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General Information

Introduction
This manual contains installation, operation, and maintenance instructions for the Chandler Engineering Model 7120 Stirred Fluid Loss.

Purpose and Use
The Model 7120 Chandler Stirred Fluid Loss Test Apparatus (Drawing 7120) is a high-pressure, high-temperature apparatus used to perform stirred fluid loss testing of cement slurries in accordance with ISO 10426 and API 10A standards.

Description
The Fluid Loss Tester cylinder assembly includes an impeller that is rotated at 150 rpm. The mixing speed matches the impeller speed used in pressurized Consistometers during thickening time tests, allowing the sample to be conditioned in the cylinder. At the completion of the simulated thickening-time test, the cylinder assembly is inverted to start the fluid loss test. A graduated cylinder or the back-pressure receiver is used to collect the filtrate for measurement of the fluid loss characteristics of the slurry.

Heat to the cylinder is supplied by an external, electrical-resistance, tubular heater around the cylinder. Cylinder temperature is sensed by a thermocouple in the cell wall and is controlled by a temperature controller.

A supply of compressed air, nitrogen, or other inert gas is required for cylinder pressurization. The pressure of the gas supplied to the cylinder and filtrate chambers is adjusted using pressure regulators mounted on the front panel of the apparatus. Pressure is released from the cylinder using the pressure release valve mounted on the front panel.

A water jacket for cooling of the test cylinder is built into the unit. Water inlet and outlet connections are provided at the rear of the instrument. The flow of cooling water is controlled using a panel-mounted coolant switch.
Specifications

- Meets requirements of ISO 10426-2, Section 10 for Stirred Fluid Loss Tests
- 2000 psi / 0-13,900 kPa Cylinder Pressure Gauge and Regulator
- 160 psi / 0-1200 kPa Filtrate Pressure Gauge and Regulator
- 450°F / 0-232°C Programmable Temperature Controller
- J-type thermocouple (ASTM E220) mounted in wall of cylinder
- Screen: 45 µm (325 mesh) with a 22.6 cm² (3.5 in²) filtration area backed by a 250 µm (60 mesh)
- Electronic Timer
- Cylinder Cooling Jacket
- Variable Speed DC Motor Drive
- Filtrate Collection Cylinder
- 50 ml Graduated Cylinder

Operating Conditions

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>208 – 240 VAC</td>
</tr>
<tr>
<td>Input Current</td>
<td>8A</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 / 60 HZ, 1PHASE</td>
</tr>
<tr>
<td>Maximum Working Temperature</td>
<td>450°F (232°C)</td>
</tr>
<tr>
<td>Minimum Working Temperature</td>
<td>41°F (5°C)</td>
</tr>
<tr>
<td>Heater Wattage</td>
<td>700 W</td>
</tr>
<tr>
<td>Maximum Water Pressure (for cooling)</td>
<td>100 psi (689 kPa)</td>
</tr>
<tr>
<td>Maximum Cylinder Pressure</td>
<td>2000 psi (13,900 kPa)</td>
</tr>
<tr>
<td>Cylinder Volume</td>
<td>500 ml (approximate)</td>
</tr>
<tr>
<td>Collection Volume</td>
<td>100 ml in filtrate cylinder</td>
</tr>
<tr>
<td>Impeller Speed</td>
<td>150 rpm</td>
</tr>
</tbody>
</table>

Environmental Conditions

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Indoor Use</td>
</tr>
<tr>
<td>Altitude</td>
<td>6561.6 ft (2000m)</td>
</tr>
<tr>
<td>Temperature</td>
<td>41°F - 104°F (5°C - 40°C)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>0% to 95% non-condensing</td>
</tr>
</tbody>
</table>

Weights and Dimensions

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>35.1” (89cm) high x 19.7 (50cm) wide x 26.2” (67cm) deep</td>
</tr>
<tr>
<td>Net Weight</td>
<td>125 lbs (56.7 kg)</td>
</tr>
</tbody>
</table>
Safety Requirements

READ BEFORE ATTEMPTING OPERATION OF THE INSTRUMENT

The Chandler Engineering Model 7120 Stirred Fluid Loss Cell is designed with operator safety in mind. Any instrument that is capable of high temperatures and pressures should always be operated with CAUTION!!

WARNING: Read before attempting operation of instrument. This instrument is capable of high temperatures and pressures and must always be operated with CAUTION. The instrument is designed for operator safety. To ensure that safety it is essential to follow the instructions outlined below.

