

Model 950-ASH

Arson Scanner Hydrocarbons and Accelerants Detector Training Manual



GRACE
INDUSTRIES, INC.

www.arsondetection.com

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Model 950-ASH

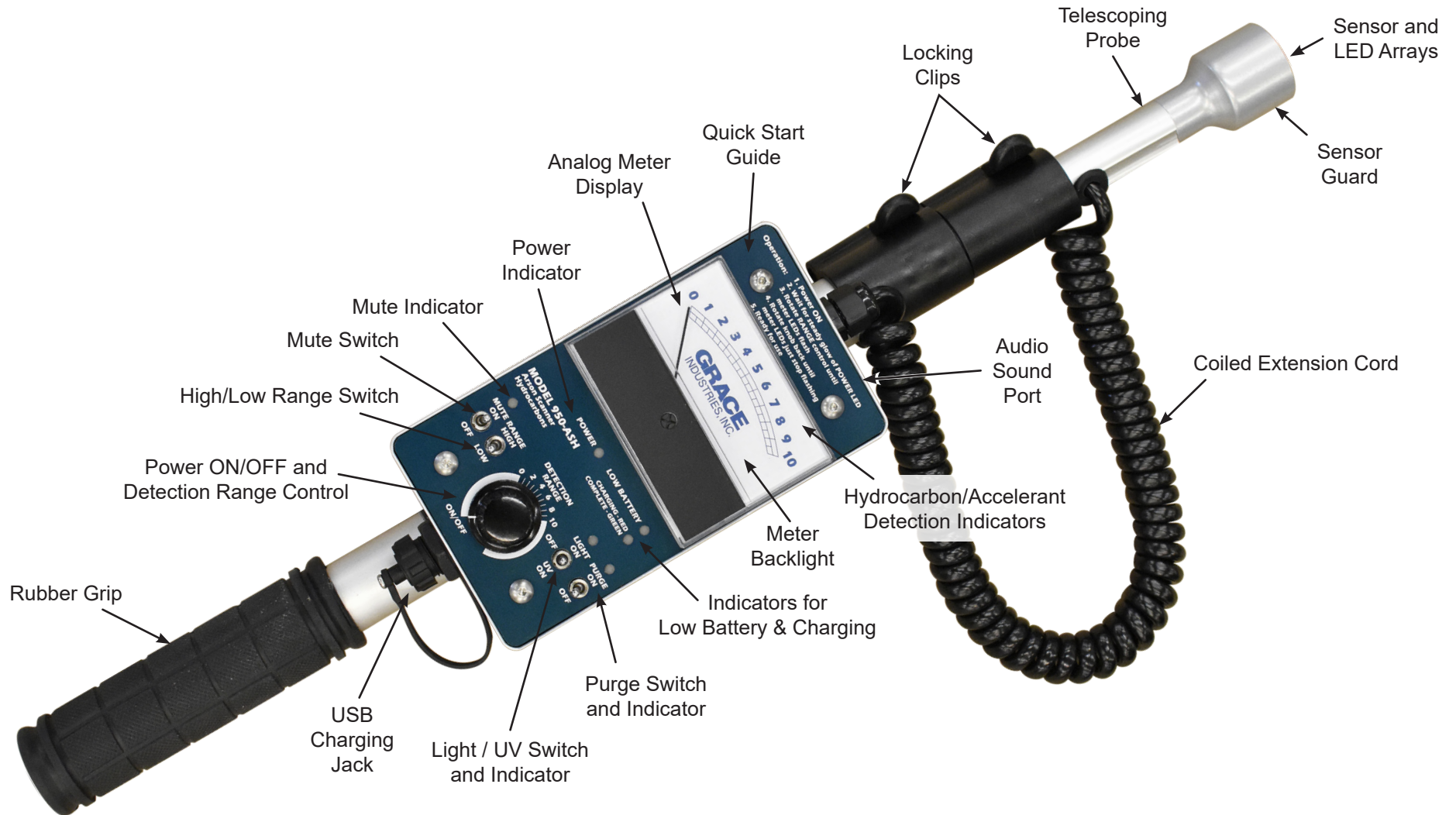
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OPERATIONAL NOTE: The 950-ASH is not intended for use as an absolute measuring device and should only be used as a relative indicator that a hydrocarbon or detectable substance may exist. Positive readings from the 950-ASH of suspect material should be properly collected and analyzed by chromatography or other precise instrument to determine its actual composition. Rapid changes in humidity or temperature will affect the 950-ASH sensor and it must be given enough time to stabilize after these changes and prior to resuming use, typically 20 to 30 seconds is sufficient. **WARNING:** The 950-ASH should not be used to detect carbon monoxide.

