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**“TRACTOR MOUNTED FORAGE HARVESTER”
(AGRIZONE FORAGE MASTER)**

TESTED AT

**STATE LEVEL FARM MACHINERY TRAINING AND TESTING
INSTITUTE, REHMANKHERA, HARDOI ROAD
LUCKNOW, U.P. - 226101**

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(The Institute is approved Testing Centre by Department of Agriculture & Cooperation, Ministry of Agriculture, GOI vide letter no. 8-1/2004-My (I&P) dated September 14,2010 and subsequent letters)

THIS TEST REPORT IS VALID FROM 19.06.2023 TO 18.06.2030

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP- 2011/414	“TRACTOR MOUNTED FORAGE HARVESTER” (AGRIZONE FORAGE MASTER)	JUNE	2023



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Type of test	:	COMMERCIAL
Name of machine	:	“TRACTOR MOUNTED FORAGE HARVESTER” (AGRIZONE FORAGE MASTER)
Test Code referred	:	IS: 11467-1985 Test code for cereal harvesting machine IS: 6025-1982 Specification for knife section for harvesting machine. IS: 4468 (Part 1) : 1997 Agriculture wheeled tractor- rear mounted three point linkage: part-1 categories 1,2,3 & 4. IS: 4931: 1995 Agriculture tractor- rear mounted power take off type 1,2 and 3.
Test requested by	:	M/S- GSA INDUSTRIES VILL- DAULATPUR, RASULPUR,JAURAN ROAD DISTT-PATIALA, PUNJAB-147001
Testing Authority	:	STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, REHMANKHERA, HARDOI ROAD, LUCKNOW, U.P. - 226101
Period of test	:	MARCH 2023 TO JUNE 2023

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1. This Test Report should not be reproduced in part or full without prior permission of the Incharge Testing Centre.
 2. The data given in the Test Report pertain to the particular machine submitted for test by the Applicant.
 3. The data collected during the test do not in any way attribute to the durability of the machine.
 4. The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
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Selected Conversions

S. No	Units	Conversion Factor
1	Force	
	1 kgf	9.80665 N
		2.20462 lbf
2	Power	
	1 hp.	1.01387 metric hp. (Ps)
		745.7 W
	1 Ps	735W
	1 kW	1.35962 Ps
3	Pressure	
	1 psi	6.895 kPa
	1 kgf/cm ²	98.067 kPa = 735.56 mm of Hg
	1 bar	100 kPa = 10 N/cm ²
	1 mm of Hg	1.3332 m-bar

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1. SCOPE OF TEST

The scope of the test was to check and assess the followings.

- i) Specification
- ii) Hardness of critical component.
- iii) Wear analysis of critical component.
- iii) Field test
 - a) Rate of work.
 - b) Quality of work.
 - c) Ease of operation, maintenance & adjustments.
 - d) Labour requirement
 - e) Power requirement
 - f) Defects, Breakdowns and Repairs.

2. TEST PROCEDURE / CODES

- i) IS: 11467-1985 Test code for cereal harvesting machine
- ii) IS: 6025-1982 Specification for knife section for harvesting machine.
- iii) IS: 4468 (Part 1) : 1997 Agriculture wheeled tractor- rear mounted three point linkage: part-1 categories 1,2,3 & 4.
- iv) IS: 4931: 1995 Agriculture tractor- rear mounted power take off type 1,2 and 3.

3. METHOD OF SELECTION

The machine was Randomly selected by representative of the testing authority out of 06 machines made available for selection from their periodical production line at manufacturer's site. Machines of Sr. No 0019 to 0024 were available and Sr. No 0020 was selected for testing.

4. SPECIFICATION

4.1	General		
	Name of manufacturer/applicant	:	M/S- Gsa Industries Vill- Daulatpur, Rasulpur, Jauran Road, Distt-Patiala, Punjab-147001
	Name of machine	:	Forage Master
	Type	:	Tractor Mounted
	Make	:	GSA Industries.
	Model	:	Agrizone Forage Master
	Brand	:	Agrizone
	Year of manufacture	:	2023
	Serial No.	:	0020
	Recommended power of tractor, (hp) apa	:	40 and above
	Type of blade	:	Disc and flat type.
4.2	PRIME MOVER USED		
	Tractor	:	Sonalika-55 (DI)
	Chassis No.	:	B2ADR1019755S3
	Max. PTO Power Kw	:	35.04
	Year of manufacturing	:	2021

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Rated engine speed recommended for field test (apa)	1600/1700
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4.3 Constructional details: (Ref Fig.1)

4.4 Main frame

It consists of a square section of size 1190×110×110 mm. The cross shaft and top link connection is fabricated with it. The primary gearbox is bolted at one end of it, whereas the other end of the main frame support secondary gearbox, crop guide (or feeding chute as the case maybe) disc cutter, feeding roller, flywheel assembly and discharge chute.

