 4, dated 03/16/15, Section 72-00-00, Engine, Turboprop Inspection.
- Engine Ground Performance Check: this check should be performed prior to the return to service of the new engine installation, after a hot section inspection and engine overhaul to establish baseline performance. Thereafter at each inspection interval to compare performance history with the new or overhauled engine baseline to evaluate the effects of progressive engine performance deterioration or component replacement. This data should never be used as the sole criterion for determining the airworthiness of an engine, refer to the ENGINE TORQUE FOR TAKEOFF chart in section 5 of the Airplane Flight Manual Supplement AFMS201321-208 or -208B, respectively, to determine if the engine is producing sufficient power for airworthy operation. Prior to performing this check, the engine cowling must be in place in order to ensure consistency of engine parameters, F.O.D. screens must not be installed.

INSTRUCTION:

a. Record indicated outside air temperature (IOAT), in degrees Celsius, in Table 1.
b. Record pressure altitude, which is the altimeter indication with 29.92 inch-hg (1013 mb) set in the altimeter Kollsman window, in Table 1.
c. Using the IOAT and Pressure Altitude obtained in steps a & b, determine the torque, ITT, fuel flow, and Ng target values from Chart 1 and record them in the target column of Table 1
d. Start the engine as outlined in section 4 of AFMS201321-208 or 201321-208B.
e. Position the airplane nosed into the wind; ensure that the air-conditioning, bleed air and generator are all off and the IPS is in the normal position, the control pushed in and locked.
f. Verify that the propeller control is in the high rpm position and push the power lever forward to establish an engine torque equal to the target torque value determined in Step c.
   Note: Do not exceed any engine operation limitations.
g. Let the engine stabilize at this power setting for 2-3 minutes then record the actual ITT, Np, Ng and fuel flow indications in the appropriate column of Table 1.
h. Return the engine power to idle and shut-down the engine as outlined in section 4 of AFMS 201321-208 or 201321-208B.
i. Compare the actual engine operational values recorded with the target values determined in Step c. If any of the actual values exceed the target values troubleshoot in accordance with the P&WC Maintenance Manual § 72-00-00.
j. Record this data in the engine maintenance logs for future trend history reference.

Propeller: Hartzell Model HC-B3TN-3AF(Y)/T10890CN(K)-2 propeller installations will be inspected in accordance with the latest revision of Hartzell Propeller Owner's Manual 139, Section 5, 6 and 7.

9. TROUBLESHOOTING INFORMATION

Aircraft modified per this STC should be subject to the troubleshooting criteria outlined by the latest revision of the following documents:

- Engine: The engine will be subject to troubleshooting in accordance with the latest revision of Pratt & Whitney Maintenance Manual 3021442, Section 72-00-00.
- Propeller: Hartzell Model HC-B3TN-3AF(Y)/T10890CN(K)-2 installations will be subject to troubleshooting in accordance with the latest revision of Hartzell Propeller Owner's Manual 139, Section 4-Testing and Troubleshooting .

10. REMOVAL AND REPLACEMENT PROCEDURES

All standard components and parts that have not been replaced or altered per installation of this STC shall be removed and replaced in accordance with the following documents:

- Airframe: The latest revision of Cessna Aircraft Company Maintenance Manual D2078-13.
- Engine: The latest revision of Pratt & Whitney Maintenance Manual 3075742 Rev 4, dated 03/16/15
- Propeller: For Model HC-B3TN-3AF(Y)/T10890CN(K)-2 propeller, the latest revision of Hartzell Propeller Owner's Manual 139.

The following Blackhawk Modification documents will also be required for removal and replacement of each component installed under this STC:

- Installation Instructions, Document No. 201321-001, Rev. IR, Dated 4/6/2015, or later approved revision.
- Engine Installation, Drawing No. 201321-005, Rev. IR, Dated 3/20/2015, or later approved revision.
- Engine Indicator Installation, Drawing No. 201321-003, Rev. IR, Dated 3/31/2015, or later approved revision.
- Propeller Installation and Propeller De-icing, Drawing No. 201321-008, Rev. IR, Dated 3/20/2015, or later approved revision for Model HC-B3TN-3AF(Y)/T10890N(K)-2.
- Cowling/Inlet Installation, Drawing No. 201321-014, Rev. IR, Dated 3/20/2015, or later approved revision.
- Engine Rigging Procedures, Document No. 201321-800, Rev. IR, Dated May, 2015, or later approved revision.