To ensure safety:

- Provide adequate training of all personnel that will operate the instrument.
- Locate the instrument in a low traffic, well ventilated area.
- This is a bench top device; place the instrument on a suitable level and stable surface. Allow adequate clearance around the instrument to provide adequate ventilation and to allow the head assembly to be rotated safely.
- Always position the instrument in such a manner that allows easy access to the power cord.
- Post signs where the instrument is being operated to warn non-operating personnel that high pressure, high temperature equipment is in use.
- Observe caution notes.
- Observe and follow the warning labels on the instrument.
- Never exceed the instrument maximum temperature and pressure ratings.
- Always disconnect main power to the instrument before attempting any repair.
- Turn OFF the heater at completion of each test. Appropriately-rated fire extinguishers should be located within close proximity.
- Avoid contact with moving parts.
- Although the pressure vessel was designed using appropriate materials and techniques, it is imperative to monitor the condition of the vessel and related components with a focus on safety.
- Note that Chandler Engineering recommends periodic re-inspection and testing of the pressure vessel assembly to maintain the rated temperature and pressure ratings. Without re-inspection and testing, the pressure rating of the vessel assembly should be de-rated as a function of age, usage and condition in accordance with established vessel de-rating schedules at Chandler Engineering. Chandler Engineering supports the design and offers periodic vessel testing services and component replacement if/when required.
- A fire extinguisher, type 8 BC, should be located within 50 feet (15 meters) of the instrument.
- Have the safety officer at your location or laboratory review the safety aspects of the instrument and installation and approve the operational and installation procedures.
- Hearing protection may be necessary during initial startup.
- Before attempting to operate the instrument, the operator must read and understand this manual.
Symbols Used on Equipment

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="symbol1" alt="Protective Conductor Terminal" /></td>
<td>Protective Conductor Terminal</td>
</tr>
<tr>
<td><img src="symbol2" alt="Hazardous Voltage Inside" /></td>
<td>Hazardous Voltage Inside Disconnect power before opening</td>
</tr>
<tr>
<td><img src="symbol3" alt="Hot Surface Do Not Touch" /></td>
<td>Hot Surface Do Not Touch Allow to cool before servicing</td>
</tr>
<tr>
<td><img src="symbol4" alt="Documentation must be consulted in all cases where this caution symbol is marked." /></td>
<td>Documentation must be consulted in all cases where this caution symbol is marked.</td>
</tr>
<tr>
<td><img src="symbol5" alt="Pinch Point Don’t touch rotating parts" /></td>
<td>Pinch Point Don’t touch rotating parts</td>
</tr>
</tbody>
</table>

Where to Find Help

In the event of problems, contact your local sales representative or Chandler Engineering:

- Telephone: 918-250-7200
- Fax: 918-459-0165
- E-mail: chandler.sales@ametek.com
- Website: www.chandlereng.com

Instrument training classes are also available.
Section 1 – Installation

Unpacking the Instrument
Verify all parts listed on the packing slip have arrived with the instrument. If parts are missing, contact Chandler Engineering immediately.

Lifting Instructions
To position the instrument for installation, a two person lift is recommended. Firmly grasp the bottom of the instrument frame on opposite sides while lifting to ensure the instrument stays level. Do not attempt to lift, carry, or move the instrument with only one person.

Utilities Required
208-240VAC, 8A, 50/60HZ
Water supply
Drain

Tools/Equipment Required
Basic hand tools

Setting up the Instrument
1. Place the instrument on a sturdy, level table.
2. Close the supply and drain valves.
3. Connect the water supply and drain lines.
4. Connect power cord to the correct voltage source.

Note: The instrument is now ready to insert the cylinder and operate.
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Section 2 - Operation

Fluid Loss Cylinder Assembly

The fluid loss cylinder assembly consists of a stainless steel housing that is sealed with a top housing assembly and a bottom impeller housing assembly. The pressure seal is accomplished using o-rings. The temperature of the cell is measured using a thermocouple located in the cylinder wall. The impeller is driven at 150 rpm using a shaft through the bottom housing assembly. The shaft seal is a high temperature packing material. The packing tension is adjustable by tightening the nut on the bottom of the housing assembly. Pressure is transmitted into the cell using a high pressure quick disconnect and high pressure hose. Pressure enters the cell through the annular area between the paddle shaft and the standpipe assembly. The impeller drive shaft is supported with two bronze bushings that serve to center the shaft and provide a thrust bearing surface. The filter screen is supported between the top cap and a shoulder in the cell and sealed with an o-ring.

Cement Fluid Loss Tests

Note that the Model 7120 Fluid Loss Testing Apparatus is designed to meet the requirements of ISO 10426, Part 2, Section 10. The following procedures are based on this standard with specific additions that are applicable to the device. We recommend obtaining a copy of ISO 10426, Part 2 in addition to this manual.

