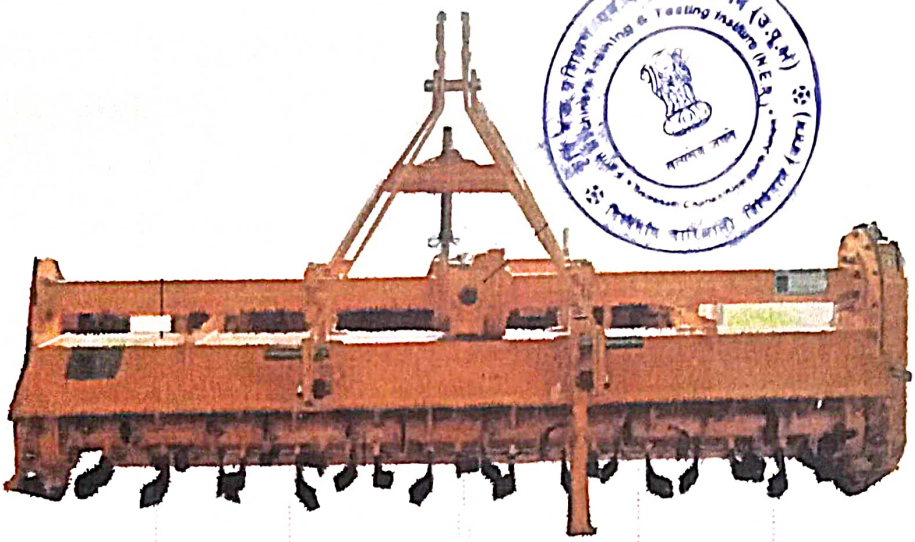
व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)

संख्या/No.: Imp. 5/403
माह / Month: July 2021

THIS TEST REPORT IS VALID UPTO 31.07.2028



SWAN AGRO ROTO PUDDLER, MODEL: NSML RP215
SINGLE SPEED, CHAIN DRIVE, CENTRALLY MOUNTED

सत्यमेव जयते
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]

Website: http://nerfmtti.nic.in
Ph. No. 03715-222094
Fax No: 03715-230358
E-Mail: fmti-ner@nic.in

1.SCOPE OF TEST

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

1.1 Laboratory Test:

a) Checking of specifications
b) Hardness of soil engaging parts/blades of Roto Puddler
c) Chemical analysis of critical components/blades of Roto Puddler
d) Wear analysis of critical components/blades of Roto Puddler

1.2 Field Test :

a) Rate of work
b) Quality of work
c) Ease of operation and adjustments
d) Labour requirement
e) Defects, Breakdowns & Repairs

2. METHOD OF SELECTION

As per Govt. of India, OM No. 13-13/2020-M&T (I&P), dated 24.04.2020, the random selection was exempted. Hence, the machine was directly submitted by the applicant at this Institute for test.

3. TEST PROCEDURE

IS: 6690-1981(Reaffirmed in 2012)	:	Specifications of blades for rotavator for power tillers
IS: 4931 – 1995 (Reaffirmed in December 1999)	:	Agricultural Tractors-Rear Mounted PTO Shaft (Types 1, 2 & 3)
IS: 4468 – 1997 (Reaffirmed in 2012)	:	Agricultural Wheeled Tractors- Rear Mounted Three Point Linkage.
IS: 11531 – 1985 (Reaffirmed in 2001)	:	Test Code for Puddler

4. SPECIFICATIONS

4.1 General:

Name and address of the manufacturer	:	**M/S NEW SWAN MULTITECH LTD.** Vill. Raian, P.O. Heeran, Kohara-Machiwara Road, Ludhiana, Punjab Pin – 141 112
Name & Address of Applicant	:	**M/S NEW SWAN MULTITECH LTD.** Vill. Raian, P.O. Heeran, Kohara-Machiwara Road, Ludhiana, Punjab Pin – 141 112
Name of machine	:	Roto Puddler
Type	:	Single Speed, Chain Drive, Centrally Mounted,
Make	:	Swan Agro
Model	:	NSML RP215
Year of manufacture	:	5 M2020
Serial Number	:	195
Recommended power source, kW (apa)	:	28

