

VCM/PROPANE GAS DETECTION SYSTEM

ABERDEEN CHEMICAL PLANT

AUGUST 22, 1985

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VCM/PROPANE GAS DETECTION SYSTEMABERDEEN CHEMICAL PLANTTable of Contents

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VCM/PROPANE GAS DETECTION SYSTEMABERDEEN CHEMICAL PLANTI. Purpose of Design

The purpose of this design is to provide the VCM tank farm area with an additional gas monitoring system to detect serious VCM releases, and to provide the boiler house propane storage area with a gas monitoring system to detect propane gas releases. Presently, there are six fixed point monitor locations for VCM that are tied into one of the plant's Honeywell GC's. These monitor locations are listed below:

1. Sphere (grade level).
2. Compressor shed (grade level).
3. Between railcar unloading stations number 1 and 6
(Top of railcar level).
4. Between railcar unloading stations number 2 and 7
(Top of railcar level).
5. Between railcar unloading stations number 3 and 8
(Top of railcar level).
6. Between railcar unloading stations number 4 and 9
(Top of railcar level).

These existing monitors do not provide immediate response and are not distributed throughout the entire VCM tank farm area. The propane storage area, located east of the boiler house, is not equipped with any gas detection instrumentation. Since these areas are not monitored by plant personnel the majority of the time, and since they have the potential for a serious release, additional protection is needed.

In addition to the gas monitoring system, this design will provide a pressurization blower and air heater for the fire pump houses near the VCM tank farm. The purpose of this blower is to prevent VCM from entering the buildings in the event of a serious VCM leak.

VCM/PROPANE GAS DETECTION SYSTEMABERDEEN CHEMICAL PLANTII. Process DescriptionA. VCM Tank Farm

This design will provide for the installation of eight VCM gas sensors, AT-101 through AT-108, in the VCM tank farm area (see P&I diagram for locations). These sensors will be tied into dual channel combustible gas monitors, AI-121 through 124. Each monitor will accept signals from two sensors and display the higher of the two readings. The monitors will indicate the percent of the lower explosive limit (LEL) of VCM gas in the air. The monitors will be tied into alarms in the vinyl control room. The first alarm will be set at 10% LEL and the second alarm will be set at 30% LEL.

Should any of the monitors indicate a low level (10% LEL) of VCM gas in the air, the panel operator will notify the vinyl shift supervisor and the yard operator of the situation. If the monitors indicate a high level (30% LEL) of VCM gas in the air, the panel operator will isolate the sphere by pushing the sphere control valve override switch. This switch closes the following valves:

- (1) The valve on the vapor line to/from the compressors.
- (2) The valve on the liquid line from the compressors.
- (3) The valve on the liquid line to the VCM transfer pumps.
- (4) The valve on the liquid recirculation line from the VCM transfer pumps.

In addition to the vapor monitors, a pressurization blower, F-150, will be installed for the fire pump houses. This blower will provide air to pressurize fire pump houses #1, #2, #3, and #4. Pressurizing the fire pump houses will prevent any VCM from entering the buildings in the event of a serious VCM leak.

The blower will run continuously to avoid dependence on an automatic control scheme that could malfunction during an emergency. The blower was sized to maintain a 0.25 inch of water pressure in the buildings while providing enough air to the diesel engines for combustion. This blower will be equipped with an extended inlet stack to provide VCM free air in the event of a serious release. An electric air heater, HC-100 will be located in the discharge duct of the blower to maintain the pressurization air temperature at 50°F year-round.

II. Process Description (Continued)

B. Boiler Propane Storage

The boiler propane storage area will be equipped with propane gas sensors AT-109 through AT-112 (see P&I diagram for locations). These sensors will be tied into dual channel combustible gas monitors, AT-125 and AI-126. Each monitor will accept signals from two sensors and display the higher of the two readings. The monitors will indicate the percent of the lower explosive limit (LEL) of propane gas in the air. The monitors will be tied into alarms in both the boiler control room and the vinyl control room. The alarms will be set at 30% LEL. Should any of the monitors indicate a propane gas release, the boiler operator and vinyl personnel will be notified by the alarms so that appropriate action can be taken.

VCM/PROPANE GAS DETECTION SYSTEMABERDEEN CHEMICAL PLANTIII. Equipment and Instrument Specifications

<u>Item No.</u>	<u>Description</u>
AI-121	VCM transfer pumps gas monitor
AI-122	South unloading stations gas monitor
AI-123	North unloading stations gas monitor
AI-124	Compressor shed gas monitor
AI-125	Propane tank/pump gas monitor
AI-126	Propane vaporizer gas monitor
AT-101	Gas sensor north of VCM transfer pumps
AT-102	Gas sensor east of actuated valves
AT-103	Gas sensor southwest of unloading stations
AT-104	Gas sensor southeast of unloading stations
AT-105	Gas sensor northwest of unloading stations
AT-106	Gas sensor northeast of unloading stations
AT-107	Gas sensor south of compressor shed
AT-108	Gas sensor north of compressor shed
AT-109	Gas sensor at propane transfer pumps
AT-110	Gas sensor south of propane tanks
AT-111	Gas sensor between middle and east vaporizer
AT-112	Gas sensor between middle and west vaporizer
F-150	Fire pump house pressurization blower
HS-130	Handswitch for F-150
HC-100	Duct Air Heater



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Engineering Center
Ponca City, Oklahoma
SPECIFICATION SHEET

SPECIFICATION SHEET

PROJECT NO. _____

DATE _____

DATE 12-21-84DRAWN BY ECJCHECKED BY VLT

PLANT Aberdeen Chemical PROJECT VCM/PROPANE GAS DETECTION SYSTEM

ITEM NO
SERVICE

AI-121 through AI-124, Gas Monitors (2)

Quantity: 45

Manufacturer: General Monitors (1)

Model No.: 580

Service: To indicate VCM gas concentrations in the ^{VCM} tank farm and railcar unloading area.