Low-Temperature Fluid Loss Testing [Below 190°F / 88°C]
1. Orient the cylinder enclosure to the upright or mid-position detent position.
2. Prepare the slurry in accordance with ISO 10426, Part 2 procedures.
3. Pour the slurry from the blender into the cylinder, taking care not to spill cement on the cylinder threads. Fill the cylinder up to a level slightly below the second blade from the top of the paddle. Use the Fill Gage 71-0162 as a guide. See the following figure.
NOTE: Using too much slurry in the cell can cause the standpipe to become clogged with cement, preventing the controlled release of pressure.

4. Fit the filter screen in place.
5. Open the bleed valve, and screw the cap assembly into the threaded cylinder, until finger tight. Close the bleed valve.
6. Care must be taken not to rotate the cylinder so that cement slurry comes into contact with the filter screen. If this happens, the slurry residue can bake onto the screen, forming a hard crust and blocking all or part of the screen.
7. Lower the cylinder assembly into the enclosure until the cylinder cap is flush with the enclosure's cover (ensure that the latch snaps in place) and insert the thermocouple with cable connected.
8. Attach the high pressure hose to the bottom of the cylinder.

   NOTE: The hose must be connected to apply pressure to the cell. The quick disconnect will not trap pressure in the cell when the hose is disconnected.

9. Verify that the compressed-air supply line or nitrogen gas bottle is connected to the fitting on the back of the instrument cabinet.
10. Turn on the master power switch.
11. Rotate the cylinder Pressure Regulator clockwise to adjust the cylinder pressure. Apply 500 psi ±50 psi / 3500 kPa ±300 kPa.
12. Turn on the motor switch to agitate the slurry at 150 rpm.
13. Enter the desired thickening-time schedule into the temperature controller and turn on the heater switch.
14. Start the timer on the front panel or monitor the time display in the temperature controller to record the test time.
15. Once the slurry has reached the specified temperature invert the vessel.
WARNING: Do not remove the thermocouple without switching the heater off and ending the temperature controller program.

16. Apply 1000 psi ±50 psi / 7000 kPa ±300 kPa differential pressure to the test cell.
17. Open the valve below the screen to start the fluid loss test.

**High-Temperature Fluid Loss Testing [Above 190°F / 88°C]**

1. Orient the cylinder enclosure to the upright or mid-position detent position.
2. Prepare the slurry in accordance with ISO 10426, Part 2 procedures.
3. Pour the slurry from the blender into the cylinder, taking care not to spill cement onto the cylinder threads. Fill the cylinder up to a level slightly below the top of the impeller standpipe. A scribed line exists in the vessel that may be used as a reference.
4. Fit the filter screen in place.
5. Open the bleed valve, and screw the cap assembly into the threaded cylinder, until finger tight. Close the bleed valve.
6. Care must be taken not to rotate the cylinder so that cement slurry comes into contact with the filter screen. If this happens, the slurry residue can bake onto the screen, forming a hard crust and blocking all or part of the screen.
7. Lower the cylinder assembly into the enclosure until the cylinder cap is flush with the enclosure's cover (ensure that the latch snaps in place) and insert the thermocouple with cable connected.
8. Attach the high pressure hose to the bottom of the cylinder.

**NOTE:** The hose must be connected to apply pressure to the cell. The quick disconnect will not trap pressure in the cell when the hose is disconnected.

9. Verify that the compressed-air supply line or nitrogen gas bottle is connected to the fitting on the back of the instrument cabinet.
10. Turn on the master power switch.
11. Rotate the cylinder pressure regulator clockwise to adjust the cylinder pressure. Apply 500 psi ±50 psi / 3500 kPa ±300 kPa or sufficient pressure to prevent boiling of water at the test temperature. (Reference Table 1 for vapor pressure of water). Do not close the pressurizing valve.
12. Turn on the motor switch to agitate the slurry at 150 rpm.
13. Enter the desired thickening-time schedule into the temperature controller and turn on the heater switch.
14. Start the timer on the front panel or monitor the time display in the temperature controller to record the test time.
15. Once the slurry has reached the specified temperature invert the vessel.

**WARNING: Do not remove the thermocouple without switching the heater off and ending the temperature controller program.**

16. Connect the back-pressure receiver to the test valve below the screen. (Reference Table 1 for vapor pressure of water).
17. Apply 1000 psi ±50 psi / 7000 kPa ±300 differential pressure across the screen. Generally, this pressure will equal 1500 psi ±50 psi / 10500 kPa ±300 kPa to create the desired differential pressure. Apply sufficient pressure to the back-pressure receiver to prevent the cement filtrate from boiling at the test temperature.

