PROTECH ANALYZER SELECTED SPECIFICATIONS

Analysis	**Interference-free, not matrix dependent lead acetate** **ProTech D:** H_2S or TS. H_2S & TS analysis can be done on same analyzer. (Please note: TS requires optional reaction furnace) **ProTech W:** H_2S
Linearity	±2.0% of full scale
Repeatability	±2.0% of full scale for ranges 1 to 50 ppmv ±2.5% of full scale for range > 50 ppmv ±3.0% of full scale for ranges 0.5 to 1 ppmv ±5.0% of full scale for ranges < 0.5 ppmv
Measurement Range **High Range**	0 to 500 ppmv (no dilution) 0 to 100% (permeation dilution system)
Low Range	0 to 1 ppmv (5 ppbv sensitivity level) 0 to 100 ppbv (5 ppbv sensitivity level)
I/O Capabilities **Output**	3 – Serial ports (USB/RS232 selectable, RS232 & RS485) 1 – Ethernet LAN 6 – SPDT 8A programmable relays (form C) 8 – Solenoid drivers 3A 6 – 4 to 20 ma loop-powered (user scalable & programmable) 10 – Quick view status indicators (LED)
Inputs	1 – MMI intrinsically safe keypad with menu 2 – Isolated 4 to 20 ma 4 – Wet inputs (user programmable) 4 – Dry contact (user programmable)
Modbus Protocol	Modicon 16, Modicon 32, Enron/Daniel
Area Classification	**ProTech D1:** Class 1, Division1, Groups B, C & D, T3 **ProTech D2 & W:** Class 1, Division 2, Groups B, C & D, T3
Power Requirements	10 Watt (24 VDC), 250 Watt (120 VAC – TS option) 10 to 36 VDC or 90-240 VAC 50/60 Hz

Please note: we work continuously to improve the performance of our products – all specifications are subject to change without notice.

Galvanic assures flexible, headache-free installation and operation

Galvanic Applied Sciences' expert support team will work with you to determine the best, most cost-effective way for your facility to meet your H_2S analysis needs. Galvanic's high-performance analyzers are calibrated to your exact specifications and custom-configured at the factory to integrate seamlessly into your existing infrastructure. Galvanic can also supply other key components and services for a total integrated solution – from custom designs and field commissioning for your systems – to analyzer shelters and sample-conditioning panels.

ISO 9001-2008

GALVANIC
APPLIED SCIENCES

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Application Insight: ProTech™ Family of High-Performance H_2S Analyzers

Cost-Effective H_2S Analysis & Process Optimization in Acid Gas Removal (Sweetening)

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NATURAL GAS PROCESSING PLANTS # 3

Process optimization in acid gas sweetening requires precision monitoring of both the inlet and outlet streams. The ProTech D1 & D2 family of high-performance H_2S analyzers by Galvanic Applied Sciences (formerly called the 903) is ideally suited to the task. Multi-stream, dual-range capability means that you can use a single analyzer for extremely sensitive, accurate, and cost-effective analysis of both streams simultaneously. Rugged, reliable, and interference-free, the analyzer is capable of very low detection limits and outperforms all other analytical methods in the critical application range of 0 to 15 ppmv. The low total cost of ownership marks the ProTech series as the highest-value H_2S analyzers on the market today.

Acid Gas – a Major Culprit in Pipeline Corrosion

Although naturally occurring components of many natural gas streams, acid gases H_2S and CO_2 can combine with moisture to create a corrosive and potentially lethal brew. Further, H_2S itself is a hazardous gas harmful to personnel at low levels. Accordingly, its concentration in natural gas is regulated by state and federal agencies and usually stipulated in contractual agreements between pipeline companies and their customers. Thus, acid gas "sweetening" – a commonly used term for the removal of acid gases – is a critical process in natural gas applications.

H_2S Removal in Amine Process

During gas sweetening, acid gases are removed by physical (non-reactive) or chemical (reactive) absorption methods, using a variety of amines.

"Sour" (acid-gas-laden) natural gas is passed through an absorber tank with amine fluid flowing in the opposite direction across a series of structures. When the amine comes in contact with the acid gas, it removes the H_2S. The 'rich' amine fluid is sent to a regeneration unit, which re-boils off the acid gas. If concentrations levels make it economically viable, it will be sent to a sulfur-recovery unit (SRU) to have the raw sulfur removed.

Monitoring the inlet and outlet of the absorber is critical to optimizing the acid gas removal process because many aspects of the processes can contribute to significant reductions in costs, *e.g.*, contact temperature, pressure, total acid gas loading, NG and amine feed flow rates, location of lean amine feed point on the absorber structure, and amine fluid degradation. The Galvanic ProTech series H_2S analyzer provides operators with information needed to optimize the process parameters and realize substantial cost savings.

