



ASPEE HBC-35 BRUSH CUTTER



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि, सहकारिता एवं किसान कल्याण विभाग

Department of Agriculture, Cooperation and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

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7. ENGINE PERFORMANCE TEST

The brush cutter is powered with 1.0 kW engine. In pursuance to Ministry's order No 7-23/2011- M & T (I&P) dated 20.04.2011 the engine performance has not been conducted and the specifications/performance as specified by the applicant has been endorsed.

7.1 Performance related parameter declared by the manufacturer/ applicant

Recommended high idle speed, rpm : 9500
Recommended low idle speed, rpm : 3600
Maximum power, kW : 1.0 @ 7000 rpm

8. MECHANICAL VIBRATION MEASUREMENT AT HANDLES

The amplitude of mechanical vibration on the handles of brush cutter was recorded as under

Sr. No.	Location		HD (μ)	VD (μ)
1	Handle	Right	1900*	1600*
		Left	1000*	1200*
2	Engine cover		3500*	2600*
3	Frame pipe		1500*	1200*

9. NOISE LEVEL MEASUREMENT**Noise at operator's ear level**

Date of test : 17.08.2017
Type of sound level meter : CESVA-SC 20E
Temperature, °C : 42
Pressure, kPa : 97.2
Relative humidity, % : 34.3
Background noise level, dB(A) : 52.8
Observed noise level, dB(A) : 93.7

10. HARDNESS AND CHEMICAL COMPOSITION OF BLADES**10.1 Hardness:****10.1.1 Hardness of triangular blade:**

Sr. No.	As per IS: 6025:1982 HRC	As observed (HRC)	Remarks
1	48 to 58	36.8 to 39.8	Does not conform

10.2 Chemical composition analysis:**10.2.1 Triangular blade:**

Constituents	As per IS: 6025-1982	Composition as observed (% of weight)	Remarks
Carbon (C)	0.70-0.95	0.6230	Does not conform
Manganese (Mn)	0.30 to 0.50	0.8365	Does not conform
Silicon (Si)	--	0.3900	--
Sulphur (S)	--	0.0000	--
Phosphorous (P)	--	0.0198	--

11. FIELD TEST

Field tests for 25.95 hrs. duration comprising of seasonal grass/weed cutting with nylon rope and perennial weed cutting using triangular blade attachments were carried out for 13.53 hrs. and 12.39 hrs. respectively. Detailed results of field tests are shown in Annexure-I & II and summarized in the ensuing table. Details about the operator are show in Annexure-III.

Sr. No.	Parameters	Seasonal Grass/Weed cutting	Perennial Weed cutting
1	Field condition	Level	Level
2	Intensity of grass/weeds	High	High
3	Average number of grass/weeds in 1 sq.m	531 to 1168	172 to 353
4	Avg. height of grass/weeds, cm	9.9 to 16.88	42.65 to 52.3
5	Avg. Diameter of grass/weed, mm	1.32 to 1.89	4.42 to 5.80
6	Avg. Mass of grass/weed cut , (kg/h)	14.42 to 35.6	56.2 to 79.0
7	Avg. area covered (Rate of work), ha/h	0.044 to 0.117	0.0557 to 0.0687
8	Avg. Time required for one hectare, h	8.52 to 22.73	14.56 to 17.95
9	Avg. Fuel consumption		
	l/h	0.355 to 0.511	0.401 to 0.538
	l/ha	4.00 to 8.07	5.98 to 8.73

11.1 Seasonal Grass/Weed cutting using nylon rope assembly**11.1.1 Rate of work**

- Average area covered (rate of work) was observed as 0.044 to 0.117 ha/h.
- Average time required for one hectare was observed as 8.52 to 22.73 h.
- Average mass of grass cut was observed as 14.42 to 35.6 kg/h.
- Average No. of grass stem in one m² area was 531 to 1168.

11.1.2 Fuel consumption

Average fuel consumption was observed as 0.355 to 0.511 l/h. and 4.00 to 8.07 ha/h.

11.2 Perennial Weed cutting using triangular blade**11.2.1 Rate of work**

- The average area covered (rate of work) was observed as 0.0557 to 0.0687 ha/h.
- Average time required for one hectare was observed as 14.56 to 17.95 hours.
- Average number of weeds in one square meter are was 172 to 353.
- Average mass of weeds cut was 56.2 to 79.0 kg/h.

11.2.2 Fuel consumption

Fuel consumption was observed as 0.401 to 0.538 l/h and 5.98 to 8.73 l/ha.

11.3 Labour requirement

Two skilled operator was needed to operate the bush cutter continuously. Additionally, one more labour is needed gather the collected bush/weeds.

11.4 Adequacy of power of prime mover

The power of prime mover was found adequate.

11.5 Wear analysis of critical components

Component	Duration of operation (h)	Initial length/ mass (gm/mm)	Length/ Mass after operation (gm/mm)	Loss of length/ mass (gm/mm)	Percentage wear	Percentage wear on hour basis
Nylon rope	13.55	3415	140	3275	95.90	7.07
Triangular blade	12.39	248.7	244.3	4.4	1.76	0.142

12. EASE OF OPERATION, ADJUSTMENTS AND SAFETY

The machine is easy to operate and there is no problem was observed during the test except, the fatigue was observed during the operation of the machine due to excessive mechanical vibration.

13. DEFECTS, BREAKDOWNS AND REPAIRS

No breakdown occurred during 25.92 hours of operation.

14. COMMENTS AND RECOMMENDATIONS

14.1 Noise at operator's ear level position was observed on higher side against warning and danger limit of 85 dB(A) as specified by ILO For continuous exposure of 8 hours per day. **This calls for reduction in noise level to improve the operator's comforts & safety.**

14.2 The amplitude of mechanical vibration marked as (*) on the relevant chapter, are on drastically higher side. It is not just directly concerned with operator's health, safety and comfort, but also adversely affect the useful life of the components. In view of above, this deserved to be given top priority for corrective action.

14.3 The capacity of fuel tank is only 0.63 liter, which does not appear to be adequate. This calls for necessary modification.

14.4 A fuel on/off knob may be considered for providing in the fuel system of engine.

14.5 The hardness and chemical composition of the cutting blade does not meet the requirement as per IS:6025-1982. It should be looked into.

14.6 The marking/labeling provided is not adequate. It is therefore recommended to provide

the marking/labeling plate with following details

- i) Make
- ii) Model
- iii) Serial No.
- iv) Year of manufacture
- v) Manufacturer's address
- vi) Engine No.
- vii) Chassis No.
- viii) Max. power (kW)
- ix) Specific fuel consumption (g/kWh)

14.7 Periodical greasing is required to be done by removing allen key bolts, which may be provided with grease nipples.

14.8 Safety provisions/safety wear

All the safety accessories recommended for safety operation should be provided with machine.

15. TECHNICAL LITERATURE

Operator's manual was supplied by the manufacturer for reference during testing. It is however recommended that same may be revised as per IS: 8132-1999. The parts catalogue and service manual may also be brought out. *brought out re*

TESTING AUTHORITY

R.K. NEMA SENIOR AGRICULTURAL ENGINEER	<i>re</i>
P. K. PANDEY DIRECTOR	<i>430-1008</i>

16.

APPLICANT'S COMMENTS

Sr. No.	Our Reference	Applicant's Comments
16.1	14.2	We will look into to reduce mechanical vibration.
16.2	14.5	We will do needful to meet the requirement as per Indian Standard.
16.3	14.6	We will provide sticker label on metal plate.
16.4	14.7	Regarding provision of grease nipple we have noted & it will be looked into.
16.5	14.8	We will provide safety kit.