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

स्वच्छ भारत
एक कदम स्वच्छता की ओर

संख्या/No.: ICE/NERFMTTI, B. Chariali/ 10/10/549
माह / Month: October 2025

THIS TEST REPORT IS VALID UPTO 31.10.2032

कृषि यंत्र प्रशिक्षण एवं परीक्षण संस्थान (उत्तर पूर्वी क्षेत्र)
Farm Machinery Training & Testing Institute (NERZ)
बिश्वनाथ चारिआलि,बिश्वनाथ(असम)
Biswanath Chariali,Biswanath(Assam)

GREAVES COTTON LTD, GSW 700, POWER WEEDER

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
कृषि एवं किसान कल्याण मंत्रालय
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
कृषि एवं किसान कल्याण विभाग
DEPARTMENT OF AGRICULTURE AND FARMERS WELFARE
उत्तर पूर्वी क्षेत्र कृषि यंत्र प्रशिक्षण एवं परीक्षण संस्थान
NORTH EASTERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE
बिश्वनाथ चारिआलि, जिला - बिश्वनाथ(असम)
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[AN ISO 9001:2015 CERTIFIED INSTITUTION]

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4. SPECIFICATIONS

4.1 General:

Make	:	GREAVES COTTON LTD
Model	:	GSW 700
Name and address of manufacturer	:	CHONGQING SHINERAY AGRICULTURAL MACHINERY CO. LTD., No. 8. Shineray Road, Hangu Town, Jiulongpo District, Chongqing, CHINA - 401329
Name and address of applicant	:	GREAVES COTTON LTD., F-62 & F-63, SIPCOT Industrial Complex, Gummidipoondi, Tiruvallur District, Tamil Nadu - 601201
Name of machine	:	Power weeder
Type of machine	:	Self propelled, Walk behind
Working size of machine (mm)	:	1050
Year of manufacture	:	2025
Serial no. of machine	:	2501402979

4.2 Details of prime mover:

Make	:	CHONGQING SHINERAY AGRICULTURAL MACHINERY CO. LTD., **CHINA**
Model	:	GS212-1
Type	:	Four stroke, single cylinder, air cooled, spark ignition engine
Year of manufacture	:	2025
Serial number	:	GS212-12501124085
Country of origin	:	**CHINA**
Recommended high idle speed (rpm)	:	3780
Recommended low idle speed (rpm)	:	1440
Recommended rated speed (rpm)	:	3600
Rated power observed (kW)	:	**3.32**
Rated power declared (apa) (kW)	:	5.00

11.2 Chemical composition of rotor blades:

Constituents	As per IS 6690:1981 (Reaffirmed 2022)		Composition as observed (% by weight)	Remarks
	Carbon Steel (%)	Silicon Manganese Steel (%)		
Carbon (C)	0.70 -0.85	0.50-0.60	0.723	Conforms
Silicon (Si)	0.10 -0.40	1.50-2.00	0.249	Conforms
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.294	**Does not conform**
Sulphur (S)	0.05(max)	0.05(max)	0.010	Conforms
Phosphorous (P)	0.05(max)	0.05(max)	0.012	Conforms

12. FIELD PERFORMANCE TEST

The field tests were conducted for total 26.55 hours of field operation for testing the said Power Weeder. The field tests were conducted at rated speed of 3600 rpm. The detailed test results are represented in the Annexure and summarized in the ensuing Table:

Sr. No.	Parameters		Observations
1	Type of soil	:	Light
2	Soil moisture (%)	:	7.8 to 11.2
3	Bulk density of soil (g/cc)	:	1.66 to 1.93
4	Forward speed of operation (kmph)	:	0.68 to 0.99
5	Depth of cut (cm)	:	6.4 to 7.4
6	Width of cut (m)	:	1.02 to 1.08
7	Area covered (ha/h)	:	0.057 to 0.085
8	Time required for one ha (h)	:	11.83 to 17.51
9	Field efficiency (%)	:	79.97 to 86.34
10	Weeding efficiency (%)	:	78.90 to 83.30
11	Fuel consumption		
	l/h	:	0.90 to 1.10
	l/ha	:	11.97 to 19.26

12.1 Rate of work

- Rate of work was recorded as 0.057 to 0.085 ha/h and the forward speed of operation varied from 0.68 to 0.99 kmph.
- Time required to cover one hectare was recorded as 11.83 to 17.51 h.

12.2 Quality of work:

- Depth of cut was recorded as 6.4 to 7.4 cm.
- Working width was observed as 1.02 to 1.08 m.
- Field efficiency was found as 79.97 to 86.34 %.
- Weeding efficiency was recorded as 78.90 to 83.30 %.

12.3 Adequacy of power of prime mover:

The power of prime mover was found adequate.

