Ammonia Detection System

Codes and Design Specifications

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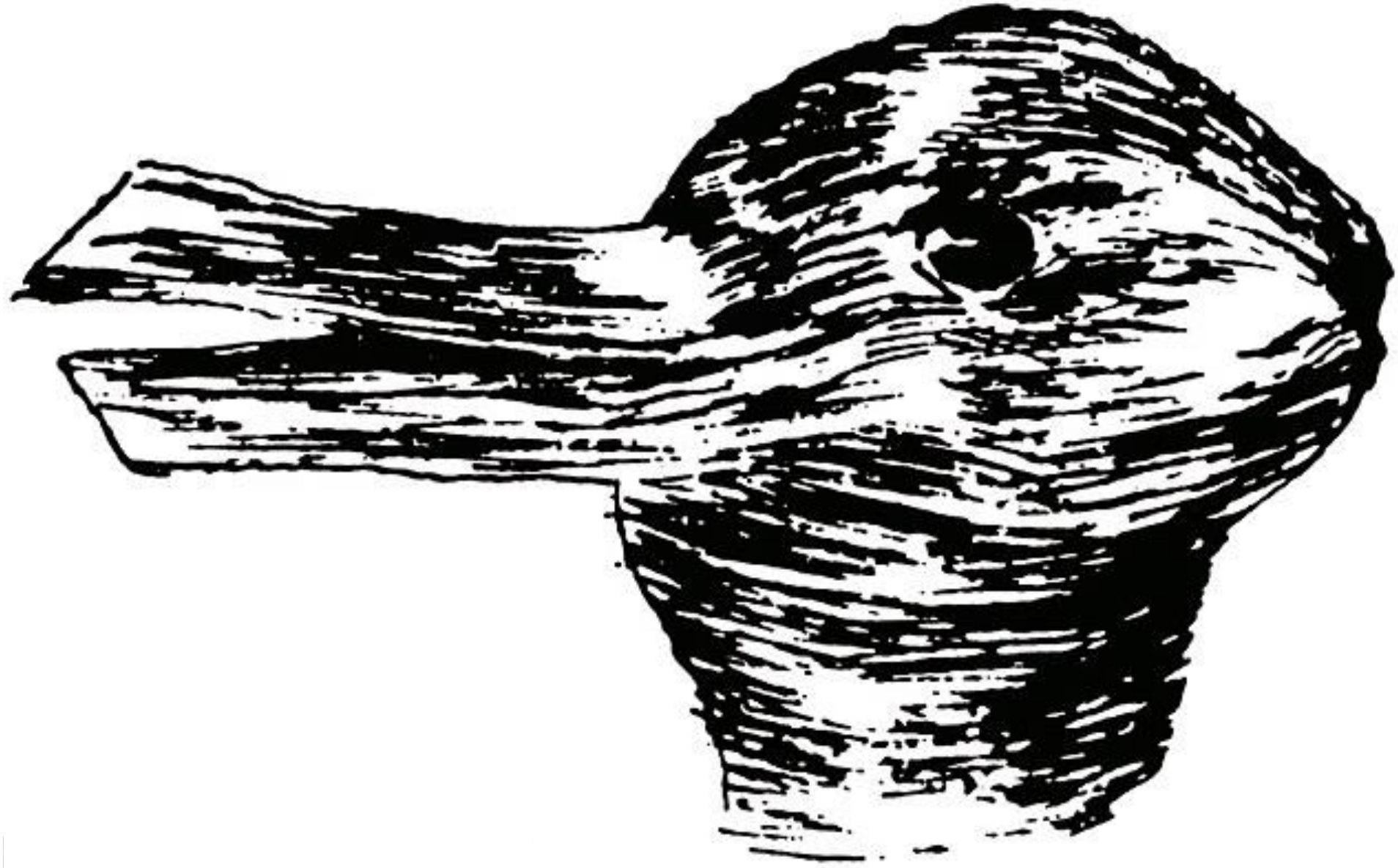
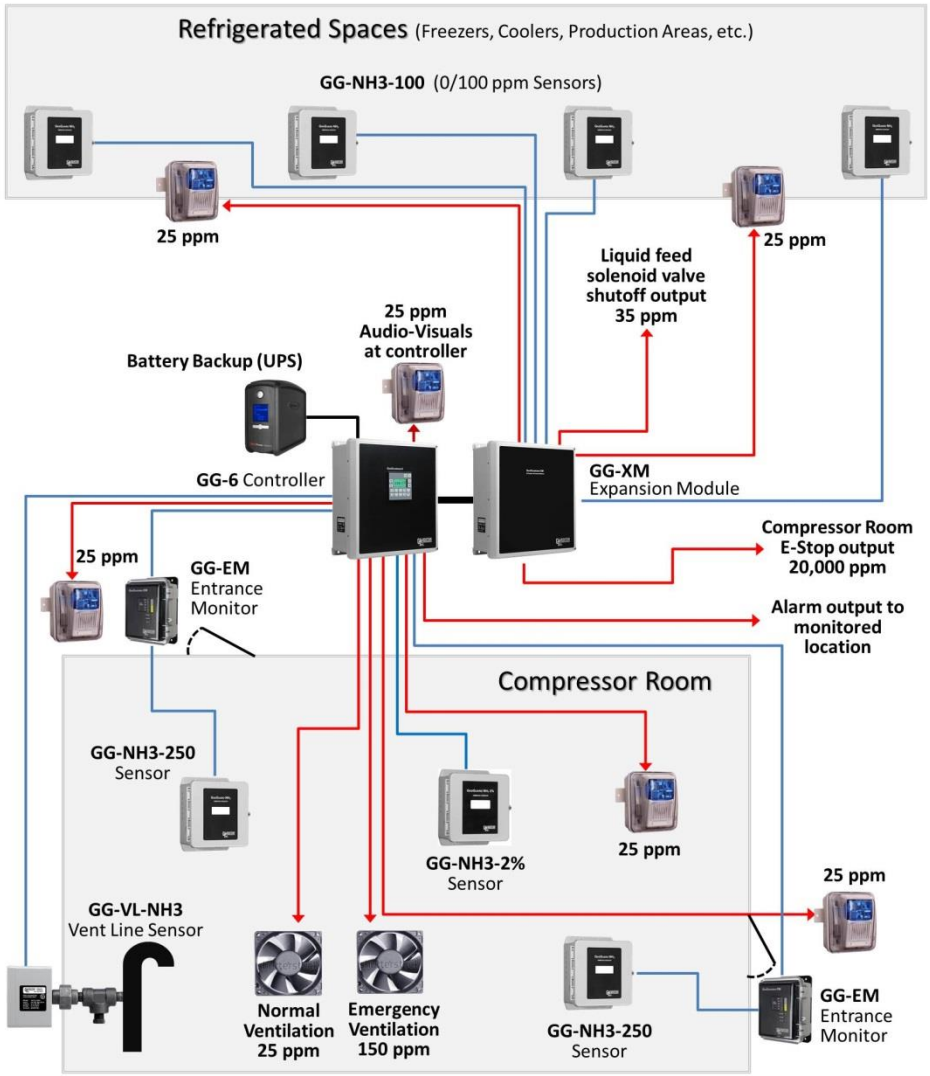


