

# DIRECT BOND CERAMIC TO STEEL ADHESIVE SYSTEM

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**DIRECT BOND CERAMIC ADHESIVE**

**ADHESION SYSTEM**

Elastotec has developed a Direct Bond Adhesion System for bonding ceramic tiles to steel for wear protection that achieves bond forces >20 MPa. Elastotec Direct Bond System is used in pulley lagging and mining equipment like transfer chutes, hoses, fans, and general equipment that suffers from wear due to material flow.

The Elastotec System includes a metal primer and a two-part epoxy adhesive.

**DIRECT BOND METAL PRIMER**



Application of direct bond ceramic tiles to steel surface can take several days to complete during which the blasted steel finish can start to oxidise/corrode. To eliminate the risk of variable adhesion due to steel corrosion after blasting, Elastotec has developed a primer system that when applied immediately after the blasting of the pulley shell seals the pulley surface and prevents surface corrosion. Photo #1 shows surface corrosion on a pulley shell after only 16 hours from the time the shell was sand blasted. The primer has no adverse effect on adhesion values of the tiles and the steel shell, but it does provide a minimum of 4 weeks protection from corrosion for the shell.

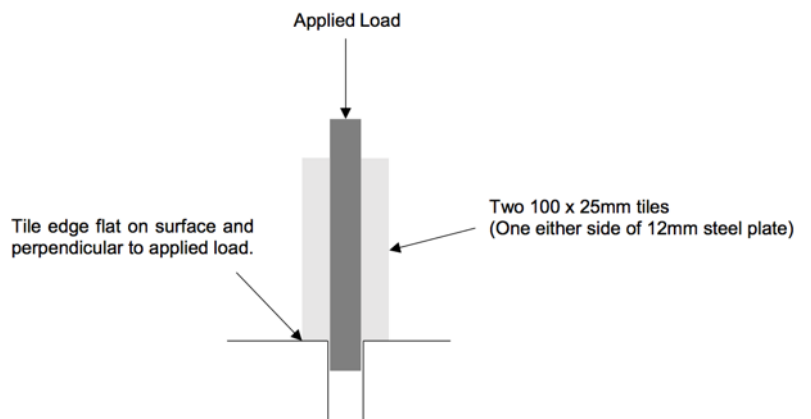


**DIRECT BOND ADHESIVE**



The Elastotec DBA adhesive has been formulated to combine excellent adhesion to the steel pulley shell and the aluminum oxide tiles with robust processing characteristics. This adhesive has proven performance for outdoor service exposed to UV, water, dust, dirt, etc. The adhesive has good properties at both low and elevated temperatures and can operate in pulley lagging applications from -20°C to +70°C.

BOND STRENGTHS AS TESTED	
Bond strength	31.2Mpa



Direct bond test method

**APPLICATION PROCESS**

## DIRECT BOND CERAMIC ADHESIVE

### APPLICATION CONDITIONS

Max humidity 80%  
Temperature 15°C (59°F) minimum  
Temperature 40°C (104°F) maximum  
Primer application steel temperature 5 degrees above dew point  
Do not apply direct bond in direct sunlight

Elastotec developed an application procedure to ensure maximum service life. Elastotec trained operators with checklist / Record for each application.

Elastotec has developed the Direct bond application system and the method of application has been designed to ensure consistent and reliable results under a variety of application conditions. In addition, a network of approved applicators has been trained to use the Elastotec Direct bond application method. This ensures that only trained operators using OEM materials apply the Elastotec DBCL. The result:

- Consistent application to OEM specifications.
- Reliable result
- Long life
- Trouble free lagging performance.

### METAL SURFACE PREPARATION AND METAL PRIMER APPLICATION

Adhesion to metal surfaces is dependent on having surface preparation that allows the bonding system to obtain a strong chemical and physical attachment. Metal surfaces are steel shot blasted to increase surface area with a surface profile of 50-100um giving a good base for adhesion. (See photo below – pulley surface must look like this). Steel surface temperature for primer application needs to be 5 degrees above dew point.

- Apply 1 coat of Elastotec Metal Primer 2207 and allow to dry completely (60 minutes)
- Apply a second coat of Elastotec Metal Primer 2207 and allow to dry completely.
- Ensure metal primer coat is even with no drips/tears.
- Check and recoat after 1 hour drying if primer coating has any defects.
- Repeat for the adhesion test pieces.

