



## SWARAJ 825 XM TRACTOR



भारत सरकार

### GOVERNMENT OF INDIA

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रौद्योगिकी प्रभाग)  
Ministry of Agriculture (Deptt. of Agri. & Co-op, Mechanization & Technology Division)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

**CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE**

**(An ISO : 9001-2008 Certified Institute)**

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T- 876/1390/2013

## SWARAJ 825 XM TRACTOR – Commercial (Initial)



T- 876/1390/2013

## SWARAJ 825 XM TRACTOR – Commercial (Initial)

Manufacturer : M/s. Mahindra & Mahindra Ltd.  
Farm Equipment Sector,  
Swaraj Division,  
Phase-IV, Industrial Area, S.A.S.  
Nagar, Distt. Mohali (Punjab)  
Near Chandigarh – 160 055

Test requested by (applicant) : The manufacturer  
Selected for test by : Applicant  
Place of running-in : At manufacturer's works

Duration of said running-in, (h):  
- Engine : 28  
- Transmission : 32

METHOD OF SELECTION : The tractor was submitted directly by the applicant for test. Hence, method of selection is not known.

## 1. SPECIFICATIONS

1.1 **Tractor:**  
Make : Swaraj  
Model : 825 XM  
Variants if any : None  
Brand name : Swaraj  
Type : Four wheeled, rear wheel driven,  
Standard Agricultural Tractor.

1.2 **Engine:**  
Make : M/s. Swaraj Engines Ltd.  
Model : S-15 XM  
Type : Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.

1.3 **Cylinder & Cylinder Head:**  
Number : 1650  
Disposition : 1650  
Bore/stroke, (mm) : One  
Capacity as specified by the applicant : Vertical, inline  
Compression ratio, (apa) : 120 / 136  
Type of cylinder head : 1537  
Type of cylinder liners : 19.6(±0.5) : 1  
Type of combustion chamber : Monoblock  
Arrangement of valves : Wet, replaceable  
: Re-entrant cavity on piston crown  
: Overhead, Inline

Year of manufacture :  
Chassis number :  
Country of Origin :  
Serial number :  
Engine speed (Manufacturer's recommended production setting), (rpm) :  
- Maximum speed at no load, (rpm) : 1690 to 1810  
- Low idle speed, (rpm) : 550 to 650  
- Speed at maximum torque, (rpm) : 950 to 1250  
Rated speed, (rpm):  
- For PTO use :  
- For drawbar use :

Valve clearance (cold/hot):  
- Inlet valve, (mm) : 0.25/NA  
- Exhaust valve, (mm) : 0.35/NA

1.4 **Fuel System:**  
Type of fuel system : Gravity and force feed  
**Fuel tank:**  
Capacity, (l) : 45.0  
Location : Above clutch housing  
Provision for draining of sediments / water : Not provided  
Type of fuel tank : Metallic

1.4.1 **Water separator:**  
Make : Swaraj  
Type : Gravity separation  
Location : In between fuel tank & filters on LHS of engine.  
Capacity (l) : 0.50  
: NA

1.4.2 **Fuel feed pump:**  
Capacity (l) : 0.50  
: NA

1.4.3 **Fuel filters:**  
Make : Bosch, India  
Model/Group combination No. : F 002 H20 105  
Number : Two  
**Type of elements:**  
- Primary : Cloth  
- Secondary : Paper  
Capacity of final stage filter, (l) : 0.45

1.4.4 **Fuel injection pump:**  
Make : Bosch, India  
Model/Group combination No. : E041 238 800  
Type : Plunger  
Method of drive : Through camshaft gears  
Serial number : NA

1.4.5 **Fuel injectors:**  
Make : Bosch, India  
Nozzle holder Number : F 002 C70 020  
Type : Multi hole (Five holes)  
Manufacturer's production pressure : 25.0 + 0.8  
setting, (MPa) : 12 ± 1 degree before TDC  
Injection timing : --  
Firing order :

