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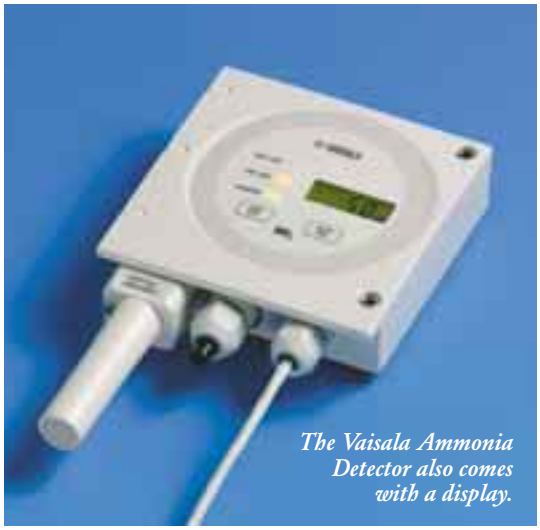
In the food industry, the foremost challenge for ammonia detectors is good selectivity and performance in various operating conditions. Highly specific to ammonia, Vaisala AMMONICAP® Ammonia Detectors have proven their performance in all ammonia leak detection areas typical in the food industry: compressor rooms, process areas, cold storage and/or refrigerated warehouses and outdoor installations.

Vaisala AMMONICAP® Ammonia Detectors

Top Selectivity and Performance for the Food Industry



The Vaisala Ammonia Detector also comes with a display.

Vaisala AMMONICAP® Ammonia Detectors are ideal for these demanding measurement areas because of their broad temperature (-40°C - +60°C) and humidity range (0 - 100 %RH) as well as their interchangeable probes - which all translates into flexibility for maintenance and servicing. As the sensor is highly specific to ammonia, it also reduces costly false alarms that often occur in ammonia detection in the in the typical measurement areas of food industry.

Ammonia detection in a compressor room

The most common installation site for an ammonia detector is the compressor room, where temperature and humidity conditions are relatively tolerable. Gases such as hydrocarbons may sometimes exist in compressor rooms and cause false alarms. Tests on the most typical gases found in compressor rooms have shown that the Vaisala AMMONICAP® Sensor has very good selectivity against these gases. Please refer to table 1 for maximum allowed concentrations for Vaisala Ammonia Detectors.

Gas	Maximum allowed concentration (ppm)
Methane	2500
Penthane	4000
Carbon monoxide	1000
Hydrogen	10000

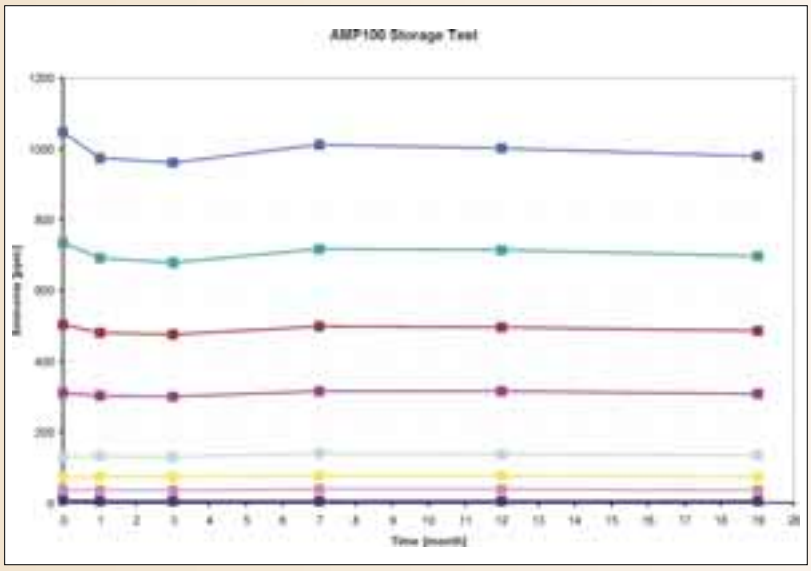
Table 1. Maximum allowed concentrations of gases in compressor rooms

The maintenance of compressor rooms is a very important issue, which was carefully taken into consideration in the design of the AMT100 series. The Service Mode function in-

Ammonia probe has an excellent shelf life

The interchangeable ammonia probe of the Vaisala AMMONICAP® Ammonia Detector Series has an excellent shelf life when stored in the original factory packaging. The graph on the right illustrates the results of a test where 6 ammonia probes were stored outdoors in the original factory packaging in constantly changing humidity and temperature conditions.