18. Open the valve below the screen to start the fluid loss test.

### Table 1 - Vapor Pressure of Water

<table>
<thead>
<tr>
<th>Temperature, °F / °C</th>
<th>Vapor Pressure, psi / kPa</th>
<th>Coefficient of volume expansion for water at saturation pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>212°F / 100°C</td>
<td>14.7 psi / 100 kPa</td>
<td>1.04</td>
</tr>
<tr>
<td>250°F / 121°C</td>
<td>30 psi / 210 kPa</td>
<td>1.06</td>
</tr>
<tr>
<td>300°F / 149°C</td>
<td>67 psi / 460 kPa</td>
<td>1.09</td>
</tr>
<tr>
<td>350°F / 177°C</td>
<td>134 psi / 930 kPa</td>
<td>1.12</td>
</tr>
<tr>
<td>400°F / 204°C</td>
<td>247 psi / 1700 kPa</td>
<td>1.16</td>
</tr>
<tr>
<td>450°F / 232°C</td>
<td>422 psi / 2910 kPa</td>
<td>1.21</td>
</tr>
</tbody>
</table>

**Recording Fluid Loss Test Results**

1. Open the bottom valve to start the test within 30 seconds of inverting the cell. Maintain at the specified temperature for the duration of the test.

2. Collect the filtrate and record the volume at 30 seconds, 1 min, 2 min, 5 min, 7.5 min, 10 min, 15 min, 25 min and 30 min with accuracy of ±1 ml.

   *NOTE:* While conducting fluid loss tests at sample and filtrate temperatures above 190°F (88°C), the filtrate must be cooled to a temperature below the boiling point before collecting the liquid volume. This may be accomplished by chilling the filtrate receiver prior to the test and cooling the receiver during the test.

3. Reference ISO 10426, Part 2, Section 10 for details relating to determination and reporting of fluid loss values. The following form may be used for reporting the results in a manner that is consistent with ISO 10426, Part 2, Section 10.

4. If nitrogen blows through at less than 30 min, record the volume collected and time at which the blowout occurs.

5. Calculate the ISO Fluid Loss, expressed as milliliters per 30 min. For tests that run the entire 30 min without “blowing out,” measure the collected filtrate volume, double the value and report it as the fluid loss value. For tests that “blow out” in less than the 30 min test interval, use Equation (16) to calculate the ISO Fluid Loss.

\[
\text{Calculated ISO Fluid Loss} = V_{t} \times \frac{10.944}{\sqrt{t}}
\]

where,

\[
V_{t} = \text{volume of filtrate collected at the time of the blowout, expressed in milliliters}
\]

\[
t = \text{the time of the blowout, expressed in minutes}
\]

6. When reporting the fluid loss of cement slurries, those for which the fluid loss was measured for a full 30 min shall be reported as “ISO Fluid Loss” while those for which the fluid “blew out” in less than 30 min shall be reported as “Calculated ISO Fluid Loss.”
Form for reporting fluid loss results

<table>
<thead>
<tr>
<th>Heat-up schedule:</th>
<th>minutes to</th>
<th>°C (°F) Test temperature</th>
<th>°C (°F)/min</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Conditioning method</th>
<th>Atmospheric</th>
<th>Pressurized</th>
<th>kPa, [psi]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Stirred fluid-loss cell</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Optional extra conditioning minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Static cell length</th>
<th>12.7 cm (5 in)</th>
<th>25.4 cm (10 in)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cell type (ends)</th>
<th>Double</th>
<th>Single</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Screen type</th>
<th>325 mesh x 60 mesh</th>
<th>325 mesh x 60 mesh with perforated metal back</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Filtrate ([ ] ml or [ ] g)</th>
<th>Time (min)</th>
<th>Filtrate ([ ] ml or [ ] g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>7 1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If filtrate weighed, relative density: ______ at 26.7 °C (80 °F)

<table>
<thead>
<tr>
<th>API fluid loss</th>
<th>______ ml/30 min</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Blowout</th>
<th>______ ml (or g) at ______ min/s</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Calculated API fluid loss</th>
<th>______ ml/30 min</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Filter cake conditions</th>
<th>Thickness ______ Consistency ______</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Time from end of conditioning to test start</th>
<th>______ min</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Start of test</th>
<th>______ °C (°F)</th>
<th>End of test</th>
<th>______ °C (°F)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Location of thermocouple</th>
<th>Cell wall</th>
<th>In slurry</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date of calibration of sensors</th>
<th>Pressure gauge</th>
<th>Consistometer</th>
<th>Fluid-loss cell</th>
</tr>
</thead>
</table>

---

*a* Thickness: of cake only; do not include remaining slurry if gelled.

*b* Consistency: hard, firm, mushy, gelled, etc.
**Fluid Loss Test Completion and Clean-up**

1. Cool the cell to a safe handling temperature (35°C or less) and release the pressure.
2. After ensuring that all the pressure is released, remove the cylinder assembly from the heating jacket.

