# 02

# Coatings and protectors.

# ZYP Boron Nitride Aerosol Lubricoat®

*HIGH TEMPERATURE LUBRICATION, NON-STICK, IN THE FORM OF AEROSOL*

ZYP Coatings, Inc. produces a superior spray version of Boron Nitride. Boron Nitride is recommended as a high temperature release agent / lubricant, non-stick for hot pressing, glass molding, superplastic molding, and melting / casting of non-ferrous metals and alloys. Boron nitride is ideal for forming a barrier layer that protects graphite, ceramic, or metal substrates used in foundry or metal transport operations, as it forms a non-wetting, non-reactive layer with molten aluminum, the magnesium and its slags. Boron nitride is also useful as a coating for electrical heating elements, thanks to its excellent electrical resistance and good thermal conductivity. Furthermore, boron nitride is excellent as a release agent for weld spatter. Therefore, easy application of even, thin layers is now possible thanks to the spray version. Thanks to its acetone / alcohol base, quick drying is guaranteed.

## *USAGE NOTES*

The surfaces where the product will be applied must be clean and degreased. Shake the can before use. Keep the can 150–300 mm (6–12 inches) from the surface. Apply a thin, even layer, making even movements. Spray as many times as necessary. Use the product in a well ventilated area. Contains an acetone / alcohol base. Consult the material safety data sheet (HDSM) before use.

*Never contact wet coatings with molten metal.*

## *ADVANTAGE*

- Fast dry
- Easy to use spray cans
- Non-corrosive product

## *SPECIFICATIONS*

| | |
|---|---|
| **Main Component** | Boron nitride<br>95% purity |
| **Dry Coating** | 97% boron nitride<br>3% silicate<br>magnesium |
| **Colour** | White, may tend to gray during initial heating due to 2% carbon from binder |
| **Limits / Temperature of use:** | |
| **Air** | 1000°C (1800°F) |
| **Gap** | 1400°C (2500°F) |
| **Reducing Atmosphere/ Inert** | 1800°C (3200°F) |
| **Clasification of Security (H-F-R)** | 2-4-0<br>Contains an Acetone / Alcohol base |

# Pyrojacket

## *INSULATING SLEEVING AND RIBBON*

Pyrojacket® is a hollow sleeve or ribbon covering for cables and hoses. Pyrojacket consists of a high-bulk glass fibre pad, and a high-temperature silicon fibre coating. The coating will withstand continuous exposure to temperaturess up to 260°C (500°F), to temperatures up to 1093° (2000°F) for 15-20 minutes and to temperatures up to 1649°C (3000°F) for 15-30 seconds.

Pyrojacket sleeves can be directly applied to a cable or hose with the connectors of fittings removed, and are available in several different inside diameters (6-127 millimetres; 0.25-5 inches). In the event that the fittings or connectors cannot be removed, Pyrojacket sleeves are available with VELCRO® Brand closure option that allows the sleeve to connect to a cable or hose without disturbing the attachments.

Pyrojacket ribbon can also be applied directly to a cable or hose without disturbing the connectors or fittings, and is available in 25, 50 and 75 millimetre (1, 2 and 3 inch) widths. Pyrojacket sleeves and ribbon are available in coils, or are cut to a specific length.

Pyrosil is a non-adhesive, self-bonding tape used to secure both ends of a sleeve or ribbon to a cable or hose. The tape is available in 11 metre (36 foot) by 25 millimetre (1 inch) rolls, and can tolerate continuous exposure of temperatures up to 246°C (475°F).

## *PRODUCT SPECIFICATIONS*

| Inside Diameter – mm (in) | Voltage – kV |
|---|---|
| 9.5 (0.375) | 5-8 kV |
| 19 (0.75) | 5 kV |
| 38.1 (1.5) | 7-10 kV |
| 50.8 (2) | 7-8 kV |
| 88.9 (3.5) | 9-10 kV |

Test results were provided by Lineman's Testing Laboratories of Canada Ltd. Samples were placed over a grounded electrode and high voltage was applied to the surface at a controlled rate of 1 kV per second until dielectric breakdown occurred.