Each unit will receive signals from two sensors and display the higher of the two readings.

Temperature Range: 0°F to 150°F

Power Requirements: 105-130 VAC, 50-60 Hz;
or 12-15 VDC, 12 watts.

Meter Span: 0-100% Lower Explosive Limit (LEL)

Three Alarm Circuits: High, Low, Malfunction.

Battery Backup: Circuit for battery backup to be included.

Location: Indicators to be located west of the vinyl control room in the emergency power generator building.

Notes:

- (1) Or company Approved Equal
- (2) All five monitors to be tied into existing alarms located on the incinerator alarm annunciator panel. These alarms will be used to indicate 25% LEL and 45% LEL readings from the gas monitors.



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PROJECT NO. _____

A F E NO. _____

DATE 5-20-86 INQ NO. _____MADE BY JCG REQ NO. _____

APP'D BY _____ P.O. NO. _____

PLANT ABERDEEN CHEMICAL PROJECT VCM/PROPANE GAS DETECTION SYSTEMITEM NO
SERVICEAI-125, AI-126, GAS MONITORS (2)QUANTITY: 2MANUFACTURER: GENERAL MONITORS (1)MODEL NO.: 580SERVICE: TO INDICATE PROPANE GAS CONCENTRATIONS IN THE PROPANE STORAGE AREA EAST OF THE BOILER HOUSE.TEMPERATURE RANGE: 0°F TO 150°FPOWER REQUIREMENTS: 105 TO 130 VAC, 50-60 HZ; OR 12-15 VDC, 12 WATTS.METER SPAN: 0-100% LOWER EXPLOSIVE LIMIT (LEL)THREE ALARM CIRCUITS: HIGH, LOW, MALFUNCTIONBATTERY BACKUP: CIRCUIT FOR BATTERY BACKUP TO BE INCLUDEDLOCATION: BOILER CONTROL ROOM

NOTES:

(1) OR COMPANY APPROVED EQUAL

(2) EACH MONITOR TO BE TIED INTO EXISTING ALARMS ON BOTH THE INCINERATOR ALARM ANNUNCIATOR PANEL (VINYL CONTROL ROOM) AND THE BOILER ALARM ANNUNCIATOR PANEL (BOILER CONTROL ROOM).



GENERAL MONITORS, INC.

3037 ENTERPRISE STREET
COSTA MESA, CALIFORNIA 92626
PHONE: (714) 540-4895 TWX 678-372

A

TO: Mr. Frank Jenson
Vista Polymers
Box 91
Aberdeen, MS

Date: 30 January 1985

GMI QUOTATION NO: 6150

Your Reference: Verbal request of 30 January 1985.

Please Reference GMI Quote No.
On All Correspondence.

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	EXT. PRICE
1.	Model 580 System to include one Dual Channel Monitor, 2 ea Sensor P/N 10001-1, 2 ea Sensor Housing P/N 10007 and 1 ea Instruction Manual. Standard Relay Configuration. *Common Alarm Relays	6 ea	\$1,764.00	\$10,584.00
1a.	Alternate System Model 610 System to include one Four Channel Monitor, 4 ea Sensor P/N 10001-1, 4 ea Sensor Housing P/N 10007 and 1 ea Instruction Manual. Standard Relay Configuration. *Common alarm relays for all Four Channels. Common alarm set point adjustment.	3 ea	\$2,973.00	\$ 8,919.00
	Note: For a discrete set of alarm relays (Malfunction Low and High) for each channel plus discrete alarm set point adjustment add \$470.00 to unit price of item #1A.			
1b.	Alternate System Model 4800 system to include one 16 Channel Monitor, 1 ea Extender Card for Channel Card and one for relay card and one Instruction Manual. Blank Panels included at N/C for inactive channels. Each active channel to include one each channel control card, Relay			

Quotation Firm For:

F.O.B.

Terms: Net 30 Days

Delivery:

ARO

Warranty:

Enclosures:

Signature: _____ Sheet No. 1 Of 2 Sheets

Name/Title _____

Local Representative _____ Phone _____

Address _____



GENERAL MONITORS, INC.

3037 ENTERPRISE STREET
COSTA MESA, CALIFORNIA 92626
PHONE: (714) 540-4895 TWX 678-372

A

TO: Mr. Frank Jenson
Vista Polymers
Box 91
Aberdeen, MS

Date: 30 January 1985

GMI QUOTATION NO: 6150

Your Reference: Verbal request of 30 January 1985

Please Reference GMI Quote No.
On All Correspondence.

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	EXT. PRICE
	Card, Sensor P/N 10001-1 and Sensor Housing P/N 10007.			
	11 active channels	1 ea	\$11,784.00	\$11,784.00
	12 " "	1 ea	\$12,597.00	\$12,597.00
	13 " "	1 ea	\$13,410.00	\$13,410.00
	14 " "	1 ea	\$14,223.00	\$14,223.00
	15 " "	1 ea	\$15,036.00	\$15,036.00
	16 " "	1 ea	\$15,849.00	\$15,849.00
	Standard Relay Configuration*			
	Note: The Standard Relay Configuration is			
	<u>Malfunction.</u> SPDT, non-latching, energized			
**	<u>Low Alarm.</u> DPDT, non-latching, de-energized.			
**	<u>High Alarm.</u> DPDT, latching, de-energized.			
	other relay options (Latching and energized) are available.			
	**Model 4800 Low & High alarm Relays are SPDT. For DPDT add \$22.00 for <u>each active</u> channel in Item #1b.			
Quotation Firm For: 60 Days				
F.O.B. Costa Mesa, CA 92626				
Terms: Net 30 Days				
Delivery: 4 to 6 weeks		ARO	Warranty: 2 years	
Enclosures: Product Catalog				

Signature: Ken Kaub Tech. Rep. Sheet No. 2 Of 2 Sheets
Name/Title Ken Kaub

Local Representative _____ Phone _____
Address _____



GENERAL MONITORS

Description

General Monitors' Model 580 is a compact, highly-versatile system for continuously monitoring combustible gas concentrations in two locations. The system consists of two remote sensing assemblies and a solid-state controller.