Model 950-ASH

Top View



Model 950-ASH

Features & Benefits

- Portable, easy to use, rugged.
- Detects approximately 125 hydrocarbons and accelerants including heating gases.
- High/Low range aids in pinpointing source of high hydrocarbon/accelerant concentration.
- Solid state sensor, housed in a protective guard, with a coiled extension cord.
- Audio and visual displays indicate detection of suspect material.
- Ultraviolet and white LEDs arrayed in the sensor head to aid investigations.
- Powered by rechargeable Lithium-ion battery with operating time of up to 7-8 hours continuous use.
- Corrosion resistant, high impact engineered polymer enclosure.
- Purge permits quick recovery of sensor.
- Mute silences audio tones and permits discreet investigation.
- Applications: arson investigation, leak detection, general purpose gas detection.

Arson Scanner Hydrocarbons and Accelerants Detector



The Model 950-ASH Arson Scanner Hydrocarbon and Accelerant Detector is a precision instrument designed specifically for detecting trace levels of hydrocarbons and accelerants.

Model 950-ASH is optimized for detecting hydrocarbons or accelerants that may be present at suspect arson fires. Model 950-ASH functions as an excellent general purpose discovery instrument for field survey such as: searching landfills for methane outgassing, detection of leaking underground storage tanks, or simply as a general purpose gas leak detector.

Additionally, Model 950-ASH employs an array of illuminating ultraviolet and white LEDs which further assist the investigator in locating accelerants or other evidence in situations where detection in low visibility environments becomes difficult. Other beneficial features include a mute function to silence the audible tones for discreet investigation and a purge feature for rapid sensor recovery.

Principle of Operation

Model 950-ASH Sensor is a solid-state semiconductor type whose resistance changes in the presence of hydrocarbon or accelerant vapors.

This change in resistance is sensed by the signal processing electronics and is displayed as an audio and visual rate signal that is proportional to the relative concentrations of hydrocarbons or accelerants present. The sensor is heated while the detector is in use to provide stable, consistent operation.

The sensing element is housed in a thimble-like structure of a double layer of very fine stainless steel ensuring complete operating safety as well as providing mechanical protection.



Power ON

Power ON by rotating the power ON/OFF detection range control clockwise until a click sound is heard.

The blue power indicator LED will begin to flash, indicating the 950-ASH is in the warmup and sensor stabilization cycle. After approximately 90-120 seconds, the blue POWER indicator LED stops flashing and glows blue to indicate the sensor has reached operating temperature and the instrument is ready for use.

During the warmup cycle, you may observe a deflection of the needle and rapid flashing of red LEDs on the analog meter display. This action is normal and will cease as the sensor gradually attains operating temperature.

NOTE: Sensor may not detect the presence of hydrocarbons or accelerants while in the warmup cycle.

The ultraviolet and white LED arrays will function during the warmup cycle.



Setting the Sensitivity



After the 950-ASH has completed the warmup cycle and is in the READY mode, it is time to set the RANGE and sensitivity.

HIGH RANGE allows for the detection of trace levels of hydrocarbons or accelerants.

LOW RANGE is used when an area of concern has high concentrations of hydrocarbons. In LOW RANGE, the sensitivity is reduced to assist in pinpointing hydrocarbon / accelerant source.

Toggle the range switch to the HIGH or LOW position as desired.

Rotate the detection range control clockwise until the needle on the analog meter display deflects clockwise and the red meter backlight LEDs begin to flash. If the mute switch is OFF, you will observe audio tones in synchronism with the red LEDs. To silence the audio tones, switch the mute switch to ON. Next, slowly rotate the detection range control slightly counter clockwise until you no longer observe the red flashing LEDs, the audible tones cease, and the needle on the analog meter display falls to the 0, 1, or 2 region of the display.

