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Garrett Gas Train

Part No. 151-00

Instruction Manual

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Ver. 3.0

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Introduction

The Garrett Gas Train is the most widely used portable instrument for determining the presence and quantity of soluble sulfides and carbonate concentrations in drilling fluid. Soluble sulfides include H_2S as well as sulfide (S^{2-}) and bisulfide (HS^-) ions. Total soluble carbonates include CO_2 as well as carbonate (CO_3^{2-}) and bicarbonate (HCO_3^-) ions.

Mud filtrate is acidified inside the gas train, converting all sulfides to H_2S or all carbonates to CO_2 , depending upon the test. The gas train separates the gas from the liquid and an inert carrier gas transports the gasses through the separate chambers. In chamber three, the gas stream is passed through a Dräger tube, which responds to H_2S or CO_2 by darkening along its length. The stain length is proportional to the amounts of sulfides or carbonates in the filtrate. For qualitative H_2S analysis, lead acetate paper disks may be inserted to determine the presence or absence of sulfides.

The OFITE Garrett Gas Train consists of a transparent train, pressure regulator assembly, CO_2 and N_2O cartridges (sold separately), Dräger tubes for H_2S and carbonate detection, a flowmeter, and a convenient carrying case. For determining active sulfides in oil-based fluids, OFITE offers a separate kit that analyzes whole mud samples.

Specifications

Body Dimensions:

Chamber 1: Depth 3.54" (90 mm) × Diameter 1.52" (39 mm)

Chambers 2 & 3: Depth 3.54" (90 mm) × Diameter 1.18" (30 mm)

Passages between chambers: Diameter 0.08" (2.0 mm)

Dispersion tube:

Stem: Diameter 0.315" (8.0 mm) × Length 5.9" (150 mm)

Frit Diameter: 1.18" (30 mm)

Carrier gas should be inactive with H_2S or sulfide salts, citric acid, demulsifier and isopropanol for the sulfide analysis. CO_2 bulbs are preferred, but nitrogen gas or helium will work. Nitrous oxide bulbs are to be used only for the carbonate analysis. Avoid using compressed air or oxidative gases.

Flowmeter: Floating ball type is preferred, capable of measuring between 200 and 400 cm^3/min . carrier gas.

Syringes and injection tubes must be glass or a plastic type that is inert to sulfides and oil muds.

Components

#142-58	O-ring for HTHP Coupling
#143-00	Regulator
#143-02-10	CO ₂ Puncture Head Assembly
#143-02-13	O-ring for Puncture Pin Holder Assembly, CO ₂ Cartridge
#143-02-14	O-ring for Puncture Pin Holder Assembly
#143-03	Barrel for CO ₂ Cartridge
#145-601	Hydrogen Sulfide Test Papers, Package of 100
#151-01	Dispersion Tube
#151-02	Dräger Tube, Hydrogen Sulfide 100/1, Range: 100 - 2,000 PPM (Low Range)
#151-03	Dräger Tube, Hydrogen Sulfide 0.2%/A, Range: 0.2 - 7% by Volume (High Range)
#151-04	Dräger Tube, Carbon Dioxide 0.01%/A, Range: 0.01 - 0.3% by Volume
#151-06	Gas Bag
#151-07	Stopcock
#151-08	API Flow Meter Tube
#151-09	Dräger Hand Pump
#151-10	O-ring for Dräger Pump
#151-11	O-ring for Flow Meter Tube
#151-12	O-ring for 2 nd and 3 rd Chambers
#151-13	O-ring for 1 st Chamber
#151-14	Rubber Hose, ¼" OD × ⅛" ID, 1' Length
#151-14-1	Nylon Tube, 3" Length
#151-16	Rubber Septum, Qty: 8
#151-17	Octyl Alcohol (Defoamer), 2 oz.
#151-53	Carrying Case
#153-34	Glass Pipet, 1 mL × ⅒ mL
#153-40	Glass Pipet, 10 mL × ⅒ mL
#153-63	10 cc Disposable Syringe with Needle
#230-15	*Sulfuric Acid, 5 N, 2 oz., (UN #2796)

Optional:

#153-53-9	Magnetic Stirrer, 1,500 RPM, 115 Barnant (for oil-mud analysis)
#151-20	Kit for Determining Active Sulfides in Oil-Based Fluids:
#151-17	Octyl Alcohol Defoamer, 2 oz.
#151-20-1	*Citric Acid, 2M, Demulsifier, IPA Solution, UN #1219, 16 oz
#151-20-2	Sample Injection Needle
#153-29	Glass-Tip Syringe, 2 CC
#153-29-1	Glass-Tip Syringe, 5 CC
#153-29-2	Glass-Tip Syringe, 10 CC
#153-66	Disposable Syringe, 20CC

#151-00-SP Spare Parts for #151-00:

- #142-58 O-ring for HTHP Coupling, Qty: 4
- #143-00-1 Diaphragm for Airco Regulator
- #143-02-13 O-ring for Puncture Pin Holder Assembly, CO₂ Cartridge, Qty: 4
- #143-02-14 O-ring for Puncture Pin Holder Assembly, Qty: 4
- #143-05 EZ-Puncture CO₂ Bulbs, 8-Gram, UN #1013, Package of 10, Qty: 10
- #143-07 Regulator Repair Kit
- #143-08 EZ-Puncture N₂O Bulbs, 8-Gram, UN #1070, Qty: 5
- #145-601 Hydrogen Sulfide Test Papers, Package of 100, Qty: 2
- #151-01 Dispersion Tube
- #151-02 Dräger Tube, Hydrogen Sulfide 100/1, Range: 100 - 2,000 PPM, Qty: 2
- #151-03 Dräger Tube, Hydrogen Sulfide 0.2%/A, Range: 0.2 - 7% by Volume, Qty: 2
- #151-04 Dräger Tube, Carbon Dioxide 0.01%/A, Range: 0.01 - 0.3% by Volume, Qty: 2
- #151-06 Gas Bag, Qty: 5
- #151-07 Stopcock
- #151-10 O-ring for Dräger Pump, Qty: 2
- #151-12 O-ring for 2nd and 3rd Chambers, Qty: 6
- #151-13 O-ring for 1st Chamber, Qty: 3
- #151-14 Rubber Hose, ¼" OD × ⅛" ID, 1' Length, Qty: 4
- #151-15 Nylon Fitting for Filter Flow Tube, Qty: 2
- #151-16 Rubber Septum, Qty: 12
- #151-17 Octyl Alcohol (Defoamer), 2 oz., Qty: 2
- #153-34 Glass Pipet, 1 mL × ⅒ mL, Qty: 4
- #153-40 Glass Pipet, 10 mL × ⅒ mL, Qty: 2
- #153-63 10 cc Disposable Syringe with Needle, Qty: 12
- #230-13 *Sulfuric Acid, 5N, UN #2796, 8 oz., Qty: 2