   **WARNING:** Do not attempt to remove the cylinder end plugs without verifying that all pressure has been vented.

Due to the nature of this equipment and sample, it is possible for pressure to remain in the vessel if the sample has blocked the release ports.

If the end plugs are difficult to remove, assume that the vessel is pressurized and proceed with extreme caution. Orient the cylinder assembly with the bleed holes directed away from the operator. Slowly remove the **bottom end plug** allowing pressure to vent via the bleed holes.

*Always remove the bottom plug first.* Do not remove the plug with the filtrate screen first. Refer to the illustration below:

3. Discard the cement slurry, disassemble the cell and inspect the screen to check for holes or damage. If there is damage to the oring seals or screen, discard the test results and repeat the test.
4. Carefully clean the screen to remove cement or additive residue from all components.
5. Clean and dry the fluid-loss cell in preparation for the next test. Reconnect the pressure hose to the bottom plug and blow N₂ through until all water and residue is removed from the pressure ports. This action ensures that the ports are clear and ready for the next test. If the bleed holes are blocked with sample, clear them before the next test.
6. Verify that the ports in the bottom plug assembly are free from cement. Lubricate the bushings with P-2570 (or equivalent) grease. Clean the impeller stand-pipe. Reassemble the bottom plug assembly, tighten the shaft packing and verify that the impeller shaft turns freely.
Controller Setup

Changing a Profile
The controller is pre-configured from the factory. The EZ1 button is used to manually start and stop a profile. The EZ2 button is used to acknowledge the alarm. If you prefer to change or customize a profile, see the Watlow Controller Support Tools CD for additional instructions.

Alarm Condition
If an alarm condition occurs, press the EZ2 button to acknowledge the alarm. If the alarm condition continues check the following:

a. Plug the thermocouple into the front panel;
b. Insert the thermocouple into the wall of the top plug;
c. Check the heater connections.

Once the alarm condition is acknowledged, press the EZ1 button to start the test.

NOTE: The alarm is to prevent an over temperature condition. The test will not re-start until the EZ1 and EZ2 buttons are reset.
This page is intentionally left blank.
Section 3 - Maintenance

Preventive Maintenance

1. Periodic inspection and lubrication of all bearings is essential to avoid bearing damage. Inspect the bearings, packing and oring in the bottom plug assembly. Lubricate and replace as necessary.
2. Inspect the thrust washers in the impeller drive mechanism. Lubricate and replace as necessary.
3. As the packing in the cylinder assembly wears, tightening of the packing gland hex nut is required. The packing must be tightened sufficiently to prevent leaking while allowing the shaft to be turned. Apply grease to the packing to reduce sealing friction.
4. The motor speed is adjusted to 150 rpm. This adjustment is performed using the potentiometer mounted on the right rear of the instrument enclosure. No other motor adjustments are required.
5. Periodic inspection of belt wear and belt tension is necessary. The belt inspection cover may be removed from the top of the drive assembly for this purpose. The belt tension is adjusted by loosening the motor mounting bolts and sliding the motor towards the rear of the unit. Inspect the belt for wear, and replace if it is worn.

Bottom Plug Disassembly

1. Remove the bottom plug assembly from the cell.
2. Remove the impeller by holding the drive coupling and unscrewing the impeller counterclockwise. Slide the impeller off of the standpipe.
3. Remove the standpipe assembly from the plug using a wrench.

   NOTE: During reassembly, the standpipe threads require Teflon sealing tape.

4. Remove the drive coupling from the impeller drive shaft.
5. Remove the packing tension adjustment nut from the plug.
6. Remove the impeller drive shaft by pushing the shaft through the packing towards the impeller side of the plug.
7. Remove and replace the bronze bushings from the plug and the packing tension nut if worn.
8. Remove and replace the packing if worn.

   NOTE: Replace the packing with approximately 2 inches of packing material (P-3502).

9. Inspect that all of the pressure passageways in the plug and the impeller drive shaft are clean.
10. Replace the plug oring if worn and after each 400°F (204°C) test.
11. Reassemble the bottom plug in reverse order.
This page is intentionally left blank.
### Section 4 - Replacement Parts