1.4.6 **Governor:**  
Make : Swaraj (apa)  
Model/Group combination No. : -  
Type : Mechanical, centrifugal, variable speed.  
Rated engine speed, (rpm) : 1650  
Governed range of engine speed, (rpm) : 550 to 1810

1.5 **Air Intake System:**  
1.5.1 **Pre-cleaner:**  
Make : Swaraj  
Type : Centrifugal with transparent dust collector  
Location : On top of main air cleaner inlet tube





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**17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS**

17.1 Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameter applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2008 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

| S. No.  | Characteristic  | Category (Evaluative / Non Evaluative) | Requirements as per IS: 12207-2008  | Values declared by the applicant (D)/ Requirement (R) | As observed    | Whether meets the requirements (Yes/No) |
|---|---|--|---|---|----------------|---|
| 1   | 2   | 3                                      | 4   | 5   | 6              | 7                                       |
| <b>17.1.1 PTO Performance :</b>               |   |  |   |   |                |   |
| a)  | - Maximum power under 2 h test, (kW) (Natural ambient condition)  | Evaluative                             | Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >35hp. -7.5/+10% for PTO power ≤ 35 hp   | 15.1 (D)  | 14.7           | Yes                                     |
| b)  | Power at rated engine speed, (kW)                                 | Non Evaluative                         | -do-  | 15.1 (D)  | 14.7           | Yes                                     |
| c)  | Specific fuel consumption corresponding to maximum power, (g/kWh) | Non Evaluative                         | ± 5%  | 272 (D)   | 270            | Yes                                     |
| d)  | Maximum equivalent crankshaft torque, (Nm)                        | Non Evaluative                         | ± 8%  | 103.2 (D)   | 102.4          | Yes                                     |
| e)  | Back-up torque, percent   | Non Evaluative                         | 7 percent, min.   | 18 (D)  | 20.8           | Yes                                     |
| <b>f) Maximum operating temperature (°C):</b> |   |  |   |   |                |   |
| 1)  | Engine oil  | Non Evaluative                         | The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.                           | 130 (D)   | 109            | Yes                                     |
| 2)  | Coolant (water)   | Evaluative                             | The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration. | 115 (D)   | 105            | Yes                                     |
| g)  | Engine oil consumption, (g/kWh)                                   | Evaluative                             | Not exceeding 1% of SFC at max. power under High ambient conditions   | 2.73 (R)  | 0.83           | Yes                                     |
| h)  | Smoke level   | Evaluative                             | Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)   | 3.25 per meter  | 0.36 per meter | Yes                                     |



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| 1   | 2   | 3              | 4  | 5                            | 6            | 7   |
|---|---|----------------|--|------------------------------|--------------|-----|
| <b>17.1.2 Drawbar performance :</b>   |   |                |  |                              |              |     |
| a)  | Max. drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)   | Non Evaluative | Minimum 65% of static mass with ballast  | 17.00 (D)<br>15.60 (R)       | 12.9         | No  |
| b)  | Max. drawbar pull without ballast corresponding to 15 percent wheel slip, (kN)  | Evaluative     | Minimum 65% of static mass of tractor without ballast  | 12.00 (D)<br>12.00 (R)       | 13.7         | Yes |
| c)  | Maximum drawbar power without ballast (kW).   | Evaluative     | Min. 80% of PTO power as referred in 16.1.1 (a) of PTO performance   | 12.5 (D)<br>11.8 (R)         | 13.5         | Yes |
| d)  | Max. transmission oil temperature (°C)  | Non Evaluative | The declared value should not exceed the maximum value specified by oil company  | 110                          | 61           | Yes |
| <b>17.1.3 Power lift and hydraulic pump performance :</b>   |   |                |  |                              |              |     |
| Maximum lifting capacity throughout the range of lift, (kN):  |   |                |  |                              |              |     |
| a)  | 1) At hitch points  | Non Evaluative | [Tolerance minus 10%]  | 9.81(D)                      | 10.12        | Yes |
|   | 2) With the standard frame  | Evaluative     | The lift capacity should at least be 18 kg/PTO hp. and it should be 16 kg/engine hp where the tractor is not provided with a PTO shaft | 7.65 (D)<br>3.48 Minimum (R) | 8.66         | Yes |
| b)  | Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute, (mm) | Non Evaluative | [Tolerance of plus 5 mm]   | 50 (D)<br>50 (R)             | 150          | No  |
| <b>17.1.4 Brake performance at 25 kmph:</b>   |   |                |  |                              |              |     |
| Maximum stopping distance at a force equal to or less than 600 N on brake pedal with road ballast, (m): |   |                |  |                              |              |     |
| a)  | 1) Cold brake   | Evaluative     | 10   | 10 (R)                       | 7.83 to 7.89 | Yes |
|   | 2) Hot brake  | Evaluative     | 10   | 10 (R)                       | 8.13         | Yes |
| b)  | Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> (N)  | Evaluative     | 600  | 600 (R)                      | 306 to 415   | Yes |
| c)  | Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever  | Evaluative     | Yes  | Yes                          | Yes          | Yes |





