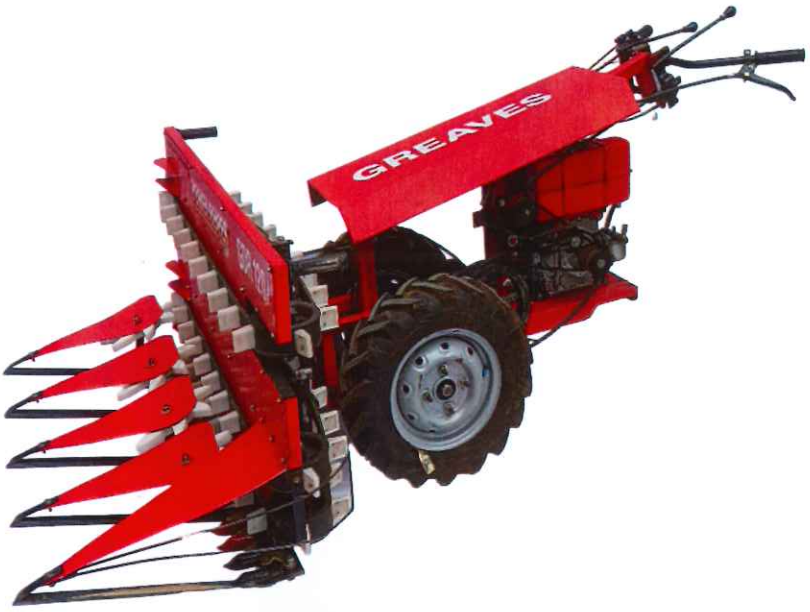
व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT
(Initial)

स्वच्छ भारत
एक कदम स्वच्छता की ओर

संख्या/No.: H&TH/NERFMTTI, B. Chariali/ 03/03/559
माह / Month: January 2026

THIS TEST REPORT IS VALID UPTO 31.01.2033



GREAVES COTTON LTD, GDR 120, SELF PROPELLED REAPER

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)
BISWANATH CHARIALI, DIST- BISWANATH, ASSAM, PIN - 784 176
[AN ISO 9001:2015 CERTIFIED INSTITUTION]

Ph. No. 03715-222094 **Website: https://nerfmtti.nic.in** **E-mail: fmti-ner@nic.in**

4. SPECIFICATIONS

4.1 General:

Name and address of the manufacturer	:	DHARMATECH INDUSTRIES, 23/2, Parishikhar Industrial Estate, NR. Ramol Toll Plaza, S. P. Ring Road, Ramol, Ahmedabad, Gujarat- 382 449
Name & Address of Applicant	:	GREAVES COTTON LIMITED, F-62 & F-63, SIPCOT Industrial Complex, Thiruvallur District, Tamil Nadu – 601 201
Name of machine	:	Reaper
Type	:	Self-propelled, Walk Behind
Make	:	Greaves Cotton Ltd
Model	:	GDR 120
Year of manufacture	:	2025
Serial Number	:	DID25B0560
Country of origin		INDIA
Size of reaper, mm	:	1300
Name of crop recommended (apa)	:	Paddy
Name of crop in which the test was conducted	:	Paddy

4.2 Details of prime mover used:

Name and address of the manufacturer (apa)	:	Greaves Cotton Ltd, Plot no. J2. MIDC Industrial Area Chikalthana, Aurangabad Maharashtra– 431 210, India
Make	:	Greaves Cotton Limited
Model	:	5520
Type	:	Single cylinder,4-Stroke, Air cooled, diesel engine
Year of manufacture	:	2025
Serial Number	:	A5B1833126
Country of origin	:	INDIA
Recommended high idle speed (rpm)	:	3700-3900
Recommended low idle speed (rpm)	:	1000-1200
Recommended rated speed (rpm)	:	3600
Recommended rated speed for field test (rpm)	:	3600
Maximum power observed, kW	:	**4.84**
Maximum power declared, kW	:	4.04

12.4 Chemical composition of Knife section (stationery):

The material of reaper knife section (stationery) was got analyzed for chemical composition. The results of chemical analysis test are as under:-

Constituents	As per IS:6025-2024	Composition as observed (% of weight)	Remarks
Carbon (C)	0.70 -0.95	0.418	**Does not Conform**
Manganese (Mn)	0.30 – 0.50	0.659	**Does not Conform**

13.FIELD PERFORMANCE TEST

The machine was tested for total of 25.17 hours for harvesting of paddy crop. The performance of the machine was assessed with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction. The detailed test results have been given in Annexure-I & II and summarized in Table 1 & 2 below.

