

THE BIRD HOUSE WEATHER STATION: ATMOSPHERICS & METRICS GUIDE

1. BAROMETRIC PRESSURE (inHg) — "The Atmosphere's Weight"

Barometric pressure measures the weight of the atmosphere pressing down on the Earth's surface. Standard sea-level pressure is 29.92 inHg.

BAROMETRIC PRESSURE LEVELS:

- * Above 30.20 inHg (High Pressure): Stable, dry air, clear skies, and calm winds.
- * 29.80 - 30.10 inHg (Normal Baseline): Standard fair weather conditions.
- * 29.50 - 29.70 inHg (Low Pressure): Increasing clouds, rising humidity, light precipitation, or approaching fronts.
- * 29.00 - 29.40 inHg (Deep Low Pressure): Strong rainstorms, high sustained winds, and active severe weather.
- * Below 29.00 inHg (Severe Low Pressure): Major weather hazards, gale-force winds, nor'easters, or tropical systems.

THE 3-HOUR TREND RULE:

The rate of pressure change indicates incoming weather shifts:

- * Rapid Fall (> 0.06 inHg drop over 3 hours): High-confidence warning of an incoming cold front, high winds, and heavy precipitation.
- * Rapid Rise (> 0.06 inHg increase over 3 hours): Indicates the storm has passed; clearing skies and cooler, drier air are taking over.

2. VAPOR PRESSURE DEFICIT (VPD) — "Atmospheric Drying Power"

VPD measures the difference between how much moisture the air currently holds versus how much moisture it COULD hold when fully saturated (100% humidity). It is measured in kilopascals (kPa).

WHY VPD MATTERS MORE THAN RELATIVE HUMIDITY:

Relative Humidity (RH) only gives a percentage, but air capacity changes with temperature (warm air holds more moisture than cold air). VPD measures the exact drying power or "evaporative demand" of the air.

VPD RANGES:

- * 0.00 - 0.40 kPa (Low Drying Power / Very Damp): Air is near saturation. Evaporation slows dramatically, surfaces dry slowly, and fog/dew forms.
- * 0.50 - 1.20 kPa (Comfort / Balanced Zone): Optimal environmental balance. Moisture evaporates at a smooth, stable rate.
- * 1.30 - 2.00 kPa (High Drying Power / Dry): The air actively draws moisture from soil, plants, and skin. Increased evaporation rate.
- * Above 2.00 kPa (Extreme Drying Power): Hot or arid conditions where moisture evaporates rapidly upon contact with the air.

3. DERIVED METRICS: FEELS LIKE & DEW POINT

- * FEELS LIKE (°F): Combines air temperature and humidity (Heat Index) to reflect human thermal comfort.
- * DEW POINT (°F): The temperature to which air must cool for water vapor to condense into dew, fog, or rain.
 - Below 55°F: Dry and comfortable
 - 55°F - 65°F: Noticeably humid
 - Above 65°F: Muggy, oppressive moisture levels capable of feeding storms.