Toscotec Steel Yankee Dryer
Take Care Of It!
TOSCOTEC STEEL YANKEE DRYER

Main Features

**INCREASED** Heat Transfer + **PATENTED** TT Head Insulation

**REDUCED** Maintenance, Energy **SAVING** and **OPTIMIZED** Design

**NO RISK** of Dangerous Fracturing

Toscotec **EXPERIENCE**

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**Energy SAVINGS**

**LESS** production cost

Intrinsically **SAFE**

**MORE** Performance and Efficiency
SERVICING TOSCOTEC STEEL YANKEE DRYER

What to do?

- **REGULAR MAINTENANCE**

- **INSPECTION AND PERIODIC CHECKS**
REGULAR MAINTENANCE
REGULAR MAINTENANCE

Guidelines and TIPs

Follow Guidelines and TIPs from the Supplier Manual

- Increase Life of the Yankee
- Maintain Optimal Performance of the Yankee
- Avoid Damage of the Equipment
**REGULAR MAINTENANCE**

**Best Practices**

**Why Follow the Warm Up Procedure?**

- Guarantees uniform heating of the Yankee Dryer;
- Guarantees uniform thermal expansion of the YD;
- Minimizes thermal stress when starting from ambient temperature.

**Why is the Water / Steam Quality important?**

- Creates a thin and uniform layer of black oxide (magnetite) inside the YD;
- Avoids problem of plugging of the soda straw pipes.
Why is prohibited to pour cold water directly on the Yankee Dryer surface?

✓ Avoids local thermal shock

Why is it necessary to work with proper doctor blade setting?

✓ Avoids problem on the YD surface

Why is it necessary to respect the loads considered in the project of the YD (e.g. presses loads, Internal pressure, etc.)?

✓ Avoids over stresses of the YD
INSPECTION AND PERIODIC CHECKS
INSPECTION & PERIODIC CHECKS

Why is it important?

Preventive Safety Program

Brings back the Yankee to Optimal Performance

Monitoring

Reports for Authority Requirements
INSPECTION & PERIODIC CHECKS
Structural Periodic checks

EVERY 2 YEARS

1. Metallized surface inspection
2. SYD internal inspection and condensate removal system check
3. Structural inspection:
   - On the Welds:
     - MPI (Magnetic Particle Inspection)
     - Ultrasonic Test
     - Phased Array Test (Innovative Technique!)
   - On the Connecting Bolts/Screws:
     - Ultrasonic Test

NO NEED to remove metallization
NO RISK for Health and Safety of people
Performed during REGULAR SHUTDOWN
FAST checks
INSPECTION & PERIODIC CHECKS

1. Metallized Surface inspection

DESCRIPTION

- Visual checks of the metallization surface;
- Roughness measurements;
- Shell TIR (Grind condition) - Total Indicated Runout measurements

PURPOSES

☑ Check the presence of damages on the SYD surface (impacts, scratches, etc.);
☑ Assess the current status of the metallization surface;
☑ Understand if there are possible issues on the condensate removal system
INSPECTION & PERIODIC CHECKS

2. SYD internal inspection and condensate removal system

DESCRIPTION

- Check the inner surface of the SYD
- Check the clearance of all the soda straw pipes
- Check all the soda straws for plugging
- Check the integrity of the condensate removal system
- Riser pipes and header wall thickness measurements (with Ultrasonic method)

PURPOSES

- Verify the presence of a thin and uniform layer of black oxide (magnetite)
- Maintain the optimal heat transfer efficiency of the SYD
- Verify the absence of erosion/corrosion in the riser pipes and headers
INSPECTION & PERIODIC CHECKS

3. Structural Periodic Inspection

**DESCRIPTION**

- Phased Array (PA) and Ultrasonic Test (UT) on:
  - 100% Circumferential shell-head welds
  - 100% Longitudinal shell welds
  - 100% Circumferential welds on the Center Stay
  - 100% of the Center Stay-Heads bolts and the Journals-Heads screws
- Magnetic Particle Inspection (MPI) on:
  - 100% Circumferential shell-head welds and Manhole welds

**PURPOSES**

- Verify the absence of sign due to the operation of the equipment
INSPECTION & PERIODIC CHECKS

Detailed Reporting

Valid for Insurance purposes and requirements from local authorities!
# INSPECTION & PERIODIC CHECKS - EVERY 2 YEARS