Type of blade	:	Hatchet (J-Shaped)
Size (cm) {Rotor Dia.× Working width}	:	39.4 x 213.0

4.2 Prime Mover Used:

Tractor	:	Mahindra & Mahindra DI 475 MKM
Chassis No./ Engine no.	:	MBNAAAJAAKRL03140/RKL2KAA0191
Max. PTO Power, kW	:	27.9

4.3 Constructional Details (Refer Fig.1) :

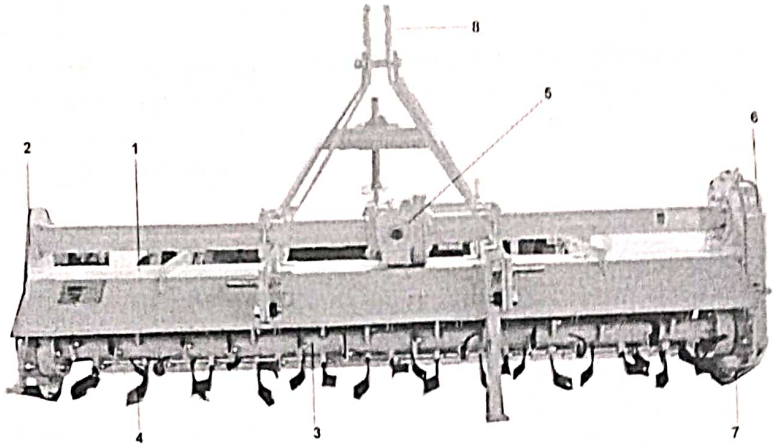


Fig.1: ROTO PUDDLER

KEYWORDS:

1. Mainframe
2. Side plate
3. Rotor shaft
4. Rotor blade
5. Primary reduction gear box
6. Secondary reduction gear box
7. Skid
8. Hitch pyramid

4.3.1 Main Frame:

Type	:	Fabricated from MS sheet & M.S Plate.
Size of MS plate, (mm)	:	2250 x 603 (curved) x 3.25
Size of supporting flat, (mm) {R.H.S and L.H.S}	:	476 x 159 x 6.94 & 476 x 157 x 6.33

4.3.2 Side plates:

Type	:	MS Sheet	
Thickness of plate, (mm)	:	R.H.S. 6.21	L.H.S. 6.55
Size of bolt:			
- Length & Dia. (mm)	:	47.34 & 11.40Φ	
Method of fixing	:	Both LHS and RHS plates are bolted to the main frame with LHS- 04 Nos. & RHS- 04 Nos of bolts & nuts.	

4.3.3 Trailing board:

Type	:	Hinged
Material	:	MS sheet
Size of board, (mm)	:	2245 x 192 (curved)

6. RUNNING –IN

Running-in was not recommended by the applicant. However, the Roto puddler was run-in for 1.0 hour before the actual test. All the fasteners were checked and tightened thereafter.

7. FIELD PERFORMANCE TEST

The field tests of the implement wet land operation were conducted for 20.92 hours, respectively to assess the performance of the implement. The performance of implement is reported in **Annexure-I** of wet land operations, The tractor was operated at standard PTO speed (540±10) and observations are summarized in the following table.

Summary of Field Performance Test

S. No.	Parameters/operations	Wet land operation (Puddling)
1	Gear Used	L-1
2	Engine speed (rpm)	
	- No load	1760 to 1773
	- On load	1750 to 1757
3	Type of soil	Light
4	Depth of standing water (cm)	10.53 to 12.87
5	Speed of operation (kmph)	2.52 to 2.80
6	Travel reduction (%)	1.68 to 2.69
7	Depth of puddle (cm)	15.8 to 17.4
8	Area puddle (ha/h)	0.3895 to 0.4360
9	Time required for one ha (h)	2.29 to 2.57
10	Puddling Index (%)	75.0 to 80.0
11	Fuel consumption	
	- l/h	3.84 to 4.55

7.1 Wet land operation :

The tractor was operated without cage wheel for puddling operation of Roto Puddler.

