Windsor™

Service & Technical Bulletin

Issue 1 - November 2008

Keeping you in touch

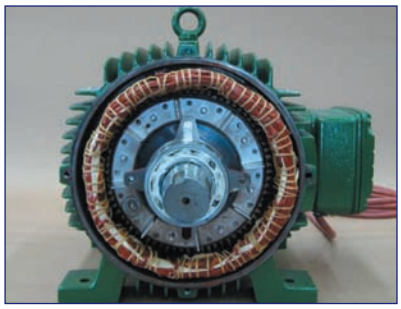
Welcome to the first edition of Windsor's Service & Technical Bulletin. We'll be providing you with important information every few months, to keep you up to date with recent and future changes to our various kiln drying, extraction and filtration systems, and to provide you with invaluable technical tips.

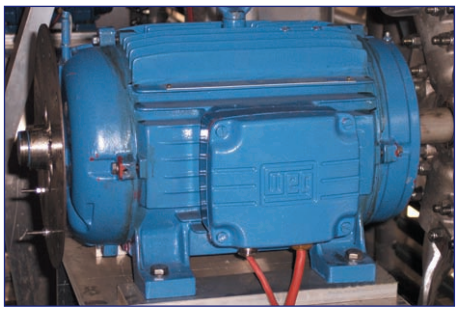
Several years ago we produced a similar service bulletin, and since then many clients have often requested its resurrection – believing it provides an important tool to maintaining and operating their Windsor products. So here it is back by popular demand! This edition is primarily focused on kilns; next edition will cover a wider range of equipment.

In the first two editions we'll recap the stories featured in past bulletins, so you can end up with the total collection. What's new about this revamped bulletin however, is we'll also be providing invaluable technical knowledge, plus information and tips directly from our engineers!

In the meantime, if you have any other questions about service, maintenance or operational matters, please feel free to call us – it's best to ask the questions now rather than later, and we'll only be too pleased to help.

In-kiln motor greasing





To ensure a long and healthy motor life it's important to follow the greasing and bearing replacement procedure in your kiln manual. But remember, if your motor setup has altered since it was supplied then it's requirements could have changed.

If you have changed your grease or application interval (or are thinking about changing it) please contact us. It is vital that any change is right for your motors. Several years ago we introduced Kluber Barrierta (used every 12 months) as a new grease for our internal kiln motors. This was done to avoid the weekly greasing with Molykote 44.

Due to the high cost of Barrierta we tested a range of cheaper greases and found an alternative that is suitable for many kiln motors. This grease is called Kluber Temp and it is compatible with Barrierta **(but not with Molykote)**. It has a re-grease interval of 12 months, however the bearings must still be changed every two years.

The really good news is that Kluber Temp is only $847.00 + GST for an 800 gram tube. That compares with $1,421.00 + GST for the same sized tube of Kluber Barrierta L55/1. Kluber Temp can be used for in-kiln motor applications operating at temperatures of 110ºC dry bulb or less.

Kiln roof guardrails

To address the issue of safe working on a kiln roof, a feature we have developed is our roof mounted guardrail system

Our design complies with AS 1657–1992: Fixed platforms, walkways, stairways and ladders - Design, construction and installation. By following that standard we can ensure that we comply with the New Zealand Building code.

A number of customers have specified our guardrail systems on their new kilns and quite a few have been installed over the past few years.

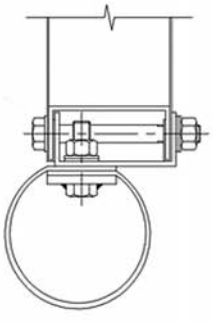
For existing owners of Windsor kilns the system can also be retrofitted. If you are interested in guardrails on your kilns please get in touch with us.