For safety, reliability, and ease of calibration, sensor outputs are not summed. Each channel is completely independent and has its own constant current sensor drive circuit. Sensors are available to meet various service requirements for most gases.

The Model 580 independently monitors two locations. The controller automatically displays the higher reading channel on an analog meter, scaled from 0-100% LEL (Lower Explosive Limit). Manual override switching permits readout of the low channel at any time. Low and high alarm set-points are common to both channels. Calibration of each channel is done independently, and an alarm override switch disables the alarms during the calibration mode. A 45 second time delay also disables the alarms on start-up.

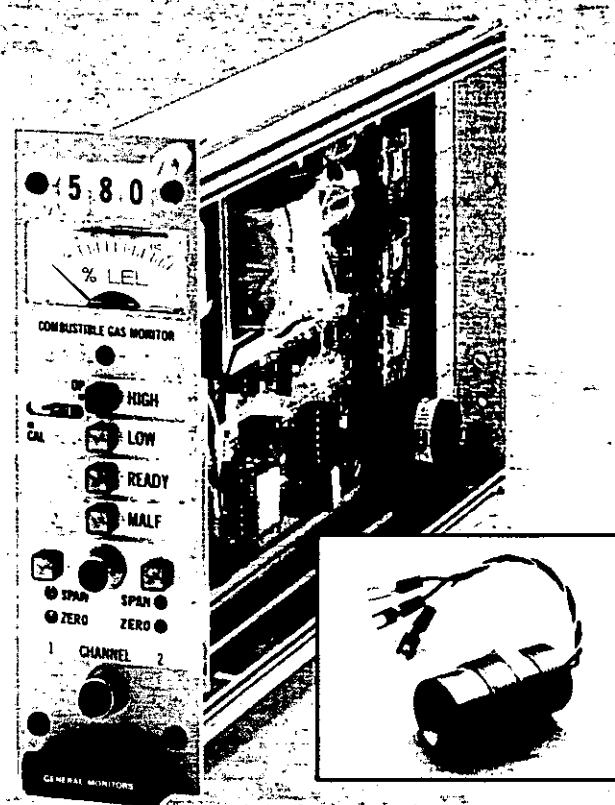
Customers may select from a wide variety of relay options, such as normally energized or de-energized high and low alarms, and latching or non-latching high and low alarms. The malfunction relay circuitry is normally energized and monitors both channels.

Features

- ☐ "Peak Picking" Circuitry
 - Automatically displays highest reading channel
- ☐ Compact Packaging
 - Dimensions: 2"W x 7"H x 11.5"D (51 mm W x 178 mm H x 292 mm D)
- ☐ Low Power Consumption
- ☐ Analog Meter Standard
- ☐ Independent 3 AMP/117 VAC DPDT High and Low Alarm Relays
 - 3 AMP/117 VAC SPDT Malfunction Alarm Relay
- ☐ Variety of Relay Options
 - Normally energized or de-energized high and low alarm
 - Latching or non-latching high and low alarm
 - Remote Reset
- ☐ Superior Reliability
 - Two week factory burn-in of system
 - Single P.C. board
 - Solid-state circuitry
 - Proven catalytic sensor
 - Malfunction alarm circuitry
 - Positive contact field terminals
 - Time delay
 - Constant current supply to sensor

ABD00243480

Model 580 — Dual Channel Combustible Gas Monitor



- ☐ Safe, Easy Calibration
 - Fully accessible calibration adjustments
 - Alarm relays automatically disabled while in calibration mode
- ☐ Low Cable Costs
 - 40 ohm loop resistance, e.g. 3000 ft. (910 meters) one way of #18 AWG cable
 - 7600 ft. (2320 meters) one way of #14 AWG cable
- ☐ User Protection
 - Two year warranty
 - CSA approved

Applications — Protection from hazardous combustible gases in:

- ☐ Fuel Loading Facilities
- ☐ Compressor Stations
- ☐ LNG Processing and Storage
- ☐ Oil Well Logging
- ☐ Sewage Plants
- ☐ Gas Turbine Enclosures
- ☐ Drilling and Production Platforms
- ☐ Solvent Vapors

Sensor Elements

General Monitors' sensors are designed for reliable performance and long life. Each sensor must undergo extensive burn-in and rigid quality control procedures before shipment.

The sensors consist of two catalytic bead elements in a balanced Wheatstone bridge circuit (See Principle of Operation). These low temperature catalytic bead sensing elements require minimal sensor excitation current, greatly increasing sensor life.

Principle of Operation

A catalytically treated ceramic active bead and a passivated ceramic reference bead form two legs of a Wheatstone bridge circuit. Combustible gases diffuse through a flame arrestor and oxidize on the catalytically treated active bead, causing an increase in its temperature and electrical resistance. This results in an unbalancing of the Wheatstone bridge circuit. The reference bead, inert to combustible gases, compensates for ambient temperature, humidity and pressure changes. The difference in resistance of the active and reference beads is converted into a sensor signal which is amplified in the controller, sent to the indicator and alarm circuits, and displayed on an analog meter. The meter is scaled in percent of the Lower Explosive Limit (% LEL). In the Model 580 the two sensor inputs are continuously compared, the higher signal being displayed on the meter.