12.4 Wear Analysis of rotor blades:

Sr. No.	Initial mass (g)	Final mass (g)	Loss of mass (g)	Percentage wear of rotor blades	
				After 26.55 h	Per hour
R-1	271.79	262.39	9.40	3.46	0.13
R-2	272.24	264.95	7.29	2.68	0.10
R-3	268.02	260.72	7.30	2.72	0.10
L-1	275.33	268.36	6.97	2.53	0.09
L-2	278.48	270.02	8.46	3.04	0.11
L-3	271.00	263.74	7.26	2.68	0.10

The hourly rate of wear of blade on mass basis after field operations was recorded as 0.10 to 0.13 %.

13. EASE OF OPERATION AND ADJUSTMENTS

Machine maneuverability while taking turns during field operation was not comfortable.

14. DEFECTS, BREAKDOWNS AND REPAIRS

No defect or breakdown was observed during test.

15. COMPONENTS / ASSEMBLY INSPECTION AND ASSESSMENT OF WEAR

15.1 Engine:

The Engine and other assemblies were dismantled after 42.3 hours of operation.

15.1.1 Cylinder:

Cylinder	Cylinder bore dia (mm)						Max. Permissible wear limit (mm)
	Top position		Middle positon		Bottom position		
	Thrust side	Non Th rust side	Thrust side	Non Thrust side	Thrust side	Non Thrust side	
1	70.03	70.02	70.03	70.02	70.03	70.02	70.035

15.1.2 Piston:

Piston dia., mm				Max. Permissible wear limit at skirt (mm)	Clearance between piston & cylinder liner at the skirt of the piston, mm	
Top (above top compression ring)		At skirt				
Thrust side	Non-thrust side	Thrust side	Non-thrust side		As observed	Max. permissible limit, (mm)
69.50	69.51	69.95	*	69.85	0.08	0.30

*Not recorded due to piston design constraints.

15.1.3 Ring side clearance:

Piston Rings	Ring Side clearance (mm)	Max. Permissible wear limit (mm)
1st Compression ring	0.05	0.10
2nd compression ring	0.03	0.08
Oil ring	*	NA

*Not recorded due to ring design constraints.

15.1.4 Ring end gap clearance:

Ring No.	Ring End gap (mm)			Max. Permissible wear limit (mm)
	At top	At middle	At bottom	
1st Compression ring	0.40	0.40	0.40	0.50
2nd compression ring	0.30	0.30	0.30	0.50
Oil ring	NA	NA	NA	0.50

15.1.5 Big end bearing:

Bearing no.	Dia of bearing (mm)	Dia of Crank pin (mm)	Clearance (mm)		Max. Permmissible wear limit (mm)	
			Diametrical	Axial	Diametrical	Axial
1	29.20	29.09	0.17	NA	0.30	0.038

15.1.6 Main bearing: Two Nos. of ball bearing 6205 were used.

Bearing No.	Diametrical clearance (mm)	Crankshaft end float (mm)	Max. permissible clearance limit(mm)	
			Diametrical clearance	Crankshaft end float
1.	Ball bearing	0.10	NA	0.20
2.	Ball bearing			

15.1.7 Valve guide clearance:

Valve guide diameter (mm)		Valve stem diameter (mm)		Valve guide clearance (mm)		Max. Permissible wear limit (mm)	
Inlet	Exhaust	Inlet	Exhaust	Inlet	Exhaust	Inlet	Exhaust
5.49	5.46	5.47	5.44	0.02	0.02	0.02	0.02

Valve, guide and timing gear:-

Any marked sign of overheating of valves : None

Pitting of seat/faces of valves : None

Any visual damage of teeth of timing gears : None

Condition of ignition coil & magneto : Normal

15.2 Clutch: No noticeable defects observed.

15.3 Transmission gears: No noticeable defects observed.

15.4 Rotary drive unit: The rotary drive unit was dismantled and all the components were found in normal condition.

16. CRITICAL TECHNICAL SPECIFICATIONS
(Vide Ministry's letter No. 13-9/2019-(M&T) (I&P)-Part dated 26.04.2019)

Sr. No.	Parameters	Specifications	Observation	Remarks
1	2	3	4	5
1.	Type	Self-propelled, walk behind	Self-propelled, walk behind	Conforms
2.	Working width (mm)	300 –1500	1050	Conforms
3.	Type of engine	Compression ignition / Spark ignition	Spark ignition	Conforms
4.	Starting method	Manual / recoil /self-starting	Recoil starting	Conforms
5.	Type of clutch	Dry / Wet	Wet	Conforms
6.	Type of primary gear box	Sliding / constant mesh or combination of both	Sliding mesh	Conforms
7.	Type of secondary gear box	Gear type	Gear type	Conforms
8.	Material for rotor shaft	SAE1045 (CRS) / EN8 / EN9	High carbon steel (apa)	**Does not conform**
9.	No. of flanges	4 - 10	6	Conforms