| 1      | 2   | 3              | 4   | 5  | 6   | 7   |
|--------|---|----------------|---|--|---|-----|
| 17.1.5 | <b>Noise measurement :</b>                            |                |   |  |   |     |
| a)     | Maximum ambient noise emitted by the tractor dB(A)    | Evaluative     | As per CMVR   | 88 (R)   | 84  | Yes |
| b)     | Maximum noise at operator's ear level dB(A)           | Evaluative     | As per CMVR   | 98 (R)   | 93  | Yes |
| 17.1.6 | <b>Amplitude of mechanical vibrations at :</b>        |                |   |  |   |     |
| 1)     | Left foot rest  | Non Evaluative | 100 microns (max)   | 100 (R)  | 140   | No  |
|        | Right foot rest                                       |                |   | 100 (R)  | 200   | No  |
| 2)     | Seat (with driver seated)                             |                |   | 100 (R)  | 330   | No  |
| 3)     | Steering wheel  |                |   | 100 (R)  | 250   | No  |
| 17.1.7 | <b>Haulage requirements :</b>                         |                |   |  |   |     |
| a)     | Gross mass of the trailers, (tonnes):                 |                |   |  |   |     |
| 1)     | Two wheel   | Non Evaluative | --  | 4.0 (D)  | 4.0   | Yes |
| 2)     | Four wheel  | Evaluative     | --  | 4.0 (D)  | 4.0   | Yes |
| b)     | Distance travelled / litre of fuel consumption, (km): |                |   |  |   |     |
| 1)     | Two wheel   | Non Evaluative | --  | 5.0 to 7.0 (D)                                     | 7.35 to 7.57                                    | No  |
| 2)     | Four wheel  |                |   | 5.0 to 7.0 (D)                                     | 5.63 to 6.30                                    | Yes |
| c)     | Fuel consumption (ml/km/tonne):                       |                |   |  |   |     |
| 1)     | Two wheel   | Non Evaluative | --  | 35 to 45 (D)                                       | 33.0 to 34.0                                    | No  |
| 2)     | Four wheel  |                |   | 35 to 45 (D)                                       | 39.7 to 44.4                                    | Yes |
| 17.1.8 | <b>Wetland cultivation :</b>                          |                |   |  |   |     |
|        | Sealing for the following assemblies:                 | Evaluative     | The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only. | There should be no ingress of water and/or mud (R) | No ingresses of mud and / or water was observed | Yes |
| 1)     | Clutch assembly                                       | -do-           |   |  |   |     |
| 2)     | Brake housings  | -do-           |   |  |   |     |
| 3)     | Front axle hubs                                       | -do-           |   |  |   |     |
| 17.1.9 | <b>Safety features :</b>                              |                |   |  |   |     |
| a)     | Guards against moving and hot parts                   | Evaluative     | As per CMVR   | At present no requirements                         | --  | --  |
| b)     | Lighting arrangement                                  | Evaluative     | As per CMVR   | --   | Provided  | Yes |