Two adjustable electronic alarm circuits may be field-set for any alarm level up to 100% LEL. The low alarm signal indicates potentially hazardous gas accumulations at low concentrations, allowing time for corrective action. The high alarm signal indicates immediate danger. A flashing malfunction LED will indicate low input power, sensor removal or damage, "CAL" mode, severed cable or current failure. Two LED channel indicators are provided to indicate the higher channel.

A variety of alarm relay options provides contacts for high, low and malfunction alarms to be wired to auxiliary lamps, horns, fans or shut-down equipment.

Independent Channel Calibration

A

% LEL Meter

Analog output meter with linear scale calibrated in the percent of Lower Explosive Limit (% LEL).

Recessed Toggle Switch

Used for normal operation or calibration. When in the "CAL" mode high and low alarms are disabled.

Status Indicators

HIGH alarm — flashing red LED
 LOW alarm — flashing amber LED
 READY (power on) — steady green LED
 MALF (malfunction) — flashing amber LED
 *High channel indicators — green LED's
 Channel select switch — black button

Calibration Potentiometers

HIGH and LOW alarms — set point adjustments located on circuit board.
 SPAN and ZERO adjustments for each channel accessible through front panel.

Reset Button

Used for manual reset of latching high and low alarm circuits.

Height 7" (178 mm)

Depth 11.5" (292 mm)

Width 2" (51 mm)

Calibration

By placing the recessed toggle switch on the front panel to the calibration mode, the high and low alarm relays are held in standby condition and the "MALF" LED flashes. Zero and span pots are accessible from the front panel. Calibration is accomplished by adjusting the meter to zero and exposing one of the two sensors to a known concentration calibration gas and adjusting the meter with the span pot to indicate the concentration. The alarm adjustments are located on the side of the controller to prevent tampering.

Relay Options

The versatility of the Model 580 is enhanced by the availability of different relay operating modes for specific user requirements. These relay options include normally energized or de-energized high and low alarms, latching or non-latching high and low alarms and sealed relays.

CSA performance certified to C22.2 No. 152-1976

Controller Specifications

Mounting Options:

Rack, panel and wall

Dimensions:

2" W x 7" H x 11.5" D
 (51 mm W x 178 mm H x 292 mm D)

Weight:

4 lbs. (1.80 kg)

Temperature Range:

0°F to 150°F (-18°C to +66°C)

Power:

117 VAC $\pm 15\%$ (220 VAC $\pm 15\%$ optional), 50-60 Hz, 22-30 VDC, 8 watts nominal

Meter Range:

0-100% Lower Explosive Limit (% LEL)

Repeatability:

$\pm 2\%$ full scale

Linearity:

$\pm 5\%$ full scale

Alarm Circuits:

High, low and malfunction:
 Standard high and low DPDT 3 AMP/
 117 VAC resistive, malfunction
 SPDT 3 AMP/117 VAC resistive, high
 and low normally de-energized,
 malfunction normally energized.

LED Status Indicators:

Flashing red for high alarm, flashing
 amber for low alarm, green for
 ready (power on), flashing amber
 for malfunction, flashing amber for
 calibration mode, steady green for
 each channel indicator.

Electrical Classification:

General purpose for mounting in non-hazardous area

Warranty:

Two years

Sensor Specifications

Type:

Continuous diffusion, low temperature catalytic bead, Standard Industrial Hydrocarbon Sensor, High Temperature Standard Industrial Hydrocarbon Sensor.

Temperature Range:

-65°F to +200°F (-55°C to +93°C);
 High Temperature Sensor to 400°F
 (200°C)

Response Time:

Typically 6-second time constant when exposed to 50% LEL of methane gas

Zero Drift:

Less than 5% per year

Life:

3 to 4 years, normal service

Electrical Classification:

NEC and CSA, Class I, Division 1, Group B, C and D; VDE 0171 (Ex) sd 3n G5

Warranty:

Two years

Cable Length:

Maximum 3 wire cable length allowable between controller and sensor assembly with one way resistance of 20 ohms (total 40 ohms loop)

AWG	FEET	METERS
20	1900	580
18	3000	910
16	4800	1460
14	7600	2320

Represented by:



GENERAL MONITORS, INC.

3037 Enterprise Street • Costa Mesa, CA 92626
 Tel. (714) 540-4895 • Telex 678-372 • FAX (714) 557-2516



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Engineering Center
Ponca City, Oklahoma
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PROJECT NO. _____

AS E. No. _____

DATE 12-20-84 (Date) _____DRAWN BY FGS (Name) _____CHECKED BY VL (Name) _____

PLANT Aberdeen Chemical PROJECT VCM/PROPANE GAS DETECTION SYSTEM

ITEM NO.
SERVICE

AT-101 through AT-112, Gas Sensors

Quantity: 12

Type: Diffusion, low temperature catalytic bead

Manufacturer: General Monitors (1)

Model No: 10001-1

Service: TO SENSE VCM AND PROPANE CONCENTRATIONS IN THE VCM tank farm and boiler propane storage area. These sensors will send a signal to respective General Monitors Indicating units. Refer to P&I or process description for Tie-in details.