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>71-0109</td>
<td>Heater Assembly</td>
</tr>
<tr>
<td>71-0123</td>
<td>Impeller</td>
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<tr>
<td>71-0162</td>
<td>Gage, Sample Fill</td>
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<tr>
<td>C06892</td>
<td>Variable Resistor</td>
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<tr>
<td>C07478</td>
<td>Timer</td>
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<tr>
<td>C07932</td>
<td>Relay, 440 VAC, 32 VDC</td>
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<td>C09111</td>
<td>Valve, Needle</td>
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<td>C09286</td>
<td>Motor</td>
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<tr>
<td>C09287</td>
<td>DC Controller</td>
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<td>C09895</td>
<td>Adapter, 3/8 NPT x 1/4T, SST</td>
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<tr>
<td>C12872</td>
<td>Packing, Grafoil, 625X.250</td>
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<td>C16434</td>
<td>Temperature Controller</td>
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<td>P-0397</td>
<td>Wrench, Hex (1/8&quot;)</td>
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<tr>
<td>P-0417</td>
<td>Terminal Strip, 240V</td>
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<tr>
<td>P-0776</td>
<td>Wrench, Hex (3/32&quot;)</td>
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<td>P-0779</td>
<td>Wrench, Hex (5/32&quot;)</td>
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<tr>
<td>P-2359</td>
<td>Quick Connect Body</td>
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<tr>
<td>P-2368</td>
<td>O-Ring (Filtrate Receiver)</td>
</tr>
<tr>
<td>P-2369</td>
<td>O-Ring (Bottom Cylinder Plug)</td>
</tr>
<tr>
<td>P-2380</td>
<td>Panel Jack (Thermocouple)</td>
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<tr>
<td>P-2383</td>
<td>Thermocouple Cable</td>
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<td>P-2392</td>
<td>Quick-Connect Stem</td>
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<td>P-2676</td>
<td>O-Ring (Top Cylinder Stem)</td>
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<tr>
<td>P-2701</td>
<td>Heat Sink</td>
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<td>P-2712</td>
<td>50 ml Graduated Cylinder</td>
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<td>P-2747</td>
<td>Thermocouple</td>
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<tr>
<td>P-2881</td>
<td>Switch, Panel</td>
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<tr>
<td>P-3107</td>
<td>Solenoid Valve</td>
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<tr>
<td>P-3148</td>
<td>O-Ring (Top Cylinder Plug)</td>
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<tr>
<td>P-3156</td>
<td>Filter</td>
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<tr>
<td>P-3376</td>
<td>Timing Belt</td>
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<tr>
<td>P-3389</td>
<td>Circuit breaker, 230 VAC version</td>
</tr>
<tr>
<td>QX-C-1266</td>
<td>Cord, Power</td>
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Please give serial number of instrument when ordering Replacement Parts.
This page is intentionally left blank.
## Section 5 – Drawings and Schematics

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<thead>
<tr>
<th>Drawing Number</th>
<th>Title</th>
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<tbody>
<tr>
<td>7120A</td>
<td>Stirred Fluid Loss</td>
</tr>
<tr>
<td>71-0038</td>
<td>Assembly, Index Plunger Knob</td>
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<tr>
<td>71-0074</td>
<td>Filtrate Receiver</td>
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<tr>
<td>71-0110</td>
<td>Top Cap Assembly</td>
</tr>
<tr>
<td>71-0115</td>
<td>Cylinder Assembly</td>
</tr>
<tr>
<td>71-0130</td>
<td>Impeller Housing Assembly</td>
</tr>
<tr>
<td>71-0313</td>
<td>Diagram, Wiring</td>
</tr>
<tr>
<td>71-0316</td>
<td>Diagram, Plumbing</td>
</tr>
<tr>
<td></td>
<td>Declaration of Conformity</td>
</tr>
</tbody>
</table>
This page is intentionally left blank.
### NOTES:
1. Shim as required for proper clearance to minimize play.

### TABLE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tr>
<td>1</td>
<td>71-0062</td>
<td>Index Plunger Knob</td>
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<td>71-0020</td>
<td>Enclosure, Support</td>
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<td>71-0021</td>
<td>Index Ring</td>
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<td>P-0800</td>
<td>Pin, Roll STL, 0.025 x 0.50</td>
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<td>71-0024</td>
<td>Plunger Index</td>
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<td>P-2572</td>
<td>Spring, Compression, 18000 lb</td>
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<td>7</td>
<td>71-0023</td>
<td>Index Body</td>
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<td>71-0002</td>
<td>Stop, Indexing Ring</td>
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<td>71-0011</td>
<td>Shim, Index</td>
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<td>10</td>
<td>H-25-000</td>
<td>Screw, HHCSS, 1/4-20x0.50</td>
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<td>11</td>
<td>H-25-022</td>
<td>Screw, HHCSS, 1/4-20x1.25</td>
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<tr>
<td>12</td>
<td>H-25-023</td>
<td>Screw, HHCSS, 1/4-20x1.50</td>
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<td>13</td>
<td>C-126-02</td>
<td>Screw, HHCSS, 1/4-20x2.50</td>
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</table>

**SECTION D-D**

---

**DATE DESCRIPTION REV**

- FJA 05/27/03 Issued ECN 8506, Added Note 1E
- TC 02/09/15 ECN T6412, Repl H-25-021 W/ H-25-023