After 1, 2, 7, 12 and 19 months the probes were brought to the Vaisala laboratory and checked in different ammonia concentrations. After the tests the probes were packaged and sealed as in the original factory packaging. The results show clearly that the probes are well within their specifications even after 19 months of storage in outdoor conditions. ●



AMT100 series probe storage test.

corporated in the Vaisala AMT Series disables or "freezes" the alarm relays and outputs for 60 minutes. After this period has elapsed the detector activates itself automatically, but it can also be reactivated manually at any time. The Service Mode function is very useful during the servicing or on-site checking of the detector. For instance, when draining compressor oil (often contaminated with some ammonia) which does not represent an emergency, the sensor output can be shut off to avoid any false alarms.

Ammonia leak detection in food industry process areas

Food industry process areas are among the most demanding ammonia detection environments. Process equipment is washed on a regular basis, causing excess humidity which can lead to a lot of false alarms with most ammonia detection technologies. In the development of the Vaisala AMMONICAP® Sensor, a lot of effort was invested into designing a reliable product that would cover the whole humidity range 0 – 100 %RH, in a non-condensing environment.

The food industry is also a large user of different aromas and spices: for example marinades and sauces are frequently used in meat processing plants and strong aromas at ice cream and yogurt factories. These substances require the ammonia detector to be highly specific to ammonia, i.e. good selectivity is a must. Vaisala AMMONICAP® Ammonia Detectors offer top selectivity even against the aromas used in ice cream factories.

Demanding ammonia measurement sites abound in the food industry, setting exacting requirements for the ammonia sensor.

Safe working environment in refrigerated warehouses and cold storage

Ammonia leaks can cause ➤

Cable version of Vaisala AMMONICAP® Ammonia Detectors

To complement the ammonia detection product range, Vaisala has just launched the cable version of the AMT100 Series Ammonia Detector. There are 5, 10 and 20 meter cables available to be installed between the detector body and the probe. The connectors of the cable can be tightened and released without tools to detector body and probe head, which gives a lot of flexibility to the installation.

With the cable version the detector can, for instance, be installed so that the probe is located in a cold storage room, while the display is located outside at normal room temperature. In this case, the display in the Vaisala AMMONICAP® Ammonia Detector AMT102 also comes in handy as there is no need for an extra alarm lamp. Instead, the user can just check the display outside the cold storage and then enter the cold storage safely, knowing that there is no ammonia leakage. ●

The AMT100 series ammonia detectors are now available as a version with cable.

Figure 1 a.The effect of the outdoor humidity to the zero line.

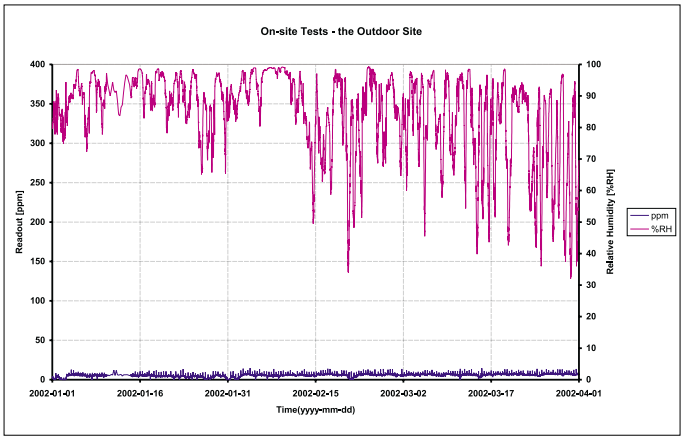
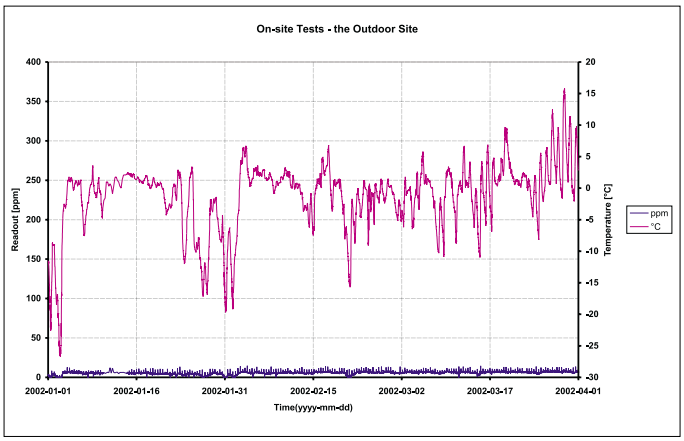


