LASER LAND LEVELLER
TOPCON, SYSTEM FIVE

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE & FARMERS WELFARE
(DEPARTMENT OF AGRICULTURE, COOPERATION & FARMERS WELFARE)

NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE
TRACTOR NAGAR, SIRSA ROAD, HISAR-125001 (HARYANA)
The welding of various parts shall be free from blow holes, exposed porosity, exposed inclusions unfilled crate and un fused welds.

The exposed metallic parts shall be free from rust and shall have a protective coating.

Marking- Each terracer shall be marked with:
   a) Manufacturer’s name and trade-mark, if any.
   b) Size; and
   c) Batch or code number

These particulars shall be stamped, embossed or engraved on metallic plate and rigidly fitted on a non-wearing part of terrace.

Labeling plate not provided, however only a sticker of make & manufacturer name is provided on mould board frame of laser land leveler.

**FIELD TEST**

The field tests of 20.06 hours with 5 replications were conducted. The each replication was of minimum 3.41 hour. The field performance observation are given in annexure II.

The summary of field performance test is given in Table VIII.

### TABLE-VIII: Summary of field performance

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Parameters</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Tractor used</td>
<td>New Holland-3630 TX</td>
</tr>
<tr>
<td>ii)</td>
<td>Gear used</td>
<td>H-1</td>
</tr>
<tr>
<td>iii)</td>
<td>Type of soil</td>
<td>Sandy loam</td>
</tr>
<tr>
<td>iv)</td>
<td>Av. soil moisture, %</td>
<td>2.9 to 12.6</td>
</tr>
<tr>
<td>v)</td>
<td>Bulk density of soil, g/cc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Before operation(Undisturbed soil)</td>
<td>1.739 to 1.792</td>
</tr>
<tr>
<td></td>
<td>After operation(Disturbed soil)</td>
<td>1.498 to 1.576</td>
</tr>
<tr>
<td>vi)</td>
<td>Av. Depth of cut, mm</td>
<td>17 to 30</td>
</tr>
<tr>
<td>vii)</td>
<td>Av. Working width, m</td>
<td>1.97 to 2.11</td>
</tr>
<tr>
<td>viii)</td>
<td>Av. speed of operation, kmph</td>
<td>4.54 to 5.02</td>
</tr>
<tr>
<td>ix)</td>
<td># Wheel slippage, %</td>
<td>7.41 to 13.30</td>
</tr>
<tr>
<td>x)</td>
<td>* Area covered, ha/h</td>
<td>0.038 to 0.065</td>
</tr>
<tr>
<td>xi)</td>
<td>Time required for one hectare, h</td>
<td>15.43 to 26.17</td>
</tr>
<tr>
<td>xii)</td>
<td>Fuel consumption</td>
<td></td>
</tr>
<tr>
<td>xiii)</td>
<td>- l/h</td>
<td>3.32 to 3.78</td>
</tr>
<tr>
<td></td>
<td>- l/ha</td>
<td>51.29 to 98.86</td>
</tr>
<tr>
<td>xiv)</td>
<td>Draft requirement, kg</td>
<td>677 to 1415 (Avg. 998 kg)</td>
</tr>
<tr>
<td>xv)</td>
<td>Range dia. of laser beam, m</td>
<td>650</td>
</tr>
</tbody>
</table>
Land slope before operation, %

<table>
<thead>
<tr>
<th></th>
<th>Lengthwise</th>
<th>Widthwise</th>
</tr>
</thead>
<tbody>
<tr>
<td>xvi)</td>
<td>0.254 to 0.807</td>
<td>0.163 to 0.461</td>
</tr>
</tbody>
</table>

Land slope after operation, %

<table>
<thead>
<tr>
<th></th>
<th>Lengthwise</th>
<th>Widthwise</th>
</tr>
</thead>
<tbody>
<tr>
<td>xvii)</td>
<td>0.041 to 0.077</td>
<td>0.038 to 0.114</td>
</tr>
</tbody>
</table>

Blade bucket capacity, kg (Approx)

xviii) 723 to 761

Coefficient of variation of leveling after leveling

xix) 0.003 to 0.006

Evenness in leveling, %

xx) 99.4 to 99.7

# Vary with depth of cut of blade
* Vary with land slope & depth of cut

6.1 Rate of Work
6.1.1 The rate of work in sandy loam soil was recorded as 0.038 to 0.065 ha/h and the forward speed as 4.54 to 5.02 kmph.
6.1.2 The time required to cover one hectare area was recorded as 15.43 to 26.17 h.
6.1.3 Fuel consumption of tractor varies from 3.32 to 3.78 l/h whereas fuel consumption per hectare varies from 51.29 to 98.86 l/ha.

