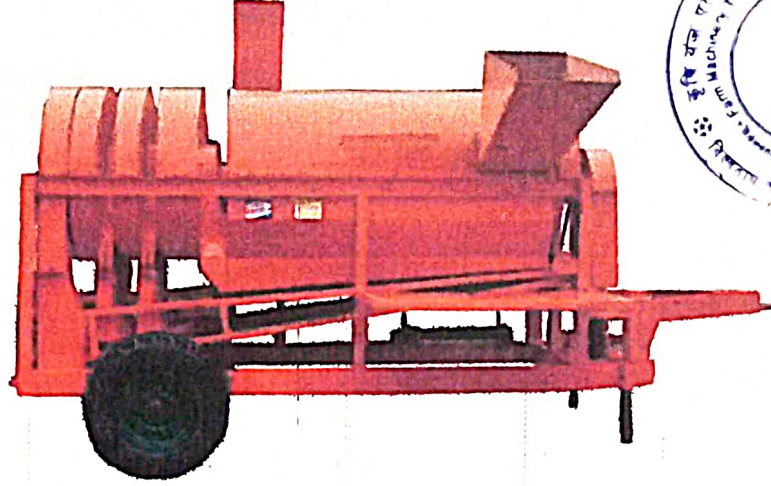




THIS TEST REPORT IS VALID UPTO 30/06/2028



**BKE, MULTI CROP THRESHER
MODEL: TOT-07**



भारत सरकार
GOVT OF INDIA

कृषि एवं किसान कल्याण मन्त्रालय

MINISTRY OF AGRICULTURE & FARMERS WELFARE

कृषि, सहकारिता एवं किसान कल्याण विभाग

DEPARTMENT OF AGRICULTURE, COOPERATION & FARMERS WELFARE

उत्तर पूर्वी क्षेत्र कृषि यंत्र प्रशिक्षण एवं परीक्षण संस्थान

NORTH EASTERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE

विश्वनाथ चारिआलि, जिला-विश्वनाथ (असम)

BISWANATH CHARIALI: BISWANATH: ASSAM, PIN - 784 176

[AN ISO 9001:2015 CERTIFIED INSTITUTION]

1. SCOPE OF TEST

The scope of test was to check and assess the following:

1.1 Laboratory Test:

- Checking of specification and other data furnished by the applicant.
- Checking of material, visual observation and provision for adjustment.

1.2 Field Test :

- Rate of work
- Quality of work
- Ease of operation and adjustments
- Labour requirement
- Defects, Breakdowns & Repairs.

2. METHOD OF SELECTION

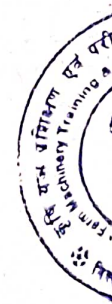
As per Govt. of India, OM No. 13-13/2020-M&T (I&P), dated 22.12.2020, the random selection was exempted. Hence, the machine was directly submitted by the applicant at this Institute for test.

3. TEST CODE AND PROCEDURE

- | | | | |
|------|--|---|---|
| i. | IS: 6284 – 1985
(Reaffirmed March, 2009) | : | Test Code for Power Thresher for Cereals |
| ii. | IS: 9020 – 2002
(Reaffirmed March, 2012) | : | Power Threshers – Safety Requirements |
| iii. | IS: 4931 - 1995
(Reaffirmed December, 1999) | : | Agricultural tractors - Rear Mounted PTO shaft (Types 1, 2 & 3) |