## *BENEFITS*

- Withstands intermittent flame
- Sheds molten spatter of metals and glass
- Resistant to slag and resin buildup
- Protects against abrasion, solvents and corrosive chemicals
- Protects operators against scorching contacts of metal hoses and pipes
- Provides "Danger Red" warning
- No harmful combustion by-products
- Easily installed

## *APPLICATIONS*

- Protective covering for cables, ropes and hoses
- Seath for bundling of multiple wires
- Insulation covering to prevent heat loss from hot metal hoses and piping

## *AVAILABILITY*

- Pyrosil Tape: 11 m (36 foot) rolls x 25 mm (1 inch) wide tape
- Ribbon: 25, 50 and 75 mm (1, 2 and 3 inch) widths
- Sleeve: 6-127 mm (0.25 - 5 inch) diameter
  Supplied in coils or cut to length as required
  Also available with a VELCRO® Brand closure option

# Pyrojacket

## *RECOMMENDED USES*

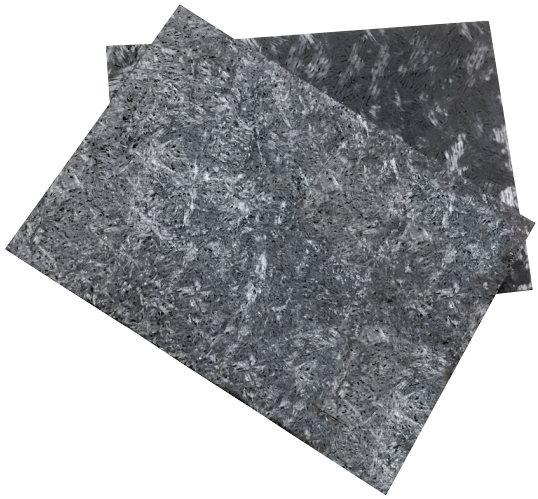
| | |
|---|---|
| **Steel mills** | Pyrojacket is commonly used in the steel industry by producers, specialty steel producers and minimills. Applications include continuous strand casting and slab scarfing equipment. Also, hydraulic and cooling water lines in furnace areas require Pyrojacket protection. Melt shop equipment can also utilize Pyrojacket for molten splash protection. |
| **Aluminium Smelting** | Nonferrous smelting mills use Pyrojacket to protect hose, cable and wire rope from the effects of molten aluminium slag and splash. A specially fabricated glass-filled Pyrojacket is used as a crucible seal. |
| **Heavy Steel Fabrication** | Fuel supply lines in flame cutting and gouging operations are affected by molten weld spatter. Pyrojacket can increase the life of oxy-acetylene and mig welding lines by avoiding production interruptions. |
| **Hot hoses and pipes** | Steam, hot water and hot oil lines can have a "branding" effect on operators. Pyrojacket offers high-temperature protection for operator safety. |
| **Radiant Heat** | Hoses and cables close to furnaces, boilers, engines and exhaust manifolds can benefit from Pyrojacket protection. |
| **Intermittent flame** | Pyrojacket can be used near burners used for heating and annealing glass and metal. Pyrojacket is also useful around furnace doors and welding, brazing and flame cutting operations. |
| **Fire hazard areas** | Pyrojacket can protect hoses and piping conveying oils, solvents, fuels or other flammable liquids to help prevent them from becoming open lines that feed a fire. Fuel lines on vehicles, ships and locomotives are good examples. |
| **Abrasion protection** | Although not its intended purpose, the heavy rubber covering makes Pyrojacket a good abrasion resistant material. |
| **Reduced heat loss** | Thermal insulation covering hoses and piping means reduced energy costs and better maintenance of the hose or pipe's temperature. |

| | |
|---|---|
| **000900** | Sleeve Pyrojacket 3/8" x ft |
| **000906** | Sleeve Pyrojacket 1/2" x ft |
| **P023-006784** | Sleeve Pyrojacket 3/4" x ft |
| **000446** | Sleeve Pyrojacket 1" x ft |

# P-25W y CT-14

## *CARBON / CARBON COMPOSITES*

Pyrotek P-25W and CT-14 carbon/carbon composite materials are used for many specialty glass applications and are made by reinforcing carbon with carbon fibres.
These materials provide an excellent, long life nonchecking surface for hot glass contact applications. Other uses for P-25W and CT-14 are stacker bar inserts, sweepout and transfer pads/plates and wareguides for the container glass industry.



## *AVAILABILITY*

**P-25W**
- 4 millimetre (0.16 inch), 6.4 millimetre (0.25 inch), 9.5 millimetre (0.38 inch) thickness
- Machined parts

**CT-14**
- 4 millimetre (0.16 inch), 6.4 millimetre (0.25 inch), 9.6 millimetre (0.38 inch)
- Small machined parts

## *BENEFITS*

- Long life
- Provides a non-checking surface

## *APPLICATIONS*

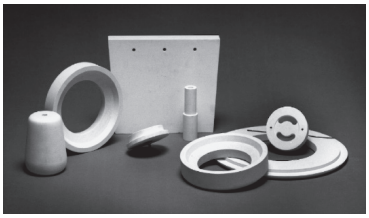
- Stacker bar inserts
- Sweep-out pads
- Transfer pads
- Specialty glass
- Wareguides
- Transfer and dead plates

