



Patented

# KLEERBAND® FLANGE PROTECTORS & RADOLID® PROTECTION CAPS

Radolid® Bolt Protection Caps • Now with VCI - patent pending\*



**ADVANCE**  
PRODUCTS & SYSTEMS, INC.

ISO-9001 CERTIFIED COMPANY - FM537405



\*Patent Pending only applies to Radolid Caps with VCI



## **Kleerband® Flange Protectors:** The quick, easy and effective way to apply protection and prevent corrosion

**Grease Injection Fitting**

**All metal wormgear screw connection for ease of installation (No special tools needed for installation)**

**Radolid® Protection Caps**

**Transparent Polyband Allows 360 Degree Continuous Inspection**

**Positive Loading Relief Vent Plug**

Kleerband® Flange Protectors are designed to protect the flange face, studs and gaskets on raised face, full face, and ring-joint flanges. Kleerband® protects from atmospheric corrosion encountered in chemical plants, refineries, gas plants, offshore platforms, onshore oil fields, metering stations, water and wastewater plants, pump stations, and underground pipelines.

Controlling corrosion and being aware of its damaging effects is paramount in pipeline maintenance. With the use of Kleerband® Flange Protectors and Kleerge® Corrosion Inhibitor Grease, flanges remain safe from hazardous and

unsightly corrosion that can cause leakage, failure, or even shutdown of equipment. The downtime combined with the cost of cutting and welding a new flange and replacing flange bolts, nuts and seals can become very expensive.

Kleerband® Flange Protectors are also designed for use on cathodically isolated flanges to prevent foreign matter from shorting out or bridging over an isolating gasket. All Kleerband® Flange Protectors are equipped with an exclusive positive loading relief vent and plug that assures complete loading of flange cavities. The extruded, clear, flexible polyband allows visual inspection without removal of the protector and ensures complete filling of the flange cavity. In addition, it is non-corroding providing many years of service life and is completely reusable.

# Stop trying to protect flanges the old way. APS has the clear advantage to prevent corrosion.

With the Kleerband® design, visual inspection of the flange surface can be accomplished without removing the flange protector.



APS presently manufactures Kleerband® Flange Protectors to fit all ANSI flanges 150# series to 2500# series from 1/2" diameter to 144" diameter. Also available are flange protectors to fit API 2000# to 15,000# flanges, API integral flanges, API obsolete flanges and AWWA flanges.

## Stainless Steel Flange Protectors

The 7100 series flange protector is manufactured with 22 gauge 304L or 316L stainless steel band, stainless steel worm-gear strap, and grease fitting. This standard coupling is practically indestructible and is appropriate for extreme temperatures. APS Flange Protectors are manufactured according to ANSI B16.5 specifications up to 24". Above 24", please provide the specifications of your flange including the circumference.

## Shrink Sleeves



Shrink sleeve flange shields consist of multiple components (i.e. shrink sleeve, skirting, mastic filler material, masting tape) that require numerous tools for installation (i.e. propane tank, torch, hose). Safety equipment, along with extra time and personnel, are required to properly install shrink sleeves. Installing shrink sleeve flange shields is an awkward and

complicated method of flange protection. Once installed, flanges cannot be inspected for corrosion without removal of the shrink sleeves and the necessity to repeat the entire installation process. In addition, shrink sleeves are very expensive and must be burned or cut off for removal.

Tape products must be wrapped completely around the circumference of the flange though not all flanges can be accessed in this manner. Tape covered flanges are not easily filled and usually result in voids in the flange cavity where condensation forms. Tape products, besides trapping moisture, are non-fillable and non-inspectable, making it necessary to cut away and dispose of this non-reusable means of protection.