SUMMARY OF CROP PARAMETERS

Table-1

Sr. No.	Parameters	Range
1	Variety of crop	Paddy (Ranjit)
2	Straw moisture content (%)	38.5 to 43.5
3	Grain moisture content (%)	14.8 to 17.1
4	Plant height (mm)	966 to 1160
5	Length of ear head (mm)	217.0 to 273.0
6	Number of grains per ear head	157 to 272
7	Number of hills per m^2	15 to 35
8	Number of tillers per hill	9 to 13
9	Straw-grain ratio	1.78:1 to 2.56:1

SUMMARY OF FIELD PERFOMANCE TEST

Table-2

Sr. No.	Parameters	Range
1	Forward speed (kmph)	2.54 to 2.75
2	Width of cut (m)	1.14 to 1.16
3	Stubble height (mm)	118 to 204

4	Losses (Percentage of total grain yield)	
	-Pre-harvest loss	Nil
	-Post harvest loss (Cutter bar)	0.02 to 0.05
	-Conveyor loss/shattering loss	0.28 to 1.22
5	Area harvested (ha/h)	0.24 to 0.25
6	Field efficiency (%)	77.4 to 83.3
7	Time required for one hectare (h)	4.00 to 4.17
8	Fuel consumption	
	- l/h	0.79 to 0.81
	- l/ha	3.20 to 3.38

13.1 Rate of work

- The forward speed of operation ranged between 2.54 to 2.75 kmph.
- The area harvested by the machine was recorded as 0.24 to 0.25 ha/h.

13.2 Quality of work

- Field efficiency was observed as 77.4 to 83.3 %.
- The post-harvest (Cutter bar) loss was observed as 0.02 to 0.05%.
- The conveyor loss/shattering loss was observed as 0.28 to 1.22%.
- The stubble height was recorded as 118 to 204 mm.
- Machine leaves the harvested crop in windrows.

13.3 Labour requirement

- Two unskilled labours are required for cutting the crop manually at corner and side of each field.
- Two skilled labours are required for operating the machine continuously.

13.4 Operator's comfort, safety and ease of operation

- All the controls were within the easy reach of the operator.
- The machine was provided with the transmission clutch for the smooth changing of travel speed.
- The machine was provided with main clutch for stopping forward motion of the machine and cutter bar operation at same time.
- There is no safety provision in case of overloading of cutter bar and safety covers were not provided on all the moving parts.

14. EASE OF OPERATION AND ADJUSTMENT

No noticeable difficulties were observed in operation and adjustment during the field test.

15. DEFECTS, BREAKDOWNS AND REPAIRS

It was observed that, V-belt transferring power from engine to main gear box was broken during field performance test and it was replaced with the new one.

16. COMPONENTS / ASSEMBLY INSPECTION AND ASSESSMENT OF WEAR

16.1 Engine:

The Engine and other assemblies were dismantled after 37.25 hours of operation.

16.1.1 Cylinder:

Cylinder	Cylinder bore dia (mm)						Max. permissible wear limit (mm)
	Top position		Middle positon		Bottom position		
1	Thrust side	Non Thrust side	Thrust side	Non Thrust side	Thrust side	Non Thrust side	
	78.01	78.00	78.00	78.00	78.00	78.00	78.15

16.1.2 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)
77.50	77.50	77.91	*	0.15	0.09	0.25

16.1.3 Ring side clearance

Piston Rings	Ring side clearance (mm)	Max. permissible wear limit (mm)
1st Compression ring	0.05	0.25
2nd compression ring	0.03	0.20
3rd compression ring	0.04	0.20
Oil ring	0.06	0.15