Location: Sensors to be located between 2 and 3 feet above ground level at each of the designated locations on the P&I diagrams

Notes:

(1) Or company approved equal



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Ponca City, Oklahoma
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PROJECT NO. _____

DATE 1-25-85 _____DRAWN BY EGT _____CHECKED BY YLT _____

PLANT Aberdeen Chemical PROJECT VCN/PROPANE GAS DETECTION SYSTEM

ITEM NO
SERVICE

F-150 Blower (see note 2)

Service: Fire Pump House pressurization

Location: Fire Pump House Roof (Fire pump houses #1, #2, #3, #4)

Material: Air

Density: .076 lb/ft³

Rate: 3500 SCFM @ 0.50" H₂O

Minimum Pressure Required in Buildings: .15" H₂O

Temp.: 10°F min.

100°F max.

Mat'l of Const.: C.S.

Manufacturer: The New York Blower Co. (1)

Model No.: 155 KB-1

Description: 1 1/2 hp, 1750 RPM

Combustion Air Required For Each Detroit Diesel Engine:
620 SCFM

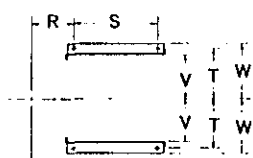
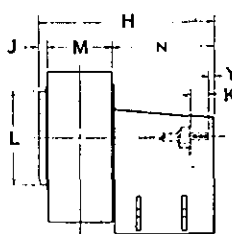
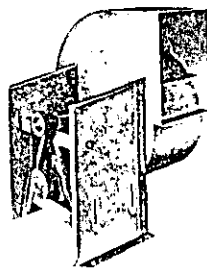
Notes:

- (1) Or Company approved equal
- (2) Blower handswitch, HS-130, to be tied into the air duct heater HC-100 ALSO.
- (3) Provide screen for inlet of blower.
- (4) Provide local on/off switch for blower (see spec. sheet for HS-130).
- (5) Provide belt guards for blower.

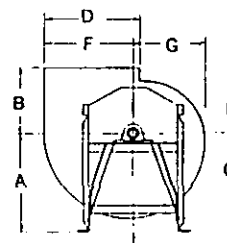
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SIZES 125 and 155—BELT DRIVEN

MAXIMUM TEMPERATURE: 200°F.



Inlet and outlet dimensions are outside.
Dimensions not to be used
for construction unless certified.



DIMENSIONS [INCHES]

Size	Wheel dia.	Outlet area sq. ft.	A	B	C	D	E	F	G	H	J	K	L	M	N'
125	12 1/4	.86	17	10	12 3/8	13 3/4	7 7/8	13	10 3/8	27 1/2	1 1/8	3	13 3/4	9 3/8	17
155	15	1.29	17	12	15 1/8	16 7/8	9 3/4	15 7/8	12 3/4	30	1 5/8	3	16 3/4	11 3/8	17

Size	R	S	T	V	W	Y	a*	b*	c*	d*	Shaft	Keyway	Base holes
125	6 1/8	12 7/8	9 1/4	8 1/8	10 1/8	5/8	11 5/8	16 1/4	12 7/8	9 1/4	1	1/4 x 1/8	9/16
155	7 1/8	12 7/8	9 1/4	8 1/8	10 1/8	5/8	14 1/8	19 3/4	15 3/4	11 3/8	1	1/4 x 1/8	9/16

*Discharge dimensions . . . see page 5.

SIZE 125

Capacities based on air density of .075 lbs. per cu. ft.
Maximum safe speed at 70°F.: 1715 RPM

CFM	OV	1 1/2" SP		1 1/4" SP		1 1/2" SP		1 3/4" SP		1" SP		1 1/2" SP		2" SP		2 1/2" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1031	1200	420	.09	498	.12	638	.20	772	.29								
1203	1400	461	.13	535	.17	658	.25	777	.34	893	.44						
1375	1600	509	.19	575	.23	688	.31	793	.41	896	.51						
1547	1800	557	.26	616	.30	723	.39	818	.49	910	.59	1094	.84				
1719	2000	608	.34	660	.39	760	.48	850	.59	934	.70	1100	.95	1262	1.23		
1891	2200	658	.44	706	.49	801	.60	884	.71	963	.83	1116	1.08	1266	1.37	1412	1.68
2063	2400	711	.56	752	.61	842	.73	922	.85	997	.98	1137	1.23	1276	1.53	1413	1.85
2235	2600	764	.72	801	.75	884	.88	961	1.02	1032	1.14	1166	1.42	1293	1.71	1421	2.04
2407	2800	819	.88	852	.93	928	1.05	1002	1.20	1071	1.33	1197	1.62	1317	1.92	1436	2.25
2579	3000	873	1.07	903	1.12	972	1.25	1044	1.40	1109	1.54	1230	1.85	1345	2.17	1456	2.50
2751	3200	927	1.29	954	1.34	1019	1.48	1085	1.63	1150	1.79	1267	2.10	1375	2.43	1482	2.78
2923	3400	982	1.54	1007	1.59	1066	1.73	1130	1.88	1192	2.06	1305	2.39	1409	2.73	1511	3.09
3095	3600	1038	1.82	1060	1.87	1114	2.01	1174	2.18	1234	2.35	1343	2.70	1445	3.06	1542	3.43

NOTE: Performance shown is for Junior Fans with outlet duct and with or without inlet duct. BHP shown does not include belt drive loss, but does include bearing drag. Tinted capacities indicate BHP requirements which may exceed maximum motor limitations . . . see below.