Kiln door seal maintenance

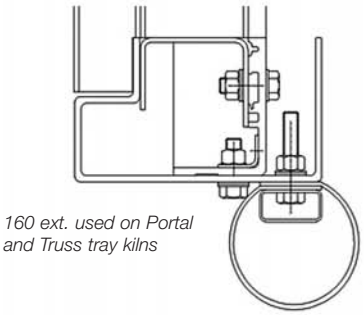
A common cause of premature failure of the bottom door seal is incorrect adjustment. If the door bottoms out on the concrete pad and crushes the seal flat, its life will be greatly reduced.

To ensure the door seal operates correctly without being squashed flat, we recommend a gap of between 30 and 50mm between the bottom of the door and the concrete. This gap can be obtained by adjusting the door cam pins fitted on each side on the door. If more clearance is required we can supply a modified set of door lugs.

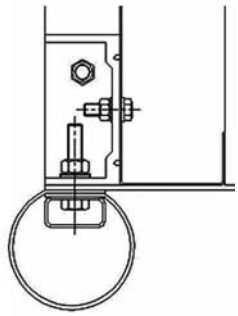
Bottom door seals do periodically wear out, so to make their replacement cheaper and faster, we have introduced bolt-on kits. These new kits are now available for all our kiln door types and mean that for future replacements, the seal is the only part that is bought. Examples of these seals are shown in the following sketches.



70x30 frame used on Panel and Classic kilns



160 ext. used on Portal and Truss tray kilns



100 x 50 frame used on Portal and some Truss tray kilns

Working on the plenum floor

We want to make sure that everyone involved with our equipment is kept safe. Our Service bulletins will occasionally feature extracts from kiln manuals dealing with safety issues.

There are times when it is necessary to work in the plenum area. This is a high risk area due to the rotating fans and very hot surfaces. However maintenance inspections to examine fixings, check fans and grease motors make it necessary to work there on a regular basis.

Before working in the plenum area, electrical power and heat sources must be isolated. Windsor recommends the following steps:

1. Advise other people in the area what you are doing
2. Understand your site lockout protocols
3. Identify the equipment to be isolated
4. Switch off the equipment before isolating
5. Identify the point of supply (pipework isolating valve, MCC, DB or local isolator)
    - Isolate using a suitable label (a Hold Tag) and where possible a padlock.
    - Attempt to start the equipment. Test for voltage to ensure that the correct supply/control has been isolated and to prove that the isolator is working.
    - If there is more than one person working on different aspects of the equipment, then each person must attach their personalised hold card and padlock.

Following these few simple guidelines should help to keep everyone working with the kiln safe.

Silicone motor cable replacement

For in kiln motors, both the motor power and heater cables can deteriorate with time. An expected normal service life for motor cables is between 2 and 4 years.

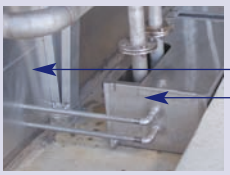
When greasing the motor bearings, check that the cables are in good order. They must be clamped at the terminal box entry and restrained against chaffing from the airflow.

In addition we recommend that the cables are changed each time the motor is disturbed as they become brittle and can crack when moved.

Steam generator water supply

Regardless of the hardness of your site water, regular maintenance of the steam generator water supply is needed.

1. The water supply to the tank is controlled outside the kiln by an Omron floatless level sensor and solenoid valve. To check its operation lift the level sensor out of its tank and listen for the click of the solenoid valve as it opens to let water into the tank.
2. There are three probes inside the Omron valve that measure the water level. Remove the Omron sensor from the level tank and check them for build up of scale. Clean as necessary.
3. With the kiln switched off and with the steam generator cold, use a pressure water hose to clean scale and deposits from the pipe that connects the Omron valve to the generator tank. If the build up is particularly heavy the connecting pipework may need to be removed and cleaned thoroughly.



Water supply from solenoid valve

Return to Omron level sensor

The Omron level sensor and level tank outside

Kiln fan balance and maintenance

Do not balance a fan by drilling and grinding

Kiln fan maintenance is important, the following points may help you.