Replacement parts can be found in the applicable Blackhawk documents listed above. Wiring diagrams required for maintaining or repairing electrical wiring are also included in the documents listed above.

11. RECOMMENDED TIME BETWEEN OVERHAUL

Engines ..... See Pratt & Whitney Service Bulletin No 3003 latest revision
Propellers .....See Hartzell Service Letter HC-SL-61-61Y latest revision

12. AIRWORTHINESS LIMITATIONS

NOTICE:

This section is FAA approved and specifies maintenance required under §43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

Airframe:
This STC does not change or replace any requirements in the latest revision of the Cessna Maintenance Manual D2078-13, Chapter 4 Airworthiness Limitations Section.

Engine:
All airworthiness limitations associated with the Pratt & Whitney PT6A-42A engine installed under this STC are defined in the latest revision of Pratt & Whitney Maintenance Manual 3075742 Rev 4, dated 03/16/15 , under the Airworthiness Limitations Section.

Propeller:
All airworthiness limitations associated with the Hartzell HC-B3TN-3AF(Y)/T10890CN(K)-2 propeller installed under this STC are defined in the latest revision of the Hartzell Propeller Owner's Manual 139, under the Airworthiness limitations Section.

13. ASSISTANCE

For questions or assistance of any matter concerning this STC installation or operation contact Blackhawk Modifications Product & Customer Support Department at:

Blackhawk Modifications, Inc.
7601 Karl May Drive
Waco, Texas, USA 76708
Phone (254) 755-6711
Customer.service@blackhawk.aero
www.blackhawk.aero

Outside air temp (IOAT) °c		**TARGET VALUES**	**ACTUAL ENGINE INDICATION**
Pressure Altitude ft			
Torque (Tq) ft-lbs			
Propeller (Np) rpm		1900	
Inter Turbine Temp (ITT) °c			
Gas Generator (Ng) rpm			
Oil Temp (OT) °c		0 to 99°C	
Oil Pressure (OP) psi		100 to 135	
Fuel Flow (FF) lbs/hr			

TABLE 1 Ground Performance Record

Table 2 Ground Performance

Altitude (at 29.92 in. Hg)	Ambient Temperature	Torque (ft-lbs)	Fuel Flow (pph)	N_G	ITT
SL	-40Â°F (-40Â°C)	2396	537	92.5%	1162Â°F (628Â°C)
	-22Â°F (-30Â°C)	2396	543	94.0%	1218Â°F (659Â°C)
	-4Â°F (-20Â°C)	2397	548	95.5%	1274Â°F (690Â°C)
	14Â°F (-10Â°C)	2396	554	97.0%	1328Â°F (720Â°C)
	32Â°F (0Â°C)	2395	560	98.5%	1384Â°F (751Â°C)
	50Â°F (10Â°C)	2397	566	99.9%	1438Â°F (781Â°C)
	68Â°F (20Â°C)	2397	572	101.3%	1492Â°F (811Â°C)
	86Â°F (30Â°C)	2397	578	102.7%	1546Â°F (841Â°C)
	104Â°F (40Â°C)	2203	548	102.6%	1555Â°F (846Â°C)
	122Â°F (50Â°C)	2006	518	102.3%	1562Â°F (850Â°C)
	140Â°F (60Â°C)	1767	482	101.7%	1567Â°F (853Â°C)
2000' (609.6m)	-40Â°F (-40Â°C)	2396	531	93.7%	1202Â°F (650Â°C)
	-22Â°F (-30Â°C)	2396	536	95.3%	1260Â°F (682Â°C)
	-4Â°F (-20Â°C)	2396	541	96.8%	1315Â°F (713Â°C)
	14Â°F (-10Â°C)	2396	547	98.3%	1369Â°F (743Â°C)
	32Â°F (0Â°C)	2396	553	99.8%	1425Â°F (774Â°C)
	50Â°F (10Â°C)	2397	558	101.3%	1481Â°F (805Â°C)
	68Â°F (20Â°C)	2396	564	102.7%	1535Â°F (835Â°C)
	86Â°F (30Â°C)	2240	541	102.9%	1551Â°F (844Â°C)
	104Â°F (40Â°C)	2040	509	102.5%	1557Â°F (847Â°C)
	122Â°F (50Â°C)	1853	480	102.2%	1560Â°F (849Â°C)
	140Â°F (60Â°C)	1621	446	101.5%	1566Â°F (852Â°C)
4000' (1219.2 m)	-40Â°F (-40Â°C)	2396	522	95.1%	1249Â°F (676Â°C)
	-22Â°F (-30Â°C)	2396	528	96.7%	1305Â°F (707Â°C)
	-4Â°F (-20Â°C)	2396	535	98.2%	1360Â°F (738Â°C)
	14Â°F (-10Â°C)	2397	542	99.7%	1416Â°F (769Â°C)
	32Â°F (0Â°C)	2397	547	101.2%	1474Â°F (801Â°C)
	50Â°F (10Â°C)	2397	553	102.7%	1530Â°F (832Â°C)
	68Â°F (20Â°C)	2257	531	103.0%	1546Â°F (841Â°C)
	86Â°F (30Â°C)	2066	501	102.7%	1551Â°F (844Â°C)
	104Â°F (40Â°C)	1883	472	102.4%	1555Â°F (846Â°C)
	122Â°F (50Â°C)	1705	444	102.0%	1558Â°F (848Â°C)
	140Â°F (60Â°C)	1480	411	101.2%	1564Â°F (851Â°C)
	-40Â°F (-40Â°C)	2397	520	96.7%	1301Â°F (705Â°C)
	-22Â°F (-30Â°C)	2397	524	98.3%	1359Â°F (737Â°C)
	-4Â°F (-20Â°C)	2396	529	99.8%	1416Â°F (769Â°C)

