

## 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 consequences of these effects on approach minima, power settings, sight