| 1       | 2  | 3              | 4  | 5      | 6                | 7              |     |
|---------|--|----------------|--|--------|------------------|----------------|-----|
| 17.1.10 | <b>Labelling of tractors (Provision of labelling plate):</b> |                |  |        |                  |                |     |
|         | 1) Make  | Evaluative     | Should conform to the requirements of CMVR along-with declared value of PTO HP | --     | Swaraj           | Yes            |     |
|         | 2) Model   | Evaluative     |  | --     | 825 XM           | Yes            |     |
|         | 3) Year of manufacture                                       | Evaluative     |  | --     | WA (2012)        | Yes            |     |
|         | 4) Engine number   | Evaluative     |  | --     | S15XM105/SRA0001 | Yes            |     |
|         | 5) Chassis number  | Evaluative     |  | --     | WATA09705000001  | Yes            |     |
|         | 6) Declaration of PTO power, (kW)                            | Evaluative     |  | --     | 15.1             | Yes            |     |
| 17.1.11 | <b>Discard limit for:</b>                                    |                |  |        |                  |                |     |
| a)      | Cylinder bore diameter, (mm)                                 | Evaluative     | To be specified by the manufacturer  | 120.30 | 119.95 to 120.0  | Yes            |     |
| b)      | Clearance between piston & cylinder liner at skirt, (mm)     | Non Evaluative | -do-   | 0.55   | 0.151            | Yes            |     |
| c)      | <b>Ring end gap (mm):</b>                                    |                |  | -do-   | 2.50             | 0.45           | Yes |
|         | - Top comp. ring.  | Evaluative     | -do-   | 2.50   | 0.50             | Yes            |     |
|         | - 2 <sup>nd</sup> comp. ring.                                |                | -do-   | 2.50   | 0.60             | Yes            |     |
|         | - Oil ring.  |                | -do-   | 2.50   | 0.60             | Yes            |     |
| d)      | <b>Ring groove clearance (mm):</b>                           |                |  | -do-   | 0.25             | Taper rings    | --  |
|         | - Top comp. ring.  | Evaluative     | -do-   | 0.25   | 0.068            | Yes            |     |
|         | - 2 <sup>nd</sup> comp. ring.                                |                | -do-   | 0.25   | 0.069            | Yes            |     |
|         | - Oil ring.  |                | -do-   | 0.25   | 0.069            | Yes            |     |
| e)      | <b>Clearance of main bearings (mm):</b>                      |                |  | -do-   | 0.30             | 0.123 to 0.124 | Yes |
|         | - Diametrical clearance                                      | Evaluative     | -do-   | 0.60   | 0.10             | Yes            |     |
|         | - Crankshaft end float                                       | Evaluative     | -do-   | 0.60   | 0.10             | Yes            |     |
| f)      | <b>Clearance of big end bearings, (mm):</b>                  |                |  | -do-   | 0.30             | 0.074 to 0.075 | Yes |
|         | - Diametrical  | Evaluative     | -do-   | 0.60   | 0.15             | Yes            |     |
|         | - Axial  | Evaluative     | -do-   | 0.60   | 0.112 to 0.127   | Yes            |     |
| g)      | Clearance between king pin and bush, (mm)                    | Non Evaluative | -do-   | 0.80   | 0.112 to 0.114   | Yes            |     |
| h)      | Clearance between center pin and bush, (mm)                  | Non Evaluative | -do-   | 0.80   | 0.112 to 0.114   | Yes            |     |





| 1       | 2   | 3                                      | 4   | 5           |   |
|---------|---|--|---|-------------|---|
| 17.1.12 | <b>CATEGORY OF BREAKDOWNS / DEFECTS :</b> |  |   |             |   |
| S. No.  | Characteristic                            | Category (Evaluative / Non Evaluative) | Requirements as per IS: 12207-2008  | As observed | Whether meets the requirements (Yes/No) |
| 1.      | Critical                                  | Evaluative                             | No critical breakdown   | None        | Yes                                     |
| 2.      | Major                                     | Evaluative                             | Not more than two and neither of them should be repetitive in nature  | None        | Yes                                     |
| 3.      | Minor                                     | Evaluative                             | Not more than five and frequency of each should not be more than two.   | None        | Yes                                     |
| 4.      | Total breakdowns                          | Evaluative                             | In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or 5 minor breakdowns | None        | Yes                                     |

