CILBOND® 48
TECHNICAL DATA SHEET

CILBOND 48 is a Fast Drying One-Component Bonding Agent for Castable Polyurethane Elastomers and Thermoplastic Polyurethane Elastomers (PUs and TPUs).

BENEFITS OF CILBOND 48

BONDING CAPABILITIES :

Cilbond 48 is a one-component bonding system for hot and cold-cure PU's and TPU'S to all metals during the curing process at temperatures of 68°F to 275°F for cast elastomers and up to 390°F for TPUs.

Cilbond 48 will also bond PU and TPU to epoxies and fibreglass reinforced plastics, polyamides and other engineering thermoplastics, such as Hytrel®, PBT, PET, PPS, PPO, PEEK, PES etc.

IN-SERVICE BENEFITS :

Cilbond 48 is especially suitable for use in dynamic conditions where hydrolytic stability is important, exhibiting no failure in the cement to metal bond.

This is illustrated by tests where a 95°A modified polyether TDI prepolymer / Ethacure 300 system was bonded to mild steel with Cilbond 48. It showed 100% rubber tear with peel loads of ≥1000N/25mm, when tested at 73°F after total immersion for 15 days in pressurised tap water at 221°F.

Cilbond 48 exhibits excellent salt-spray resistance, illustrated by bonding a polyether TDI prepolymer / Ethacure 300 to a mild steel substrate and tested at 95ºF in a 5% salt solution for 700 hours. Results showed no edge corrosion or bond failure.

PROCESSING BENEFITS :

Cilbond 48 is formulated with a fast-drying solvent system which dries quickly to give tack-free / non-blocking coatings. It will also bond without the need of a pre-bake, but will reliably withstand cycles of up to 24 hours at 210-220°F.

TYPICAL PHYSICAL PROPERTIES OF CILBOND 48

Appearance	*Colourless Liquid*
Viscosity - No 3 Zahn Cup @ 78°F	*13 - 17 seconds*
Viscosity - Din 4 @ 78°F	*25 seconds*
Non-Volatile Solids	*21.5 % by weight*
VOC Content	*78.5% by weight (5.8 lbs per US Gallon)*
Volume Solids	*18.1%*
Weight per Gallon	*7.3 lbs*
HAP Content	*17.7% (8.1lb HAP / US Gallon solid)*
Specific Gravity @ 78°F	*0.88 – 0.92*
Flash Point (Abel Pensky)	28.4ºF (-2°C)
Moulding Temperature Range	*68 - 275°F (Cast Elastomers) and 300 - 445ºF (TPU)*
Optimum Dry Coating Thickness	*1.0 mil for maximum adhesion and corrosion resistance.*
Typical Coverage at 1 mil dry coating thickness	*610ft² / US Gallon*
Shelf Life	*12 Months from Date of Manufacture*

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WHERE TO USE CILBOND 48

Cilbond 48 will bond all castable TDI, NDI and MDI prepolymer systems, MDI quasi systems, cold cure polyurethanes and TPU's to metals and plastics (including fabrics and cord) at temperatures of 68ºF to 275°F for cast elastomers and up to and even above 390ºF for TPUs.

Cilbond 48 is especially suitable for use in dynamic conditions where hydrolytic stability is important, exhibiting no failure in the cement to metal bond.

END-USE APPLICATIONS OF CILBOND 48

End applications for products using **Cilbond 48** include :

- Rollers for the paper and textile industries, including rotationally cast PU rollers
- Solid tyres
- Carriage wheels
- Dunnage
- Pipe linings
- Pipe coatings
- Reinforced screen decks
- Belts
- Any product with an engineering bond between a PU elastomer and a metal or plastic substrate.

Cilbond 48 should also be considered for bonding PUs to a range of RFL-treated and untreated fabrics and cords such as polyamide, Aramid, polyester and carbon fibre, as used in hose and belt construction.

METAL SURFACE PREPARATION

Cilbond 48 must be applied to carefully prepared surfaces for it to be effective. Surfaces should ideally be grit-blasted with clean, filtered (200-400 micron) sharp alumina or steel grit and solvent degreased.

Alternatively, surfaces may be phosphated using well-established proprietary systems.