The Model 950-ASH is now ready to scan for hydrocarbons/ accelerants.

Detecting Hydrocarbons or Accelerants



To detect the presence of hydrocarbons/accelerants, scan the suspect material or area of concern at an angle of approximately 45° while holding the sensor end of the telescoping probe approximately 1/2" to 1" from the area to be surveyed.

Scan very slowly to provide sufficient time for vapor to penetrate the sensor.

NOTE: The time required for a hydrocarbon/accelerant to change from liquid to vapor and diffuse into the sensor is dependent upon environmental factors such as temperature, humidity, wind velocity and the type of hydrocarbon/accelerant. It is important to take your time and be patient.

NOTE: To silence the 950-ASH for discreet investigation, switch mute to the ON position.

Detecting Hydrocarbons or Accelerants



When the sensor is exposed to a hydrocarbon or accelerant, the analog meter display needle will deflect clockwise, followed by flashing red LEDs and repeating audio tones. This response indicates the possible presence of hydrocarbons/accelerants. If high concentrations of a detected hydrocarbon/accelerant are sensed, it may be necessary to clear the sensor using the purge function and scan the area of concern again. Another positive reaction indicates the presence of a suspect material. Collect the sample of debris for analysis.

For investigations where the sensor responds to higher levels of hydrocarbon/accelerant vapor, the needle on the analog meter may fully deflect to the highest level on the scale. Model 950-ASH can be normalized for these conditions by rotating the detection range control counterclockwise until the flashing detection indicator LEDs and audio tones just stop. Upon further investigation, when the audio tones and detection indicator LEDs begin again, you are closer to higher concentrations of hydrocarbon/accelerant vapor and may have the opportunity to collect a sample.

Purging the Sensor



The purge function is used to clear the sensor after exposure to high levels of hydrocarbon or accelerant vapor.

Remove the Model 950-ASH detector from the contaminated vicinity and set the purge control to the ON position.

The red purge indicator LED will flash.

While the purge feature is in use, audible tones and red analog meter LEDs will be observed.

Allow the purge to remain ON until the red purge indicator LED stops flashing and glows red (this may take approximately 20 seconds).

Return the purge switch to the OFF position and reset the sensitivity and detection threshold. Your 950-ASH is now ready to detect another sample.

Note: While the purge feature is in use, sensor will not detect the presence of hydrocarbons or accelerants.

Mute feature may be used during the purge cycle to silence the audio tones.

Principle of Operation for Ultraviolet and White LED Arrays



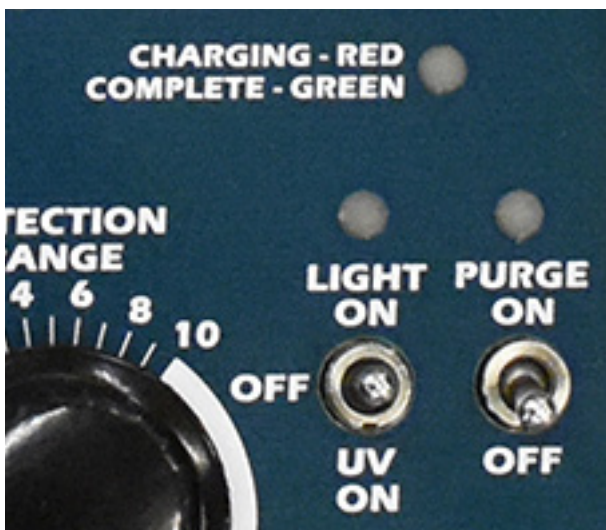
UV and White LEDs arrayed around the Sensor

The LED features of your Model 950-ASH consist of an array of eight long-wave ultraviolet (395 nm) LEDs and an array of eight white LEDs.

Each LED array is controlled by a 3-position toggle switch located on the controls and display panel. The ultraviolet and white LED arrays function independently of each other and cannot be used simultaneously.

It is desirable to use the ultraviolet (UV) LED array in as little ambient light at the investigation scene as possible. The UV LED array allows the investigator to search for a fluorescence or glow of suspect material, potentially indicating the presence of residual or trace amounts of hydrocarbons, accelerants, or other questionable material. Hold the UV LED array at an angle of approximately 45° and approximately 1/2" inch away to examine the suspect material. During an investigation, if fluorescence of suspect debris is discovered, it should be gathered and sent to a lab for analysis.

