

FlarePro Process Mass Spectrometer

Fast, Accurate Determination of Flare Gas Heat Value by Process MS

New rules for flare stack combustion from the US Environmental Protection Agency (EPA) set to take effect in early 2019 include additional monitoring and analysis requirements that make it necessary for refinery operators to quickly and accurately determine the heat values of flare stack gases.

Determining the heating values of vent gas is important because sufficient combustible material must be continuously present to achieve high combustion efficiencies. To assist refiners in making that determination, AMETEK Process Instruments has developed the Dycor FlarePro quadrupole process mass spectrometer.

The FlarePro provides fast and accurate BTU content measurement, even when confronted with widely changing flare gas streams. Field testing has shown that the FlarePro mass spectrometer offers more detailed and relevant data faster than gas chromatography and provides BTU numbers that are equivalent to those provided by a calorimeter, but with greater specificity.

The FlarePro uses ASTM method D 2650-04 (Standard Test Method for Chemical Composition of Gases by Mass Spectrometry) to calculate the concentrations of individual gas components. The resulting data is then converted into the flare gas heat value as described in ASTM D3588-98 (Standard Practice for Calculating Heat Value, Compressibility Factor and Relative Density of Gaseous Fuels).



Description of AMETEK Process Mass Spectrometer on Flare Stacks

The AMETEK FlarePro quadrupole process mass spectrometer is used for this application. The instrument has the following specifications:

- ▶ Stainless steel enclosure with 24" footprint (general purpose or C1, D2 area classification)
- ▶ 1 – 100 amu mass range
- ▶ 16 valve inlet system
- ▶ Dual electron multiplier/ faraday plate detector (10 ppm to 100% detection)
- ▶ TEC Cooling
- ▶ Process 2000 software for method creation and auto-calibration
- ▶ Modular design for ease of servicing
- ▶ Low maintenance
- ▶ Modbus/OPC Communications



FlarePro™ Process Mass Spectrometer

Accuracy of the Method

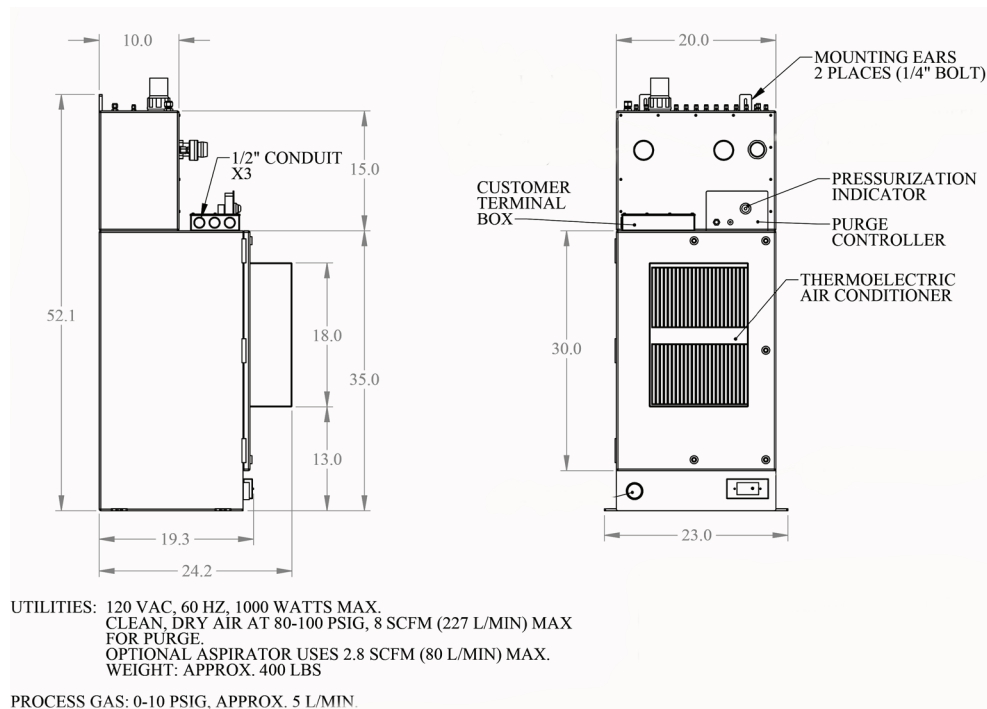
Based on real, field stream data and using the modified analysis method described above, we have verified the response of the mass spectrometer over a wide range of BTU values.

Sample No	Calculated by MS	Measured in Lab	Calculated/ Meas.
557793	1702 BTU	1697 BTU	100 %
558856	788 BTU	766 BTU	103 %
599491	158 BTU	143 BTU	111 %

If the flare analysis requires the reporting of the sulfur-bearing components, the following analysis method and matrix is used:

m/z	H2	CH4	Ethene	Ethane	Propene	Butene	Butane	Pentane	Propane	1-Pentene	1-Hexene	Hexane	Heptane
2	✓												
15		✓											
28			✓										
30				✓									
39					✓								
41						✓							
43							✓						
44								✓					
55									✓				
56										✓			
57											✓		
71												✓	
100													✓

	H2S	COS	SO2	CS2
34	✓			
60		✓		
64			✓	
76				✓



150 Freeport Road, Pittsburgh, PA 15238
 Ph. +1-412-828-9040, Fax +1-412-826-0399
 www.ametekpi.com



© 2016, by AMETEK, Inc.
 All rights reserved. Printed in the U.S.A.
 F-0519 Rev.3 (0417)

One of a family of innovative process analyzer solutions from AMETEK Process Instruments.
 Specifications subject to change without notice.

SALES, SERVICE AND MANUFACTURING:

USA - Pennsylvania
 150 Freeport Road, Pittsburgh PA 15238 • Tel: +1-412-828-9040, Fax: +1-412-826-0399

USA - Delaware
 455 Corporate Blvd., Newark DE 19702 • Tel: +1-302-456-4400, Fax: +1-302-456-4444

Canada - Alberta
 2876 Sunridge Way N.E., Calgary AB T1Y 7H2 • Tel: +1-403-235-8400, Fax: +1-403-248-3550

WORLDWIDE SALES AND SERVICE LOCATIONS:

USA - Houston, Texas
 Tel: +1-713-466-4900, Fax: +1-713-849-1924

BRAZIL
 Tel: +55 19 2107 4100

CHINA
 Beijing / Tel: +86 10 8526 2111, Fax: +86 10 8526 2141
 Chengdu / Tel: +86 28 8675 8111, Fax: +86 28-8675 8141
 Shanghai / Tel: +86 21 6426 8111, Fax: +86 21 6426 7818

FRANCE
 Tel: +33 1 30 68 89 20, Fax: +33 1 30 68 89 99

GERMANY
 Tel: +49 21 59 91 36 0, Fax: +49 21 59 91 3639

INDIA
 Tel: +91 80 6782 3200, Fax: +91 80 6782 3232

SINGAPORE
 Tel: +65 6484 2388, Fax: +65 6481 6588