Good metal preparation is vital if the environment is continually wet, such as sub sea situations.

Most engineering plastics can be grit blasted, but it may be necessary to use finer grit (100-200µ) and use a lower air pressure to prevent plastic flow and any fibrillation.

For detailed recommendations on substrate preparation refer to **Information Sheet A1**.

APPLYING CILBOND 48

AGITATION

Cilbond 48 should be stirred prior to use.

BRUSHING

Application by brushing is normally undertaken without further dilution, but for coating large areas, dilution with MEK or the diluent blend shown below, improves flow and speed of application. The application of two thin coats is more consistent with good bonding than applying one thick coat.

DIPPING

Dilute to a viscosity of 16-24 seconds using a Zahn No.2 cup at 78ºF or 13-20 seconds using a Din 4 or Ford 4 Cup at 78ºF. Use MEK if a fast drying coating is required, or MEK/Toluene blends if slow drying is required.

SPRAYING

Dilute to 16-24 seconds on a Zahn No 2 cup or 13-20 seconds on a DIN 4 or Ford 4 cup at 78ºF, using up to 30% of the diluents shown below.
A nozzle size of 0.04–0.06 in and an air-pressure of 22 psi is recommended. Excessive air-pressures may lead to cob-webbing. If cob-webbing (fibrillation) occurs, use more diluent containing more higher boiling solvent, such as MPA.

If MEK is used as the sole diluent, beware of chilling the sprayed metal parts (due to rapid MEK evaporation) and subsequent condensation of water, which may lead to a micro porous film. It is normally preferred to use a diluent made up from MEK and toluene in the ratio of ca. 3:1 by weight or volume.

DILUENTS

See separate section below on the recommended diluent blends for brushing or spraying.

ROLLER COATING

The viscosity of **Cilbond 48** may be too low for some roller application processes.

DRYING

Dry each coat for at least 30 minutes, and the final coat for at least 45 minutes at room temperature of ≥73°F. At below 68°F, extend the drying time accordingly.
Forced drying may be used (and is recommended for cold-cast PUs with little or no exotherm), if care is taken to prevent blistering of the films, but use low temperatures (of up to 140°F) in the early stages of drying. Pre-warming parts to ~140ºF prior to coating will also reduce drying time. For cold cast PU, where no heat input is possible, the final coat should be left to dry for several hours, preferably overnight, prior to casting the PU. Alternatively, consider **Cilbond 41** for low temperature on-site bonding.

PRE-BAKING

Pre-baking is not usually required to develop good bonding to the substrate however if a pre-bake is necessary, CIL recommend using 1 hour at 210-220°F. The maximum pre-bake is 24 hours at 210-220ºF and pre-bakes at >250ºF should be carefully controlled.

COATING THICKNESS

For general-purpose applications use a dry coating thickness of **0.6 mil**.
For dynamic fatigue or severe environment applications use a dry coating of **≥1.0 mil**.

PU CASTING

Cast the PU as directed by the PU manufacturer. For hot cast PU's, always heat the coated metals up to the mould temperature/casting temperature. For cold cast PU's and rotational casting it is important, in order to maximise the environmental resistance, to either extend the drying time (as described above) or preferably, heat the coated parts at 140-160°F for 30–60 minutes, prior to casting the PU and for very fast curing PU systems the moulding process can be conducted after the metals have cooled down, if it is absolutely necessary.

POST-CURES

Post curing is not required with **Cilbond 48**, but any post cure specified for the PU, will generally enhance the bond strength and the environmental resistance of the bond.

STORAGE

Coated parts can be stored for up to 7 days, provided they are protected from dust and moisture, but ideally the PU should be cast within 48 hours.

DILUENTS

It is normal to dilute **Cilbond 48** to suit the application process. For Brushing add between 10-20% of the recommended Solvent. For Spraying / Dipping add between 20-50%, although this is a guide only :

Methyl Ethyl Ketone (MEK) :

Brushing	MEK is fast drying, so it is used mainly for brush application to relatively small components
Spraying / Dipping	May cause excess chilling and cob-webbing/fibre formation. Works best with HVLP systems

Acetone :

Brushing	Yes, at 10-20%,but use for small parts only. Acetone can cause severe chilling of the metals.
Spraying / Dipping	Do not use acetone for normal spray applications, though it can be used for tumble spraying.

