



Shiwani, DMR-6'1, Mini Rice Mill (Tractor-operated)



भारत सरकार
GOVT OF INDIA

कृषि एवं किसान कल्याण मन्त्रालय

MINISTRY OF AGRICULTURE & FARMERS WELFARE

कृषि, सहकारिता एवं किसान कल्याण विभाग

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1. SCOPE OF TEST



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

- Checking of specifications and other data furnished by the applicant.
- Checking of material, visual observation and provision for adjustment.
- Rate and quality of work.
- Labour requirement and power consumption.
- Ease of operation and adjustment.
- Safety provision.
- Wear of critical components.
- Defects, Breakdowns & Repair.

2. METHOD OF SELECTION

The machine was directly submitted for test by the applicant at this Institute. Hence, the method of selection is not known.

3. TEST CODE AND PROCEDURE

The following codes were referred for testing of Mini Rice Mill.

- i) IS 12792:1989 (Reaffirmed 2010) : Agricultural Produce Milling Machinery – Mini Rice Mill - Specification
- ii) IS 8427:1989 (Reaffirmed 2005) : Agricultural Produce Milling Machinery – Rubber Roll for Paddy Dehusker – Specification
- iii) IS 9555:1999 (Reaffirmed 2010) : Rice Polisher – Specification
- iv) IS 9049:1989 (Reaffirmed 2010) : Agricultural Produce Milling Machinery – Paddy Dehusker, Rubber Roll Type – Test Code
- v) IS: 4931: 1995 (Reaffirmed 2009) : Agricultural tractors - Rear Mounted PTO Type 1, 2, 3

4. SPECIFICATION

4.1 General :

- Name and address of the manufacturer : **M/s. Shiwani Enterprises,**
Nahar Chowk, Koriyatola,
Infront of Bus Stand, Raxaul,
Raxaul East Champaran Bihar-845305
- Name & Address of Applicant : **M/s. Shiwani Enterprises,**
Nahar Chowk, Koriyatola,
Infront of Bus Stand, Raxaul,
Raxaul East Champaran Bihar-845305
- Type : Rubber Roll Type Dehusker with Abrasive
Horizontal Polisher, Tractor PTO operated



Make	:	Shiwani	
Model	:	DMR-6"1 (as per labeling plate)	
Year of manufacture	:	2015	
Chassis Serial Number of machine	:	001	
Dehusker Serial Number	:	001	
Polisher Serial Number	:	001	
Country of origin	:	India	
Rated capacity (kg/h)	:	As specified	As observed
Dehusker	:	1000 kg/h (Paddy)	1368 kg/h (Paddy)
Polisher	:	600 kg/h (Brown Rice)	575 kg/h (Brown Rice)
Power Source as recommended	:	35 HP Tractor/20 HP Electric Motor/ 22 HP Stationary Diesel Engine	
Power source used during the test	:	Swaraj 855 FE Tractor (Refer Annexure - V)	

4.2 Details of the Mini Rice Mill :

The Mini Rice Mill consists of a Dehusking & a Polishing unit, which are mounted on a trailer. The dehusking unit mainly consists of feed hopper, rubber rolls, blower, main outlet, husk outlet etc. Whereas, the polishing unit consists of feed hopper, abrasive stone polisher with metallic screens, blower, rice outlet and bran outlet, etc. Both the units get power directly from the Tractor PTO through V-belts and pulleys. Feeding is done manually in the feed hopper of both the dehusker and the polisher.

4.3 Constructional Details:

4.3.1 Chassis (Main Frame)

: Main frame is fabricated of MS Channels, MS angles, and MS sheet. An axle made of MS Square bar of size 1500×48×48 mm is fitted beneath the main frame. Two pneumatic wheels are attached at both the ends of the axle to form a trailer. A drawbar hitching hook made of MS rod of dia. 27.6 ϕ mm is provided at the front end of the trailer for hitching with tractor. The dehusker is fitted at the rear end, whereas the polisher is mounted at the front end of the trailer.

Dimension of main frame (mm)

- Length	:	2790
- Width	:	910

Height of hitch point from ground level : 660 (mm)

Provision for height adjustment : Not provided

4.3.1.1 Wheels :

Type	:	Pneumatic
Make	:	MADI STONE

1	2	3	4
10	Marking and Packing :		
10.1	Marking: Each Polisher shall be marked with the following particulars:		
	a) Manufacturer's name and his recognized trade-mark, if any;	Manufacturer's Name : M/s Shivani Enterprises, Trade mark : Provided	Conforms
	b) Batch or code number;	S. No. : 001	Conforms
	c) Power rating and capacity;	H.P. : 20, Capacity : 600 kg	Conforms
	d) Type;	Not provided	Does not conform
	e) Model No.;	Model : EMRY	Conforms
	f) Year of manufacturing; and	Not provided	Does not conform
	g) Direction of rotating parts and rated speed.	Not provided	Does not conform
10.1.1	A minimum cautionary notice worded as follows shall be written in vernacular language legibly and prominently on the main body of the polisher:		
	a) DO NOT WEAR LOOSE DRESS, BANGLES, WATCH, ETC, WHILE WORKING;	Not provided	Does not conform
	b) DO NOT WORK UNDER THE INFLUENCE OF INTOXICANTS LIKE LIQUOR, OPIUM, ETC;		
	c) CHILDREN AND AGED PERSONS SHOULD BE DISCOURAGED FOR WORKING ON POLISHER;		
	d) DO NOT CROSS OVER MOVING BELTS;		
	e) DO NOT OPERATE POLISHER WITHOUT GUARDS AND SAFETY DEVICES;		
	f) DO NOT MAKE ADJUSTMENT WHEN POLISHER IS WORKING; AND		
	g) DO NOT PUT OR TAKE-OFF BELT WHILE PULLEY IS RUNNING.		

9. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS

Performance of the Mini Rice Mill:

9.1 Summary of Performance of Paddy Dehusker at rated input capacity:

The detailed performance results of machine are given in **Annexure- II** and are summarized in **Table-3**. The performance of the machine at rated input capacity is summarized below.

Feed rate	Fuel consumption	Output	Capacity		Specific fuel consumption	Shelling efficiency	Losses in main outlet			Blown losses		
			Input	output			Broken	Unshelled	Husk	Whole	Broken	Unshelled
(kg/h)	(l/h)	(Kg/h)	(Kg/l)		(l/t)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
1368	2.2	1118	621.8	508.2	1.6	98.2	5.9	1.4	0	0.4	2.8	0.2

9.1.1 Rate of work:

- Rated input capacity was recorded as 1368 kg/h against the declaration of 1000 kg/h, which is in the higher range as per the specified limit of Indian Standard.
- The output capacity was recorded as 1118 kg/h at rated input capacity of the dehusker.
- The input & output capacity per unit of fuel consumption of the dehusker were recorded as 621.8 Kg/l and 508.2 Kg/l respectively.

9.1.2 Quality of work

- Percentage of broken rice was recorded as 5.9 %, which does not meet the specified maximum limit of 5.0% as per IS: 12792. This should be looked into.
- The cleaning efficiency of husk aspirator was recorded as 100 % against the minimum requirement of 95% as per IS: 12792 and meets the requirement.
- The percentage of blown rice & broken rice were recorded as 0.4 & 2.8 % respectively, against the minimum requirement of zero per cent as per IS: 12792 and does not meet the requirement. This should be called for introduction of corrective measures.
- Shelling efficiency at rated input capacity was found as **98.2 %** against the requirement of **85%** in case of raw paddy, which meets the requirement.

9.1.3 Fuel Consumption:

- Fuel consumption at rated input capacity was observed as 2.2 and 1.8 l/h for first and second pass respectively.
- The specific fuel consumption at rated input capacity was calculated as 1.6 and 0.8 l/t for first and second passes respectively.

9.1.4 Labour Requirement:

One semi-skilled labour is required to feed the paddy into the hopper. Additionally, one labour is required for raw paddy handling and one for brown rice handling. The same numbers of labours are required for polisher operation..

9.2 Summary of Performance of polisher at rated input capacity:

The detailed performance results of machine are given in **Annexure- IV** and are summarized in **Table-4**. The performance of the machine at rated input capacity is summarized below.

Feed rate (kg/h)	Fuel consumption (l/h)	Output (Kg/h)	Capacity (Kg/l)		Specific fuel consumption (l/t)		Broken at rice outlet (%)	Degree of Polish (%)	Losses in bran outlet (%)	
			Input	output	For Brown Rice	For Paddy			Polished rice	Broken rice
575	3.6	485	159.7	134.7	6.3	4.3	9.5	13.6	Nil	12.8

9.2.1 Rate of work:

- Rated input capacity was recorded as 575 kg/h of brown rice against the declaration of 600 kg/h, which is within the specified limit of Indian Standard.
- Output capacity was recorded as 485 kg/h at rated input capacity.
- The input capacity per unit of fuel consumption of the polisher was recorded as 159.7 Kg/l.

10. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's Comments
10.1	9.9.1	a. Feed rate will be declared as 1350 kg/h on the labelling plate of dehusker in commercial production.
10.2	9.1.2	a. Percentage of broken rice will be reduced in commercial production. c. Percentages of blown and broken will be reduced in commercial production.
10.3	9.2.2	a. & b. Percentage of losses at bran outlet will be reduced and degree of polish will be kept in limit as per recommendation.
10.4	9.2.4	b. Elevator unit will be provided to reduce manpower requirement.
10.5	9.5	Inspection window will be provided on feed hoppers of both the machines.
10.6	9.6	Suitable transmission guards will be provided.
10.7	9.7	The rubber roll size will be declared, which is DMR-6"
10.8	9.9	Minimum cautionary notices will be written in vernacular languages.
10.9	9.10	Name of the manufacturer on the labelling plates will be corrected as SHIWANI ENTERPRISES.
10.10	9.11	Necessary modification will be done for hitching with all tractors.
10.11	9.12	Position of Bran outlet will be modified.
10.12	9.13	Sufficient information will be provided on labelling plate as per the recommendation.