

What Makes A Good Hygrometer?

Characteristic	Benefit
Fast Speed of Response	<ul style="list-style-type: none"> • Minimize time on sample gas • Most productive use of operator and instrument time • Reduce emissions, in accordance with ISO environmental issues • Reduce personal hazard to operator • Provides 'real time' data for on-line operations – significant aid to process control and fault diagnosis
Repeatability	<ul style="list-style-type: none"> • The analyzer should provide the ability to perform multiple tests on the same sample, given constant sampling conditions and methodology, and achieve consistent results within the stated operating tolerances • Good repeatability leads to increased operator confidence • Increased validity of data • Aids productivity in the commissioning of an instrument or on re-activation following Plant interruption
Thermal Stability	<ul style="list-style-type: none"> • Any hygrometer, to produce accurate data, should be capable of sampling in a wide range of ambient temperatures, with gases of different temperatures • The resistance of the analyzer to fluctuations in temperature greatly simplifies the installation • The reliability of, and confidence in, all data collected is vastly increased
Heated Sensor	<ul style="list-style-type: none"> • A heated Sensor offers a very robust level of performance, as it cannot easily be saturated or damaged by exposure to ambient air / gases during the connection / disconnection process • The heated Sensor provides a very high level of calibration traceability, thereby greatly improving the validity of the sample data
Flow Independence	<ul style="list-style-type: none"> • The hygrometer ought not to require a fixed flow level for each measurement • Productivity is aided through greater ease of operation • Sampling set-up and methodology are simplified, hence reducing the costs of ongoing service and maintenance • Provides an additional level of diagnostic capability under Plant equilibrium conditions
Flow Requirement	<ul style="list-style-type: none"> • A low flow level helps to minimize emissions of hazardous and / or wastage of expensive sample gases • Aids the user with regard to ISO emissions requirements and Health & Safety requirements

	<ul style="list-style-type: none"> • Low flow requires a less complex sampling methodology and installation • Low flow usage extends the operational life of the instrument and increases the mean Service interval
Atmospheric Pressure	<ul style="list-style-type: none"> • A hygrometer should be calibrated, and operated, at atmospheric pressure. • A simpler methodology helps reduce data errors associated with user sampling methodology • Provides the only level of traceability to Internationally accepted Standards • Simple installation and methodology help to simplify the diagnosis of any System or process faults
Contamination Resistance	<ul style="list-style-type: none"> • The instrument should display a high resistance to light volatile contaminants • The recovery from exposure to such contaminants should be fast • A high resistance to contamination significantly increases the validity of the collected data
Sensor Stability	<ul style="list-style-type: none"> • On a gas stream of a known moisture concentration, the analyzer should show resistance to the effects of drift and hysteresis • Provides higher significance of data • Improved user confidence in data • Helps negate cost penalties associated with inaccurate data and associated Plant disruption
Specificity of Sample Gas	<ul style="list-style-type: none"> • The instrument should be capable of achieving a high level of performance on a number of different sample gases • The versatility of the analyzer will have a direct bearing on the level of productivity it provides to the user
Self Diagnosis	<ul style="list-style-type: none"> • The instrument should provide the capability to verify measurements while on-line. • The user ought to be able to confirm both the functionality of the Sensor and the electronics of the hygrometer. • Such diagnostic features provide significant levels of user confidence that the analyzer is functioning correctly, particularly in on-line applications where stable moisture levels may be experienced for extended periods of time
High Accuracy	<ul style="list-style-type: none"> • The hygrometer should have a traceable calibration from an independent, accredited laboratory • Helps in the reduction of commercial interfaces at the point of supply / receipt • Reduces uncertainty of data • Increases operator confidence • Increases flexibility and correlation of data

	<ul style="list-style-type: none"> • Simplifies process control and management deliberation • High accuracy in one measurement can help in determining the criticality of other parameters
Inertness of Sensor	<ul style="list-style-type: none"> • The moisture Sensor should be chemically inert, and should not degrade with time given 'clean' operating conditions • The inert Sensor will not contribute contamination either to the sample gas stream or the application process • An inert Sensor will provide a long operating life for the analyzer and will mean that the hygrometer will be capable of operating on a variety of different applications
Warm-up Time	<ul style="list-style-type: none"> • The analyzer should be fast to respond on initial start-up and in cases of recovery from power interruption • The fast warm-up of the instrument in these events is critical to the productivity of the analyzer and the audit trail of data collected
Graphical Display	<ul style="list-style-type: none"> • Provides the operator with the ability to quickly identify when a sample equilibrium condition has been achieved • Offers the benefit of being able to scrutinize the long-term performance of the Sensor and in turn make a decision as to the required frequency of recalibration
Datalogging	<ul style="list-style-type: none"> • Internal datalogging facilities are an excellent means of aiding process and management control • A date-stamped identification of each measured sample will increase the integrity of the data audit trail
Portability	<ul style="list-style-type: none"> • The ease of transportation of any portable analyzer is critical to the simplicity of use and hence overall productivity for the operator.
Level of Technical Support	<ul style="list-style-type: none"> • Any hygrometer purchased should be fully supported by a high level of after-sales care • A fast instrument turnaround should be available for recalibration • Spare parts, where required, should be readily available • A fixed duration maintenance contract can be an extremely reliable way of spreading capital investment and guaranteeing reliable performance
Level of Supplier Knowledge	<ul style="list-style-type: none"> • The level of technical knowledge of the supplier should be of paramount importance when buying a hygrometer • Purchasing direct from a supplier, or recommended representative, will provide a greater knowledge of hygrometry and applications than will be available from a distributor

When assessing the relative merits of any analyzer, the following should also be considerations. While not fundamental to the Sensor technology of a particular type of hygrometer, all will affect the level of performance to some degree, and the effect of each should be minimized to achieve accurate results.

These issues may include:

- Linearity of the analyzer
- Interference errors
- Electrical supply variations
- Output regulation
- Output ripple and noise
- Output terminal isolation
- Output insulation resistance
- Electrical supply interruptions
- Electrical supply transients
- Electrical supply insulation / isolation
- Radio frequency
- Vibration