Figure 1 b. The effect of the outdoor temperature to the zero line.



product spoilage and safety risks to personnel, which means that on-line ammonia detection should be performed in both refrigerated warehouses and cold storage rooms. Refrigerated warehouses can sometimes have a very low oxygen content, which is typical for instance in fruit storage. Since the Vaisala AMMONICAP® polymer thin-film sensor does not require oxygen to operate, it is well suited to low oxygen environments.

Low temperatures of as little as -40 °C can be demanding for ammonia detectors, especially with regard to their warm-up time. The AMT100 series has only a 3 -minute warm-up time from -40 °C to +60 °C, which is a clear asset. During installation or maintenance you can get the full specification after 3 minutes with the AMT100. This is not possible with all technologies utilized in ammonia detection, for instance electrochemical cells demand 2 – 8 hours to warm up. Additionally, the AMT100 series offers excellent zero line stability in changing humidity and temperature conditions (please see figure 1).

Outdoor installations

Several customers in the food industry have found that the outdoor installation of ammonia detectors is very useful, especial-

The Vaisala AMMONICAP® polymer thin film sensor is highly specific to ammonia, which is a must in the food industry.

The IP33 Box is designed to provide extra protection from water for the ammonia detection unit in outdoor or harsh indoor environments.

ly in air inlets and outlets. When an ammonia leak takes place, the monitoring in the inlets helps to check that no ammonia gas is returning to the factory. Monitoring the outlets is also helpful in analyzing the released concentration.

Thanks to the IP65 enclosure, Vaisala AMMONICAP® Ammonia Detectors can be installed outdoors. In addition to this, Vaisala offers an extra enclosure for installation sites where the detector may need extra protection from water. It can be used in both indoor and outdoor environments. The enclosure also has a UV protected cover, which extends the lifetime of ammonia detectors in outdoor use.

AMT Series – versatility for diverse environments

Ammonia detection is required in a wide variety of environments in the food industry: outdoors, indoors, cold and warm, wet and dry. Constantly changing humidity and temperature conditions - which often combine with strong aromas - demand good selectivity and stability from an ammonia detector. The Vaisala AMMONICAP® Ammonia Detector with its top selectivity is an ideal choice for the food industry, whatever the installation conditions. ●

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Associated Wholesale Grocers in Springfield, Missouri is a large refrigerated storage facility with up to 50 million products in the facility at any one time. Refrigerated products are kept at various temperatures. In order to keep the facility refrigerated, a large ammonia system is in operation, which must be continuously monitored for ammonia leaks. Vaisala AMMONICAP® Ammonia Detectors offer the selectivity and many other useful features that the plant needs.

Vaisala AMMONICAP® technology

Ammonia Sensing at Its Best

The 840,000 ft^2 facility was built in 1970, with a new ammonia refrigeration system installed in 1985. A large, 3,175 kg (7000 lb) ammonia refrigeration system is used to store up to 50 million dollars worth of products in the facility at any one time. It is of paramount importance that the ammonia refrigeration system is working properly. An integral part of the ammonia refrigeration system at Associated Wholesale Grocers is an ammonia leak detector.

Numerous requirements

When choosing an ammonia leak detector, the maintenance supervisor of Associated Wholesale Grocers had many factors to consider. The detector should be highly specific to ammonia, and must not cause false alarms due to other odors in the area, for example caused by forklift trucks. The detector must operate in a wide temperature range at the various temperatures that occur at the facility. It must also withstand fluctuating humidity and be easy to maintain.

Having previously tried many technologies, the maintenance supervisor had never succeeded in finding a technology that could meet all his needs. Going through the manufacturers of solid state and electrochemical sensors, he decided to try a fairly new technology in ammonia sensing, a polymer thin film capacitive sensor. With the new AMMONICAP® technology, introduced in 2001, Vaisala has been the manufacturer to meet the requirements of Associated Wholesale Grocers.

Vaisala AMMONICAP® technology

The AMMONICAP® is a capacitive sensor with an ammonia sensitive polymer film. Ab- ➤