The white LED array feature is desirable for use as a flashlight in dimly lit or low visibility environments. When using this feature, a backlight will illuminate the analog meter display.



3-Position Switch for UV and White LED Light

How Ultraviolet (UV) Light is Used in Arson Investigations



Ultraviolet (UV) light is used to detect information that is otherwise invisible to the human eye and to uncover valuable evidence that can be used to solve a fire investigation.

UV light is used to identify the presence of hydrocarbons, accelerants, and to identify pour patterns.

UV light not only assists in identifying the presence of accelerants but also in rapidly locating accelerant residues and assists in locating the point of origin of the fire.

The color in which accelerants glow is affected by heat exposure. The longer an accelerant is exposed to heat (i.e. the origin), the more differentiated its fluorescence color will be from other, less exposed areas.

Evidence of accelerants is absorbed in a fire and is almost always invisible to the naked eye. However, the area contaminated by accelerants is easily discernible under UV light.

How Ultraviolet (UV) Light is Used in Arson Investigations



Volatile hydrocarbons such as gasoline, kerosene, acetone, etc. fluoresce when exposed to UV light. By using UV light, investigators can accurately identify locations where samples should be collected for further laboratory analysis.

UV light can also be helpful in locating fragments of incendiary devices since explosive wrappings are frequently fluorescent. Samples collected in cans and plastic evidence bags can be heated in warm water to form condensation. The latent accelerant residue rises to the surface and can be seen under UV light.

UV light has been used to identify pour patterns, the shape of an accelerant container, and pour trails leading back to containers. UV light will indicate accelerant long after its odor is noticeable. Masking an accelerant will not prevent its UV detection. Accelerant on skin or clothing will fluoresce as well.

How Ultraviolet (UV) Light is Used in Arson Investigations



Advantages of Investigating With UV Light

- UV light is not affected by environmental factors such as temperature, humidity, and wind conditions.
- The 950-ASH sensor responds to a general area of saturation and the UV light aids in pinpointing specific areas.
- UV lights have been proven to effectively fluoresce samples up to two months after an incident.
- After a lengthy, hot fire, the odors of hydrocarbons or accelerants have usually disappeared.

Recommended Investigation Techniques



When attempting to detect trace amounts of hydrocarbons or accelerants, hold the sensor approximately 1/2" to 1" away from the suspect material and scan the area very slowly.

For ease of investigation, adjust the telescoping probe length by unlocking the clips, extending to the desired length and then closing the locking clips.

It is important to scan the area very slowly because a hydrocarbon or accelerant must vaporize before it can be detected by the sensor. The time required for hydrocarbons/accelerants to vaporize and become airborne particles may vary from one investigation to another. Environmental factors such as temperature, humidity, wind velocity, and type of hydrocarbon/accelerant all affect the instrument's ability to detect.

Be patient and observant when using the instrument.

Keep in mind good investigative practices. Survey the area thoroughly and imagine where you would take a sample if you did not have the 950-ASH. Take your time. Check the top layer of debris first before digging to obtain suspect material. Positive samples may be obtained from a suspect area many hours or even days after a fire has occurred.

Storage and Maintenance

At the end of each use, clean with a soft cloth. DO NOT use cleaning solvents.

After each use, inspect the instrument for signs of physical damage. Remove from service if physical damage is observed.

To prevent damage between use, collapse the telescoping probe to its shortest length, lock the clips and store the 950-ASH, wall charger, and mini-USB cable in the protective case provided.