- If a fan is removed from a shaft it should be removed as an assembly. Match mark the bush and the hub prior to removal and do not rotate the bush in the hub when reassembling.
- Fans should be crack tested annually. Test both the hub and blades and inspect the fasteners and replace any cracked or corroded items. We can supply individual parts from stock.
- We recommend re-balancing the fans every 5 years and also if the fan assembly is dismantled or if any parts are replaced.
- Balance specifications for Hartzell and Smithco fans are in the kiln manual. Hartzell fans require a single plane balance and Smithco fans require a 2 plane balance. Stainless steel weights should be added to the fan hub fixings and the balancing discs fitted to the rear of each motor. Never remove material from the blades or hubs.
- Inspect fan scrolls, these must be smooth and uniform in shape. Torn or damaged scrolls can cause blade vibration which can lead to fatigue cracks in the blades.

For more information check your kiln manual or talk to Brent Morris.

Kiln maintenance poster

Have you got our free poster? It details all of the basic kiln maintenance items and how often they need to be done. If you want a copy of this poster for your kiln control room, please contact us or email sales@windsor.co.nz

The poster is laminated so you can write the next maintenance date on it. Also, if you would like to receive information like this bulletin from Windsor via email, or know someone at your company who should get a copy, please contact us at sales@windsor.co.nz. Just send us your name and company and put 'Service Bulletin' in the subject line.

Safety issues when working on a kiln roof

- Follow your site requirements for safe working at height
- Use a safety harness system
- Tie the top of any ladder used for roof access
- Do not go on the roof in bad weather conditions
- Be aware of vent linkage cables and cable trays. These are a potential trip hazard
- Watch out for steam from opening vents
- Do not lift the vent lids when the kiln is running

TIPS from your kiln manual

Before you load each charge you should check the wet bulb wick and either wash it out or replace it. Use chux cloth 2 layers thick for 90°C DB operation, 3 layers for 120°C and 4 layers for 140°C DB operation. Ensure the wick covers the tip of the probe properly and does not block the reservoir drain. Verify that the water flow to the kiln wet bulb is correct, around 150cc/min is typical. It is worth checking that this flow is maintained during the cycle as site water pressure can vary.

This is an extract from a typical kiln manual. Manuals are full of information to help you run your Windsor kiln efficiently.

Power Costs Have Escalated – Can We Help?

Fan Settings For Power Saving or Increased Motor Life

Timber drying kilns have large fans running 24 hours a day. You may be concerned about diminishing returns caused by the escalating price of electrical energy.

As the major supplier of kilns in Australiasia we share your concerns. Our Engineers have been exploring ways of reducing your power consumption.

We believe you may be able to achieve up to 50% savings in power costs by re-pitching the circulation fans in your kilns.

Any reduction in blade pitch angle will reduce your overall power consumption. We estimate with a 10% reduction in through-put, you can save up to 50% on your fan electricity costs.

If this is an opportunity you wish to explore further, we recommend you consider the following:

- Re-pitching of the fans is critical to the operation of the kiln. We recommend this should only be carried out by Windsor's Engineers. We have developed special tooling to complete this quickly and accurately.
- Modificiation costs will vary considerably from site to site depending upon location, age of equipment, number and type of fans.
- Kiln motor life will be increased following this modification - in some cases by as much as 50%.
- With older kilns it may not be practical to alter the fan pitch.
- For kilns running VSD control, similar power savings are possible by re-programming your VSD.
- If your kiln drying circumstances change you can re-set the fan pitch angle again to get maximum performance.

If you would like to explore the possibilities for your site please feel free to contact Brent Morris.

Kiln motor bearings

The internal temperature of a kiln motor can reach 180°C. Because of this, standard industrial bearings cannot be used. A specialised type must be fitted to our internal kiln motors. The reference numbers are listed below. It is critical that bearings should have the correct clearance (C4) and should be heat stabilised (S1, X28 or TS3, depending on manufacturer). If a standard bearing is used in these conditions, it is likely to lose fit on the shaft and lose clearance around the ball races. Bearing failure can result in damage to the motor, fan blades and scroll. If the motor stator is damaged from a bearing failure (poling), it is unlikely that a successful rewind will be possible.