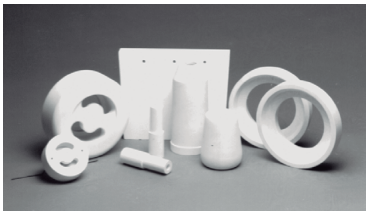
## *PHYSICAL PROPERTIES*

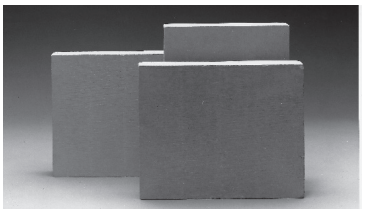
| Property | P-25W | CT-14 |
|---|---|---|
| **Density–g/cm³ (lb/in³)** | 1.75 (0.063) | 1.55 (0.056) |
| **Flexural Strength (perpendicular)–MPa (ksi)** | 129 (18.7) | 75.84 (11) |
| **Flexural Strength (in plane)–MPa (ksi)** | 172 (25) | 74.46 (10.8) |
| **Compressive Strength (perpendicular)–MPa (ksi)** | 85 (12.4) | 62.05 (9) |
| **Compressive Strength (in plane)–MPa (ksi)** | 200 (29) | 96.53 (14) |
| **Thermal Conductivity (perpendicular)–W/m·K (BTU·in/ft2·hr·°F)** | 200 (29) | 96.53 (14) |
| **Thermal Conductivity (in plane)–W/m·K (BTU·in/ft2·hr·°F)** | 8 (55) | 8.5 (59) |
| **Hardness (relative scale–Rockwell 15x_E18)** | 95 | 82 |
| **Rated Temperature** | 760°C (1400°F) | 760°C (1400°F) |

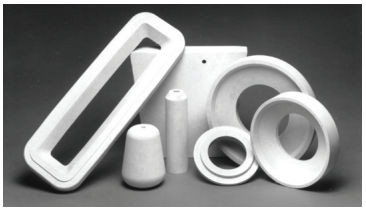
# Refractory Board Products (N-17, N-19, CS-1, N-600, N-14, B-3, B-3A)

*INSULATING BOARDS AND MACHINED COMPONENTS*









Pyrotek offers several grades and types of technically advanced insulating refractory boards for molten metal applications. The carbon fibre reinforced calcium silicate boards available are N-17, N-19, CS-1 and N-600. The glass reinforced calcium silicate boards available are N-14, B-3 and B-3A. These refractory ceramic fibre free materials are available in sheets or as precision machined components. Pyrotek machine shops are equipped with CNC tooling equipment to produce components to customer specifications. Popular project application information for each type of board material can be provided by Pyrotek.

## *BENEFITS*

- No refractory ceramic fibres (non-RCF)
- Low thermal conductivity
- Thermal shock resistant
- Non-wetting
- Excellent machining characteristics

## *APPLICATIONS*

- Machined spouts (dip tubes)
- Billet/slab floats
- Continuous sheet caster tips
- Transition plates and headers
- Orifice plates for horizontal casters
- Trough liners
- Insulated riser inserts
- Continuous caster head boxes
- Molten metal dams
- Baffle plates
- Furnace linings