| <b>17.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2008:</b> |   |   |                                |   |
|---|---|---|--------------------------------|---|
| S. No.  | Characteristic                                    | Requirements as per IS: 12207-2008                              | As observed                    | Whether meets the requirements (Yes/No) |
| 1   | Air cleaner oil pull over, max. oil pull over (%) | 0.25% (max.)  | 0.10                           | Yes                                     |
| 2.  | Seating requirements                              | Should meet the requirements of IS: 12343-1998                  | Meets the requirements         | Yes                                     |
| 3.  | Fitment of ROPS                                   | With a provision for fitment of ROPS.                           | Provided                       | Yes                                     |
|   |   | If ROPS fitted it should meet the requirement of IS: 11821-1992 | ROPS not fitted                | Not applicable                          |
| 4.  | Technical requirements for PTO shaft              | Should meet the requirements of IS: 4931 - 1995                 | Meets the requirements         | Yes                                     |
| 5.  | Dimensions of three point linkage                 | Should meet the requirements of IS: 4468 (Part-I)-1997          | Does not meet the requirements | No                                      |
| 6.  | Specifications of linkage drawbar                 | Should meet the requirements of IS: 12953-1990.                 | Meet the requirements          | Yes                                     |
|   | Specifications of swinging drawbar                | Should meet the requirements of IS: 12362 Part 3-1994.          | Not provided                   | Not applicable                          |
| 7.  | Accessories                                       | Trailer hitch, front tow hook, linkage drawbar may be provided. | Provided                       | Yes                                     |



- 17.3 Conformity with following IS:**
- i) Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : Conforms
  - ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS: 4931-1995 (Reaffirmed in March, 2009)] : Conforms
  - iii) Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468 (Part-I):1997 (Reaffirmed in February, 2012)] : **Does not conform**
  - iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in February, 2012)] : Conforms
  - v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Reaffirmed in March, 2009)] : Conforms
  - vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (Part-1)-1996 (Reaffirmed in February, 2012) / ISO 4254-1:1989] : **Does not conform**
  - vii) Tractors and machinery for agriculture and forestry – Technical means for ensuring safety Part 2: Tractors (first revision) IS 12239 (Part-2)-1999 (Reaffirmed in March, 2009)] : **Does not conform**
  - viii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays – Symbols for Agricultural Tractors and Machinery [IS: 6283 (Part-2) – 2007(Reaffirmed in March, 2009) / ISO 3767-2:1991]] : **Does not conform**
  - ix) Guidelines for location and operation of operator controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009) / ISO 3789: 1982] : Conforms
  - x) Agricultural Tractor & Machinery Lighting device for travel on public roads [IS: 14683-1999 (Reaffirmed in March, 2009)] : Conforms
- 17.4 Salient Observations:**
- 17.4.1 Laboratory tests:**
- 17.4.1.1 PTO performance:**
- i) The backup torque is 20.8 %.
  - ii) The maximum power was observed as 14.7 kW against the declaration of 15.1 kW, which meet the requirement of IS: 12207-2008 with regard to tolerance.
  - iii) The specific fuel consumption corresponding to maximum power was measured as 270 g/kWh against the declaration of 272 g/kWh, which meet the requirement of IS:12207-2008 with regard to tolerance.
- 17.4.1.2 Drawbar performance :**
- During the ballasted drawbar performance test ,the max drawbar pull with ballast corresponding to 15% wheel slip is observed as 12.89 kN against the minimum requirement is 15.60 kN (i.e. 65% of static mass with ballast),which does not meet requirement of IS:12207 -2008. This should be looked into for necessary action for improvement.



