

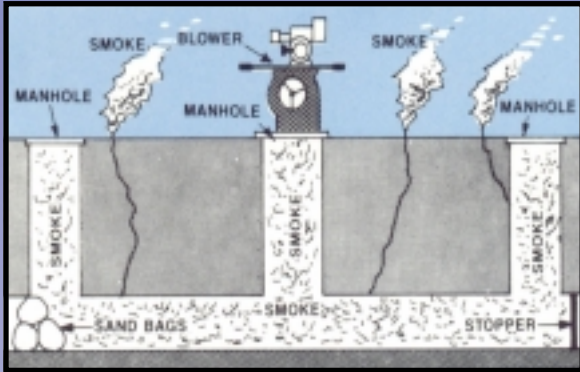
# **The SUPERIOR** *Smoke Testing Technique*

**For Sewer Inflow Analysis, Maintenance,  
Trouble Shooting and New Construction**



# THE SUPERIOR SMOKE TESTING TECHNIQUE

High readings on treatment plant flow gauges immediately following rainfall is a positive indication of storm/surface water inflow. Smoke testing is the fastest, most economical and positive means of locating sources of inflow in sewer collection systems. Elimination of these sources as required by law, will improve treatment plant operations – and correct problems of overloading which are a major contributor to pollution of water resources.



*The Superior Smoke Testing technique is a fast and easy way to quickly identify...*

- Leaks permitting storm/surface water intrusion (inflow)
- Connected roof and cellar drains
- Cross connected sanitary and storm sewers
- All connected lines, including abandoned and supposedly unconnected lines
- Leaking manholes
- Yard and foundation drains
- Sump pumps

## Industry Experts!

The **Superior** Smoke Testing Technique was developed in 1961 as a way to locate sewer faults at a low cost. It has **proven** to be an extremely effective method of pin-pointing sources of inflow and other sewer line problems in both existing and new collection systems. When you use Superior Smoke products you can be confident in your choice of suppliers. All products meet recommendations of NASSCO, EPA & WEF. Our products have identified inflow problems in millions of feet of sewer line in thousands of municipalities!

## Recommended Equipment

Each test consists of two sections of line, generally 600-800 feet of 8-12" pipe, and require 5 to 6 minutes of smoke to walk the test area.

A portable air blower with a capacity of between 1500 and 2000 cfm is required. A blower of lesser capacity will not generate sufficient pressure to disclose all faults in a line. Recommended Blowers are the Superior Models 20-S or 10-S.



Other items required include line plugs and bags (partly filled with 1/4 round stones with an attached rope for easy positioning) and canvas or rubber flaps for confining the smoke in specific sections of line.

Materials for sketching location of faults to complete engineering reports, and a Polaroid camera or equivalent are also needed.

For information on advance notice – see specific heading.

## Personnel and Cost

The smoke testing technique is uncomplicated and can be performed by regular maintenance crew members (2 or 3) who quickly master the fundamentals. A crew can easily test 10,000 linear feet of sewer line in an eight-hour period. The cost is only a few cents per foot for labor, blower, and smoke product. A fraction of the cost of other inspection methods.

# PROCEDURE

As illustrated on the previous page, usually two sections of line (600-800 ft.) are tested simultaneously, with the smoke being introduced through a centrally located manhole. Blocking the far side of the upstream and downstream manholes is only necessary when isolating a section of line. The smoke under pressure will quickly fill the main plus all connected lines, and follow the path of least resistance. It will flow through all openings to the surface, revealing the location of the faults. Invariably, the fault will be found at the site or within a few feet of it. Only enough pressure to sufficiently overcome atmospheric pressure is required.

Smoke tests are effective regardless of surface, type of soil, or depth, provided openings exist for the smoke to follow. For example, it is not uncommon to see smoke exiting from cracks in paved surfaces, showing points of surface water entry.

Best results are obtained on dry days when water is not leaking into the line. (Other methods may overlook many sources of inflow, unless the passing camera picks up water actually leaking into the line).