Whilst there are many makes of bearings, based on our experience there are three manufacturers that we will recommend – they are SKF/FAG, NSK and NTN. We are unable to recommend KRW or DKFL for this particular purpose. The bearing specification varies depending on the motor type. We recommend that internal kiln bearings are replaced every two years.

External motors have different requirements, for more information please ring us or consult your kiln manual.

Fan balancing and pitching

Fan pitching and two plane balancing

Balancing disc

To ensure that kiln motors and fans provide the optimum airflow through a timber stack, it is essential to have a correctly pitched and balanced fan/motor assembly.

There are four points to check for:

- That the fan blades are not over pitched.
- The fan pitch must be the same for all blades.
- Fan balance should be checked in forward and reverse directions.
- Balancing should be done in two planes. This is done by adjusting the weights on the fan hub and on the balance disc on the non drive end of the motor.

Several years ago Windsor started balancing fans in two planes. This proved a very successful move and means our fans operate more efficiently, which in turn reduces wear and tear on the motor and kiln structure.

As part of our continuing product development the engineers at Windsor have designed and made a unique tool that ensures each blade is pitched exactly the same.

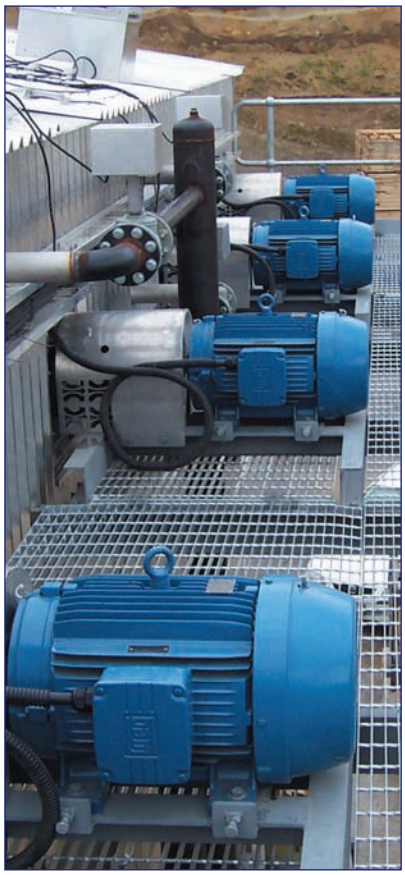
We know that if fan blades are pitched at different angles (even if the difference is as small as ½ degree) there is a detrimental effect on fan balance.

The full specification for correctly setting up your kiln fans is in your Windsor manual.

By using the new tool to set up your fan blades we are able to ensure that they perform correctly when rotating in both forward and reverse directions.

External kiln motors

Most of our high temperature kilns are fitted with external motors, which have different maintenance needs.



Weekly
- Lubricate fan shaft bearings.

3 monthly
- Check motor hold-down and fan pedestal bolts
- Check Bearing hold down bolts and grease lines on HT kilns
- Clean out grease catch trays on HT kilns
- Check out plenum floor for loose panels and missing fasteners
- Check the integrity of the locknuts on the fan hub through-bolts
  Important Note: Do not re-torque the fan hub through bolts
- Check rotor tip clearance
- Check condition of vent linkages
- Check the steaming bath level control tank and probes are clean
- Check the connecting pipe between the control tank and the steam bath is not obstructed
- Check operation of water control solenoid valve to the steam bath
- Inspect door seals and door lifter operation
- Check operation of all isolating valves on the kiln pipework
- Check cladding – Replace any missing fixings

6 monthly
- Check fans and bearings, clean out grease lines
- Check motor shaft coupling and wall flashing seal

Yearly
- Inspect fan rotor for wear and build up of resin
- Check clearance of rotor/shaft/fan case
- Grease motor bearings

Don't forget If you have changed the type of grease that you use on your kiln motors or if you apply it at different intervals to those listed in your kiln manual, please contact us. It is vital that any change is the right one for your motors.

Safety windows in Kiln doors

Some customers have asked us to provide small windows in the kiln access doors.