# Refractory Board — Products

## *PHYSICAL PROPERTIES*

| | N-17 | N-14 | N-600 | B-3 | B-3A | CS-1 |
|---|---|---|---|---|---|---|
| **Density–kg/m³ (lb/ft³)** | 817 (51) | 848 (53) | 801 (50) | 765–935 (48–58) | 935–1092 (58–68) | 817 (51) |
| **Loss On Ignition– (Maximum Percentage)** | 8% | 8% | 4.8% | <2% | <1% | 4% |
| **Coefficient of Thermal Expansion– $10^{-6}$/°C ($10^{-6}$/°F)** | 7 x $10^{-6}$/°C (3.9 x $10^{-6}$/°F) | 7 x $10^{-6}$/°C (3.9 x $10^{-6}$/°F) | 7 x $10^{-6}$/°C (3.9 x $10^{-6}$/°F) | 6–7 x $10^{-6}$/°C (3.3–3.9 x $10^{-6}$/°F) | 6–7 x $10^{-6}$/°C (3.3–3.9 x $10^{-6}$/°F) | 6 x $10^{-6}$/°C (3.3 x $10^{-6}$/°F) |
| **Maximum Service Temperature** | 850°C (1562°F) | 850°C (1562°F) | 850°C (1562°F) | – | – | 850°C (1562°F) |
| **Continuous Service Temperature** | 850°C (1562°F) | 850°C (1562°F) | 850°C (1562°F) | – | – | 850°C (1562°F) |
| **Compressive Strength– MPa (psi)** | 16 (2321) | 17 (2466) | 16 (2321) | 20 (2901) | 20 (2901) | 16 (2321) |
| **Flexural Strength– MPa (psi)** | 8 (1160) | 8.8 (1276) | 8 (1160) | – | – | 8 (1160) |
| **Thermal Conductivity– W/m·K (BTU·in/ft²·hr·°F)** | 0.20 (1.39) @ 300°C (572°F)<br>0.201 (1.39) @ 500°C (932°F)<br>0.201 (1.39) @ 700°C (1292°F) | 0.20 (1.39) @ 300°C (572°F)<br>0.201 (1.39) @ 500°C (932°F)<br>0.201 (1.39) @ 700°C (1292°F) | 0.20 (1.39) @ 300°C (572°F)<br>0.201 (1.39) @ 500°C (932°F)<br>0.201 (1.39) @ 700°C (1292°F) | 0.30 (2.08) @ 20°C (68°F)<br>0.27 (1.87) @ 200°C (392°F)<br>0.28 (1.94) @ 500°C (932°F)<br>0.29 (2.01) @ 800°C (1472°F) | 0.33 (2.29) @ 20°C (68°F)<br>0.30 (2.08) @ 200°C (392°F)<br>0.30 (2.08) @ 500°C (932°F)<br>0.30 (2.08) @ 800°C (1472°F) | 0.191 (1.33) @ 300°C (572°F)<br>0.197 (1.37) @ 500°C (932°F)<br>0.203 (1.41) @ 700°C (1292°F) |
| **Board Dimensions– mm (in)** | 2438 x 1219 (96 x 48) | 2438 x 1219 (96 x 48) | 2490 x 1219 (98 x 48) | 2525 x 1225 (99 x 48) | 2500 x 1200 (98 x 48) | Machined shapes |
| **Board Thickness– mm (in)** | 13, 19, 25, 27, 32, 38, 44, 51, 64, 75, 100 (0.5, 0.75, 1.0, 1.05, 1.25, 1.50, 1.75, 2.0, 2.5, 3.0, 4.0) | 13, 19, 25, 27, 32, 38, 44, 51, 64, 75, 100 (0.5, 0.75, 1.0, 1.05, 1.25, 1.50, 1.75, 2.0, 2.5, 3.0, 4.0) | 25, 51 (1.0, 2.0) | 13, 19, 25, 32, 38, 51, 76, 102 (0.5, 0.75, 1.0, 1.25, 1.50, 2.0, 3.0, 4.0) | 13, 19, 25, 32, 38, 51, 76, 102 (0.5, 0.75, 1.0, 1.25, 1.50, 2.0, 3.0, 4.0) | N/A |
| **Thermal Shrinkage (Linear)–24 hours @ 750°C (1382°F)** | 1.36% | 1.10% | 0.03% | 0.60% | 0.59% | 0.68% |

# Roller Covering Braided Sleeves

*XHBR 10, XHBR 20, XHBR 30*

XHBR 10 is a 100% stainless steel braided sleeve for roller covering with a temperature resistance of 700°C (constant temperature).

For "Out-of-Furnace applications", King's is supplying two types of high-quality braided roller coverings.
The maximum operation temperature is for XHBR 20 and XHBR 25 is 425°C.
The maximum operation temperature is for XHBR 30 and XHBR 35 is 350°C.
XHBR 25 and XHBR 35 with a smooth surface are specially developed for convex and concave rollers.

All materials are defect free. A roll can consist of maximum 4 pieces. If a roll consists of 2 pieces, 1.25 m extra material will be given. For a roll of 3 pieces, 2.50 m and a roll of 4 pieces, 3.75 m extra.