## Tapes



## Wax Fillers



Wax and epoxy fillers are both messy and difficult to apply. These fillers require many tools and are extremely time consuming. Wax must be melted and poured into a form until it hardens. Epoxy must be injected under high pressure or troweled on the flanges leaving potential voids. Both wax and epoxy fillers have a tendency to shrink and separate from the flange surface over time allowing moisture to migrate between the filler and the flange causing hidden corrosion growth. Once installed, wax and epoxy fillers are non-inspectable for corrosion and are messy and difficult to remove and dispose of safely.

## Specifications

Kleerband® Flange Protectors are manufactured of 100% virgin vinyl compound. The polyvinyl chloride resin used to make this compound, as well as the plasticizers and all of the other ingredients, have been granted approval by the FDA in accordance with regulations.

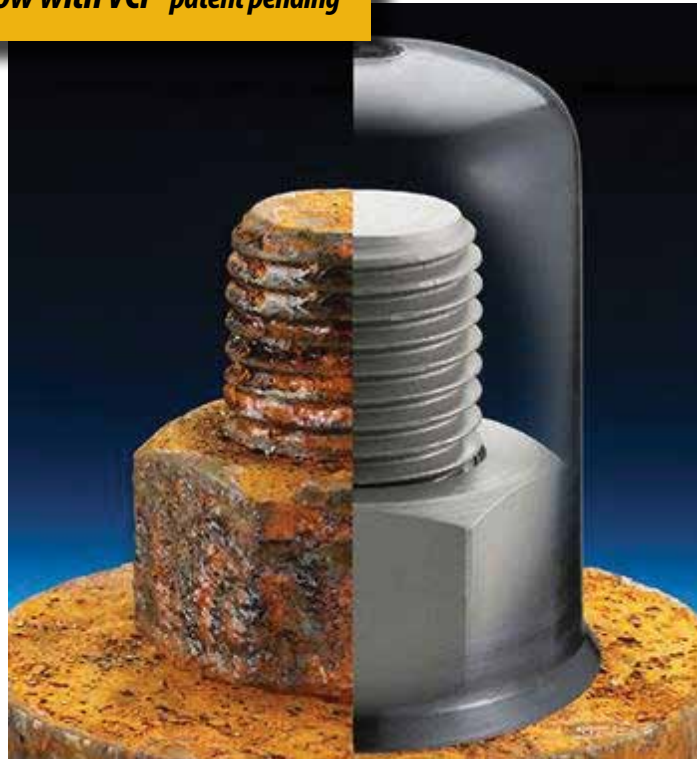
## Compound Physical Evaluation

Hardness - Shore A (± 3) - instantaneous.....	80
-10 second delay.....	75
Specific Gravity (± .02) .....	1.22
Tensile Strength (PSI) .....	2425
100% Modulus (PSI).....	1175
Elongation (%).....	435
Low Temperature Brittleness (°F).....	-15
Operating Temperature (°F).....	Min.-13
Operating Temperature (°F).....	Max.+167

# APS' Radolid® Protection Caps:

The quick, easy and cost effective way to apply nut and bolt protection

Radolid® Bolt Protection Caps  
Now with VCI - patent pending



Practical, efficient and reusable



Unprotected

Protected

**Radolid® Protection Caps** are used to eliminate corrosion of nuts and bolts thus allowing quick removal when necessary. These caps are easily installed by being pressed onto the bolted joint by hand. The barbed edge snaps in place preventing the caps from accidentally being removed. Manufactured of high density black or white UV-resistant polyethylene, these caps are reusable and will keep nuts and bolts corrosion free for years. *(APS recommends coating the nuts, studs and bolt heads with APS Kleergel® High Melt Corrosion Inhibitor Grease for added protection.)*

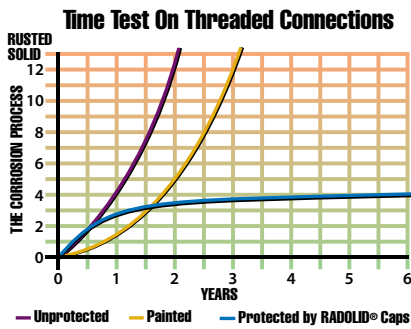
Size Range: 1/4" to 3 1/2" diameter bolt or stud  
Standard Operating Temperature(°F).....Min -84  
Standard Operating Temperature(°F)...Max +210  
Other high temp material available to 430 °F Max

