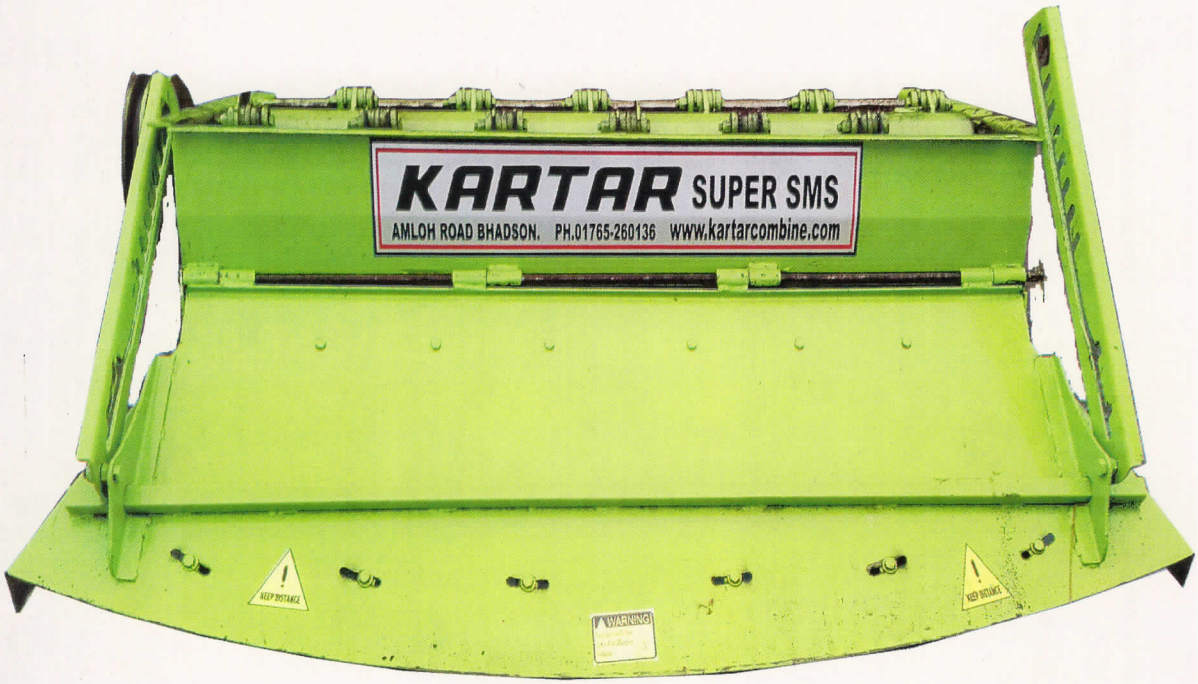
व्यावसायिक परीक्षण रिपोर्ट
**COMMERCIAL TEST REPORT**

संख्या/ **No.: COMP-150/2389/2019**
माह/**Month : December, 2019**

**THIS TEST REPORT VALID UP TO : 31th DECEMBER, 2026**




# **KARTAR SUPER SMS,** FITTED ON KARTAR-4000 SELF PROPELLED COMBINE HARVESTER

सत्यमेव जयते

भारत सरकार
**Government of India**
कृषि एवं किसान कल्याण मंत्रालय
**Ministry of Agriculture and Farmers Welfare**
कृषि, सहकारिता एवं किसान कल्याण विभाग
**Department of Agriculture, Cooperation and Farmers Welfare**
उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
**Northern Region Farm Machinery Training and Testing Institute**
ट्रैक्टर नगर, सिरसा रोड, हिसार, (हरियाणा) - 125 001
**Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001**
**[ISO 9001:2015 CERTIFIED]**

Website: http://nrfmtti.gov.in/
E-mail: fmti-nr@nic.in
Tele./FAX: 01662-276984

## 4. ROTOR BALANCNING TEST

| | | | |
|---|---|---|---|
| | Date of test | : | 13.12.2019 |
| | Make and model of Rotor balancing machine | : | PROTEQ and H - 1 K |
| | Mass of the job ( kg) | : | 85.6 |
| | Service speed of the job rpm | : | 1863 |
| | ISO balancing grade | : | G 16 |
| | Balancing speed rpm | : | 1863 |

| S.No. | **Particulars** | As permissible | As observed | Remark |
|---|---|---|---|---|
| | Unbalance weight (Left side plane) (g) | 42.56 | 9.56 | Balanced |
| | Unbalance weight (Right side plane) (g) | 42.56 | 10.55 | Balanced |

| | | |
|---|---|---|
| | Unbalance angle (**Left side plane**) (degree) | 286.37° |
| | Unbalance angle (**Right side plane**) (degree) | 210.81° |

## 5. FIELD PERFORMANCE TEST

**5.1** The SMS fitted on Kartar- 4000combine harvester was operation in the paddy field for 5.71 hrs, to assess (a) performance of SMS and, (b) performance of combine harvester with SMS.