Amines in Acid Gas Removal

H_2S and/or CO_2 may be removed, depending on the particular application. Some amines remove both in varying ratios; others may remove only one or the other. Examples include:

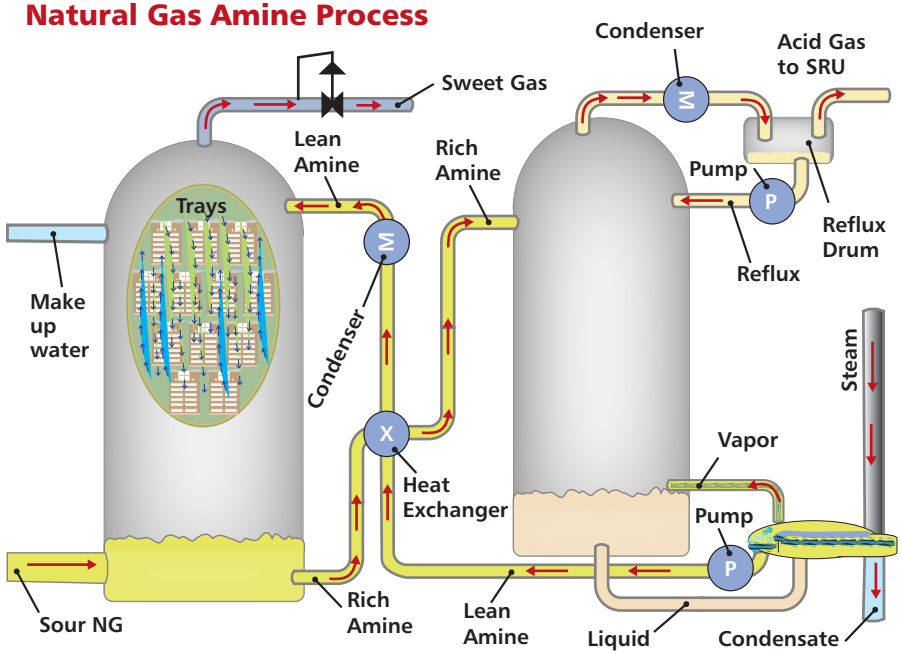
Chemical Absorption Fluids

- Monolethanolamine (MEA)
- Diethanolamine (DEA)
- Methyldiethanolamine (MDEA)
- Di-isopropylamine (DIPA)
- Di-glycolamine (DGA)
- High-load DEA (activated) & formulated MDEA

Physical Absorption Fluids

- Selexol®
- Sulfinol®
- Propylene carbonate

Natural Gas Amine Process



Designed and built to optimize performance in the harshest monitoring environments, Galvanic's ProTech family of H_2S analyzers deliver the utmost in ease-of-operation, precise measurements, consistent, field-proven performance – and value.

Whether you're on-site or around the globe, you can rest assured. With easy remote-access capability and fast, accurate H_2S-specific measurement – you have all you need to monitor critical H_2S levels to ensure pipeline, equipment, and public safety as well as regulatory and contractual compliance. Galvanic's ProTech analyzers are interference free and are not matrix dependent.

Ultra-high-sensitivity, lowest total cost of operation – the ProTech series can outperform any H_2S analyzer on the market:

- Multi-stream, dual-range capability (multi-stream available on D series systems only)
- Fast response-analysis time to quantify increasing or decreasing concentration levels
- Unbeatable performance: 5 ppbv sensitivity level; low ranges 0 to 1 ppmv and 0 to 100 ppbv
- Proven lead acetate tape technology – most-widely used and accepted method for H_2S analysis
- Rugged, field-proven construction and five- to 14-week tape lifetime enable hands-off operation for extended periods of time (tape life depends upon application)
- Designed for easy serviceability throughout
- Comprehensive, "smart" self-diagnostics coupled with remote access enables fast and easy issue identification and resolution
- 10 *quick-status* indicator lights (LED) and large, easy-read visual display (LCD)
- Proprietary *Tape Assurance System* assures smooth, trouble-free operation
- User-friendly Windows®-based software with graphical interface

Choose the ProTech Analyzer that's Right for Your Specific Application Needs

FEATURE	W	D1	D2
H_2S over-range capability	●	●	●
5 ppb sensitivity level	●	●	●
ASTM D4084-94 & D4324-97	●	●	●
Total Sulfur capability (ASTM D4468-95)		●	●
CSA Class 1, Div 1, Groups B,C & D, T3		●	
CSA Class 1, Div 2, Groups B,C & D, T3	●		●
Multi-stream capability		●	●