**BREAK EDGES: DEBURR**

1. PLC ±0.005
2. PLC ±0.000
3. ANKL + 12°

**SURFACE FINISH:**

- 63 RMS

---

**CHANDLER ENGINEERING**

**ASSY, INDEX PLUNGER KNOB**

**PROJECT 71-0039**

**DRAWN LDR 5/7/2014**

**MFG LDR 5/7/2014**

**ENGRI TC 5/23/2014**

---

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<table>
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<th>ITEM NO.</th>
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<th>QTY.</th>
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<td>71-0026</td>
<td>BODY-FILTRATE RECEIVER</td>
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<td>2</td>
<td>71-0067</td>
<td>END CAP-FILTRATE RECEIVER</td>
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<td>3</td>
<td>71-0027</td>
<td>END CAP-FILTRATE RECEIVER</td>
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</tr>
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<td>4</td>
<td>P-1487</td>
<td>ELBOW, SS, 1/8NPTX1/4T, SW</td>
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<td>5</td>
<td>C08161</td>
<td>VALVE, NDL SST 1/8MP X 1/8MP</td>
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<td>6</td>
<td>P-2359</td>
<td>COUPL, SS, 1/4IDX1/8MP, QDISC, SW</td>
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<tr>
<td>7</td>
<td>P-2368</td>
<td>ORING, BUNA, AS033-70</td>
<td>2</td>
</tr>
</tbody>
</table>

**Break Edges, Deburr**
- Weldment edges are in inches
- 2 PLC ±0.005
- 2 PLC ±0.020
- 1 PLC ±0.000

**Surface Finish**
- .010 (+.000 .000)
- .050 (+0.000 .025)

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NOTES:
1. VESSEL WORKING PRESSURE: 2000 PSI (13.78 MPa)
2. PRESSURE TEST PER TEST PROCEDURE 71-0153.
3. SHAFT TO BE STRAIGHT WITHIN .005 T.I.R.
4. APPLY LITHIUM GREASE (P-3217) TO O-RING AREA ON BOTH PLUGS BEFORE BEING ASSEMBLED INTO CYLINDER.
5. ORING (C00595) AND RETAINING RING (71-0111) ARE PRESSED INTO PLACE ON THE VESSEL 90° APART.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
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<tbody>
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<td>T1-0131</td>
<td>CYLINDER PLUG BASE</td>
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<td>2</td>
<td>T1-0127</td>
<td>PLUG, ADJUSTMENT, PACKING</td>
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<td>3</td>
<td>T1-0125</td>
<td>SHAFT, IMPELLER, HEAT TREATED</td>
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<tr>
<td>4</td>
<td>P-3497</td>
<td>BEARING, BRZ, 1/4 ID x 3/8 OD x 1-1/4 LG</td>
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<td>P-3498</td>
<td>BEARING, BRZ, 1/4 ID x 1/4 LG x 1/2 OD</td>
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<td>6</td>
<td>P-3148</td>
<td>ORING, VITON, PARKER #227</td>
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<td>7</td>
<td>C12872</td>
<td>PACKING, GRAFOIL, .625 X .250</td>
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<td>8</td>
<td>P-3501</td>
<td>CONNECTOR, SS, 1/8 OD x 1-16 MP, Q DISC, SW</td>
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</tbody>
</table>

**Break Edge, Deburr, Dimensions:**

- 8 PLC: ±0.03
- 2 PLC: ±0.01
- 1/2° ANG
- SURFACE FINISH: 63 RMS

---

**Dimensions:**

- PLC: ±0.10
- SURFACE FINISH: 63 RMS
- THIRD ANGLE PROJECTION

---

**Drawing Information:**

- **Drawn:** JB
- **MFG:** TC
- **ENGR:** JM
- **DATE:** 10/22/2007

---

**Title Block:**

- **REV:** D
- **SIZE:** B
- **PN:** T1-0130
- **PROJ:** 71
Declaration of Conformity

Manufacturer's Name: Chandler Instruments Company L.L.C.
Manufacturer's Address: 2001 North Indianwood Avenue
Broken Arrow, Oklahoma 74012

Declares that the product:
Product Name: Stirred Fluid Loss
Model Number: 7120

Conform to the following standards:
EMC Directive 2004/108/EC

EN 61326-2-1:2013
CISPR11:2009 &
ANSI C63.4:2009 Conducted Emissions, Group 1, Class A
CISPR11:2009 Radiated Emissions, Group 1, Class A
IEC 61000-4-2:2008 Electrical Discharge, Criteria A
IEC 61000-4-3:2006 Radiated Electromagnetic Field, Criteria A
IEC 61000-4-4:2004 Electrical Fast Transients / Burst, Criteria A
IEC 61000-4-5:2005 Surge Immunity, Criteria A
IEC 61000-4-6:2008 RF Conducted Immunity, Criteria A
IEC 61000-4-8:2009 Magnetic Immunity, Criteria A
IEC 61000-4-11:2004 Voltage Dips and Interruptions, Criteria B