The crop parameters recorded during the test were as under:-

**Crop Parameters**

| Sl. No. | **Parameters** | | **Observations** |
|---|---|---|---|
| 1. | Average plant height, cm | : | 114 to 120 |
| 2. | Average number of tillers/$m^2$ | : | 270 to 296 |
| 3. | Average length of ear head, cm | : | 26 to 32 |
| 4. | Average straw/grain ratio | : | 1.6 |
| 5. | Average moisture, % | | |
| | - Grain | : | 15.0 |
| | - Straw | : | 74.9 |

The results of field performance test of paddy crop harvesting are summarised in Table and presented in detail in **Appendix – II to V.**

**Table : SUMMARY OF LOSSES & EFFICIENCIES OBSERVED DURING FIELD PERFORMANCE TEST.**

| Crop variety | Collectable losses (%) | Non-collectable losses (%) | Total processing losses (%) | Threshing efficiency (%) | Cleaning efficiency (%) | Grain breakage in main grain tank (%) | Forward speed (kmph) | Area covered (ha/h) | Fuel consumption | | Grain output (kg/h) | Crop throughput (t/h) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | (l/h) | (l/ha) | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| PADDY | | | | | | | | | | | | |
| Pusa 1121 | 2.4 | 0.8 | 2.7 | 98.7 | 97.0 | 1.06 | 1.47 | 0.416 | 8.81 | 21.15 | 2983.78 | 7.73 |

**SUMMARY OF FIELD PERFORMANCE OF SMS**

| | |
|---|---|
| Uniformity of straw spread, CV, (percent) | 18.2 |
| Weighted mean size of chopped straw, cm | 9.5 |

## 6. DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS

No noticeable defect observed

## 7. SUMMARY OF OBSERVATIONS

### 7.1 Field test

| 7.1.1 | Performance of SMS with Kartar-4000 Combine Harvester | |
|---|---|---|
| 1 | Uniformity of straw spread, CV, (percent) | 18.2 |
| 2 | Weighted mean size of chopped straw, cm | 9.5 |

**7.1.2 Performance of Kartar-4000 combine harvester with Kartar Super SMS**

| S. No | Parameters | Observations |
|---|---|---|
| 1. | Speed of operation (kmph) | 1.47 |
| 2. | Area covered (ha/h) | 0.416 |
| 3. | Fuel consumption:<br>- (l/h)<br>- (l/ha) | <br>8.81<br>21.15 |
| 4. | Crop throughput (tonne/h) | 7.73 |
| 5. | Grain breakage in main grain outlet (%) | 1.06 |
| 6. | Header losses (%) | 0.43 |
| 7. | Total non-collectable losses (%) | 0.8 |

| | | |
|---|---|---|
| 8. | Total collectable losses (%) (un threshed + broken from main outlet) | 2.4 |
| 9. | Total processing losses (%) | 2.7 |
| 10. | Threshing efficiency (%) | 98.7 |
| 11. | Cleaning efficiency (%) | 97.0 |

## 8. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS AS PER IS 15806 : 2018

| S. No | Characteristics | Category (Evaluative/ Non evaluative) | Requirement Declaration | Tolerance | Observed | Remarks |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8.1 | Uniformity of straw spread, CV, (percent) | Evaluative | 20 Max. | -- | 18.2 | Conforms |
| 8.2 | Weighted mean size of chopped strew, cm | Evaluative | 20 Max. | -- | 9.5 | Conforms |
| 8.3 | Processing losses in rice (%) | Evaluative | Average 4% | Nil | 2.7 | Conforms |
| 8.4 | Threshing efficiency (%) | Evaluative | ≥ 98 % | Nil | 98.7 | Conforms |
| 8.5 | Cleaning efficiency | Evaluative | ≥ 96 % | Nil | 97.0 | Conforms |
| 8.6 | Grain Breakage in main grain tank | Evaluative | ≤ 2.5 % | Nil | 1.6 | Conforms |
| 8.7 | Non-collectable losses | Evaluative | ≤ 2.5 % | Nil | 0.8 | Conforms |
| | **i)** Material of blades for straw management System (SMS) | Non evaluative | The flail and fixed blades shall be manufactured from steel having the following chemical composition or such other composition as shall be agreed to between the supplier and the purchaser.<br>a) Carbon 0.70 to 1.0 percent. | -- | Flail blade<br>C- 0.5340<br>Mn- 0.2623<br>Cr- 0.0094<br>Ni- 0.6149<br>Fixed blade<br>C- 0.4539<br>Mn- 0.2534<br>Cr- 0.0126<br>Ni – 0.5469 | As the code itself accommodate the variation in chemical composition , there is little scope for declaration of conformity or otherwise |

| | vi) | Break down (critical, major & minor) | | | |
|---|---|---|---|---|---|
| Sr. No. | Category of breakdowns | Category (Evaluative/ Non evaluative) | Requirements as per IS 15806:2018 | 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 breakdown | Evaluative | In no case total no of (major + minor) breakdowns exceed five | None | Yes |