The blower should not be started over the manhole because of the possibility of igniting flammable vapors in the line. The blower should be started first and then placed over the manhole. In less than a minute, smoke will be issuing from the roof vents of buildings connected to the line. If plugs are being used, do not tighten them before the smoke has fully penetrated the line, otherwise trapped air may prevent complete penetration.

The crew should check building, grounds and streets for telltale signs of smoke. Smoke immediately backing up into the blower indicates a line blockage. If this should occur, testing should be discontinued until the line has been cleared. Smoke issuing from the ground, pavement, yards, roof drains, etc., shows sources of inflow. Record for future repair.

## Advance Notice

Press releases to the news media (newspapers, radio and TV) will generate much public good will and support for a program that will improve the local sewerage system, and assure compliance with EPA regulations. Such releases should outline the place, as well as the problems that will be solved by having the smoke testing done.

Local fire and police departments should be advised daily of the areas being tested, on a street to street basis. Personnel handling telephone inquiries should be acquainted with the purposes of the smoke testing program, and be prepared to advise against unnecessary exposure to the smoke.

Proper advance notices are necessary and the responsibility of the agency or contractor performing the tests. Door to door notification within 24 hours before the tests is recommended. This prevents unethical occupants from covering up illegal drains, sump pumps, etc. before the tests. While giving advance notice discrete neighborhood inquiries can identify persons suffering from heart and/or lung diseases, such as emphysema, who should never be exposed to any smoke, including Superior. Individuals with respiratory problems should be removed from the premises prior to the tests. Others, such as house confined invalids, sleeping shift workers and locked in animals should be identified and evacuated before the test.

### To Whom It May Concern:

Please be informed that the Sewer Operating Committee will be testing lines in this area on (insert date) by the use of smoke. The smoke should not enter the premises unless a leak is present.

The presence of smoke in your house should be reported immediately to the personnel conducting the tests, or by calling (insert telephone number).

Avoid unnecessary exposure to the smoke. The smoke is relatively harmless but may be irritating to nasal passages. Any smoke irritation will be temporary and should quickly disappear after exposure has ceased. Persons with heart and respiratory ailments should leave the house during the test. House pets will react in a manner similar to a prudent person and leave the smokey area. If an exit is not available, be sure pets are provided with proper ventilation.

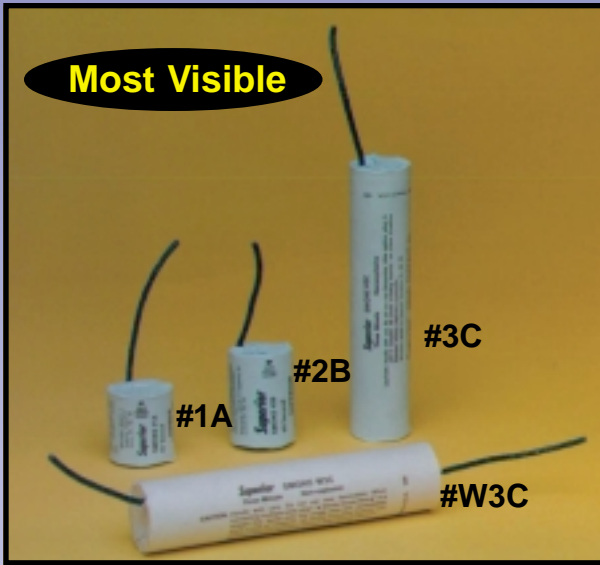
To minimize the chance of smoke entering your house, please pour water into all drains including floor drains prior to the date of the test.

Signed \_\_\_\_\_

# CLASSIC SUPERIOR SMOKE

Classic Superior Smoke Candles quickly produce clean efficient smoke which varies in color from white to gray depending upon density and lighting. Superior Smoke items contain no explosive materials and offer a T.O.P. (total obscuring power) of 2100. T.O.P. is the scientific method of determining the quantity of smoke generated by a given unit of smoke composition. By comparison crude oil has a T.O.P. of 200.

Smoke is created by a chemical reaction where the visible portion is mostly atmospheric moisture. Due to its high visibility, classic smoke simply provides the best results when testing sewers.