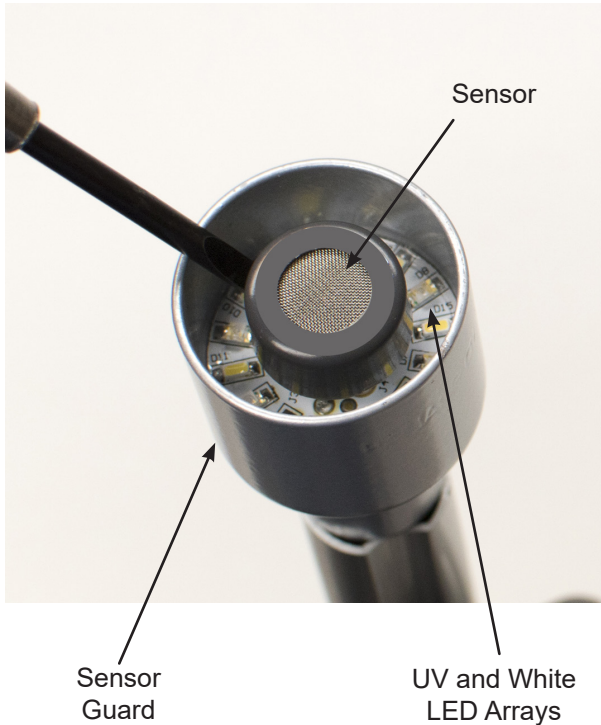
Store in a dry, well ventilated area. Recommended storage conditions are: 50° to 77°F (10° to 25°C) at no more than 65% relative humidity. Do not leave your 950-ASH exposed to elevated temperatures such as those that occur inside a vehicle during summer months.

The sensor may be removed for cleaning or replacement ***See next page for detailed instruction of Sensor Removal or Replacement.***

Cleaning is usually not required, however, if the sensor should become contaminated with ashes or other debris, carefully loosen and unplug it from the sensor socket. Gently tap it over a white piece of paper and observe if any material is dislodged. Plug the sensor back into the socket by carefully aligning the pins and gently pressing the sensor into place.

If the sensor should accidentally become submerged in liquid, remove it from the sensor socket and allow to dry for 24 hours. Permanent damage to the sensor is likely to occur if submerged in any liquid. Replacement may be necessary. Sensors are available for purchase from Grace Industries, Inc.

Removal / Replacement of Sensor



- Remove damaged or malfunctioning sensor from the socket located at the end of the telescoping probe.
- Use a small screwdriver to carefully and incrementally loosen the sensor from the socket.
- Once it is loose, pull sensor out of the sensor guard.

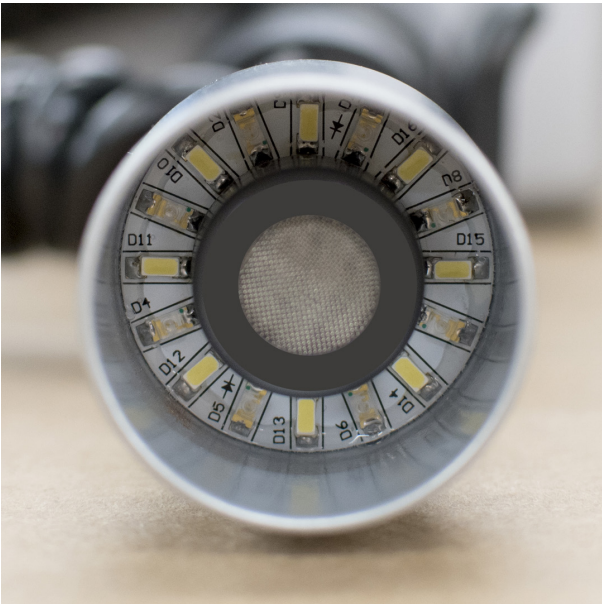
Removal / Replacement of Sensor



Sensor Pins

Sensor Socket

- Plug in new replacement sensor by carefully aligning the sensor pins into the socket.



- Gently and firmly press the replacement sensor into the socket until it is secure.
- Allow for required warm-up period (approximately 3 minutes) before use.

Battery Run Time & Battery Charging



USB Charging Wall Plug Power Cube
and Mini-USB Cord

950-ASH is powered by a rechargeable Lithium-ion battery with operating time of up to 7-8 hours of continuous use.

Model 950-ASH has a mini-USB charging jack at the bottom of the main housing. The battery can be charged using the mini-USB cable and wall plug charger provided with the instrument. A computer USB port may also be used to charge the battery.

The charging indicator will glow red while the Model 950-ASH is charging. Battery is fully charged when the charging indicator glows green.

Complete charge time is up to 24 hours.

NOTE: Charging via computer USB port may take longer.