1	2	3	4	5
10.	Type of flanges	Square / circular/ rectangular	Square	Conforms
11.	Distance between consecutive flanges (mm)	80 to 150	150	Conforms
12.	No. of blades in each flange	3 - 6	4	Conforms
13.	No. of rotor blade	12 (Min.)	24	Conforms
14.	Thickness of rotor blade (mm)	5 (min.)	5.02	Conforms
15.	Material of blade	Boron (28Mn Cr B5) / High Carbon Steel EN42j	High Carbon Steel	Conforms
16.	Hardness of Blade, HRC	38 (Min.)	33	**Does not conform**
17.	Shape of rotor blade	C / J shape	J shape	Conforms
18.	Provision for handle height adjustment	Must be provided	Provided	Conforms
19.	Provision for handle rotation	Must be provided	Not Provided	**Does not conform**
20.	Provision for emergency stop of engine	Must be provided	Provided	Conforms
21.	Provision for easy start of engine	Must be provided	Provided	Conforms
22.	Provision for shield/cover to prevent flying of mud & stone from rotor	Must be provided	Provided	Conforms
23.	Depth control mechanism	Must be provided	Provided	Conforms
24.	Provision for transport wheels	Must be provided	Provided	Conforms
25.	Provision for cover on exhaust	Must be provided	Provided	Conforms
26.	Direction of exhaust emission away from operator	Must be provided	Provided	Conforms
27.	Marking / labeling of machine	The labeling plate should be riveted on the body of machine having Name and address of manufacturer & Applicant, Country of origin, Make, Model, Year of manufacture, Serial number, Engine number, Engine HP, rated rpm & SFC.	Name and address of manufacturer and Country of origin were not provided.	**Does not conform**

1	2	3	4	5
28.	Literature	Operator manual, Service manual and Parts catalogue should be provided.	Provided	Conforms

17. COMMENTS AND RECOMMENDATIONS

17.1 The average rated power in rating test of engine was observed as 3.32 kW against declared value of 5.00 kW by the applicant/manufacturer. This should be looked into for corrective action.

17.2 The specific fuel consumption (SFC) in rating test of engine was observed as 490 g/kWh against declared value of 395 g/kWh by the applicant/manufacturer which exceeded by more than 5 percent of that declared by the manufacturer and hence does not fulfill the requirement of IS 7347-1974 (Amended 2021). This should be looked into for corrective action.

17.3 Name and address of manufacturer and Country of origin were not provided on the labeling plate of the machine. This should be looked into for corrective action.

17.4 The engine was not marked with manufacturer name or trade-mark, rated power and rated speed which does not fulfill the requirement of IS 7347-1974 (Amended 2021). This may be looked into.

17.5 Machine maneuverability while taking turns during field operation was not comfortable. It shall be looked into for ease of operation for the operator.

17.6 The hardness and chemical composition of rotary blades do not conform to the requirement of IS 6690:1981 (Reaffirmed 2022). This may be looked into for corrective action.

17.7 The amplitude of mechanical vibration marked as (*) is on drastically higher side and is directly concerned with operator's health, safety and comfort. Besides, it is also adversely affect the useful life of machine components. In view of above, this deserves to be given top priority for corrective action.

17.8 Noise at operator's ear level was observed on higher side against warning limit of 85 dB(A) as specified by the International Labour Organization (ILO) for continuous exposure of 8 hours per day. This calls for reduction in noise level to improve the operator's comfort and safety.

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17.9 Adequacy of Literature:

The following literature in English language was provided for reference during testing:

- Operator's/ Service manual
- Parts catalogue

It is recommended to bring out the manual in Hindi and other vernacular languages as per IS: 8132-2023.

TESTING AUTHORITY

(M.R. PATIL)
SENIOR AGRICULTURAL ENGINEER

(P. KAMALABAI)
DIRECTOR

Draft test report compiled by - **Sh. D. Deori, Technical Assistant**

18. APPLICANT'S COMMENTS

We will take necessary action as per comments and recommendations in the test report for improvement in future production.

ANNEXURE

FIELD PERFORMANCE RESULTS

Place of Test: NERFMTTI Farm, Biswanath Chariali, Biswanath, Assam

Sr. No.	Parameters	I	II	III	IV
1	Date of test	24.09.2025	25.09.2025	26.09.2025	29.09.2025
2	Net test duration (h)	6.83	6.92	6.00	6.80
3	Field length (m)	25.5	27.8	25.8	26.2
4	Type of soil	Light			
5	Bulk density (g/cc)	1.93	1.66	1.82	1.72
6	Soil moisture (%)	9.5	7.8	8.2	11.2
7	Previous treatment	Nil			
8	Forward speed (kmph)	0.68	0.99	0.87	0.82
9	Av. depth of cut (cm)	7.0	7.4	6.4	7.1
10	Av. width of cut (m)	1.05	1.06	1.02	1.08
11	Area covered (ha/h)	0.057	0.085	0.075	0.077
12	Time required for one ha (h)	17.51	11.83	13.37	13.07
13	Field efficiency (%)	79.97	80.60	84.30	86.34
14	Av. height of weeds (cm)	14.8	14.4	12.2	18.8
15	Av. number of weeds per m^2 (before operation)	109	90	140	108
16	Av. number of weeds per m^2 (after operation)	23	15	26	19
17	Weeding efficiency (%)	78.90	83.30	81.40	82.41
18	Fuel Consumption				
	l/h	1.10	1.01	0.90	1.05
	l/ha	19.26	11.97	12.03	13.78