GRC Instrument DynaTup POE2000  
low energy pendulum Tester  
(without Computer Support)

Asset No: 9700002332  
Categorized: Research  
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Remarks: Booking System  
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RA Register: P012

**Standard Operating Procedures**

1. This machine is designed for testing of only **non-metal** materials:
   - Rigid thermoplastic molding and extrusion materials, including filled and reinforced compounds, and rigid thermoplastic sheet;
   - Rigid thermoplastic molding materials, including filled and reinforced compounds;
   - Rigid thermosetting sheet, including laminates;
Fiber reinforced materials (composite), incorporating mat, woven fabric, woven rovings, chopped strands, chopped rovings, rovings, and milled fibers, including pre-impregnated materials (prepregs);

- Unidirectional fiber reinforced materials (composites), including pre-impregnated materials (prepregs).
- Specimen wider than 0.250” (6.36 mm) wide are recommended.

<table>
<thead>
<tr>
<th>Set Number/Weight Set</th>
<th>Energy Range (Baseline Capacity)</th>
<th>Weight Values for POE2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ft, lbs</td>
<td>joules</td>
</tr>
<tr>
<td>Base</td>
<td>2.7</td>
<td>.99</td>
</tr>
<tr>
<td>1</td>
<td>4.5</td>
<td>1.94</td>
</tr>
<tr>
<td>2</td>
<td>8.0</td>
<td>3.99</td>
</tr>
<tr>
<td>3</td>
<td>16.0</td>
<td>8.03</td>
</tr>
</tbody>
</table>

*Weight was measured at 90 degree

- Radius of strike 12.533” or 318.3 mm
- Drop height is adjustable from 2.05 ft (0.62m) or 165º to 0º datum
- Velocity is 11.35 ft/sec (3.46m/s) at 2 ft elevation and adjustable on chosen angle of fall. Maximum velocity is 11.48 ft/sec (3.5 m/s).

**Typical Test Operation Sequence**

1. Install weights
   - Estimate breaking energy for specimen and select a pendulum weight. Use lightest pendulum weight and expect a to break each specimen in the group with loss of not more than 85% of its energy

2. Install Tup
   - IZOD specimen – Test Methods A, C and D (ASTM -- check manual)
   - Charpy specimen – Test Method B (ASTM -- check manual)

3. Perform system set-up routine through control console (section 5), COP (Center of Percussion), COS (Center of Strike), Excess Energy and Toss Energy. COP is
performed with the pendulum at an angle of 5 degree to the left of center. System set-up should be repeated for each new energy and velocity range.

4. **Control Console**- Enter test parameters into the system via control console (section 5)—test type, specification, batch identification, batch size and specimen size.

- MODE key – returns to main menu
- RESET key – returns the system to title screen
- ENTER key – transmit data from console to system or NEXT key on display
- TEST key – activate test sequences or Test function key on display
- CLEAR key – erase the field if errors are made when entering values via keypad

**DISPLAY on the console:**

- ZERO PENDULUM – Place pendulum in the down position at the zero height angle. Wait till pendulum settles into a steady state.
- Press the zero function key which will zero the system and automatically advance to the Main Screen

**POE2000 MAIN SCREEN:**

- Device SET-UP – initiates the Devices Set-up process sequence (hammer radius, wt, etc)
- Test SET-P – initiates the Test Set-up process. Up to 10 setups can be stored (Ef/unit, test type and test specification)
- TEST – initiates the Test sequence of events (the Batch #, Specimen #, temperature and dimensions are entered before test) Up to 100 batches and specimens data can be stored.
- RESULTS – initiates the Results sequence of events (viewed, printed or output to floppy disk in a spreadsheet format.

**DEVICE SET-UP Screen 1** – Units of measure (Joule), Pendulum weight ( ) lbs, Radius of Strike ( ) in, Next FLD will move cursor to next function and

**Next SCN** to continue device set-up 2.

**DEVICE SET-UP Screen 2** – Nominal Em Range and Nominal Velocity field

**Next SCN** to continue device set-up 3.
- **DEVICE SET-UP Screen 3** – Center of Percussion—Place pendulum to zero height angle, wait for pendulum to steady and press ZERO, next screen will appear

- **DEVICE SET-UP Screen 4** – Center of Percussion—Raise pendulum 5° CCW then release (real-time degree display on console), wait for next screen

- **DEVICE SET-UP Screen 5** – Center of Percussion – Warning appears if COP is out of preset range

- **DEVICE SET-UP Screen 6** – Correct Factor – Place pendulum to zero height angle, wait for pendulum to steady and press ZERO, next screen will appear

- **DEVICE SET-UP Screen 7** – Correct Factor – Latch Pendulum then adjust angle of fall. EM value should be zero. Manually rotate the pendulum counterclockwise until it is engages the latch mechanism and is locked in the ready position. Set height of fall by adjusting the dial plate. Em result value resulting from the angle of fall will be displayed. Press READY key and go to next screen

- **DEVICE SET-UP Screen 8** – Correct Factor – Release Knob and allow pendulum to free-fall. Wait for screen to prompt.

- **DEVICE SET-UP Screen 9** – Correct Factor – Energy or Velocity out of range. Check any mechanical problem.

- **TEST SET-UP SCREEN**

  - **Test Set-up Screen** – Test Set-up No: 1 (display last set-up used), Ef/u: Area (Width or Area), Test Type: Charpy (IZOD or CHARPY), Toss No: No (Yes or No), Spec: ASTM (ASTM, ISO, or OTHER), Press SAVE.

  - **Test Screen 1** – Test set-up 1 (this number corresponds to your test type an specifications, Batch: 1 (100 different batches can be stored), Batch Size: 100 (number of specimens per batch).

  - **Test Screen 2** – Specimen: 1 (default), Temperature: 25°C, W: 10 mm (Specimen width), H: 10 mm (Specimen height)

  - **Test Screen 2** – Test Increment: Manual (Auto or Manual), Specimen: 5 (number of Specimen to test), Latch pendulum, then press START (which will advance to
**Test Screen 4** (to continue Test process sequence). ‘CLEAR’ key will clear existing test result when pressed. Prompt display is YES or NO

- **Test Screen 4-READY** – Em = 000.00 kg.cm³, Specimen: 100, Waiting for pendulum release

- **Test Screen 5-Break type** – 1 = Complete, 2 = Hinge, 3 = Partial, 4 = Non-break, Entry:0

- If in TOSS Test, TOSS Correction has been selected,
  - **Test Screen 6-TOSS Correction** – Lock pendulum in place, clamp broken piece, align to as close as original specimen configuration. Press ‘READY’ Key
  - **Test Screen 7-TOSS Correction** – Waiting for pendulum release....

- **Test Screen 8-Results** – Results, Batch = 4, Specimen = 100, Fracture Energy = 000.00 kg/cm³ will be displayed. Press ‘NEXT TEST’ and Test Screen 4 will appear and to continue test sequence till batch completed.

- **RESULTS SCREEN 1** – Batch 1 (key in required number), PRINT (print out), VIEW (view individual test result on screen), OUTPUT (to store file on FDD).

13. When test completed, place pendulum to zero position, off all switches connected to equipment.