4. SPECIFICATIONS**4.1 General:**

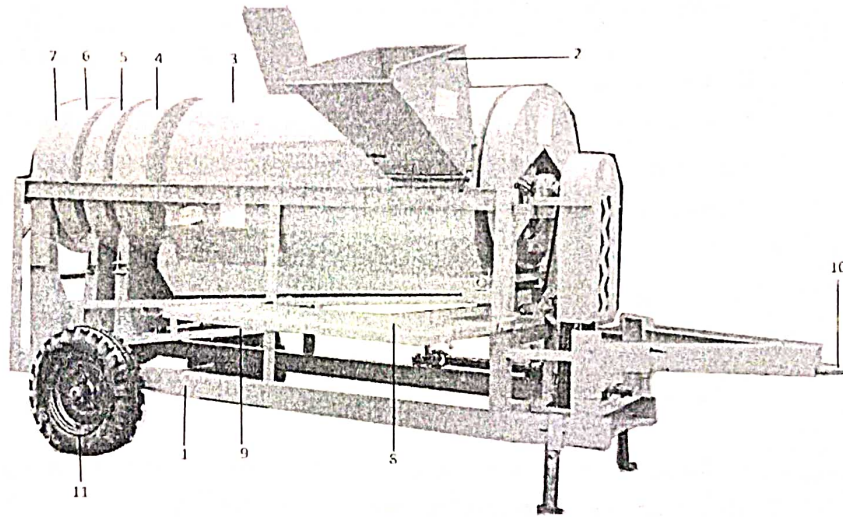
- | | | |
|--|---|---|
| Name and address of the manufacturer | : | B. K. Engineering Workshop, Kala Godown, Ward No. 08, Nagaon Road, Lanka, Dist: Hojai, Assam-782446 |
| Name & Address of Applicant | : | Jay Prakash Bajaj, Kala Godown, Ward No.08, Nagaon Road, Lanka, Dist: Hojai, Assam-782446 |
| Make | : | BKE |
| Model | : | TOT-07 |
| Type | : | Tractor operated, Axial Flow(Throw in) |
| Size of thresher, mm (threshing length × diameter of cylinder without spikes / at tip of spikes) | : | 1375 × 577φ / 815φ |
| Serial Number of machine | : | TOT BKE 22 |



Year of manufacture	: 2019
Country of origin	: India
Design Suitability	: Paddy & Mustard.
Type of prime mover	: Tractor P.T.O. operated
Recommended power source, kW	: 30-33 kW.

4.2 Prime Mover Used:

Tractor used for paddy	: Swaraj 744
Chassis No./ Engine no.	: MBNAV53ACLCK59203/DC.3009/SBK13150
Max. PTO Power, kW	: 30.1 kW
Tractor used for Mustard	: Sonalika DI-740 III
Chassis No./ Engine no.	: JZESU511728S3/3100ELI536507566F3
Max. PTO Power, kW	: 30 kW

4.3 Constructional Details (Refer Fig.1)

- | | |
|---------------------------------|---------------------|
| 1. Frame | 7 Sieve blower unit |
| 2. Feeding Chute | 8 Feeder's platform |
| 3. Threshing cylinder top cover | 9 Shaker unit |
| 4. Bhusa blower-1 unit | 10 Hitching hook |
| 5. Bhusa blower-2 unit | 11 Pneumatic wheel |
| 6. Bhusa blower-3 unit | |

Fig.1: SCHEMATIC VIEW OF BKE MULTI CROP THRESHER

6. PERFORMANCE TEST

The test trials were conducted in Paddy crop variety- Sona Masuri and Mustard crop variety- Maharaz M-27 to determine the input and output capacities of the machine. Assessment with regard to quality and rate of work, labour requirement and handling characteristics was made after best setting of machine. For each short-run test trial, three samples at regular intervals were taken for analysis. The detailed crop and machine parameters are given in **Annexure-I & III** and are summarized in the ensuing tables. Swaraj 744 used for Paddy and Sonalika DI-740 III used for Mustard as prime mover during the trials.

6.1 Crop Parameters:

S. No.	Parameter	Range	
		Paddy	Mustard
1	Name of crop	Paddy	Mustard
2	Variety of crop	Sona Masuri	Maharaz, M-27
3	Grain-crop ratio	0.700 to 0.785	0.34 to 0.45
4	Moisture content of grain (%)	12.0 to 13.4	4.3 to 6.9
5	Moisture content of straw (%)	11.0 to 13.0	11.0 to 11.5

6.2 Machine parameters

S. No.	Parameters	Range	
		Paddy	Mustard
1.	Prime mover P.T.O. speed (rpm):		
	- No-load	480 to 486	377 to 379
	- On-load	470 to 480	373 to 374
2.	Threshing cylinder speed (rpm):		
	- No-load	657 to 660	433 to 434
	- On-load	650 to 653	430 to 431
3.	Bhusa blower 1, 2 & 3 speed (rpm) :		
	- No-load	657 to 660	433 to 434
	- On-load	650 to 653	430 to 431
4.	Shaker Unit speed (rpm):		
	- No-load	359 to 369	227 to 228
	- On-load	353 to 361	225 to 226
5.	Concave clearance (mm) :	30 to 41	30 to 41

6.3 Power requirement at no-load

The machine was run for 1.0 hour with Swaraj 744 tractors to determine the no-load fuel consumption. The tractor P.T.O. speed during the No-load test was recorded as 485 rpm and the corresponding fuel consumption was recorded as 1.50 l/h.