COMPLETE PACKAGE MODEL NUMBERS

Junior Model No.	Motor		Adj. drive RPM range
	HP	RPM	
125GD	1/3	1150	420/640
125GB	1/3	1725	630/960
125HB	1/2	1725	630/960
125IB	3/4	1725	730/1110
125JB	1	1750	840/1240
125KB	1 1/2	1750	920/1380
125LB	2	1750	1040/1430
125MB	3	1750	1190/1540

SIZE 155

Capacities based on air density of .075 lbs. per cu. ft.
Maximum safe speed at 70°F.: 1400 RPM

CFM	OV	1 1/2" SP		1 1/4" SP		1 1/2" SP		1 3/4" SP		1" SP		1 1/2" SP		2" SP		2 1/2" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1535	1200	342	.13	401	.17	510	.26	609	.36								
1791	1400	380	.19	433	.24	529	.33	619	.44	704	.56						
2047	1600	418	.27	467	.32	554	.44	637	.55	715	.67	858	.93				
2303	1800	459	.37	503	.43	584	.55	658	.67	731	.80	866	1.08	991	1.39		
2559	2000	500	.48	540	.55	615	.69	685	.82	751	.96	878	1.26	997	1.58	1106	1.92
2815	2200	542	.63	579	.71	649	.86	714	1.00	776	1.16	895	1.46	1007	1.80	1113	2.15
3071	2400	584	.81	620	.89	685	1.05	745	1.20	803	1.37	914	1.70	1020	2.05	1122	2.42
3327	2600	628	1.01	660	1.09	721	1.27	780	1.45	833	1.62	939	1.97	1039	2.34	1135	2.72
3583	2800	672	1.24	702	1.33	759	1.52	814	1.72	865	1.90	964	2.27	1060	2.66	1150	3.06
3839	3000	715	1.51	743	1.61	798	1.82	850	2.02	899	2.21	993	2.61	1083	3.01	1170	3.44
4095	3200	759	1.81	785	1.93	838	2.14	887	2.36	934	2.57	1023	2.99	1109	3.41		
4351	3400	804	2.16	828	2.28	877	2.51	924	2.73	970	2.97	1056	3.41				
4607	3600	848	2.55	872	2.67	918	2.91	963	3.16	1006	3.40						

NOTE: Performance shown is for Junior Fans with outlet duct and with or without inlet duct. BHP shown does not include belt drive loss, but does include bearing drag. Tinted capacities indicate BHP requirements which may exceed maximum motor limitations . . . see below.

COMPLETE PACKAGE MODEL NUMBERS

Junior Model No.	Motor		Adj. drive RPM range
	HP	RPM	
155GD	1/3	1150	315/540
155GB	1/2	1725	470/715
155IB	3/4	1725	550/830
155JB	1	1750	590/870
155KB-1	1 1/2	1750	650/900
155KB-2	1 1/2	1750	720/980
155LB	2	1750	740/1110
155MB	3	1750	830/1150

MAXIMUM MOTOR LIMITATIONS

Maximum motor frame*		ML dimension maximum overall motor length
Open	TE	
182T	182T	

*Frame sizes vary in length with motor manufacturer. Check NEMA "C" dimension against ML dimension above if specific make of motor is required.

MINIMUM/MAXIMUM V-BELT DRIVE CENTER DISTANCES

Motor frame size	Minimum/maximum centers in inches
48	7.75/10.75
56, 143T, 145T	7.25/10.25
182T	8.25/9.75



Conoco Inc.
Engineering Center
Ponca City, Oklahoma
SPECIFICATION SHEET

SPECIFICATION SHEET

PROJECT NO. _____

DATE _____

DATE 2-13-85

DATE BY EGT

DATE BY VLT

PLANT Aberdeen Chemical PROJECT VCM/PROPANE GAS DETECTION SYSTEMITEM NO
SERVICE HS-130, HandswitchService: F-150Location: Next to F-150Description: Local ON/OFF push button
for pressurization blower F-150Power Requirement: 120 V AC

V



Conoco Inc.
Engineering Center
Ponca City, Oklahoma
SPECIFICATION SHEET

SPECIFICATION SHEET

PROJECT NO. _____

A F E NO. _____

DATE 8-21-85 (IND) NO. _____MADE BY JCG RE (I) NO. _____

APPROD BY _____ P (I) NO. _____

PLANT ABERDEEN CHEMICALPROJECT ICM/PROPANE GAS DETECTION SYSTEM

ITEM NO

SERVICE HC-100 DUCT AIR HEATERQUANTITY: 3MANUFACTURER: CHROMALOX (1)MODEL NO: CABB 252

SERVICE: TO PREHEAT AIR ENTERING FIRE PUMP HOUSE TO
50°F. 0-60°F AIR HEATING CAPABILITY AT 3500 SCFM
AIR FLOWRATE,

POWER REQUIREMENT: 480 V AC, 1POWER USAGE: 25 KW EACH @ MAXIMUM POWERLOCATION: BLOWER DISCHARGE DUCT (2)SIZE: 20 1/8" x 26 1/8"

NOTES:

(1) OR COMPANY APPROVED EQUAL.