6.2 Quality of work
6.2.1 Depth of cut of soil cutting blade was varies from 17 to 30 mm.
6.2.2 Slope of land across its length & width after laser leveler operation was observed as 0.041 to 0.077% & 0.038 to 0.114% respectively.
6.2.3 Coefficient of variation & evenness of the operation of leveling after operation were observed as 0.003 to 0.006 and from 99.4 to 99.7 % respectively.
6.2.4 Working diameter of laser beam was recorded 900 m.

7. Ease of Operation, Adjustments & Safety
7.1 Depth of cut of soil cutting blade can be adjusted by raising/lowering the receiver height from operator seat & for this operator need not to get down from tractor
7.2 Maneuverability of the laser leveler unit during field operation was satisfactory.

8. Soundness of Construction
No breakdown occurred during 20.06 hrs. of operation field operation

9. Comments & Recommendations
9.1 Quality of field leveling was satisfactory.
9.2 Deflection of laser beam before & after the field test was within the limit & the deflection was also normal after the temperature gradient & vibration test.
9.3 No leakage of hydraulic oil from hydraulic circuits observed during field & lab test.
9.4 No moisture or water vapour were observed inside emitter prism glass when tested for water resistance.
9.5 Dimensions and hardness of soil cutting blade does not conform to the limit specified in IS: 9813:2002. It should be looked into in future at regular production level for corrective action.
9.6 Draft requirement varies from 677 to 1415 kg, where as the average draft requirement was observed as 998 kg.
9.7 Working range diameter of laser beam was observed as 650 m against the declared value of 800 m. It should be looked into.
|xvi)  | Land slope before operation, % | Lengthwise | 0.254 to 0.807 | Widthwise | 0.163 to 0.461 |
|xvii) | Land slope after operation, % | Lengthwise | 0.041 to 0.077 | Widthwise | 0.038 to 0.114 |
|xviii) | Blade bucket capacity, kg (Approx) | | | | 723 to 761 |
|xix)  | Coefficient of variation of leveling after leveling | 0.003 to 0.006 |
|x)    | Evenness in leveling, % | 99.4 to 99.7 |

# Vary with depth of cut of blade
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9.6 Draft requirement varies from 677 to 1415 kg, where as the average draft requirement was observed as 998 kg.
9.7 Working range diameter of laser beam was observed as 650 m against the declared value of 800 m. It should be looked into.
9.8 Marking of the implement does not conform the requirements of IS: 9813:2002. The identification plate is not provided. It should be provided on implement with following information.
  i) Make and model
  ii) Serial No. & size
  iii) Year of manufacturer
  iv) Trade name
  v) Approx mass
  vi) Minimum power of prime mover/tractor kW/Ps.

9.9 The safety symbols, signs, pictograms and hazard warnings are not provided on the machine. It should be provided for safety of the users.
  i) The serial No. of the implement is not provided. Each implement shall have serial No./identification No.

10. LITERATURE:
No literature was supplied by the manufacture regarding operation, maintenance & service of implement except leaflets showing fabrication, assembly & testing of laser unit and brief information of laser unit of Topcon Sokkia India Pvt. Ltd. applicant for reference during test.
The literature as operator’s manual, parts catalogue and service manual should be brought out as per IS:8132:1999 in Hindi & other regional languages for the guidance of users & technical personnel.

TESTING AUTHORITY

| G.R. AMBALKAR  
Agricultural Engineer |
|----------------------|
| R.K. NEMA  
Senior Agricultural Engineer |
| HIMAT SINGH  
Director |

Test report compiled by: Sh. Maan Singh, Sr. Tech. Assistant

11. APPLICANT’S COMMENTS

<table>
<thead>
<tr>
<th>Para No.</th>
<th>Our Reference</th>
<th>Applicant’s Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.1</td>
<td>9.5, 9.7, 9.8 &amp; 9.9</td>
<td>We would like to assure that, we definitely take care of the points listed and will work in the direction to improve.</td>
</tr>
</tbody>
</table>