6000’ (1828.8m)	14Â°F (-10Â°C)	2398	535	101.3%	1474Â°F (801Â°C)
	32Â°F (0Â°C)	2397	541	102.8%	1531Â°F (833Â°C)
	50Â°F (10Â°C)	2249	520	103.0%	1540Â°F (838Â°C)
	68Â°F (20Â°C)	2080	492	102.9%	1546Â°F (841Â°C)
	86Â°F (30Â°C)	1905	465	102.7%	1551Â°F (844Â°C)
	104Â°F (40Â°C)	1733	438	102.3%	1557Â°F (847Â°C)
	122Â°F (50Â°C)	1568	411	101.9%	1558Â°F (848Â°C)
	140Â°F (60Â°C)	1355	380	101.1%	1564Â°F (851Â°C)
8000’ (2438.4m)	-40Â°F (-40Â°C)	2396	543	98.7%	1371Â°F (744Â°C)
	-22Â°F (-30Â°C)	2397	543	100.3%	1429Â°F (776Â°C)
	-4Â°F (-20Â°C)	2395	544	101.8%	1486Â°F (808Â°C)
	14Â°F (-10Â°C)	2398	546	103.3%	1544Â°F (840Â°C)
	32Â°F (0Â°C)	2220	504	102.8%	1537Â°F (836Â°C)
	50Â°F (10Â°C)	2073	482	102.9%	1542Â°F (839Â°C)
	68Â°F (20Â°C)	1916	457	102.8%	1548Â°F (842Â°C)
	86Â°F (30Â°C)	1751	430	102.5%	1553Â°F (845Â°C)
	104Â°F (40Â°C)	1594	406	102.2%	1558Â°F (848Â°C)
	122Â°F (50Â°C)	1443	382	101.8%	1562Â°F (850Â°C)
	140Â°F (60Â°C)	1246	353	101.0%	1566Â°F (852Â°C)
10,000’ (3048m)	-40Â°F (-40Â°C)	2398	560	101.1%	1461Â°F (794Â°C)
	-22Â°F (-30Â°C)	2398	564	102.7%	1521Â°F (827Â°C)
	-4Â°F (-20Â°C)	2344	550	103.5%	1549Â°F (843Â°C)
	14Â°F (-10Â°C)	2196	500	103.1%	1540Â°F (838Â°C)
	32Â°F (0Â°C)	2044	467	102.7%	1539Â°F (837Â°C)
	50Â°F (10Â°C)	1907	447	102.8%	1544Â°F (840Â°C)
	68Â°F (20Â°C)	1762	423	102.7%	1549Â°F (843Â°C)
	86Â°F (30Â°C)	1609	398	102.4%	1553Â°F (845Â°C)
	104Â°F (40Â°C)	1465	376	102.1%	1560Â°F (849Â°C)
	122Â°F (50Â°C)	1327	354	101.8%	1564Â°F (851Â°C)
	140Â°F (60Â°C)	1142	327	100.9%	1569Â°F (854Â°C)