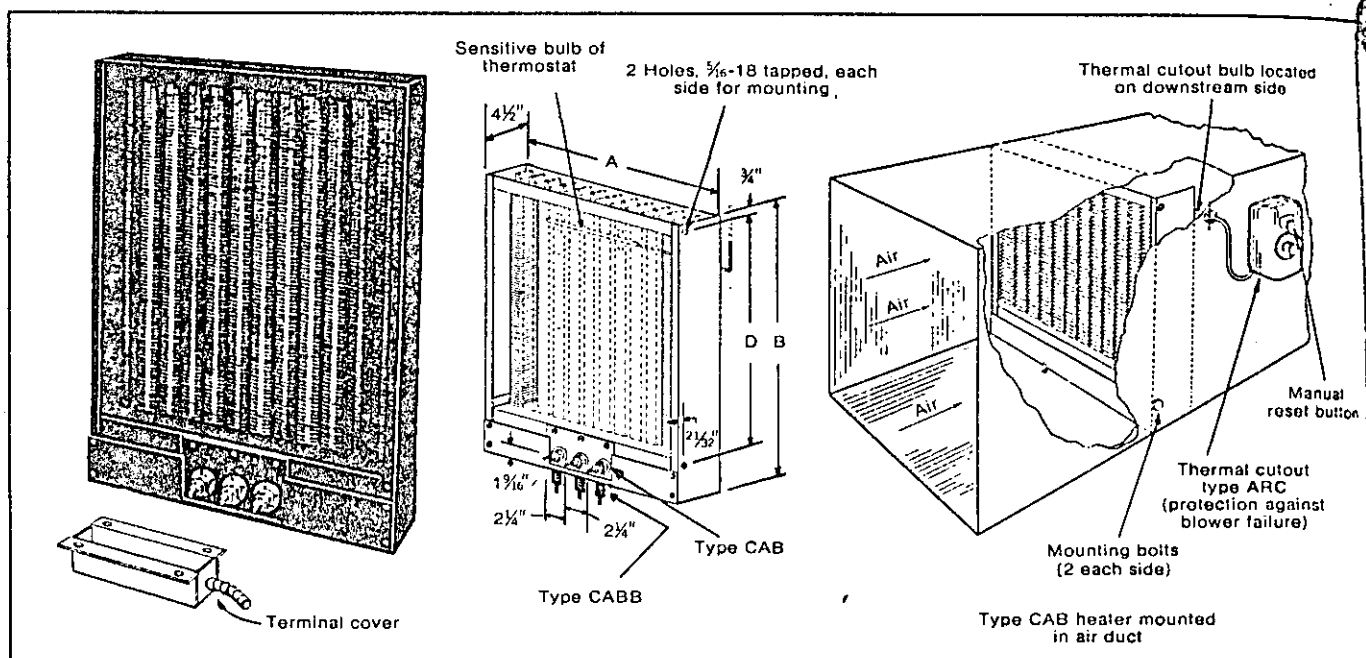
(2) FAN DISCHARGE DUCT IS 11 3/8" x 16 7/8", SO A DUCT ENLARGEMENT
TRANSITION PIECE WILL BE REQUIRED.

(3) WIRE HEATERS IN PARALLEL WITH BLOWER F-150 TO ENSURE
HEATER DOESN'T OPERATE WITHOUT AIR MOVEMENT.

(4) PROVIDE OVERHEAT PROTECTION BY INSTALLING THERMAL
CUTOUT INSTRUMENT (CHROMALOX NO. ARC-29)

(5) PROVIDE THERMOSTAT CONTROL TO MAINTAIN EXIT AIR
AT 50°F.

Process air heaters

**Type CAB (side terminals)****Type CABB (bottom terminals)**

Uses: As sole heat source. As booster heater. To convert forced-air ovens and dryers. With blower and duct, Type CAB can be used in fabricating simple forced-air drying units. Can also be used with blower only for wider distribution of heat.

Maximum Sheath Temperatures:

Rust-resisting iron sheath.....750°F
 Chrome steel sheath.....950°F

Maximum Work Temperatures:

Type CAB process air heaters can generally be used in the following applications at maximum temperatures shown without exceeding their capability if properly installed according to instructions packed with heaters.

Sheath Material	Air Velocity	Maximum Output Air Temp.
Iron	9 feet/second	90°F
	16 feet/second	220°F
Chrome Steel	4 feet/second	190°F
	9 feet/second	330°F
	16 feet/second	440°F

The preceding maximum work temperatures are based on 26-watts-per-sq.-in. watt density. If elements have a lower watt density, output air temperature may be increased; if watt density is higher, output air temperature should be lowered.

Construction. Chromalox Finstrip® elements are mounted in a sturdy steel frame with narrow side of element and fins facing air flow. Mounting holes at sides of frame facilitate attachment to duct.

Controls. Overheat protection is recommended to prevent burnout if air flow is restricted, and standard bracket is installed on frame for mounting Type ARC-590 thermal cutout (page 134.) For thermostat, see Control Section.

Wiring. Blower motor should be wired in parallel with heater circuit. Terminals are located on bottom of heater and heater is installed with terminals facing upstream. Alloy wire or bus bar (page 118) must be used for power connections.

Terminal cover: Specify Quantity, Part No. 1-21921, PCN 269720, Terminal Covers. Chromalox can supply other sizes and ratings. Ask for Product Manual PF-109.

Dimensions—Inches	Volts	KW	Number	Number	Catalog	Product	Approx.
A B D	3 Phase	26 w/ Sq. In.	of Circuits	of Finstrips	No.	Code No. (PCN)	Net Wt. Lbs.

Type CAB—Rust-resisting iron sheath—for sheath temperatures to 750°F

10%	15%	11½	240	6	1	6	CAB-62	260072	25
			480	6	1	6	CAB-62	260080	25
15%	18½	14%	240	12	1	9	CAB-122	260136	35
			480	12	1	9	CAB-122	260144	35
15%	21%	17%	240	15	1	9	CAB-152	260195	40
			480	15	1	9	CAB-152	260208	40

Type CAB—Chrome steel sheath—for sheath temperatures to 950°F

10%	15%	11½	240	6	1	6	CAB-611	260451	25
			480	6	1	6	CAB-611	260460	25
15%	18½	14%	240	12	1	9	CAB-1211	260515	35
			480	12	1	9	CAB-1211	260523	35
15%	21%	17%	240	15	1	9	CAB-1511	260574	40
			480	15	1	9	CAB-1511	260582	40
20%	21%	17%	240	20	1	12	CAB-2011	260603	55
			480	20	1	12	CAB-2011	260611	55
29½	21%	17%	480	30	2	18	CAB-3011	279160	75