**17.4.1.3 Hydraulic Performance :**

- i) The lifting capacity at standard frame was recorded as 8.66 kN and the moment about the rear axle was computed as 12.86 kN-m. The moment about rear axle is on higher side as compared to the moment about front axle i.e. 14.69 kN-m. It is therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or standard ballast mass at front axle may be provided to avoid front lifting of the tractor.
- ii) Total drop in height of lift during lift load maintenance test was recorded as 150 mm against the preferably maximum requirement of 50 mm, and calls for necessary corrective action.

**17.4.1.4 Mechanical Vibration:**

The amplitude of mechanical vibration on various assemblies marked as (\*) in Chapter-9 of this test report are on higher side especially at the left & right foot rest steering control wheel and seat (with driver seated). This calls for dampening down of vibrations to improve the operational comfort and service life of components.

**17.4.1.5 Three point linkage:**

- i) The lateral distance from lower hitch point to center line of tractor does not meet the requirements of IS: 4468(Part I)-1997. This should be looked into for necessary corrective action.

**17.4.1.6 Linkage Drawbar:**

Some of the parameters conform to Cat I and some of them conform to Cat. II. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

**17.4.1.7 Location and operation of operator's control:**

- i) The fuel shut off lever does remain in "stop" position without application of sustain manual effort
- ii) Alternator drive 'V' belt is not covered with guard.
- iii) The working clearance between the position control lever and draft control lever was observed as 45 mm against the minimum requirement of 70 mm and as per IS: 12239 (Part 2)-1996 This should be looked into for necessary corrective action.

**17.4.2 Field Performance:**

During the field performance test 30 blade rotavator is recommended, when rotavation operation on going beyond the optimum depth the engine rpm was suddenly dropped observed as 1730 to 1300 rpm. So the 24 blade rotavator is matching the tractor and rotavation operation carried out. Therefore, Should be looked into for necessary improvement for engine stall while continuous the rotavation operation.

**17.4.2.1 Wet land cultivation (Puddling Operation):**

No ingress of mud and / or water was noticed during puddling operation of the tractor and meet the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor is recommended as suitable for wetland operation (Puddling).

**17.4.2.2 Haulage performance:**

- i) The distance travelled / litre of fuel consumption with two wheel trailer was observed as 7.35 to 7.57 km/l against the declaration of 5.00 to 7.00 km/l. This does not meet the requirement of IS: 12207-2008 and therefore, should be looked into for necessary corrective action.
- ii) The fuel consumption with two wheel was observed as 33.0 to 34.0 ml/km/tonne against the declaration of 35 to 45 ml/km/tonne for two wheel trailer. This does not meet the requirement of IS: 12207-2008 and therefore, should be looked into for necessary corrective action.

- iii) During the haulage test with 4 wheel trailer having 4 ton gross mass of trailer, on slope the engine rpm was dropped as observed 1200 to 1600 rpm & operator used H-3 gear & sometime H-2 gear selected. Should be looked into for necessary improvement for engine stall while continuous the haulage test.

**17.5****Recommendation with regard to safety on tractor:**

The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Provision for spark arresting device in exhaust system.
- ii) Provision of differential lock.
- iii) Alternator drive 'V' belt is not covered with guard.
- iv) Vertical retainer is provided on only one side of clutch pedal
- v) Provision of width of foot step as per IS: 12239 (Part-1)-1996.

**17.6****Maintenance / Service Problems:**

No noticeable maintenance or service problem was observed during the test.

**17.7****Adequacy of Literature supplied with machine:****17.7.1**

The following literature was supplied with the tractor for reference during the test.