7.1.1 Quality of work :

(a) The depth of puddle was recorded as 15.8 to 17.4 cm.

(b) The puddling index was recorded as 75.0 to 80.0 %.

7.2 Effectiveness of sealing for wet land operation:

After completion of field test in wet land, the implement was dismantled for checking the effectiveness of sealing provided against ingress of mud and/or water in various sub-assemblies/components. The observations are given in ensuing table:

Sl. No.	Location	Whether ingress of mud and/or water was observed (Yes/No)
1	Primary reduction gear box	No
2	Secondary reduction gear box	No
3	Rotor axle bearing cap	No

7.3 Labour requirement :

One skilled operator is needed to operate the tractor with the implement.

7.4 Adequacy of power of prime mover as used during test :

The power of the prime mover as used during test was found adequate.

7.6 Wear analysis :

7.6.1 On mass basis :

Wear analysis on mass basis was done after 21.92 hours (running-in & wet land operation) and the results are as shown below,

Sl. No.	Initial Mass (g)	Final Mass (g)	Percentage of Wear	
			After 21.92 hours	Per Hour
1	405.5	400.0	1.36	0.06
2	412.0	408.5	0.85	0.04
3	406.0	402.5	0.86	0.04
4	410.5	406.0	1.10	0.05
5	402.5	398.0	1.12	0.05
6	410.5	406.5	0.97	0.04
7	400.0	394.5	1.38	0.06
8	405.0	401.0	0.99	0.05
9	404.5	399.5	1.24	0.06
10	403.0	397.5	1.66	0.06

The hourly rate of wear of blade on mass basis after wet land operations was recorded as 0.04 to 0.06%

8. EASE OF OPERATION & ADJUSTMENTS

The operator can easily adjust and control the implement from operator's seat in the field as the adjustments are within the easy reach of operator. However the operator has to get down from the tractor in order to raise/lower the depth adjusting skids. No noticeable difficulty was observed during the operation and adjustment of Roto Puddler.

9. DEFECTS, BREAKDOWNS AND REPAIRS

No breakdown was occurred during 21.92 hours of field performance test (Running-in and wet land operation)

10. COMMENTS AND RECOMMENDATIONS

10.1 Dimensions of Three point linkage of implement do not conform to IS: 4468-1997 (Part-1) and it should be looked into for corrective action

10.2 Dimensions of PIC of implement do not conform to IS: 4931-1995 and it should be looked into for corrective action.

10.3 The type mentioned on the labeling plate of machine gear drive but actual machine is chain drive. It should be looked into for corrective action.

10.4 Chemical composition of rotor blades does not conform to IS: 6690-2002. The percentage of Silicon content in composition of roto puddler blade material was recorded as 0.210. The Silicon content was on lower side when compared with the relevant Indian Standard. Moreover, the hardness of Shank portion of roto puddler blades also does not conform to relevant Indian Standard. It is therefore, recommended that the material of roto puddler blade should be improved and shall be provided as per requirement of Indian Standard.

10.5 Adequacy of literature:

Operator cum Service Manual & Parts Catalogue was not provided along with the machine during the course of testing. Please provide service manual and parts catalogue 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	10.1	We will look into this for corrective action in further production.
11.2	10.2	We will look into this for corrective action in further production.
11.3	10.3	It is a clerical mistake. We will look into this for corrective action in further production.
11.4	10.4	We use the material Boron steel (27MnCrB5) for rotor blade manufacturing for better life of blade that's why the chemical composition of blade does not conforms to IS:6690:2002