- Capable of being blown and seen 1000's of feet away.
- Optical density (obscuration) 10 times that of burning oil.
- Most consistent smoke; Same quality from beginning of test to end.
- Field adjustable cfm/static pressure option.
- Doesn't contain engine exhaust, and won't get wet.
- Works with most any blower.
- Meets recommendations of WEF, EPA, and NASSCO.

## Sealpac Containers

Superior Smoke #'s 1A, 2B, 3C, and W3C can also be packaged in these unique resealable containers which protect them from exceptionally hot and humid climates.



## Versatile! Combine different items for a variety of test section lengths.

Connect two #W3C's in tandem for a 6 minute burn time, or one #W3C and one #2B for four minutes. Choose the item, or combination that's just right for the job at hand. As a guideline use two consecutive #3C for each test lasting 5 to 6 minutes; generally two sections line, 600 to 800 feet of 8" to 12" pipe.

## 1 Year Warranty; Guaranteed to Work!

All Superior classic smoke candles are warranted for 1 year, and are guaranteed to work within this time period. If an item should fail, simply return for free replacement. Items have been known to work several years after date of manufacture when stored cool and dry.

**All classic Superior Smoke generators are packaged and sold per dozen.**

ITEM #	GENERATING TIME	VOLUME	ITEM SIZE	SHIPPING WEIGHT
#1A	30 Seconds	4000 cubic feet	1 1/2" x 1 1/2"	2 lbs. / doz.
#2B	60 Seconds	8000 cubic feet	1 1/2" x 2"	2 lbs. / doz.
#3C	3 Minutes	40,000 cubic feet	1 1/2" x 6"	6 lbs. / doz.
#W3C	3 Minutes*	40,000 cubic feet	1 1/2" x 6"	6 lbs. / doz.

\*Note: Item #W3C is double wicked, furnished with quick clips for extending smoke generating time.

**CAUTION:** All smoke including Superior can irritate breathing passages without respiratory protection.

# SUPERIOR SMOKE FLUID SYSTEMS

The most common problem associated with liquid based smoke systems has been thin / wet smoke. As cool liquid is introduced into the heating chamber it has a natural tendency to lower the temperature of the system to where efficient smoke production is impossible. Superior Signal Company, world leaders in sewer smoke testing products, has developed a fluid based smoke system engineered to minimize this effect, thus maximizing performance!

## Engineered to optimize DRY smoke output!

- Superior Smoke fluid is injected through a **custom-machined precision orifice** designed to minimize the chances of “overloading” the heating chamber.
- The **unique heating chamber** is much larger than standard muffler type smokers, thus extending the time available for fluid to convert to smoke.
- The heating chamber is **insulated** to retain heat and maximize smoke production.
- Precision valve provides maximum control.
- Field adjustable cfm/static pressure option.
- Meets recommendations of WEF, EPA, and NASSCO.

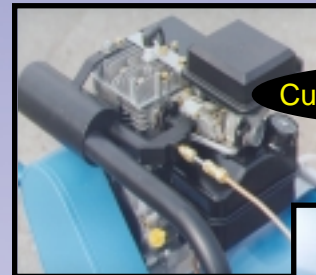
**Only from Superior Signal; your partner in Smoke Testing for over 40 years!**

## The Fluid

**Superior Smoke Fluid** is inexpensive, easy to use, and is as safe and clean as it gets. Available in single 1 gallon containers, a 5 gal. container, or in 55 gallon drums. Also works in competitive propeller driven systems.



**Reduces Fluid Overload!**



**Custom Fluid Injector**



**“Micro” Control Valve**

**Specifications** All Blowers are single unit sturdy metal construction with carrying handles and 27 1/2 in. custom fiberglass base.

Model	Power	Carrying Weight	Standard Capacity
10-L	Briggs & Stratton 3.5 hp Gasoline	75 lbs.	1800 CFM @ 1.7 static pressure*
20-L	Briggs & Stratton 3.5 hp Gasoline	75 lbs.	1800 CFM @ 1.7 static pressure*

*\*Also available as 4200 CFM @ 3.0 static pressure, or 4000 CFM @ 4.0 static pressure.*

Model 20-L includes auxiliary outlet with removeable cover, 8' x 8" vinyl duct with draw strings to attach to outlet, and adjustable damper to direct air/smoke through base or auxiliary outlet.