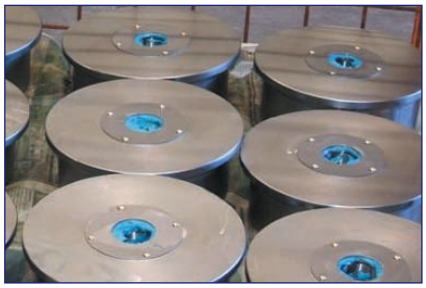
The solution we developed (pictured) is now standard on all our new kilns and are available as a retro fit item for older kilns. For more information please contact Robert Hughes.

Fan blade pitching jig

To ensure that kiln fans provide the optimum airflow through a timber stack it is essential to have correctly pitched fan blades. Following the last bulletin a number of people have asked if our special fan pitching jig is available for sale.

This unique tool was specially made for our service team to enable accurate and efficient fan blade set up, but because of the level of interest we have decided to make it available for sites with Windsor kilns. The part number is KI-09F-350, it costs $1,497 plus GST and it is suitable for Smithco and Air Radiator blades, please ask about other blade manufacturers.

Cart wheels



The kiln carts supplied by Windsor are fitted with a special wheel designed to stand up to the rigours of kiln life.

We always keep a stock of wheels at Wellington so if you are building new carts or if you need to replace old wheels on your existing carts please get in touch with us.

Fixing problem kilns

The Windsor Service team also service, maintain and upgrade kilns made by other manufacturers.

Our experience gives us a unique advantage when it comes to maintenance (especially with fan assemblies). We can quickly diagnose problems, often before they disrupt production.

We offer anything from a kiln audit through to a full kiln service and because we carry a wide range of spares we can also quickly replace faulty items such as heat exchangers, motors, fan blades, temperature probes, valve actuators and vent motors etc.

Kiln manuals

How often do you use your Windsor kiln manual? Did you know it can help to keep your kilns running efficiently? Every time we commission a kiln we supply two copies of the kiln manual; this is full of essential and useful detail. Save this bulletin in your kiln manual for future reference!

Can you still find your kiln manual, or has it been lost? We keep a copy of each manual we issue, so we can arrange for a photocopy to be made and sent out to you. We will charge only for the copying and postage. Let us know if you need another copy.

If you haven't looked at your manual for some time it is worth reminding yourself of some of the more important information in it. Of course we are always happy to discuss any question that you might have about our equipment. But you might find for an instant response that the answer is in your kiln manual.

Using your manual can certainly save you time and money on maintenance, especially on items like fans and motors.

Handy Hint! Door lifter maintenance

Because the door lifting pump is exposed, we have found that its relief valve can get a bit sticky. To keep it in good shape we suggest that you put a small amount of 'anti-seize' on the thread to keep it operating efficiently.

Getting down to the nuts and bolts

In an average year a kiln goes through a punishing regime that would damage lesser structures due principally to vibration and thermal expansion and contraction. A long operating life is a key part of our kiln design, but regular maintenance is an important factor in ensuring top performance. Fastening checks are an important part of kiln maintenance. Regular checking of fastenings saves kiln downtime and damage to components which saves money.

The Windsor kiln manual details the kiln's critical fastenings, such as fan and motor fixings and specifies the correct torque settings.

Kiln motor rebuilds

Motors running inside a kiln are not like any other motor you have in the sawmill. The kiln motors get a lot hotter than others. They also have to cope with operating long hours, often in conditions with very high humidity.

With correct maintenance, a Windsor in-kiln motor should have an average life expectancy of five years.

When the time comes for replacing the motors in your kilns, we offer a cost effective alternative to to purchasing a brand new replacement.