## 9. CRITICAL TECHNICAL SPECIFICATIONS

**(Vide Ministry's communication F. No 9-1/2019 M&T (I&P) dated 20.08.2019)**

| Sl No. | Parameters | Specification | Observation | Remarks |
|---|---|---|---|---|
| **Rotor** | | | | |
| 1. | Rotor diameter, mm | 165-170 | 165 | Conforms |
| 2. | No. of lugs on rotor in row | 6 | 6 | Conforms |
| 3. | No. of rows in periphery | 4 | 4 | Conforms |
| 4. | Length of pivotal flail, mm | 170-180 | 176.1 | Conforms |
| 5. | Width of flail, mm | 50 ± 1 | 50.0 | Conforms |
| 6. | Thickness of flail, mm | 5.0 (Min.) | 5.0 | Conforms |
| 7. | No of flails in one set | 2 | 2 | Conforms |
| 8. | Spacing between flails of one set, mm | 35 (Max) | 34.7 | Conforms |
| 9. | Distance between adjacent flails units, mm | 200±10 | 204 | Conforms |
| 10. | No of rows/bars of serrated blades | 1 | 1 | Conforms |
| 11. | No of serrated blades in row | 20 (Min.) | 24 | Conforms |
| 12. | Spacing between serrated blades, mm | 50 (Max.) | 50.0 | Conforms |
| 13. | Overlapping of pivotal blade on serrated blade, mm | 60 (Min.) (adjustable) | 105 | Conforms |
| **Spreader** | | | | |
| 14. | Total number of flaps | 6 + 2 ( side ) | 6+2 | Conforms |
| 15. | Length of flaps, cm | 38 (Min.) | 39.0 | Conforms |
| 16. | Distance between flaps ( left to right) | Adjustable | Adjustable | Conforms |
| 17. | Spreader angle with horizontal, degree | Adjustable preferably downwards | Adjustable | Conforms |

| | | | | |
|---|---|---|---|---|
| 18. | Spreader angle with line of travel, degree | 15 (Min.) (adjustable) | 25°(Max) | Conforms |
| 19. | Spreader sheet thickness, mm | 2.5-3.0 | 2.6 | Conforms |
| 20. | SMS sheet thickness, mm | 5.0 (Min.) for outer | 5.0 | Conforms |
| 21. | Rotor balancing | Should be dynamically balanced | Observed balanced | Conforms |
| 22. | Rotor rpm | Min. 1600 | 1863 | Conforms |
| 23. | Fitting of SMS on combine harvester | Rigidly fixed to the combine chassis | Rigidly fixed | Conforms |
| 24. | Fitting of power transmission system on combine harvester | Rigidly fixed to the combine chassis | Rigidly fixed | Conforms |
| 25. | Marking/labelling of machine | Labelling plate should be riveted on the body of machine having Name and address of manufacturer, Country of origin Make Model Year of manufacturer, Serial number, Type Size required size of prime mover (kW), Weight of the machine (Kgs) | Provided | Conforms |
| 26. | Literature | Operator manual, Service manual and Parts catalogue should be provided | Provided but only name sake | Conforms |

## 10. COMMENTS AND RECOMMENDATIONS

**10.1** **Field performance test**

No noticeable defect observed during field test.

**10.2** Applicant has recommended Kartar-4000 combine harvester for SMS field testing. This is vital information and therefore the same must be inscribed in labelling plate also for the guidance of users.

**10.3** In the labelling plate, the power requirement is given as 74.3 kW, whereas the power of the combine harvester recommended is 94.3 kW. **This is misleading and therefore Must be looked into for corrective action.**

**10.4** In the labelling plate manufacture has declared the weight of SMS as 290 kg, which is misleading. The actual weight was observed as 192 kg. It may be looked into.

**10.5** **Ease of operation and safety provision**

No noticeable difficulties observed during operation of SMS.

**10.6** Material of SMS and bush for flail blades is not specified. It should be specified.

**10.7** **Literature supplied with the machine**

1) There was one document entitle "Operator manual and Service manual" was supplied. However, it could be anything but the operator manual, as it lacks the relevant information on operation, adjustments and safety etc.
Therefore the Operator manual/ Service manual need to be brought out as per IS 8132: 1999.
2) Parts catalogue is provided during field test.

## TESTING AUTHORITY

| | |
|---|---|
| MAAN SINGH<br>SENIOR TECHNICAL ASSISTANT | |
| **P. K. PANDEY**<br>**DIRECTOR** | |

Test report compiled by C.Veeranjaneyulu, Senior Technician

## 11. APPLICANT'S COMMENTS

No comments received from applicant