### Sewer Smoke Fluid

#SL-1 (1 gallon)

#SL-5 (5 gal. container)

#SL-55 (55 gal. drum)

### Fluid Conversion Chamber Kit

#519 Includes conversion chamber, fluid tank, injector, control valve and tubing. Fits all Superior 10-S and 20-S blowers.

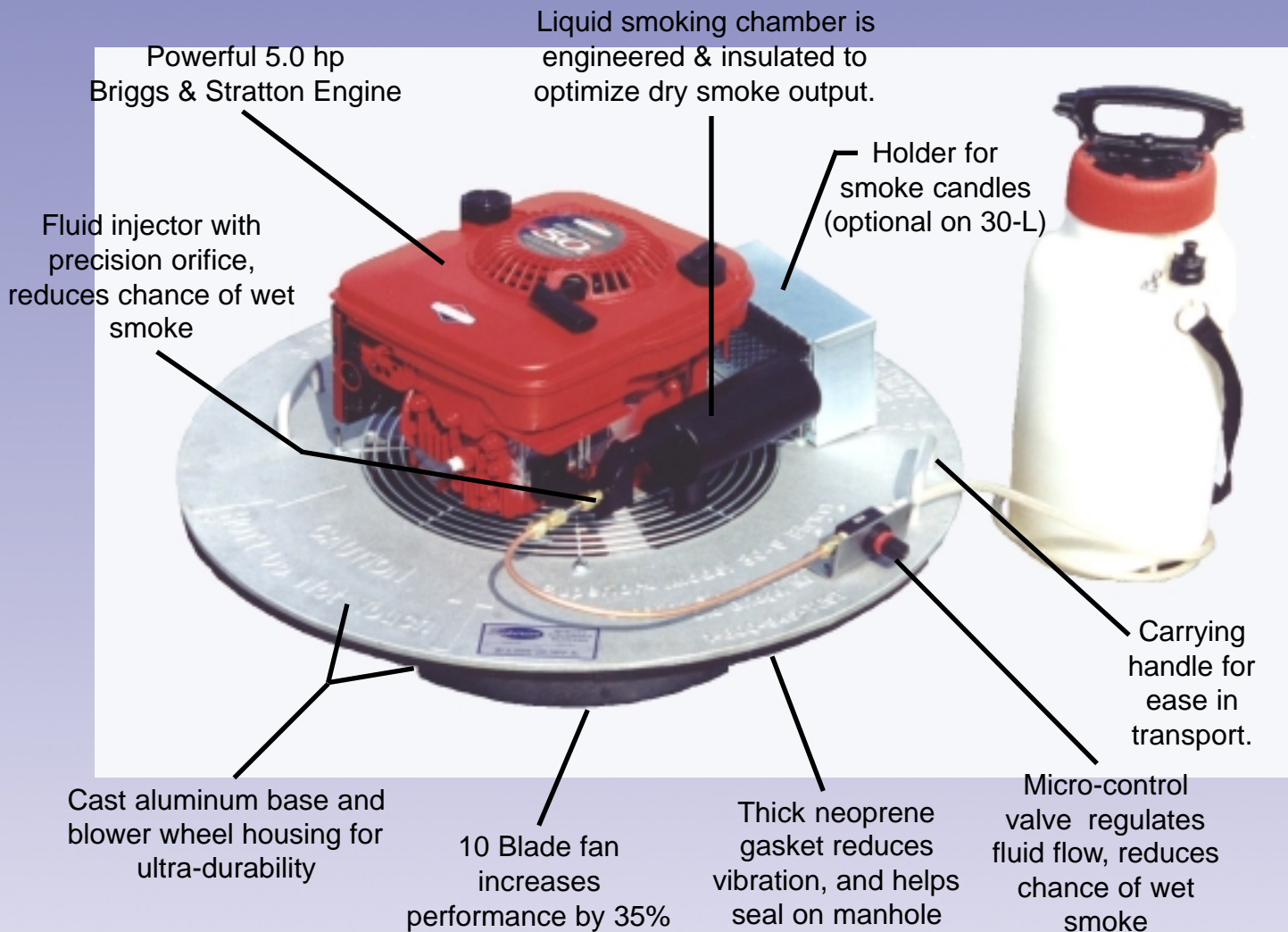
**WARRANTY:** Superior Blowers are warranted to be free of defects in material and workmanship in normal use or service for a period of one year from date of purchase by the original purchaser and will be repaired without cost, if received at Superior Signal Company, 178 West Greystone Road, Spotswood, NJ 08884. Gasoline engines are covered by separate Briggs & Stratton warranty.

