Indicated vs True Airspeed

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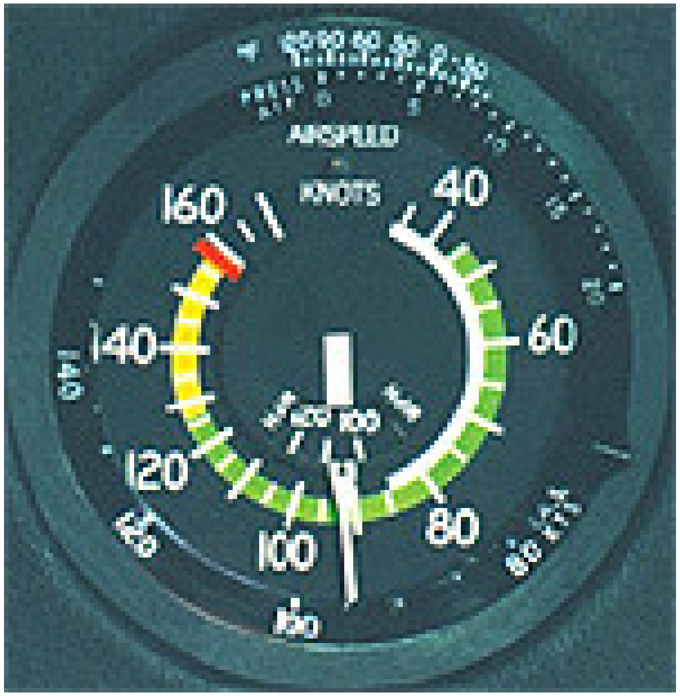
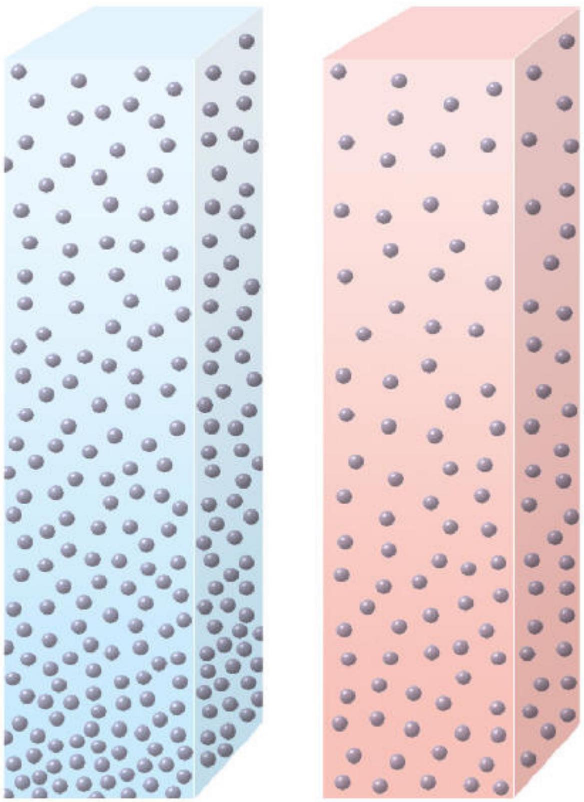
Indicated (KIAS) Airspeed



- What You See On Airspeed Indicator
- Caused by 'Ram Air' Entering Pitot Tube
- As Density Altitude Increases
  - Air Molecules Decrease
  - IAS Decreases
  - Lift Decreases

KIAS



- As Temperature Increases
- Density Altitude Increases
- KIAS Decreases
- Less Lift

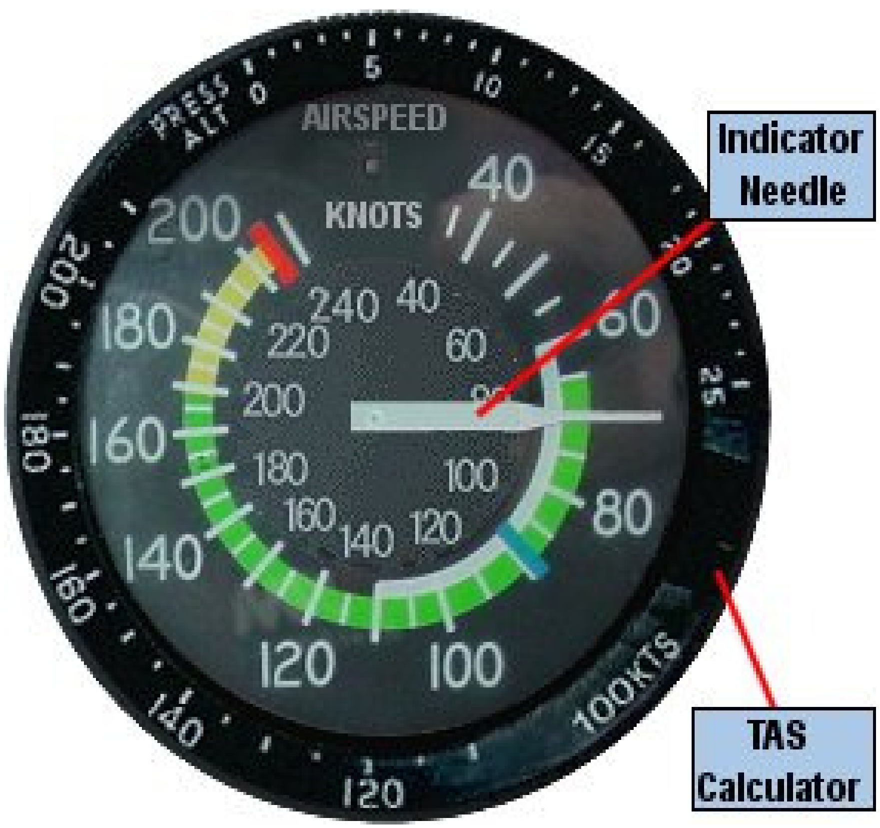
Key Concept

- For Specified Configuration (e.g., Landing Flaps, Gear)
- Vso is a Constant
- E.g., If Vso = 34 knots it is Independent of Density Altitude
- Does This Mean We Stall at the Same True Airspeed?
  - NO – Our True Airspeed Changes So as to Provide the Same Lift

True Airspeed (KTAS)

- KTAS = KIAS $(Do/D)^{1/2}$
- Do = Air Density at Sea Level
- D = Air Density at Cruise Altitude
- Many Performance Charts in Airplanes Specify KTAS
- We Want to Know KTAS For Our Flight Planning Since it, With Wind, Gives Us GS
- But When We Fly We Need KIAS

What to Do?



- Some Airspeed Indicators Have Rotary Dial
- Pressure Altitude Is Set Opposite Index
- KTAS is Read Off Outside Dial
- Or – Use E6B

E6B

- Cruise at 6,500' MSL, KTAS = 125 knots
- Altimeter Setting = 30.32
- OAT = -10 deg C
- First – Find Pressure Altitude
  - We Could Use 6,500' But to be Precise
  - Recall Pressure Altitude is Referenced at 29.92” Hg
  - As Pressure Increases every 0.1” Hg, Altitude Decreases ~ 100'
  - Therefore, Pressure Altitude ~ 6,100'
  - Or, Set Altimeter to 29.92” Hg and Read Direct

E6B

- Now With Temperature -10 deg C, Pressure Altitude 6,100'
  - Set E6B With -10 Opposite 6,100' In TAS Window
- Read KIAS Off Inner Ring (Likely Labeled KCAS or CAS) and KTAS off Outer Ring