Windsor service exchange motors are built to an even higher specification than the standard class H 180ºC rating that is found in both new motors and those offered by other motor rewinders

Windsor Rebuilt Kiln Motors Have the Following Features

- Copper wire rated for 220º C – I.E. exceeds class H 180ºC
- Special heavy duty 'Kaptan' slot liners rated at 300º C
- The motor windings for our rebuilt motors are re wound using a method that reduces the internal voltage in the motor coils. This is specific to our own rewinds and not found in other motors
- Silicon glass motor cable insulation rated at 300º C. This wire is capable of operating at 300ºC for 1 hour
- Heat stabilised bearings – these don't lose their interference fit on the motor shafts when operating at high temperatures
- Kluber grease – This allows 12 months running before regreasing is required
- 240V AC heaters fitted to the motor windings. These dry out any moisture that enters the motor during kiln reconditioning cycles
- Worn motor shafts and end housings are repaired / replaced as required
- Supplied with a new motor cable

Kiln motor rewinds

A properly maintained Windsor in-kiln motor has an average life of five years. After that time it is possible to extend its life by getting it rewound. The kiln motor is not like any other motor in a sawmill, it gets a lot hotter than the kiln and it operates in an aggressive atmosphere, so it is critical that the correct methods and materials are used. We always use special high grade parts which provide a longer life, but we know that some rewinding companies use lower grade materials which are not suitable for use in a kiln.

Our years of experience mean that we can provide a range of motors that are perfect for in-kiln use, ensuring a long life and peak performance. If you do not use the Windsor rewinding service, then make sure that your local supplier uses the correct parts.

Things to look for in a rewound motor:

- Copper wiring rated to 220°C, not the usual Class H 180°C
- Heat stabilised bearings
- Correct high temperature grease
- Silicon glass terminal lead insulation rated 220°C
- Special Kaptan slot liners
- 240V AC 50W heaters
- Damaged shafts should be rebuilt
- Worn end housings should be replaced
- Output shaft checked for run out

Some of these materials are imported exclusively for Windsor.

Windsor service packages

Our full-time team of specialists are dedicated to helping you run your kilns and keeping your costs and downtime to a minimum. To help do this we have four basic service packages available:

1. Audit and Maintenance Report.

This option gives you the benefit of our experience and reduces your costs. We inspect and test a number of key parts including motor non-drive end bearings and crack testing fan components. A report including maintenance recommendations is issued on the completion of our kiln audit.

For this option to be successful there must be competent maintenance engineers available on site to complete any work recommended in our report.

Travels costs etc. can be reduced if we audit more than one kiln at a time.

2. Service of kiln Fans and Motors

This is our most popular service option in which we maintain the fans, drive components and the motors in your kiln. This ensures that the complicated parts of your kiln run reliably.

3. Full Kiln Service

All areas of the kilns are covered including full bolt checks, panels and sealing inspection, fan crack testing, motor servicing, steam control valve operation and system checks.

This level of service gives you the ability to run a Windsor kiln continuously for 24 hours a day, 7 days a week, shutting it down just once a year for our planned service visit.

A full kiln service report is sent detailing the work completed and what will be due at the time of the next service.

4. Dynamic Balancing of Fans

Dynamic balancing is important to ensure reliable operation of your kiln fans. We have developed a two plane balancing system and an accurate method of fan pitch adjustment.

Fans should be balanced when the kiln is installed and it is good policy to rebalance them after five years of operation. They should also be rebalanced if:

- The balance disc or weights have been disturbed.
- The taper mounting bush has been removed from the fan hub.
- If any of the fans or fan parts are replaced or corroding significantly.

Options

Our service options can be customised to suit your site requirements. Talk to us about your service needs and we will design a plan to suit you. For instance to save you money and to raise awareness about kiln maintenance issues we are happy to involve your site fitters in the work we do on site.

Windsor's commitment is to provide the best kiln service option for kiln owners and we are determined to be no dearer than any other quality maintenance providers.

Please contact Brent Morris for more information.

Is there someone else at your company that should get a copy of the Windsor Service Bulletin? Please email sales@windsor.co.nz or phone to ensure they get the next issue.

If you would like to receive information like this bulletin from Windsor via email, please contact us at sales@windsor.co.nz. You need not write any message, just put 'Please send me the bulletin' in the subject line.

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