**NEW**

# Superior Model 30-S/L Blowers

For powerful smoke testing, the 30-S/L offers the high quality and performance you've come to expect from Superior Signal.

Model 30-**S**; Uses Classic Smoke Candles Only  
Model 30-**L**; Uses Classic or Liquid Smoke



## Specifications

**Model:** 30-S / 30-L (Shown)  
**Power:** 5 hp Briggs & Stratton Gasoline Engine  
**Output:** 4,300 cfm  
**Carrying Weight:** 65 lbs.  
**Construction:** Low profile design, Cast Aluminum  
**Fan Type:** 10 blade propeller  
**Base diameter:** 30 inches  
**Additional Uses:** Line Stringing, Ventilation

**Liquid Conversion Kit #520;** Quickly converts Superior model 30-S or similar blower to fluid smoker.

Kit contains...

- Fluid conversion chamber
- Custom injector
- Fluid tank
- Control valve
- All necessary hardware

**Superior Signal** Company, Inc. 1-800-945-TEST  
[www.SuperiorSignal.com](http://www.SuperiorSignal.com)

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# SUPERIOR AIR/SMOKE BLOWERS

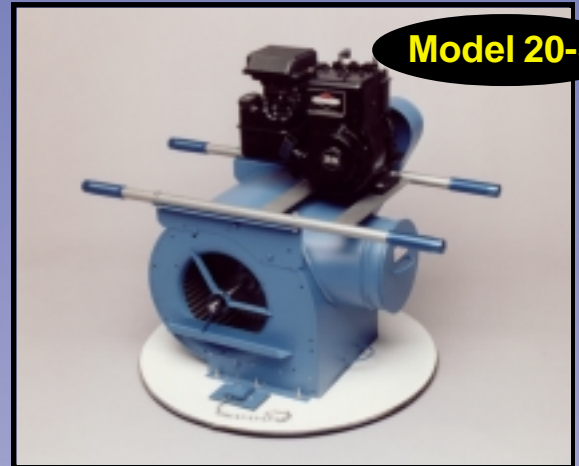
Superior air/smoke blowers are engineered for efficient and economical smoke testing of sewer lines to detect sources of inflow and leaks. Also for fast ventilation of sewerage collection systems and closed areas.

Manufactured in two models powered by dependable 3.5hp Briggs & Stratton gasoline engines. Both are single unit sturdy metal construction complete with carrying handles for easy handling, beltguard and 27 1/2" custom fiberglass base, eliminating need for separate manhole cover.

Model 10-S Standard equipment as detailed above.

Model 20-S Standard equipment plus:

- Auxiliary outlet with removable cover.
- 8' x 8" vinyl duct with draw strings to attach to outlet.
- Adjustable damper to direct air/smoke through base into manhole or auxiliary outlet.



## Specifications

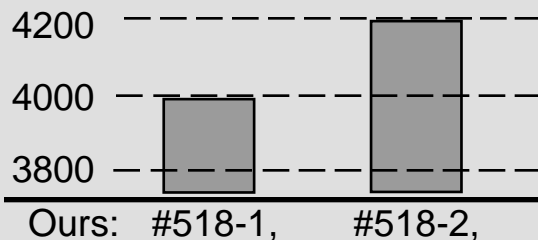
Model	Power	Carrying Weight	Standard Capacity
10-S	Briggs & Stratton 3.5 hp Gasoline	65 lbs.	1800 CFM @ 1.7 static pressure*
20-S	Briggs & Stratton 3.5 hp Gasoline	65 lbs.	1800 CFM @ 1.7 static pressure*
*Also available as 4200 CFM @ 3.0 static pressure, or 4000 CFM @ 4.0 static pressure.			
5-E	12v or 110v Electric	15 lbs.	180 CFM @ 1.3 static pressure