16.1.4 Ring end gap clearance

Ring No.	Ring End gap (mm)			Max. Permissible wear limit (mm)
	At top	At middle	At bottom	
1st Compression ring	0.30	0.30	0.30	1.40
2nd compression ring	0.35	0.35	0.35	1.40
3rd compression ring	0.35	0.35	0.35	1.40
Oil ring	0.14	0.14	0.14	1.40

16.1.5 Big end bearing

Bearing no.	Dia of bearing (mm)	Dia of Crank pin (mm)	Clearance (mm)		Max. Permmissible wear limit (mm)	
			Dimentrical	Axial	Dimentrical	Axial
1	40.08	39.98	0.10	0.50	0.20	3.15

Condition of bearing: Normal

16.1.6 Main bearing

Bearing No.	Diametrical clearance (mm)	Crankshaft end float, (mm)	Max. permissible clearance limit (mm)	
			Diametrical clearance	Crankshaft end float
Bush Bearing	0.09	0.80	0.20	0.90

16.1.7 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
7.01	7.00	6.97	6.97	0.04	0.03	0.10	0.10

16.2 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 and magneto : Normal

17. 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.	Type of machine	Walk-behind type	Walk-behind type	Conforms
2.	Effective width of cutter bar (mm)	1100(Min.)	1340	Conforms
3.	Number of crop dividers	5(Min.)	5	Conforms
4.	Type of knife section	Serrated	Serrated	Conforms
5.	Number of knife sections on cutter bar	24 (Min.)	17	**Does not conform**
6.	Type of crop conveyor	Chain/Belt	Chain	Conforms
7.	Numbers and type of wheel equipment	Two/Pneumatic or Iron	Two pneumatic	Conforms
8.	Type of prime mover	Diesel/Petrol/Kerosene/Petrol start kerosene run IC engines.	Diesel	Conforms
9.	Minimum power of prime mover (kW)	2.0 to 4.5	4.84	Conforms
10.	Material of knife section	High Carbon steel EN42J or above	EN42J (apa)	Conforms

11.	Material of knife back	High Carbon steel EN42J or above	EN42J (apa)	Conforms
12.	Material of ledger plate	High Carbon steel EN44 above	EN42J (apa)	**Does not conform**
13.	Hardness of knife section, HRC	38(Min)	40-62	Conforms
14.	Hardness of ledger plate, HRC	45 (Min.)	91-92 HRBW	**Does not conform**
15.	Provision for adjusting the height of cutter bar	Must be provided	Provided	Conforms
16.	Guards against all moving parts/drives and hot parts	Must be provided	Provided	Conforms
17.	Spark arrester in engine exhaust	Must be provided	Not provided	**Does not conform**
18.	Location and direction of exhaust emission to be away from the operator and machine for satisfactory operation	Must be provided	Provided	Conforms
19.	Slip clutch/safety pins at cutter bar drive	Must be provided	Not provided	**Does not conform**
20.	Slip clutch/safety pins at conveyor drive	Must be provided	Not provided	**Does not conform**
21.	Provision of row marker/crop guide	Must be provided	Not provided	**Does not conform**
22.	Marking/labeling of machine	The labeling plate should be riveted on the body of machine having Name and address of manufacturer, Country of origin, Make, Model, Year of manufacture, Serial number, Type, size, Size of prime mover (kW)	Name and address of manufacturer and type was not provided.	**Does not conform**
23.	Literature	Operator manual, Service manual and Parts catalogue should be provided.	Provided	Conforms

18. COMMENTS AND RECOMMENDATIONS

18.1 During field performance test it was observed that V-belt transferring power from engine to main gear box was broken. This should be looked into for improvement in quality.

18.2 Specification of knife sections of the cutter bar does not conform to IS 6025:2024 and it should be looked into for corrective action.

18.3 Specification of knife section back does not conform to IS: 10378-2024 and it should be looked into for corrective action.

18.4 The hardness of knife section (both movable and stationary) and chemical composition of knife section (both movable and stationary) do not conform to the requirement of IS 6025-2024. It should be looked into for improvement.