## What is VCI?

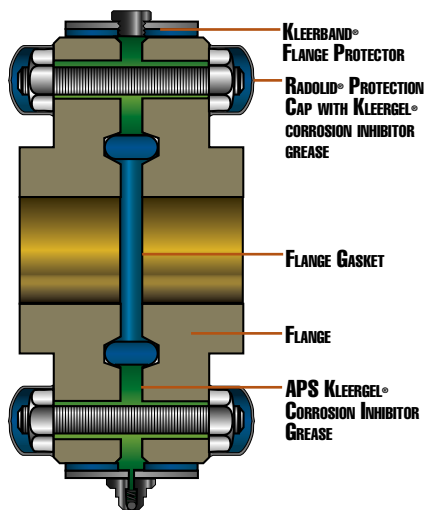
**Volatile Corrosion Inhibitors (VCIs)** are a class of corrosion inhibiting compounds some or all of whose ingredients have sufficient energy (vapor pressure) to release molecules from the resin compound into the air and block the corrosive effects of electrolytes. VCI molecules condense in a microscopic layer on all surfaces they can reach. For VCI to work properly, caps must be secured onto the head of a bolt or nut fitting flush with the surface of the flange or substrate. This is to maintain the VCI's integrity under the cap. Radolid® bolt protection caps with VCI additive are the only nut and bolt cap available in the market. Radolid® caps with VCI can be reused 2 to 3 times before requiring grease to be added to the caps.

# Independent Laboratory Corrosion Test Results Show the Importance of Good Flange and Nut & Bolt Protection

## Radolid® Nut Cap Exposure Test



### Protects The Entire Flange



Certified copy of test results available on request.

## Flange Protection Corrosion Test

Flange assembly #1 was plain and unprotected. Flange #2 was protected with a Kleerband® Flange Protector and Radolid® Nut Caps. Testing consisted of 500 hours ASTM B 117 salt fog exposure. (Actual test result documents available upon request. Salt spray test for VCI enhanced Radolid® caps available upon request.)

	#1 Unprotected Flange	#2 Protected Flange
<b>0-Hours</b>		
<b>500-Hours</b>		
<b>500-Hours Disassembled</b>		
	<b>End result: Flange, nuts and bolts badly corroded making flange seal failure possible and maintenance difficult at best.</b>	<b>End result: Flange, nuts and bolts in good repair with seal integrity safe for years and maintenance able to be achieved with efficiency.</b>

**Kleerband® Flange Protectors prevent this type of damage from occurring.**

Typical cost to replace and repair this 12" ANSI 600# flange full face or RTJ gasket with nuts and bolts can be in excess of \$20,000 for offshore applications.



## ORDERING INFORMATION:

### KLEERBAND® FLANGE PROTECTORS

- Flange size
- ANSI or API

### RADOLID® PROTECTION CAPS

- Bolt diameter
- Width across flat of nuts
- Special length caps, if required
- Colors other than black

### KLEERGEL® CORROSION INHIBITOR GREASE

- 14 oz cartridge
- 35 lb pail
- 120 lb drum

## KLEERGEL® SPECIFICATIONS:

Proprietary synthetic lubricant that will not breakdown under high temperatures. Kleergel® is opaque in color (almost clear), which allows for easy inspection. FDA approved for use on potable water systems.

Dielectric Strength	(Volts / mil) ASTM-D149	500
Flash Point	ASTM D92	180 °C
Continuous Use Temp.	Grease remains flexible & stable	-41 °C to 204 °C
Salt Spray Test	ASTM B117	Pass
Rust Preventative Test	ASTM D1743	Pass



# ADVANCE

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