Troubleshooting

When turned ON, the needle on the analog meter fully deflects:

The sensor may be contaminated or the atmosphere may be contaminated. The 950-ASH is an extremely sensitive instrument and care must be taken to ensure no hydrocarbon or accelerant residue remains in or located near the sensor.

- When initially turning the detector ON, be sure the high/low range switch is set to high and detection range control is rotated completely counter-clockwise without turning OFF.
- Allow for complete warmup cycle (90-120 seconds). The power indicator will glow steady blue when ready.
- Turn the purge feature ON to clear the sensor and allow any absorbed contaminant or residue to be burned off.
- Allow the detector to remain ON for several minutes in a clean, draft-free environment.
- Set the sensitivity.

Sensor will not respond to hydrocarbons or accelerants:

- Some hydrocarbons and accelerants have odor additives that can be mistaken for hydrocarbon or accelerant vapor. You may be noticing this odor after all of the hydrocarbon/accelerant vapor has completely volatilized away and only the odorizer remains.
- The hydrocarbon or accelerant might not be vaporizing due to many factors including temperature, humidity, wind velocity, and type of hydrocarbon or accelerant.
- Allow sufficient time for a true reading. It may be necessary to wait several minutes for accumulation of airborne vapor for detection.

Inconsistent readings:

- Sensor can absorb hydrocarbons and accelerants that may cause an erratic response. This may be due to extended periods of storage or a contaminated atmosphere. Move to an area known to be free of contaminants and use the purge feature to clear the sensor. NOTE: this process may need to be repeated several times.

Hydrocarbons, Accelerants, and Gases Detected by 950-ASH

Partial list of common hydrocarbons and accelerants that can be detected by the Model 950-ASH includes, but is not limited to:

Fuels: Kerosene • Gasoline • Diesel Fuel.

Hydrocarbons and their derivatives: Methane • Ethane • Propane • Butane • Pentane • Hexane • Heptane • Octane • Propylene • Benzene • Toluene • Xylene • Ethylene Oxide.

Halogenated Hydrocarbons: Methyl Chloride • Methylene Chloride • Ethyl Chloride • Ethylene Chloride • Ethylidene Chloride • Trichloroethane • Vinylidene Chloride • Trichloroethylene • Methyl Bromide • Vinyl Chloride.

Alcohols: Methanol/Ethanol • n-Propanol • Isopropanol • n-Butanol • Isobutanol.

Ethers: Methyl Ether • Ethyl Ether

Ketones: Acetone • Methyl Ethyl Ketone. **Esters:** Methyl Acetate • Ethyl Acetate • n-Propyl Acetate • Isobutyl Acetate.

Nitrogen Compounds: Nitro Methane • Mono Methyl Amine • Dimethylamine • Trimethylamine • Mono Ethyl Amine • Diethyl Amine. **Inorganic Gases:** Ammonia • Hydrogen • Hydrogen Cyanide.

GRACE One (1) Year WARRANTY

Grace Industries Incorporated, of Fredonia PA 16124 USA, warrants products that it manufactures to be free from defects in workmanship and materials for a period of one (1) year from the original date purchase. This warranty does not apply to third party products sold by Grace Industries. Grace Industries will repair or replace, at their sole discretion, defective products free of charge. This warranty applies to products that Grace Industries deems defective in its sole discretion due to defects in material or workmanship under normal use and maintenance and where a defect was not caused by accident, misuse or abuse of the product and that no disassembly, repairs or parts replacement were made or attempted by other than Grace Industries' personnel. **GRACE INDUSTRIES, INCORPORATED SHALL NOT BE LIABLE FOR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE ARISING OUT OF THE USE OF THE PRODUCT OR FAILURE OF THE PRODUCT TO OPERATE.**

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Warranty claims process: 1) Obtain a Return Authorization Code or Number from Grace Industries corporate headquarters by calling phone number 724-962-9231, or by email correspondence to sales@graceindustries.com. 2) The product name, serial number, date and proof of purchase must be provided and 3) Return products including Return Authorization number, prepaid and accompanied by original proof of purchase that states the date and location of purchase to: Grace Industries, Inc., Repair Department, 305 Bend Hill Road, Fredonia, PA 16124, USA. Customer is responsible for all shipping costs, return shipping costs, handling, or any other fees associated with a warranty claim.



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