

Section 3. Cold Temperature Barometric Altimeter Errors, Setting Procedures and Cold Temperature Airports (CTA)

7-3-1. Effect of Cold Temperature on Barometric Altimeters

a. Temperature has an effect on the accuracy of barometric altimeters, indicated altitude, and true altitude. The standard temperature at sea level is 15 degrees Celsius (59 degrees Fahrenheit). The temperature gradient from sea level is minus 2 degrees Celsius (3.6 degrees Fahrenheit) per 1,000 feet. For example, at 5000 feet above sea level, the ambient temperature on a standard day would be 5 degrees Celsius. When the ambient (at altitude) temperature is colder than standard, the aircraft's true altitude is lower than the indicated barometric altitude. When the ambient temperature is warmer than the standard day, the aircraft's true altitude is higher than the indicated barometric altitude.

b. TBL 7-3-1 indicates how much error may exist when operating in non-standard cold temperatures. To use the table, find the reported temperature in the left column, and read across the top row to locate the height above the airport (subtract the airport elevation from the flight altitude). Find the intersection of the temperature row and height above airport column. This number represents how far the aircraft may be below the indicated altitude due to possible cold temperature induced error.

TBL 7-3-1
ICAO Cold Temperature Error Table
HEIGHT ABOVE AIRPORT IN FEET

| | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|----|
| REPORTED TEMP °C | +10 | 10 | 10 | 10 | 10 | 20 | 20 | 20 | 20 | 20 | 30 | 40 | 60 | 80 | 90 |
| 0 | 20 | 20 | 30 | 30 | 40 | 40 | 50 | 50 | 60 | 90 | 120 | 170 | 230 | 280 | |
| -10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 150 | 200 | 290 | 390 | 490 | |
| -20 | 30 | 50 | 60 | 70 | 90 | 100 | 120 | 130 | 140 | 210 | 280 | 420 | 570 | 710 | |
| -30 | 40 | 60 | 80 | 100 | 120 | 140 | 150 | 170 | 190 | 280 | 380 | 570 | 760 | 950 | |
| -40 | 50 | 80 | 100 | 120 | 150 | 170 | 190 | 220 | 240 | 360 | 480 | 720 | 970 | 1210 | |
| -50 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 450 | 590 | 890 | 1190 | 1500 | |

7-3-2. Pre-Flight Planning for Cold Temperature Altimeter Errors

Flight planning into a CTA may be accomplished prior to flight. Use the predicted coldest temperature for plus or minus 1 hour of the estimated time of arrival and compare against the CTA published temperature. If the predicted temperature is at or below CTA temperature, calculate an altitude correction using TBL 7-3-1. This correction may be used at the CTA if the actual arrival temperature is the same as the temperature used to calculate the altitude correction during preflight planning.

7-3-3. Effects of Cold Temperature on Baro-Vertical Navigation (VNAV) Vertical Guidance

Non-standard temperatures can result in a change to effective vertical paths and actual descent rates when using aircraft baro-VNAV equipment for vertical guidance on final approach segments. A lower than standard temperature will result in a shallower descent angle and reduced descent rate. Conversely, a higher than standard temperature will result in a steeper angle and increased descent rate. Pilots should consider potential