



SpectraSensors SS2000 Cost of Ownership

Key Points

- *Lower Operating Costs due to no maintenance and no consumables*
- *Payback after two years*
- *Competitive Methods cost \$10's of thousands more after only 5 years*

This **Cost of Ownership** analysis is based on comparisons between the purchase of the SpectraSensors SS2000 Moisture Analyzer and competitive technologies.

SpectraSensors is successful in the natural gas industry because our technology is an alternative to inferior solutions that is in use simply because they were the only options previously available.

Surface-based electrochemical and crystal sensors that come into contact with the corrosive environment of the gas simply cost too much to maintain. Moreover, their measurements are not dependable. Most users of sensors that use Aluminum Oxide, Quartz Crystals, or other surface-based methods are dissatisfied with the performance, and spend more money over the long run on maintenance than on the original equipment purchase.

The Comparison table on the reverse side shows the original purchase price as well as typical operating expenses of the SpectraSensors SS2000 (tunable Laser) and two competing technologies. An effort is made to conservatively estimate the competitive costs so that they are not overstated.

Payback Period: Compared to the SpectraSensors product, green indicates less money spent, red indicates more

money spent (see table).

After two years, the SpectraSensors analyzer costs less. After 5 years, the competitive solution is about \$10K more, after ten years \$20K more, and so on.

Intangible costs associated with improperly performing moisture sensors such as damaged pipelines, added dehydration costs, pipeline upsets, and the chance of pipe failures are not part of the analysis but can have enormous costs. Pipeline operators are becoming increasingly concerned with safety and are looking for a moisture sensor that gives results that can be trusted. The SpectraSensors product has the unique feature that allows the user to download and look at the Spectral output. The Spectral Output has a unique shape that allows users to qualitatively validate that the instrument is working properly.

Apples & Oranges: If a solution is required that provides measurement data that can be deemed reliable, then the SpectraSensors analyzer is the only choice. The comparison figures in this sheet are dollar comparisons only. It does not take into account that the SpectraSensors product can reliably provide the needed measurements and the competition simply cannot.



Comparison Chart:

Sensor Type	Tunable Laser	Quartz Crystal	Al ₂ O ₃
Verifiable Measurement	Uses Online Spectrum	Self Calibrates	Drifts; compare with chilled mirror
Accuracy	±4ppmv	±5%	±2%
Average Measurement Speed	2 sec	12 min	10 min
Calibration Required	Automatic	In Field	Factory
Methanol Interference	Immune	Interferes	Interferes
Glycol Vapor Interference	Immune	Interferes	Interferes
Amine Vapor Interference	Immune	Interferes	Interferes
Vulnerable to Corrosives / Contaminants	No	Very	Very
Initial Cost	\$18,850	\$12,500	\$7,500

Consumables (Gas Dryer, Cal Gas)

Frequency Required (annual)		0.5	
Cost of Consumable		\$3,000	
		\$1,500	

Extra Sensor Heads

Spares per System			1.0
Sensor Head Cost			\$1,000
			\$1,000

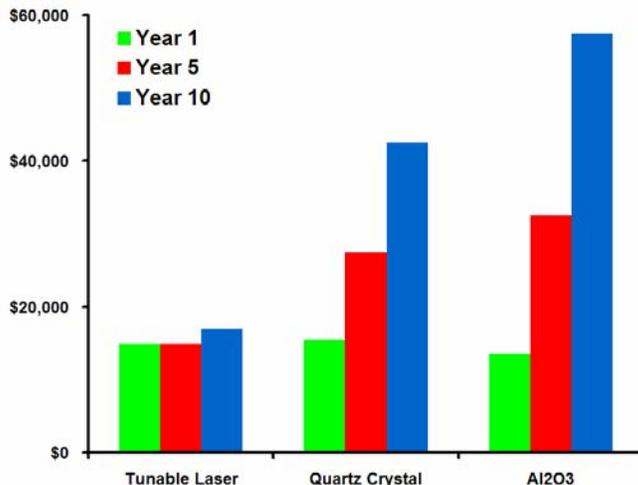
Calibration

Annual Frequency per system		0.25		4.0
Calibration/Rebuild Cost		\$1,000		\$500
		\$250		\$2,000

Repair Technician

Annual Frequency per system		5.0		5.0
Labor Rate (hrly)		\$50		\$50
Overhead Rate, truck depr. etc (hrly)		\$100		\$100
Transportation Time (hrs)		2		2
Work Time (hrs)		2		2
		\$3,000		\$3,000

	Year	Tunable Laser	Quartz Crystal	Al ₂ O ₃
Annual Cumulative Expense	1	\$18,850	\$15,500	\$13,500
	2	\$18,850	\$18,500	\$17,500
	3	\$18,850	\$21,500	\$22,500
	4	\$19,850	\$24,500	\$27,500
	5	\$18,850	\$27,500	\$32,500
	10	\$20,850	\$42,500	\$57,500



Payback Period:
Compared to the SpectraSensors product, red indicates more money spent.

Results indicate that the SpectraSensors (Tunable Laser) has lower operating costs in the long run. The payback occurs in about two years.