## Steel Yankee Dryer vs. Cast Iron Yankee Dryer

<table>
<thead>
<tr>
<th>CIYD (Routine Periodical Inspection)</th>
<th>SYD (Periodical Structural Inspection)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEAD TILT</strong></td>
<td><strong>SYD</strong></td>
</tr>
<tr>
<td>Cold and Hot Condition</td>
<td>Not Necessary</td>
</tr>
<tr>
<td><strong>SPIGOT FIT GAP CHECK</strong></td>
<td><strong>SYD</strong></td>
</tr>
<tr>
<td>YES</td>
<td>Not Necessary</td>
</tr>
<tr>
<td><strong>UT</strong></td>
<td></td>
</tr>
<tr>
<td>✓ 20% of Shell - Head Bolts (UT)</td>
<td>✓ 100% Shell-heads Circumferential welds (PA)</td>
</tr>
<tr>
<td>✓ 20% of Journal - Head Bolts (UT)</td>
<td>✓ 100% Shell Longitudinal welds (UT)</td>
</tr>
<tr>
<td>✓ 20% of Center Stay - Head Bolts (UT)</td>
<td>✓ 100% Center Stay Circumferential welds (PA)</td>
</tr>
<tr>
<td>✓ Root Shell Thickness Measurement (UT)</td>
<td>✓ 100% Center Stay - Head Bolts (UT)</td>
</tr>
<tr>
<td></td>
<td>✓ 100% Journal - Head Screws (UT)</td>
</tr>
<tr>
<td><strong>CONDENSATE REMOVAL SYSTEM INSPECTION</strong></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>MPI</strong></td>
<td></td>
</tr>
<tr>
<td>✓ 100% Shell - Head flange from inside and outside</td>
<td>✓ 100% Circumferential shell-heads Welds</td>
</tr>
<tr>
<td>✓ 100% Journal-Head flange from inside and outside</td>
<td>✓ 100% Manholes Welds</td>
</tr>
<tr>
<td>✓ 100% manholes from inside and outside</td>
<td></td>
</tr>
<tr>
<td><strong>METALLIZATION</strong></td>
<td></td>
</tr>
<tr>
<td>Visual Check (shell surface if metallization not present)</td>
<td>Visual Check</td>
</tr>
<tr>
<td><strong>STEAM LEAK</strong></td>
<td></td>
</tr>
<tr>
<td>Visual Check</td>
<td>Visual Check</td>
</tr>
<tr>
<td><strong>TIR (HOT CONDITION)</strong></td>
<td></td>
</tr>
<tr>
<td>Shell TIR</td>
<td>Shell TIR</td>
</tr>
<tr>
<td><strong>TIMING</strong></td>
<td></td>
</tr>
<tr>
<td>Approx. 2 working days</td>
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# INSPECTION & PERIODIC CHECKS - EVERY 5 YEARS

Steel Yankee Dryer vs. Cast Iron Yankee Dryer

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<td>Cold and Hot Condition</td>
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<td><strong>SPIGOT FIT GAP CHECK</strong></td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td><strong>UT</strong></td>
<td>✓ 100% Shell Surface from Outside</td>
<td></td>
</tr>
<tr>
<td></td>
<td>✓ 100% Shell - Head flange from Outside</td>
<td></td>
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<td>✓ 100% Shell - Head Bolts</td>
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</tr>
<tr>
<td></td>
<td>✓ 100% Center Stay Connecting Bolts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>✓ Root Shell Thickness Measure</td>
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</tr>
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<td><strong>CONDENSATE REMOVAL SYSTEM INSPECTION</strong></td>
<td>100 %</td>
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<td>✓ 100% Manholes from inside and outside</td>
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<td>✓ 100% Shell - Head extension from inside</td>
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<td><strong>METALLIZATION</strong></td>
<td>Visual Check (shell surface if Metall. not present)</td>
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<td>Visual Check</td>
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<td>Shell TIR</td>
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<tr>
<td><strong>TIMING</strong></td>
<td>Approx. 3 - 4 working days</td>
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TROUBLESHOOTING
TROUBLESHOOTING

Metal pieces between Yankee and Press

DAMAGE:

• Screw M20 passed between Yankee and Suction Press at 90 kN/m

FIRST ACTION:

• Non Destructive Examination Test to verify STRUCTURAL INTEGRITY of the Yankee Dryer

EVALUATION:

• Absorption of the impact without affecting the structural integrity and consequently the safety of the YD

SOLUTION:

GRIND the metallization surface
TROUBLESHOOTING
Plugging of Soda Straw

DAMAGE:
• Plugging of the soda straws pipes present inside the Yankee Dryer

FIRST ACTION:
• Clean and reassemble all the soda straw pipes

EVALUATION:
• Low Quality of Steam >> Excessive formation and detachment of Black Oxide (Magnetite) that led to the plugging of the soda straws

SOLUTION:
Toscotec reiterates the **quality standard parameters** of the boiler water, steam and condensate for the correct operation of the SYD. Toscotec works jointly with Customer to find the **best operating conditions** to avoid the same problem in the future.
TT SYD REFERENCES
Success Worldwide

OVER 160 TT SYD SOLD WORLDWIDE
1. Toscotec Steel Yankees Dryer >> More than 15 Years of Experience
2. Maintenance Guidelines >> Key to successfully run at top performance & Increase Life of Yankee
3. Periodic Structural Checks >> Safety Always at the Top!
4. TT Service >> Troubleshooting & Customer Care
5. TT SYD References Worldwide >> More than 160 TT-SYD sold Worldwide
Thanks for YOUR attention!