

प्रारंभिक व्यावसायिक परीक्षण रिपोर्ट
INITIAL COMMERCIAL TEST REPORT

संख्या/No. CSIR/CMERI/FMTTC/2024/071
माह/Month: NOVEMBER, 2024

THIS TEST REPORT VALID UP TO : 31ST OCTOBER, 2031



SONALIKA AGRO INDUSTRIES CORPORATION
TRACTOR OPERATED PADDY MULTICROP THRESHER
(PMCT-605)



Government Of India



कृषि मशीनरी प्रशिक्षण और परीक्षण केंद्र
Farm Machinery Training and Testing Centre
सीएसआईआर- केन्द्रीय यांत्रिक अभियांत्रिकी अनुसंधान संस्थान
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CSIR/CMERI/FMTTC/2024/071	TRACTOR OPERATED PADDY MULTI CROP THRESHER PMCT-605 (SIDE FEEDER HOPPER TYPE) (COMMERCIAL TEST)
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3. TEST PROCEDURE / TEST CODE

There is no Indian standard/ test code available for testing of tractor trailer as such. The guidelines, however, have been taken from the following:

IS: 6284:1985	:	Test code for power thresher for cereals
IS: 11234:1985 (Reaffirmed 2001)	:	Test code for power thresher for groundnut
IS: 9020:2002 (Reaffirmed 2012)	:	Power threshers-Safety requirements
IS 4333 (Part 1) 1996	:	Method of Analysis for food grains
IS 7897: 1975	:	Test code for chaff cutter
IS 4931:1995	:	Agricultural tractors - Rear mounted power take off Types 1, 2 and 3

4. SPECIFICATIONS

4.1 General

Name of manufacturer	:	Sonalika Agro Industries Corporation
Name of applicant	:	SONALIKA
Name of Machine	:	Multi crop Thresher (side hopper)
Type	:	Trailed Type
Make	:	Sonalika Agro Industries Corporation
Model	:	PMCT-605
Serial No.	:	SAIC0022
Year of manufacture	:	2024
Recommended crop	:	Multi crop
Recommended power source	:	35 HP and above
Suitable crops	:	Gram, Wheat, Mustard, Maize , Moong, Urad, Been, Soyabean, Jawar, Peas, Millet etc.

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5. RUNNING - IN

The machine was run in at no load for 1.0 hour at recommended threshing cylinder speed and following observations was recorded: -

- It was noticed that there was no undue knocking or rattling sound.
- On slippage of drive belts was noticed.
- On significant vibrations were noticed in the blower.
- The shaking mechanism was reciprocating smoothly, and
- No unusual vibration of the thresher was noticed.

After in, the following adjustment were made and maintained throughout the test:

Sl. No.	Particulars	Paddy	Pearl Millet	Maize
1.	No-load threshing cylinder speed, rpm	776	648	648
2.	Length of stroke of sieve, mm	30	0 to 30	0 to 30
3.	Concave clearance, mm	10-15	15-25	20-35
4.	No-load speed of aspirator, mm	776	1003	1003
5.	No-load speed of aspirator, rpm	2173	2226	2426
6.	No-load shaker unit, rpm	388	270	270
7.	Inclination of top sieve, deg	5-10°	5-10°	5-10°
8.	Inclination of bottom sieve, deg	5-10°	5-10°	5-10°
9.	Air, outflow velocity (m/s) (Primary/secondary aspirator)	10-16	10-18	10-14

6. PERFORMANCE TEST

The test was conducted in Paddy, Pearl Millet and Maize crops. The assessment of quality of work, capacity of machine and labour requirement, handling characteristics was made after best setting of the thresher by the applicant's representative.

For each test trial, three samples at regular intervals were taken for analysis. The detailed crop parameters and machine parameters are given in Annexure – I are summarized as under: -

6.1 Crop parameters

Sl. No.	Parameters	Range		
		Paddy	Pearl millet	Maize
1.	Name of crop			
2.	Variety of crop	IET 4087	Shankar	HQPM-1
3.	Grain straw ratio	0.44 to 0.49	0.79 to 0.82	0.78 to 0.85
4.	Plant height, cm	72 to 89	-----	-----
5.	Length of ear head or cob dia., mm	9.0 to 13.0	30 to 41	40 to 48
6.	Moisture content of grain, %	9.0 to 9.8	10.02 to 10.28	16.89 to 17.28
7.	Moisture content of straw, %	17.1 to 18.9	17.06 to 19.70	21.42 to 22.50

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Table-4 summary of performance results in Maize crop

Tests	Threshing drum speed (rpm)	Feeding rate (kg/h)	Grain output (kg/h)	Fuel consumption (l/h)	Capacity Kg/l)		Losses on the basis of total grain input (%)			Efficiencies (%)	
					Input	Output	Broken	Sieve overflow	Blown	Cleaning	Threshing
A Short Run Test											
	625-628	6154-6776	4800-5760	4.00-4.25	1539-1594	1200-1355	1.83-1.84	Nil	0.15-0.16	97.52-97.58	98.42-99.45
B At optimum capacity											
	615	6286	5280	390	1612	1354	1.85	Nil	0.15	97.60	99.50
C At varying speed											
(i) At 15% higher speed specified speed											
	645	7034	6120	4.75	1481	1288	1.85	Nil	0.17	97.47	99.40
(ii) At 15% lower speed than specified speed											
	546	5759	4550	3.45	1669	1319	1.80	Nil	0.16	97.56	99.42
D Long run test											
	623-630	6524-6560	5350-5445	4.19-4.38	1489-1566	1221-1300	1.81-1.83	Nil	0.15-0.16	97.55-97.60	99.42-99.44

6.4.1 Performance results on based on short run test (Paddy, Pearl Millet & Maize crops)

Rate of work

- The feeding rate in crops was recorded as 4963 to 5161, 5395 to 5628 & 6154 to 6776 kg/h.
- The grain output at main outlet was recorded as 2493 to 2691, 4187 to 4352 & 4800 to 5760 kg/h.