## Pulley Kits provide a variety of CFM and Static Pressure Options

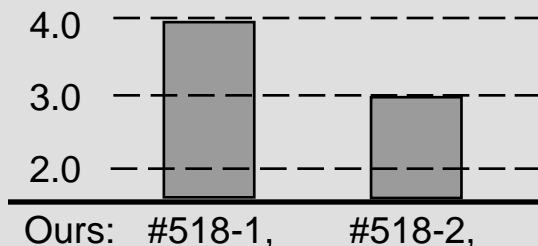
Superior Signal's Alternate Pulley Kit, is available for all new and existing 10-S/L and 20-S/L smoke blowers. Simple installation of matched sets of pulleys and belts can be easily interchanged to provide a variety of performance options.

### PERFORMANCE COMPARISON

#### C.F.M.



#### Static Pressure



### Pulley kit (order part # 518) includes...

- Pulley # 518-1; Provides 4000cfm at 4.0 inches static pressure.
- Pulley # 518-2; Provides 4200cfm at 3.0 inches static pressure.
- Belts, carrying case and installation instructions.



# LATERALS AND HOUSE PLUMBING

Many inspectors and contractors prefer to test with smoke rather than use time-consuming water or air pressure tests. Consequently, smoke tests before acceptance are specified in many state and local plumbing codes. Smoke tests will reveal:

1. Leaks that permit surface water inflow
2. Drains of all types, including roof, cellar and yard drains that are connected to house lines and discharging into collection systems.
3. Poorly soldered or fitted joints and leaky seals, which may allow water damage or noxious gases to leak indoors.
4. Rodent passages into line.

## Required Equipment

1. 2-3 Superior Smoke No. 2B (one minute)
2. Superior Electric Blower Model 5-E/12-Volt D.C. battery powered or 110-Volt A.C.
3. Pneumatic sewer plug or rubber balloon for sealing off house connections from main lines (optional)
4. Vent cap with open center hole to restrict the flow of air and smoke (optional)

## Procedure

It is not absolutely necessary to have the house line blocked off from the main, but doing so will increase test efficiency. In most cases there is a clean-out opening through which a plug or balloon can be inserted between the opening and main, and then inflated. A length of windshield hose or similar type tubing can be attached to the balloon to facilitate inflation. Vents can be partially blocked allowing the air/smoke mixture to flow throughout the plumbing system.

When you are sure the building is unoccupied, connect the blower to the line and start introducing the smoke through the intake side of the blower.

Check the interior of the house for smoke. Any smoke should be quickly ventilated by opening doors and windows. Notations should be made of leak locations. Next the yard should be checked for smoke and the location of any smoke marked for later correction of faults.

All buildings connected to the lines being tested should be checked for smoke. Points of entry for the smoke should be located. If entry to the buildings is not possible once smoke is discovered, it is advisable to return later to determine the point of entry.

### Model 5-E Electric Powered

Electric blower with flexible 8' x 4" hose. 180 CFM capacity. Available 12 volt or 110V. For testing house lines.





# Superior Signal Company, Inc.

Over 56 years combined membership...

WEF  
NRWA  
NASSCO

## Distributed By...

Hydrometrix Technologies Pty Ltd  
Cape Town, South Africa  
Tel: +27 82 373 5693

## WARRANTY:

Superior warrants that these products conform to the Product Description contained in this literature. Superior makes no other warranty, whether expressed or implied, including warranties of merchantability or of fitness for a particular purpose or application. No statements or recommendations contained herein are to be construed as inducements to infringe any relevant patent, now or hereafter in existence. Superior neither assumes nor authorizes any representatives or other person to assume for it any obligation of liability other than such as is expressly set forth herein. Under no circumstances shall Superior be liable for incidental, consequential or other damages from any alleged negligence, breach of warranty, strict liability or any other theory, arising out of the use or handling of this product.