6.4 Short run test

The detailed performance results are given in **Annexure-II & IV** and summarized in **Table-1 & Table -2** and graphically represented in **Fig. 6**.

SUMMARY OF PERFORMANCE RESULTS FOR PADDY

Table-1

Tests	Cylinder 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	Blown	Sieve	Cleaning	Threshing
A	Short Run Test										
	650 to 653	3333 to 4688	2281 to 3129	3.11 to 3.94	1072 to 1249	724 to 860	0.06 to 0.19	0.32 to 1.08	0.01 to 0.19	96.54 to 98.50	97.70 to 99.35
B	At optimum input capacity										
	652	3750	2588	3.50	1071	739	0.08	0.62	0.01	98.58	99.35
C	At 50% input capacity										
	652	1905	1429	3.45	552	414	0.04	0.47	0.02	98.69	99.40
D	At Varying Speed										
	(i) At 15% more than specified cylinder speed										
	749	4545	2970	4.85	937	612	0.62	1.75	0.12	97.58	98.14
(ii)	At 15% less than specified cylinder speed										
	553	3261	2355	3.15	1035	748	0.001	0.85	0.24	95.72	96.90

Table-2

SUMMARY OF PERFORMANCE RESULTS FOR MUSTARD

Tests	Cylinder 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	Blown	Sieve	Cleaning	Threshing
A	Short Run Test										
	430 to 431	604 to 811	159 to 198	1.28 to 1.60	399 to 582	113 to 155	0.00	0.46 to 1.15	0.82 to 2.46	97.43 to 98.91	99.89 to 99.99
	B At optimum input capacity										
430	638	187	1.60	399	117	0.00	0.64	0.72	98.84	99.98	
C	At 50% input capacity										
	430	378	96	1.56	242	62	00	0.65	0.86	98.71	99.98
D	At Varying Speed										
	(i) At 15% more than specified cylinder speed										
	494	789	233	1.32	598	177	0.00	2.13	1.48	98.67	99.95
(ii)	At 15% less than specified cylinder speed										
	370	484	130	1.13	428	115	0.00	0.40	0.70	97.42	99.90

For Paddy**6.4.1 Rate of work**

- The input rate of Paddy crop was recorded as 3333 to 4688 kg/h and the input capacity per liter fuel consumed was recorded as 1072 to 1249 kg/l.
- The grain output at main outlet was recorded as 2281 to 3129 kg/h and output capacity per liter fuel consumed was recorded as 724 to 860 kg/l.

6.4.2 Quality of work

- The percentage of broken grain was recorded as 0.06 to 0.19 %.
- The percentage of blown losses was recorded as 0.32 to 1.08 %.
- The percentage of sieve losses was recorded as 0.01 to 0.19 %.
- The threshing efficiency of the machine was recorded as 97.70 to 99.35 %.
- The cleaning efficiency of the machine was recorded as 96.54 to 98.50 %.



10. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS**10.1 Performance of the thresher:**

The detailed performance results of machine are given in **Annexure- II & IV** and are summarized in **Table-1 & 2**. The performance of machine is also represented graphically in **Fig. 6**. The performance of the machine at optimum capacity is summarized below.

PERFORMANCE AT OPTIMUM INPUT CAPACITY FOR PADDY

Crop	Optimum Capacity				Grain losses (%)			Efficiencies (%)	
	Input		Output		Broken	Blown	Spilled	Cleaning	Threshing
	Kg/h	Kg/l	Kg/h	Kg/l					
Paddy	3750	1071	2588	739	0.08	0.62	0.01	98.58	99.35

PERFORMANCE AT OPTIMUM INPUT CAPACITY FOR MUSTARD

Crop	Optimum Capacity				Grain losses (%)			Efficiencies (%)	
	Input		Output		Broken	Blown	Spilled	Cleaning	Threshing
	Kg/h	Kg/l	Kg/h	Kg/l					
Mustard	638	399	187	117	0.00	0.64	0.72	98.84	99.98

10.1.1 For Paddy**Rate of work**

The capacity of machine depends upon the skill of feeder. The optimum input capacity & grain output of the thresher were recorded as 3750 & 2588 kg/h respectively. Input & output capacity per liter fuel consumed was recorded as 1071 & 739 kg/l respectively.