Quality of work

- The percentage of broken grain was recorded was 0.43 to 0.52, 0.40 to 0.55 & 1.83 to 1.84%.
- The percentage of sieve overflow was recorded was nil in Paddy, Pearl Millet & crops.
- The percentage of total blow grain losses was recorded as 0.09 to 0.17, 0.09 to 0.17 & 0.15 to 0.16%.
- The cleaning efficiency of the machine was recorded as 97.34 to 97.85, 98.05 to 98.50 & 97.52 to 97.58%.
- The threshing efficiency of the machine was recorded as 99.08 to 99.29, 98.90 to 99.20 & 98.42 to 99.45%.

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Subrata Kr Mandal

9. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

9.1 The machine submitted for test was stated to be a Paddy multi crop thresher and as such it was required to be tested for threshing of Paddy, Pearl Millet & Maize crops. The test results of Paddy, Pearl Millet & Maize crops.

9.1.1 Summary of performance at rated input capacity (Paddy, Pearl Millet & Maize crops):

Crop	Rated input capacity		Grain losses (%)			Efficiencies (%)	
	Input	Output	Broken	Sieve overflow	Blown	Cleaning	Threshing
	Kg/h	Kg/h					
Paddy	5224	2754	0.56	Nil	0.10	97.67	99.35
Pearl Millet	5576	4292	0.57	Nil	0.95	98.50	98.90
Maize	6286	5280	1.85	Nil	0.15	97.60	99.50

9.1.2 Paddy, Pearl Millet & Maize Crops Threshing

9.1.2.1 Rate of work

- The capacity of the machine depends upon the skill of person feeding the crop and number of persons supplying the crop. The rated input capacity of machine was recorded as 5224, 5576 & 6286 kg/h.
- The output capacity was recorded as 2754, 4292 & 5280 kg/h.

9.1.2.2 Quality of work

- The percentage of broken grain was recorded as 0.56, 0.57 & 1.85%.
- The percentage of sieve overflow losses was recorded as nil in Paddy, Pearl Millet & Maize crops.
- The percentage of blown grain losses was recorded as 0.10, 0.95 & 0.15 %, which is considered normal.
- The threshing efficiency of the machine was recorded as 99.35, 98.90 & 99.50 %, which is considered normal.
- The cleaning efficiency was recorded as 97.67, 98.50 & 97.60 %, which is considered normal.

9.1.2.3 The overall performance of the thresher in Paddy, Pearl Millet & Maize crops is considered to be satisfactory. All losses, threshing and cleaning efficiencies are found within the limits specified in the Indian Standard.

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Subrata Kumar Mandal

9.1.2.4 The on load engine of the prime mover at rated input capacity of thresher was recorded as 1275-1725 rpm for threshing of Paddy, Pearl Millet & Maize crops. The hourly fuel consumption was recorded as 3.38-8.57 l/h in Paddy, Pearl Millet & Maize crops.

9.2 Labour requirement and other

9.2.1 The thresher can be installed in harvested field itself, which reduces labour requirement and transporting losses.

9.2.2 The labour requirement for threshing of Paddy, Pearl Millet & Maize crops is assessed as 8 numbers.

9.3 Long Run Test of the thresher was carried out for 65.30 hours in Paddy, Pearl Millet & Maize crops. During long run test, no breakdowns and abnormal sound in the machine were noticed.

9.4 The wear of peg tooth used for threshing Paddy, Pearl Millet & Maize crops on mass and dimensional basis was recorded as given below. The percent wear is considered as normal.

Type of tooth	Percent wear after 65.30 hours	
	Mass Basis	Dimensional basis
Peg tooth	0.0718 to 0.0840	0.0294 to 0.0374

9.5 The specification of feeding chute and feeding hopper conforms to the IS: 9020-2002.

9.6 All Pulleys and belt drives used on thresher are well protected by providing the suitable guards.

9.7 The thresher is tractor PTO Operated and tractors are available with different PTO speeds and the PTO speed varies according to make, model and its throttle settings. Therefore, it is recommended that a rotational speed counter be provided on thresher for indication of threshing cylinder speed along with a chart of recommended revolutions per minute of the threshing drum with its direction of rotation and settings of various systems.

9.8 The thresher should be provided with reflectors of suitable size and slow-moving emblem at rear side.

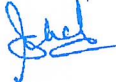
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- 9.9 The machine is provided with minimum cautionary notices as per IS:9020-2002 ad as recommended at Para 9.2 of chapter 7 of this report, for guidance as well as to ensure safety of feeder and other labourers.
- 9.10 An etched plate with following information should be provided on the machine
- Recommended lubricants and lubricating schedule.
 - Recommended speeds and settings of various systems.
 - Each thresher shall be marked with make; model; batch or code number, or serial No. if any; Power rating, Kw; and Revolutions per minute of the threshing drum and its directions of rotation.

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