Type CABB—(Bottom Terminals)—Rust-resisting iron sheath—for sheath temperatures to 750°F

20%	26%	21%	480	25	1	12	CABB-252	266626	65
29½	27%	23	480	40	2	18	CABB-402	266669	90
29½	33%	28%	480	50	2	18	CABB-502	266466	110

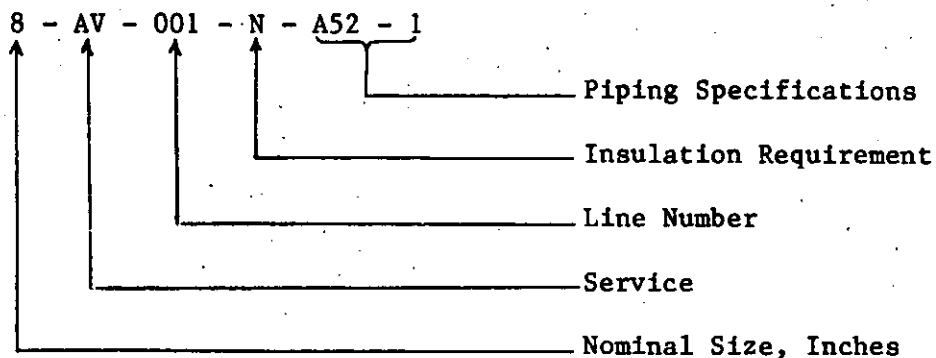
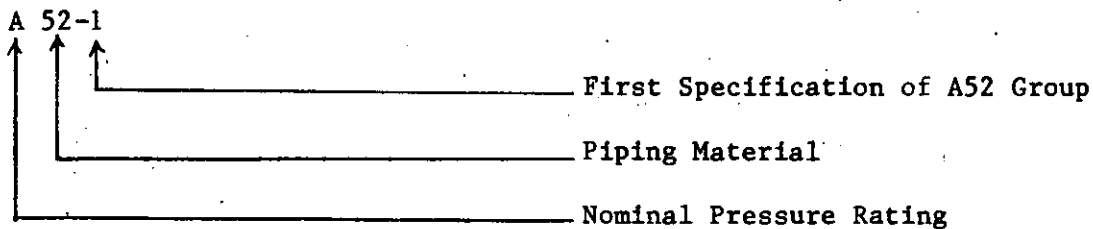
Type CABB—(Bottom Terminals)—Chrome steel sheath—for sheath temperatures to 950°F

10%	15%	11½	240	6	1	6	CABB-611	266546	25
10%	15%	11½	480	6	1	6	CABB-611	266554	25
15%	18½	14%	480	12	1	9	CABB-1211	266562	35
20%	21%	17%	480	20	1	12	CABB-2011	266570	55
20%	26%	21%	480	25	1	12	CABB-2511	266634	65
29½	27%	23	480	40	2	18	CABB-4011	266642	90

Specify: Quantity, catalog no., PCN, volts, KW, process air heaters, plus terminal covers (see above) if required.

VCM/PROPANE GAS DETECTION SYSTEMABERDEEN CHEMICAL PLANTIV. Process Piping Schedule

The following piping schedule uses a system of numbers and letters as a line designation. This system denotes the following information: line size, service, line number, insulation requirements, and piping specifications.

Sample Line DesignationSample Piping DesignationService Designation UsedDesignation

AV

Service

Ventilation Air

Insulation Requirement

N

None

Nominal Pressure Rating

A

150 Pound Class

Piping Material

52

Galvanized Steel Duct

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 2-13-85 Made By FGJ
Project VCM Gas Monitoring
Plant Aberdeen Chemical

[illegible]

VCM/PROPANE GAS DETECTION SYSTEMABERDEEN CHEMICAL PLANTV. Work List

1. Purchase and install eight gas sensors, AT-101 through AT-108, in the vinyl tank farm area (see P&I diagram for location). These sensors should be installed 2-3 feet from grade level.
2. Purchase and install four gas monitors, AI-121 through AI-124, in the emergency generator building located west of the control room.

AT-101 & AT-102 to AI-121
AT-103 & AT-104 to AI-122
AT-105 & AT-106 to AI-123
AT-107 & AT-108 to AI-124
3. Tie in the four gas monitors to two existing alarms located on the incinerator alarm annunciator panel. These alarms will be used to warn operations of any high readings of VCM from the four gas monitors. These alarms are to be labeled TANK FARM HYDROCARBONS ABOVE 10% LEL and TANK FARM HYDROCARBONS ABOVE 30% LEL.
4. Purchase and install four gas sensors, AT-109 through AT-112, in the propane storage area east of the boiler house (see P&I diagram for location). The sensors should be installed 2-3 feet from grade level.
5. Purchase and install two gas monitors, AI-125 and AT-126 in the boiler control room. Tie in the following gas sensors to the corresponding gas monitors:

AT-109 & AT-110 to AI-125
AT-111 & AT-112 to AI-126
6. Tie in the two gas monitors to an existing alarm on the boiler alarm annunciator panel located in the boiler control room and to an existing alarm on the incinerator alarm annunciator panel in the vinyl control room. These alarms will be used to warn operations of any high readings of propane from the four gas monitors. These alarms are to be labeled BOILER PROPANE STORAGE HYDROCARBONS ABOVE 30% LEL.

V. Work List (Continued)

7. Purchase and install a pressurization blower, F-150, at grade level near fire pump houses #1, #2, #3, and #4. Provide a 30 feet stack for the inlet of the blower with a Bird screen and provide ducting, 8-AV-001, to fire pump houses. Install duct air heater HC-100 in discharge duct of blower F-150.