MEK / Toluene (with MEK content ≥60%) :

Brushing	A good all round diluent for brushing.
Spraying / Dipping	A good all round diluent for spraying, especially with HVLP guns.

Glycol Ethers (MPA etc.) :

Brushing	Use for brushing large areas. These diluents are very slow drying, so extend drying time by at least 2 hours
Spraying / Dipping	Gives excellent spray properties, but extend the drying time by at least 2 hours.

Cilbond 4000 Diluent :

Brushing	Excellent diluent, but extend drying time by 2 hours
Spraying / Dipping	Excellent diluent, but extend drying time by 2 hours.

Toluene, MIBK or Butyl Acetate :

Brushing	DO NOT USE ON THEIR OWN – may cause polymer precipitation.
Spraying / Dipping	DO NOT USE ON THEIR OWN – may cause polymer precipitation.

THE USE OF CILBOND 48 + CILCURE B

When in-service temperatures are extreme (up to 355ºF) or for applications involving continuous use in aqueous environments, CIL recommends using the **Cilbond 48 + Cilcure B** system.

Cilbond 48 + Cilcure B is recommended for rotational casting of small and medium sized rollers and applications involving dynamic fatigue at temperatures of ≥285°F.

Cilbond 48 + Cilcure B is recommended for highly plasticised PU systems and for systems where the curing agent could potentially solvate the bonding agent layer, such as trans CHDI/CHDM PU systems.

HOW TO USE CILBOND 48 + CILCURE B

The standard mix ratio of **Cilbond 48** + **Cilcure B** is **100:8** by weight, but for some applications, it may be possible to use a mix ratio down to 100:2, especially for very fast cure 2 component PU's.

Cilbond 48 should be mixed with **Cilcure B** preferably by adding the **Cilcure B** to the **Cilbond 48**, whilst stirring. Stir well until homogeneous. Allow to stand for a few minutes, stir again and it is then ready for use.

Ideally make up sufficient mix to last ca. 8 hours, which is the recommended pot life. Dispose of any material after this, especially if it has a gelatinous nature.

Apply this mixture following the same procedure as for **Cilbond 48 –** we recommend the dried parts are brought up to the moulding temperature or to ≥120°F prior to casting the PU.

A high temperature pre-bake is possible, but long pre-bakes must be avoided or fully validated.

PERFORMANCE BENEFITS OF CILBOND 48 + CILCURE B

Components bonded using **Cilbond 48 + Cilcure B** subjected to water at <120°F is predicted to be ≥ 20 years.

Cilbond 48 + Cilcure B yields bonds capable of withstanding boiling water for up to 220°F for ≥200 hours.

Cilbond 48 + Cilcure B also gives improved adhesion to many difficult to bond substrates; especially epoxy resins (including Fusion Bonded Epoxy), GRP / FRP, glass, ceramics, etc.

Cilbond 48 + Cilcure B (or Cilbond 48 + Cilcure B as a primer under Cilbond 48) produces bonds capable of withstanding temperatures up to 355°F

The use of Cilbond 48 as a cover coat is covered below.

CILBOND 48 + CILCURE B AS A PRIMER UNDER CILBOND 48

This combination is used to achieve the performance benefits of **Cilbond 48** + **Cilcure B** with the processing benefits (long open time and pre-bake resistance) of **Cilbond 48**.

A primer coat of **Cilbond 48** + **Cilcure B** is applied to well-prepared metals to give a minimum of 0.6 mil dry coating thickness and dried for 1 hour at ambient temperature or with gentle applied heat.

A second coat of **Cilbond 48** is applied to give a total coating thickness of ≥1.0 mil and dried thoroughly.

The parts can now be treated as though coated with **Cilbond 48**, but have the in-service performance benefits of **Cilbond 48** + **Cilcure B**.

FURTHER INFORMATION

Cilbond 48 is supplied in 2.5, 6.5 and 55 US Gallon containers. ½ pint trial samples are also available upon request.

For more information on **Cilbond 48** or for details of our other products please visit www.cilbond.com or e-mail sales@cilbond.com