18.5 During air cleaner oil pull over test, percentage of oil pull-over was observed on higher side. It should be looked into for corrective action.

18.6 Number of knife sections on cutter bar, material of ledger plate, spark arrester in engine exhaust, slip clutch/safety pins at cutter bar drive, slip clutch/safety pins at conveyor drive and provision of row marker/crop guide did not conformed to critical technical specifications (vide Ministry's letter No. 13-9/2019-(M&T) (I&P)-Part dated 26.04.2019). This should be looked into for corrective action.

18.7 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 the component in view of above this deserves to be given top priority for corrective action.

18.8 Noise at operator's ear level was observed on higher side against danger limit of 90 dB (A) and noise at bystanders level exceeded the warning limit of 85 dB (A) as specified by 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 & safety.

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

18.10 **Technical 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.

H&TH/NERFMTTI, B.Chariali/ 03/03/559	GREAVES COTTON LTD, GDR 120 SELF-PROPELLED REAPER	COMMERCIAL (INITIAL)

TESTING AUTHORITY

(M.R. PATIL)
SENIOR AGRICULTURAL ENGINEER

P. K Bai.

(P. KAMALABAI)
DIRECTOR

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

19. APPLICANT'S COMMENTS

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

ANNEXURE-I

CROP PARAMETERS

Places of test: 1. Village- Jamuguri, Dist- Sonitpur.
2. Village- Baghmari, Dist- Biswanath.

Name of Crop: Paddy

Sr. No.	Parameters	I	II	III	IV	V
1	Date of test	28.11.2025	29.11.25	03.12.2025	04.12.2025	05.12.2025
2	Av. Moisture Content (%)					
	- Grain	14.8	15.3	16.1	17.1	15.7
	- Straw	38.5	39.8	43.5	40.3	42.1
3	Variety of crop	Paddy (Ranjit)				
4	Av. Plant Height (mm)	1160	1138	1070	966	1126
5	Av. length of ear head(mm)	273.0	265.6	254.0	217.0	243.6
6	Av. No of grains per ear head	272.2	251.4	157.2	162.8	146.8
7	No. of tillers per m^2	9.2	12.4	13.2	10	9.2
8	Straw- grain ratio	2.28:1	1.81:1	2.56:1	1.78:1	2.56:1
9	Atmospheric conditions					
	- Temperature (^{0}C)	31.2	31.0	32.4	31	28.8
	- Humidity (%)	43.2	65	40.2	64	56.6
	- Pressure (kPa)	101.1	98	98.5	98	100

ANNEXURE-II

FIELD PERFORMANCE RESULTS

Places of test. 1. Village- Jamuguri, Dist- Sonitpur.
2. Village- Baghmari, Dist- Biswanath.

Name of Crops: Paddy

Sr. No.	Parameters	I	II	III	IV	V
1	Date of test	28.11.2025	29.11.25	03.12.2025	04.12.2025	05.12.2025
2	Net test duration (h)	4.92	5.0	5.5	5.0	4.75
3	Forward speed (kmph)	2.54	2.59	2.59	2.66	2.75
4	Av. Width of cut (m)	1.14	1.16	1.14	1.15	1.14
5	Av. Stubble height (mm)	118	204	130	160	191
6	Losses (% of total gain yield)					
	- Pre Harvest loss	Nil	Nil	Nil	Nil	Nil
	- Post harvest loss (cutter bar + Uncut)	0.05	0.04	0.04	0.02	0.04
	- Conveyor loss/shattering loss	1.09	0.95	0.83	0.28	1.22
7	Av. Mass of crop per m^2 (g)	1059.0	1281.2	1133.8	1068.6	1021.8
8	Area harvested (ha/h)	0.24	0.25	0.24	0.24	0.25
9	Field efficiency (%)	82.76	83.33	80.00	77.42	80.65
10	Time required for one ha (h)	4.17	4.00	4.17	4.17	4.00
11	Fuel consumption					
	- l/h	0.80	0.81	0.79	0.81	0.80
	- l/ha	3.34	3.24	3.29	3.38	3.20