7–2–3. Altimeter Errors

a. Most pressure altimeters are subject to mechanical, elastic, temperature, and installation errors. (Detailed information regarding the use of pressure altimeters is found in the Instrument Flying Handbook, Chapter IV.) Although manufacturing and installation specifications, as well as the periodic test and inspections required by regulations (14 CFR Part 43, Appendix E), act to reduce these errors, any scale error may be observed in the following manner:

1. Set the current reported altimeter setting on the altimeter setting scale.

2. Altimeter should now read field elevation if you are located on the same reference level used to establish the altimeter setting.

3. Note the variation between the known field elevation and the altimeter indication. If this variation is in the order of plus or minus 75 feet, the accuracy of the altimeter is questionable and the problem should be referred to an appropriately rated repair station for evaluation and possible correction.

b. Once in flight, it is very important to obtain frequently current altimeter settings en route. If you do not reset your altimeter when flying *from* an area of high pressure into an area of low pressure, *your aircraft will be closer to the surface than your altimeter indicates.* An inch error in the altimeter setting equals 1,000 feet of altitude. To quote an old saying: ***"GOING FROM A HIGH TO A LOW, LOOK OUT BELOW."***

c. Temperature also has an effect on the accuracy of altimeters and your altitude. The crucial values to consider are standard temperature versus the ambient (at altitude) temperature and the elevation above the altitude setting reporting source. It is these "differences" that cause the error in indicated altitude. When the column of air is warmer than standard, you are higher than your altimeter indicates. Subsequently, when the column of air is colder than standard, you are lower than indicated. It is the magnitude of these "differences" that determine the magnitude of the error. When flying into a cooler air mass while maintaining a constant indicated altitude, you are losing true altitude. However, flying into a cooler air mass does not necessarily mean you will be lower than indicated if the *difference* is still on the plus side. For example, while flying at 10,000 feet (where **STANDARD** temperature is –5 degrees Celsius (C)), the outside air temperature cools from +5 degrees C to 0 degrees C, the temperature error will nevertheless cause the aircraft to be **HIGHER** than indicated. It is the extreme "cold" difference that normally would be of concern to the pilot. Also, when flying in cold conditions over mountainous terrain, the pilot should exercise caution in flight planning both in regard to route and altitude to ensure adequate en route and terminal area terrain clearance.

NOTE–
Non-standard temperatures can result in a change to effective vertical paths and actual descent rates while using aircraft Baro-VNAV equipment for vertical guidance on final approach segments. A higher than standard temperature will result in a steeper gradient and increased actual descent rate. Indications of these differences are often not directly related to vertical speed indications. Conversely, a lower than standard temperature will result in a shallower descent gradient and reduced actual descent rate. Pilots should consider potential consequences of these effects on approach minimums, power settings, sight picture, visual cues, etc., especially for high-altitude or terrain-challenged locations and during low-visibility conditions.

d. TBL 7–2–3, derived from ICAO formulas, indicates how much error can exist when operating in cold temperatures. To use the table, find the reported temperature in the left column, read across the top row to locate the height above the airport/reporting station (i.e., subtract the airport/ reporting elevation from the intended flight altitude). The intersection of the column and row is how much *lower* the aircraft may actually be as a result of the possible cold temperature induced error.

e. Pilots are responsible to compensate for cold temperature altimetry errors when operating into an airport with any published cold temperature restriction and a reported airport temperature at or below the published temperature restriction. Pilots must ensure compensating aircraft are correcting on the proper segment or segments of the approach. Manually correct if compensating aircraft system is inoperable. Pilots manually correcting, are responsible to calculate and apply a cold temperature altitude correction derived from TBL 7–2–3 to the affected approach segment or segments. Pilots must advise the cold temperature altitude correction to Air Traffic Control (ATC). Pilots are not required to advise ATC of a cold temperature altitude correction inside of the final approach fix.