

## SPECIAL APPLICATIONS FOR PU BONDING AGENTS

### SECTION A – PU WHEELS, CASTORS and ROLLERS

**Cilbond 49SF** is the first choice for high performance bonding since it gives the best compromise of bond strengths, heat resistance and dynamic fatigue resistance of the bonds and environmental resistance of the bonds, whilst the prebake resistance of the metal coated parts is still very good at up to 30 hours at 135°C or 60 hours at 100°C.

Therefore **Cilbond 49SF** is the first choice for corrosion resistant bonds and any application requiring a high quality tough environmental resistant bond. To maximise the bond properties a prebake between 2 and 8 hours at 100°C (or 30 mins - 2 hours at 120°C) is recommended.

**Cilbond 45SF** exhibits an exceptional pre-bake resistance for the coated parts (up to 60 hrs at 135°C or 120 hrs at 100°C before exhibiting patches of rubber to cement (RC) fail), whilst the heat resistance/creep resistance and corrosion resistance are slightly inferior to **Cilbond 49SF**. Therefore **Cilbond 45SF** can be used for many high performance applications where a clear bonding agent is specifically required.

**Cilbond 48** combines excellent heat and environmental resistance with a fast-drying clear finish. Though not as established as **Cilbond 49SF**, its versatility and user-friendliness should be considered.

### SECTION B – HIGH PERFORMANCE ROTATIONAL CASTING OR RIBBON FLOW BONDING OF PU's FOR ROLLERS, WHEELS and PIPE-COATING

**Cilbond 49SF** is the standard **Cilbond** for most PU bonding. In the case of Rotational Casting or Ribbon Flow there are two potential features which could work against good bonding:-

1. Very fast cures, amine cures or highly catalysed polyol cures could lead to poor wetting of the bonding agent and insufficient "grab" by the bonding agent.
2. The metal stock is the coldest part at the time of casting. This can influence the shrinkage of the curing PU away from the metal stock, which is not desirable.

In many cases of rotational casting **Cilbond 49SF** gives excellent bonding with no adhesion problems and this is achieved by using a generous coating of **Cilbond 49SF** on the degreased ground metal surface and ensuring the **Cilbond** coating is thoroughly dry prior to casting the PU. In most cases CIL recommend that the roller is allowed to dry overnight.

See overleaf for Procedure.

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## **SECTION B – HIGH PERFORMANCE ROTATIONAL CASTING OR RIBBON FLOW BONDING OF PU's FOR ROLLERS, WHEELS and PIPE-COATING - (continued)**

There are going to be cases where the bond line temperature is not reaching 70°C due to the mass of the metal stock. In such cases the following procedure should be followed:-

1. Grit-blast, abrade, cut or grind the metal stock to remove surface contamination.
2. Degrease thoroughly to give a good surface for bonding.
3. Mix **Cilbond 49SF** and **Cilcure B** in the ratio of 10 : 1 Parts by Weight.

Add the **CILCURE B** with stirring to the **Cilbond 49SF**. Stir to give a fully homogenous mix. Stand for ca. 15 minutes and gently stir again prior to use. Do not use a mixed batch when it is over 8 hours old.

4. Apply a generous coat of the mixed **Cilbond 49SF/Cilcure B** or (preferably) apply two thin coats, allowing the first coat to dry thoroughly. At an ambient temperature of 23°C this is >1 hr and preferably  $\geq$  2 hrs.

For brushing, it is normal to use the mixed adhesive undiluted, or it may be diluted, especially for covering large areas, with up to 20% added diluent. For detailed information on the diluents, see the Technical Data Sheets.

For spraying, care must be taken to avoid breathing the atomised mixture as this contains isocyanate. Furthermore, because isocyanates can and will react with moisture in the atmosphere to produce carbon dioxide, care must be taken to avoid the formation of microporous foam (cissing) in the dried coating.

To avoid this, use a high boiling diluent such as MPA and use low air pressures on the spray gun as this reduces chilling of the metal.

Low boiling diluents such as MEK and MIBK are recommended for brush application. For spray application, the higher boiling solvents such as butyl acetate and MPA (methyl proxitol acetate) are recommended. It is normal to use up to 50% added diluent to obtain a homogeneous film when spraying.

5. Prior to casting the PU onto the metal ensure that the bonding agent is fully dry. It is recommended that the final coat is dried for an absolute minimum of 2 hours at a typical 23°C room *temperature and left for no more than 24 hours after coating and prior to casting*. If in any doubt leave to dry for between 4 and 24 hours, for example overnight. The open-time can be extended by applying a cover-coat of **Cilbond 49SF**.

Avoid conditions which involve metal stocks at very low temperature of <15°C. Ideally, metal stocks should be at  $\geq$ 20°C, as this avoids the potential problem of moisture condensation cissing the coating.

6. Pre-warming the metal stock using infra red heaters or warm air will improve bonding. If heating is possible do not heat above 70°C for ribbon flow applications.
7. Apply the PU system as recommended by the manufacturer and allow the finished item to equilibrate for at least 24 hours prior to any in service use or bond testing.

NOTE 1: In most cases (excluding situations where corrosion resistance is important) it is possible to replace **Cilbond 49SF** with **45SF**.

NOTE 2: If the bond line temperature does not reach > 50°C (due to the PU exotherm) then consider **Cilbond 41 + CILCURE B**.

NOTE 3: This procedure does not allow for an extended pre-bake capability and as such is not necessarily suited for wheel production. The maximum pre-bake resistance is ca. 1 hr at 100°C.

## **SECTION C – ALTERNATIVE METHOD FOR ROTATIONAL CASTING/RIBBON FLOW BONDING OF PU'S, FOR TRULY COLD BONDING APPLICATIONS**

### **CILBOND 41 and CILCURE B**

For many applications, such as many roller applications, on site joint sealing, repairs and where speed of operations make the **Cilbond 49SF / Cilcure B** system uneconomic, the following method gives fast bonding for most PU elastomers, spray coating and microcellular foam. It gives good bonding to fusion bonded epoxies, metals and other plastics substrates.

1. Prepare surface to be bonded using grit-blasting, abrasion, cutting, etc and degrease.
2. Mix **Cilbond 41** and **Cilcure B** in ratio:-

<b>Cilbond 41</b>	100 parts by weight
<b>Cilcure B</b>	5 parts by weight

Add the **Cilcure B** whilst stirring the **Cilbond 41**. Stir for 5 minutes and use within 12 hours. Add MEK as diluent if required. For spraying, it may be necessary to use small amounts of MIBK to reduce cob-webbing.

3. Apply a generous coat of the mixed **Cilbond 41** and **Cilcure B**. Dry for 30 - 45 minutes and apply a second coat as necessary to achieve ca. 20 micron dry coating thickness.
4. Dry the final coat for at least 60 minutes at an ambient temperature of 23°C and for no more than 24 hours. If left for more than 24 hours a further application of **Cilbond 41** and **Cilcure B** is highly recommended.
5. Apply the PU as directed in the data sheet for that PU. **Cilbond 41** and **Cilcure B** does not demand a post cure.

NOTE: For smaller rollers or where the PU shrinkage is unlikely, it is possible to reduce the drying time for the final coat from 60 minutes to  $\geq$  20 minutes.