Ammonia Detection Code Requirements

	IIAR-2A-2008	ASHRAE 15 - 2010	NFPA 1 – 2012	UMC – 2012 Preprint	IFC - 2012	IMC - 2012	NFPA 72 - 2010
General				Comply with IIAR2, ASHRAE 15	Comply with IMC - 2012	Comply with IIAR2, ASHRAE 15, IFC-2012	Any gas detection systems installed on a fire alarm system shall comply with … (same require-ments as fire alarm)
Machine Room De-energize compressors, pumps, NC valves	40,000 PPM		40,000 PPM or upper limit of detector	40,000 PPM or upper limit of detector	40,000 PPM or upper limit of detector		
Machine Room De-energize all electrical			40,000 PPM				
Machine Room Audio Visual Alarms inside room and outside each entrance	25 PPM	1,000 PPM Manual reset inside machine room	1,000 PPM	25 PPM Manual reset inside machine room	25 PPM* “Approved locations”		
Machine Room Activate normal ventilation	25 PPM	1000 PPM		25 PPM			
Machine Room Activate emergency ventilation	1,000 PPM		1,000 PPM	1,000 PPM Manual reset only		1,000 PPM	
Power and Supervision			Per NFPA 72	Per NFPA 72			Dedicated branch circuit, 24 hour UPS or backup generator, trouble signal indicating fault in system.
Alarm signal to monitored location	Yes		Yes	Yes per NFPA 1	“approved location”		
Machine Room Concentration Display		Suggested					
Refrigerated Areas Audio Visual		1,000 PPM		50 PPM			