Low Voltage Directive 2006/95/EC

IEC 61010-1:2010 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use
IEC 61010-2-051:2003 Mixing and Stirring

Machinery Directive 98/37/EC

Dean Dorris
Director of Engineering
Ametek, Chandler Engineering

8/5/2015
Date
Model 7120

STIRRED FLUID LOSS CELL

A Critical Tool for Oil Well Drilling and Cementing

Fluid loss from oilfield muds and cement slurries to a permeable formation can significantly impact their performance or damage the formation. If a cement slurry loses too much fluid, its strength will be compromised and costly remedial well treatments may be needed. The Model 7120 Stirred Fluid Loss Cell measures the fluid loss properties of muds and slurries in accordance with API procedures.

A Vastly Improved, Safer Instrument

Chandler Engineering developed the Model 7120 Stirred Fluid Loss Cell to eliminate safety issues with the traditional instrument designs.

Operational Simplicity and Advanced Capabilities

The Model 7120 is designed to be as easy to use as possible, with clear and intuitive controls. Once the cement slurry or mud is placed into the test cell, a programmable temperature controller increases the temperature at the desired rate. The slurry is conditioned by stirring at 150 rpm similar to a consistometer. The cell is then inverted to begin the fluid loss test. A graduated cylinder or the back pressure receiver is used to collect the filtrate for measurement of the fluid loss characteristics of the slurry.

FEATURES

- Fluid Loss Measurement Through Standard Screens or Core Samples
- Safer Approach—No Need to Transfer Hot Slurry
- Quick Turnaround for Multiple Tests
Model 7120

**Specifications**

**Maximum Temperature**
450°F (232°C)

**Maximum Pressure**
2,000 psi (13.7 MPa)

**Cylinder Volume**
500 mL (approx.)

**Filtrate Collection Volume**
100 mL (approx.)

**Paddle rpm**
150 rpm

**Heater Power**
700 Watts

**Utilities**
- **Mains**
  208-240 VAC, 8A, 50/60 Hz, 1 Phase
- **Water**
  40 psi (276 kPa)
- **Nitrogen**
  1,000 to 2,000 psi (6.8 to 13.7 MPa)

**Physical Dimensions**

**Dimensions** (w x d x h)
19.7 in x 25.6 in x 38 in (50 cm x 65 cm x 96.5 cm)

**Weight**
140 lb (64 kg)

**Shipping Information**

**Volume**
22 cu ft (1 m³)

**Gross Weight**
290 lb (132 kg)

**Compliance**
API Spec 10A / ISO 10426-I

*Manufacturer's specifications subject to change without notice*
All products of Chandler Engineering are warranted for a period of one year from date of shipment to be free from defective workmanship and material. Providing written notice is made and authorization by us is given, any of our products claimed to be defective may be returned freight prepaid to our factory. If found to be defective and after examination by us, our obligation will be limited to repairing or replacing the product, at our option, free of charge, F.O.B. our factory.

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Our warranty does not cover damage or failure caused by abuse, misuse, abnormal usage, faulty installation, improper maintenance, or any repairs other than those provided by authorized Chandler Engineering personnel.

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Please Send Us Your Comments on This Manual

Model Number ___________________ Serial Number ___________________

Printing Date of this manual (from the Title Page) ___________________

Please circle a response for each of the following statements. Use:
(1) = Strongly agree (2) = Agree (3) = Neutral, no opinion (4) = Disagree (5) = Strongly disagree

a) The manual is well organized. 1 2 3 4 5

b) I can find the information I want. 1 2 3 4 5

c) The information in the manual is accurate. 1 2 3 4 5

d) I can easily understand the instructions. 1 2 3 4 5

e) The manual contains enough examples. 1 2 3 4 5

f) The examples are appropriate and helpful. 1 2 3 4 5

g) The manual layout is attractive and useful. 1 2 3 4 5

h) The figures are clear and helpful. 1 2 3 4 5

i) The sections I refer to most often are __________________________________________

Other comments _________________________________________________________________

Contact us at our website: www.chandlereng.com

Email: chandler@chandlereng.com

Please add me to your mailing list-
for Product Updates and New Product Releases, Information, Technical Articles, and General Announcements of interest to users of this instrument.

Name _____________________________________________________________

Company __________________________________________________________

Address ___________________________________________________________

Email address ______________________________________________________

My instrument is Chandler Model ____________________________

Serial Number _____________________________

ISO 9001
MANAGEMENT SYSTEM
CHANDLER ENGINEERING
P.O. BOX 470710
TULSA, OKLAHOMA 74147-9801 - U.S.A.