- i) Operator's manual (for Swaraj 825 XM Tractor)
- ii) Spare parts catalogue (for Swaraj 825 XM Tractor)

**18. CITIZEN CHARTER**

| Time frame for Testing & Evaluation as per Citizen Charter | Duration of Test                         | Whether the Test Report is released within the time frame given in Citizen Charter | Remarks |
|--|--|--|---------|
| 10 Months  | 10 Months<br>(June, 2012 to March, 2013) | Yes  | --      |

**TESTING AUTHORITY:**

**P. K. VERMA**  
SENIOR AGRICULTURAL ENGINEER

**C.R.LOHI**  
DIRECTOR

Test Report compiled by: **Shri.Chanchlesh Singh Raghuwanshi**, Senior Technical Assistant.



## 19. APPLICANT'S COMMENTS

| Para No. | Our Reference                             | Applicant's comments   |
|----------|---|--|
| 19.1     | 17.3 (iii,vi,vii,ix), 17.4.1.6, 17.4.1.7  | Necessary steps shall be taken up for adherence of these parameters by our suppliers and at our end. |
| 19.2     | 17.4.1.3                                  | Necessary design changes have been initiated to reduce the internal leakages.                        |
| 19.3     | 17.6 (i), 17.6 (ii), 17.3 (vi, vii, viii) | These requirements are being revisited for necessary corrective action at our end.                   |
| 19.4     | 17.4.1.8                                  | The existing design parameters shall be relooked into with respect to the requirements.              |

## ANNEXURE - I

## BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

| S. No. | Item                           | Disc Plough   | Rotavator       | Puddler             |
|--------|--------------------------------|---------------|-----------------|---------------------|
| 1.     | Make                           | John Deere    | Not available   | Not available       |
| 2.     | Type                           | Mounted       | Mounted         | Mounted             |
| 3.     | No. of bottom / blades         | 2             | 24, in 7 flange | 12 (6 in each gang) |
| 4.     | Type of bottom / blades        | Plain concave | Hatchet         | Notched             |
| 5.     | Size of bottom / blades, (mm)  | 640           | 270x 30 x 10    | 460                 |
| 6.     | Spacing of bottom/blades, (mm) | 260           | 240             | 164                 |
| 7.     | Lower hitch point span, (mm)   | 850           | 730             | 680                 |
| 8.     | Mast height, (mm)              | 500           | 600             | 680                 |
| 9.     | - Length                       | 1570          | 1280            | 1190                |
|        | - Width                        | 1050          | 1040            | 1810                |
|        | - Height                       | 1040          | 920             | 1330                |
| 10.    | Gross mass, (kg)               | 355           | 150             | 240                 |



- iii) During the haulage test with 4 wheel trailer having 4 ton gross mass of trailer, on slope the engine rpm was dropped as observed 1200 to 1600 rpm & operator used H-3 gear & sometime H-2 gear selected. Should be looked into for necessary improvement for engine stall while continuous the haulage test.

17.5

**Recommendation with regard to safety on tractor:**

The following requirements, inter alia, may be considered for incorporation on the tractor:

- Provision for spark arresting device in exhaust system.
- Provision of differential lock.
- Alternator drive 'V' belt is not covered with guard.
- Vertical retainer is provided on only one side of clutch pedal
- Provision of width of foot step as per IS: 12239 (Part-1)-1996.

17.6

**Maintenance / Service Problems:**

No noticeable maintenance or service problem was observed during the test.

17.7

**Adequacy of Literature supplied with machine:**

17.7.1

The following literature was supplied with the tractor for reference during the test.

- Operator's manual (for Swaraj 825 XM Tractor)
- Spare parts catalogue (for Swaraj 825 XM Tractor)

## 18. CITIZEN CHARTER

| Time frame for Testing & Evaluation as per Citizen Charter | Duration of Test                     | Whether the Test Report is released within the time frame given in Citizen Charter | Remarks |
|--|--------------------------------------|--|---------|
| 10 Months  | 10 Months (June, 2012 to March 2013) | Yes  | --      |

## TESTING AUTHORITY:

*P.K.V.*  
P. K. VERMA  
SENIOR AGRICULTURAL ENGINEER

*C.R.L.*  
C.R. LOHI  
DIRECTOR

Test Report compiled by: Shri.Chanchlesh Singh Raghuwanshi, Senior Technical Assistant.