Ammonia Detection System Layout



Compressor Room (0-250ppm sensors)

Room	Sensor	Action
Compressor Room (minimum 2)	GG-NH3-250	**25ppm**- Alarm to monitored location **25ppm**- Horn Strobe outside each entrance and inside room **25ppm**- Normal Ventilation **150ppm**- Emergency Ventilation

- Compressor Room is the highest risk location in most plants.
- Using a minimum of two 0-250 ppm sensors for redundancy is necessary.
- Locate sensors in breathing zone (5 feet off the floor).

Sensor Technologies

- Solid-state
- **Electrochemical**
- Infrared
- Catalytic bead
- Photoionization

Pro's

- **Ammonia specific – no false alarms**
- **Durable and medium life – avg 3 yrs plus**
- **Reliable trip levels down to 10 ppm**

Con's

- **Loses sensitivity over time**
- **Hot or wet applications shorten cell life**

Compressor Room Shutdown (0-2% sensor)

Room	Sensor	Action
Compressor Room Shutdown (minimum 1)	GG-NH3-2% (2%=20,000ppm)	**10,000ppm-** Redundant Emergency Ventilation. **20,000ppm**- Electrical Shunt trip or De-energize pumps, compressors, and normally closed valves.

- Designed for electrical shunt trips.
- Does not replace a lower level sensor (not made for alarming at low levels).

Sensor Technologies

- Solid-state
- Electrochemical
- Infrared
- **Catalytic bead**
- Photoionization

Pro's

- **Relatively inexpensive**
- **Long life 5+ yrs**
- **Failsafe**

Con's

- **Will respond to high levels of other combustible gases**
- **Use for high level concentrations only**

Sensor Technologies

- Solid-state
- Electrochemical
- **Infrared**
- Catalytic bead
- Photoionization

Pro's

- **Specific to target gas – no false alarms**
- **Durable and long-life**
- **Average life 5-10 yrs**

Con's

- **Expensive**
- **No replacement "sensor" – must buy new**
- **Can't detect low concentrations-use for high concentration only.**

Vent Line (0-1%)

Room	Sensor	Action
Vent Line	GG-VL-NH3 (1%=10,000ppm)	**10,000ppm (1%)-** Alarm to monitored location.

- Alarms below 10,000 ppm (1%) are not advised.
- Follow mounting instructions.
  - Locate outdoors.
  - About 3ft off roof.
  - Tee-test port facing down.

Sensor Technologies

- **Solid-state**
- Electrochemical
- Infrared
- Catalytic bead
- Photoionization

Pro's

- Durable and long life – 5 yrs plus
- Good for vent line sensors
- Inexpensive sensor replacement

Con's

- Lowest reliable trip levels: 150 ppm
- Broad spectrum– not specific to NH3
- Non-linear

Refrigerated Rooms

Room	Sensor	Action
Freezers, Coolers, Docks, Process Areas, Production	GG-NH3-100	**25ppm**- Alarm to monitored location. **25ppm**- Horn Strobe. **35ppm**- Close liquid solenoid valves.

- 0-100ppm range gives the most accuracy for the low end alarm set-points.
- Sensors should be located within 30ft of each potential leak source.
- Mount in breathing zone (5 feet off floor).

Sensor Technologies

- Solid-state
- Electrochemical
- Infrared
- Catalytic bead
- **Photoionization**

Pro's

- **Fast response/recovery times**
- **Good for low ppm (0-1,000 ppm) detection**

Con's

- **Only good for portables**
- **Not specific to target gas**
- **Broad spectrum – smells all VOC's**

Calibration

- Calibration is required every 6 months for OSHA PSM compliance.
- Detailed documentation or it didn't happen.

Questions?

Please…..

Ask me some questions!