## *PRODUCT INFORMATION*

| Product | Material | Characteristics | Diameter (mm) | Thickness (mm) | Extensibility % | Length (m) |
|---|---|---|---|---|---|---|
| **XHBR 10/25**<br>**XHBR 10/50**<br>**XHBR 10/60** | 100% SS | Heavy duty | 25<br>50<br>60 | 1.85 | -40% / +40% | 25 |
| **XHBR 20/25**<br>**XHBR 20/50** | 30% PBO / 70% SS | Heavy duty | 25<br>50 | 1.80 | -40% / +40% | 25 |
| **XHBR 25/30** | 30% PBO / 70% SS | Fine surface | 30 | 1.15 | -35% / +50% | 25 |
| **XHBR 30/25**<br>**XHBR 30/50** | 30% Kevlar / 70% SS | Heavy duty | 25<br>50 | 1.85 | -40% / +40% | 25 |
| **XHBR 35/30** | 30% Kevlar / 70% SS | Fine surface | 30 | 1.25 | -35% / +50% | 25 |

# Roller Covering Braided Sleeves

**XHBR 10** 100% stainless steel braided sleeve with a temperature resistance of 700°C

**XHBR 20** Strong roller covering material. Very stretchable and flexible material.

**XHBR 25** is a strong roller covering material with a soft and smooth surface.
Very stretchable and flexible material.
Maximum permanent temperature: 425°C

**XHBR 30** Strong and soft roller covering material. Very stretchable and flexible material.

**XHBR 35** is a strong roller covering material with a soft and smooth surface.
Very stretchable and flexible material.
Maximum permanent temperature: 350°C

# Nonwoven Felt XHF

High-quality and super-soft materials for all kind of applications. Mostly used as press ring covering.

This product can be also supplied in a tape version. Please check the product code "XHP" for that.

The 100% stainless-steel materials can be used up to 700°C.

The products with a Kevlar® or Nomex® scrim, can only be used outside the heating area but can withstand short contact with hot glass.

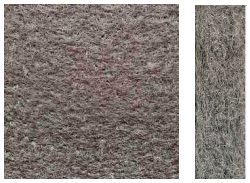
## *PRODUCT INFORMATION*

| Product | Material | Width (mm) | Thickness (mm) | Weight g/m² | Remarks (Woven Scrim) |
|---|---|---|---|---|---|
| **XHF 115NS/1.50** | 100% SS | 1500 | 6.00 | 1500 | No |
| **XHF 108ST/1.50**<br>**XHF 108SM/1.50** | 100% SS | 1500 | 0.80 | 750 | Yes, on Top 100% SS<br>Yes, in the middle 100% SS |
| **XHF 110ST/1.50**<br>**XHF 110SM/1.50** | 100% SS | 1500 | 1.20 | 1000 | Yes, on Top 100% SS<br>Yes, in the middle 100% SS |
| **XHF 112ST/1.50**<br>**XHF 112SM/1.50** | 100% SS | 1500 | 2.00 | 1200 | Yes, on Top 100% SS<br>Yes, in the middle 100% SS |
| **XHF 120ST/1.50**<br>**XHF 120SM/1.50** | 100% SS | 1500 | 3.40 | 2000 | Yes, on Top 100% SS<br>Yes, in the middle 100% SS |
| **XHF 135ST/1.50**<br>**XHF 135SM/1.50** | 100% SS | 1500 | 5.00 | 3500 | Yes, on Top 100% SS<br>Yes, in the middle 100% SS |
| **XHF 230SM/1.20** | 100% SS | 1200 | 5.00 | 3000 | Yes, Kevlar® scrim at 1/4 from the top |
| **XHF 412SM/1.40** | 100% PBO | 1400 | 3.20 | 1200 | Yes, Nomex® scrim in the middle |

## *LEGEND*

- NS = No scrim
- ST = Scrim on Top
- SM = Scrim in the Middle

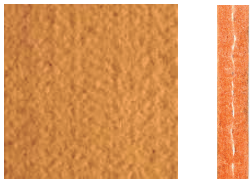
# Nonwoven Felt XHF



**XHF 115NS** A very soft, thick felt without a woven scrim

**XHF 108** This strong, thin, light-weight felt can be used to cover skeletons for the production of windshields. It can be delivered with the woven scrim in the middle or on top.
**XHF 110** This felt is comparable to XHF 108 but is 50% thicker. It can be delivered with the woven scrim in the middle or on top.
**XHF 112** The same thickness as XHF 110 but with 20% more weight. This means that the density is much higher.
**XHF 120** A very strong pure stainless-steel felt that forms a perfect soft buffer between the fragile glass and the hard tools. It can be delivered with the woven scrim in the middle or on top (as shown on the picture).
**XHF 135** Similar to the XHF 120 but more than 50% thicker. It can be delivered with the woven scrim in the middle or on top.

**XHF 230SM** A soft stainless-steel felt with an isolating Kevlar® felt. The ideal product if you need to create isolation between the hot glass and the cold tool. The Kevlar® scrim is placed out of the center. The thick part should make contact with the glass and the thin part with the cold tooling.



**XHF 412SM** This 100% PBO felt is the best isolating layer between the hot glass and the cold tool that can be used out of the heating area. It is reinforced with a Nomex® scrim.