10.1.2 Quality of work

- The percentage of broken grain was recorded as 0.08 %, which is normal.
- The percentage of blown grain was recorded as 0.62 %. This is considered normal.
- The percentage of sieve loss was recorded as 0.01 %.
- The threshing efficiency of the machine was recorded as 99.35 %, which is normal.
- The cleaning efficiency was recorded as 98.58 %,

10.1.3 Fuel consumption of prime mover during the no-load test of thresher was recorded as 1.50 l/h, whereas, fuel consumption of prime mover during the test at optimum input capacity was recorded as 3.50 l/h.

10.1.4 For Mustard**Rate of work**

The capacity of machine depends upon the skill of feeder. The optimum input capacity & grain output of the thresher were recorded as 638 & 187 kg/h respectively. Input & output capacity per liter fuel consumed was recorded as 399 & 117 kg/l respectively.

10.1.5 Quality of work

- The percentage of broken grain was recorded as 0.00 %, which is normal.
- The percentage of blown grain was recorded as 0.64 %. This is considered normal.
- The percentage of sieve loss was recorded as 0.72 %.
- The threshing efficiency of the machine was recorded as 99.98 %, which is normal.
- The cleaning efficiency was recorded as 98.84 %.

10.1.6 Fuel consumption

Fuel consumption of prime mover during the no-load test of thresher was recorded as 1.10 l/h, whereas, fuel consumption of prime mover during the test at optimum input capacity was recorded as 1.6 l/h.

10.2 The specification of feeding chute does not conform to the IS: 9020-2002 (Reaffirmed 2012). It should be provided as per the specification laid down in the said code.

10.3 The height of feeding chute from feeder's platform was measured as 1000 mm, which is considered as normal for feeder.

10.4 Provision was not made for adjusting concave clearance and sieve clearance This should be looked into for corrective action.

10.5 Due to high input capacity of the thresher and unsuitable location of feeding platform, difficulty was observed in continuous feeding of crop into the thresher at a uniform rate, which calls for modification in design of feeding chute or automatic feeding mechanism may be provided in future production.

10.6 Suitable guards/covers around the propeller shaft should be provided as per the requirement of IS: 9020-2002 (Reaffirmed 2012) to prevent accidental hazards.

10.7 Dimensions of PIC & PIC yoke of thresher does not conform to IS: 4931-1995 and it should be looked into for corrective action.

10.8 The machine was provided with minimum cautionary notices as per IS: 9020-2002 (Reaffirmed 2012).

10.9 Labeling of the Thresher

A labeling plate was provided on the thresher as per IS: 9020-2002 (Reaffirmed 2012),

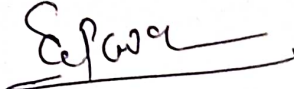
10.10 An engraved plate with the following information should be provided on the machine.

- Recommended lubricants and lubricating schedule.
- Recommended speeds and settings of various systems
- Recommended tyre inflation pressure

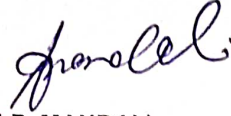
The same parameters may also be incorporated in the operator-cum-service manual.

10.11 Adequacy of literature:

Operator cum Service Manual & Parts Catalogue was provided along with the machine during the course of testing. It is further recommended to bring out these manuals in Hindi and other vernacular languages as per IS: 8132-1999.

TESTING AUTHORITY


(S.G. PAWAR)
AGRICULTURAL ENGINEER



(J.P. MANDAL)
SENIOR AGRICULTURAL
ENGINEER



(K.K. NAGLE)
DIRECTOR

Draft test report compiled by -

Shri Khagendra Bora,
Sr. Technical Assistant

11. APPLICANT'S COMMENTS

Para No	Our Reference	Applicants Comments
11.1	10.2	We will look into the necessary corrective action for the future production towards specification of the feeding chute as per IS: 9020-2000(Reaffirmed 2012).
11.2	10.6	We will look into the necessary corrective action for the future production towards providing safety guards/covers as per requirement of IS: 9020-2000(Reaffirmed 2012).
11.3	10.7	Necessary action will be taken to make corrective regarding the Dimension of PIC & PIC yoke of the thresher as per IS: 4931-1995.
11.4	10.11	Operator cum Service Manual & Parts Catalogue will be provided in bilingual form consisting the local language for the future production as per IS: 8132-1999.