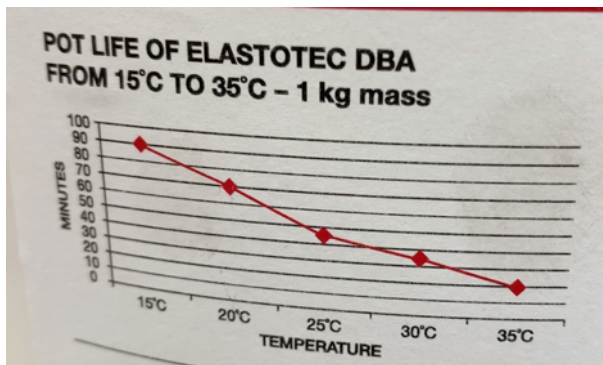


**DIRECT BOND CERAMIC ADHESIVE**

**ADHESIVE APPLICATION**

Calculate the Direct Bond Adhesive pot life from the Elastotec graph on each adhesive kit and record.

This must be done for EACH manually mixed batch of adhesive and each time that adhesive is dispensed through the mixing nozzle from the pneumatic gun, as the temperature changes during the day and the adhesive pot life is dependent on temperature.



Mix the adhesive, there are two ways to mix the adhesive:

1) Manual mixing method

Manual mixing using a spatula and mixing board – mix until colour of adhesive is uniform (3-5 minutes) – ensure no unmixed resin or hardener remain on the mixing board or spatula. Start the timer as soon as the mixing begins. For Manual mixing mix Adhesive PARTS A: PART B at 1:1 by volume or 1:0.86 by weight.

2) Pneumatic gun mixing method.

This is the preferred method as it is more consistent, requires less labour and results in minimal wastage. Apply mixed adhesive direct from the mixing board or from the pneumatic mixing gun.



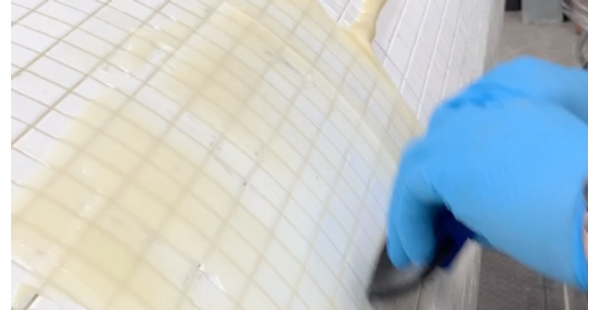
Apply mixed adhesive direct from the mixing board or from the pneumatic mixing gun and spread with a 5mm half diamond notched trowel to form an adhesive layer of uniform thickness – no lumps or exposed metal. Spread with a 5mm half diamond notched trowel to form an adhesive layer of uniform thickness – no lumps or exposed metal. Keep the notched trowel perpendicular from the pulley surface to obtain the largest adhesive lines – laying the trowel over will reduce the height of the adhesive lines and will result in insufficient adhesive for uniform coverage under each tile.

For best results keep a good bank of adhesive in front of the trowel, remove excess adhesive from the edges of the trowel and where necessary use a light tapping motion to help the adhesive spread evenly and eliminate air traps and short fill.



## DIRECT BOND CERAMIC ADHESIVE

Apply the ceramic tiles onto the surface ensure there's enough adhesive under the full ceramic surface.



After the adhesive under the tiles is set (this can take 4 to 8 hours depending on ambient conditions) apply adhesive over the tiles to and spread the adhesive filling the gaps to finish the grouting. Finished surface of tiles after grouting – gaps between tiles have been filled with adhesive – it is okay for there to be a thin film of adhesive left on the tile surface.



## DIRECT BOND CERAMIC ADHESIVE



### STORAGE

#### STORAGE RECOMMENDATIONS

- Stock usage based on a first-in first-out method (FIFO).
- The storage room for lagging and adhesives must be cool, dry and dust-free.
- Avoid storage places near sources of ozone generating equipment.
- Do not store outside.
- Avoid storage in direct sunlight and strong artificial light as UV light can damage the products and may lead to a premature ageing.
- Under no circumstances should fuels, lubricants, acids, disinfectants, solvents, or other chemicals be stored in the same storage area.
- Keep the storage place clean. Protect the material from dust, water etc. with suitable coverings.
- Allow 24 hours before use when removed from cold storage.
- Elastotec Metal Primer 2207 store in flammable goods cabinet

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#### SHELF LIFE

#### ADHESIVES AND PRIMERS


- Shelf life: 2 Years
- Storage temperature: <25°C

Products stored under the above conditions for longer periods of time than recommended need to be re-tested for adhesion before being used.



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