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Nomogram determines volume percent of water in air

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A RATHER lengthy formula is required to determine the volume percent of water in an air stream. This nomogram eliminates calculation and will enable volume percent of water to be determined directly from dry and wet-bulb temperature measurements. It is based on the formula:

$$\% \text{ H}_2\text{O} = \frac{\frac{[P_w / (B - P_w)] - 0.000372 (t_d - t_w)}{1 + [P_w / (B - P_w)] - 0.000804 (t_d - t_w)}}{\times 100}$$

where B = barometric pressure, in. Hg; P_w = vapor pressure of water at t_w, in. Hg; t_d = dry-bulb temperature, °F.; and t_w = wet-bulb temperature, °F.

Example. What is the volume percent water in air at an altitude of 5,000 ft when the dry-bulb and wet-bulb temperatures are 90°F. and 75°F., respectively?

Solution. First, determine wet-bulb depression, 90°F. - 75°F. = 15°F. On the nomogram, Step 1, line 5,000 ft on A scale with 75°F. on t_w scale and note intersection with Pivot Line. Step 2, from this point on the Pivot Line, connect with 15°F. on (t_d - t_w) scale, and read 3 volume percent water in air where line crosses H₂O scale.

END