Material	:	Mild steel
Dimensions of frame, (mm)	:	1190×110×110 and 950×110×110
Mainframe hitch pin size, (mm)	:	170×25.50 Ø

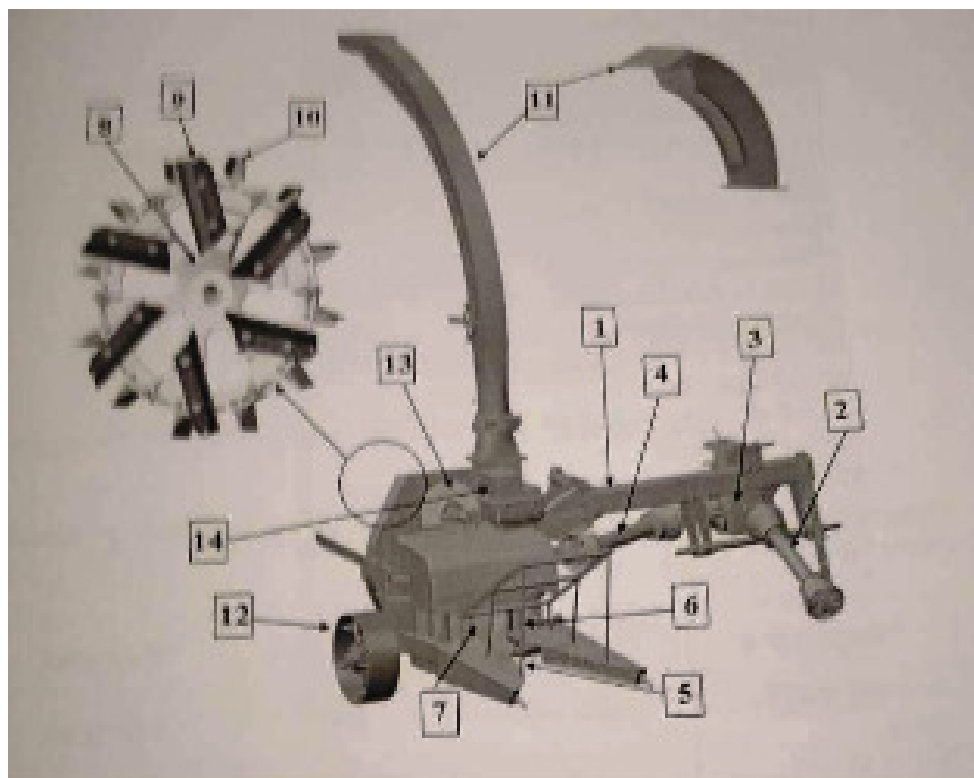


Fig.:1 FORAGE HARVESTER (AGRIZONE)

KEYS:

1. Main frame	2. Main cardan shaft	3. Primary gear box	4. Intermediate cardan shaft	5. Crop Guide
6. Disc cutter	7. Feeder drum	8. Fly wheel	9. Fly wheel knives	10. Fly wheel palate
11. Long chute/ Short chute	12. Height adjustment wheel	13. Grinding wheel	14. Secondary gear box	

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4.5 Feeding system			
4.5.1	Crop guide size		
	Size of crop guide, mm	:	998×290/160×3.42 (t)
	No. of crop guide	:	02
	Diameter of feeding drum, mm	:	260
4.5.2	Feeding chute size		
	Length of Feeding chute	:	930
	Width of Feeding chute (big end) mm	:	550
	Width of Feeding chute (small end) mm	:	410
	Shape of feeding drum	:	3.0
	Dia. of feeding drum mm	:	258
4.5.3	Conveyor system		
	Type	:	Roller
	No. of blade	:	3+3
	Type of blade	:	Serrated
	Material	:	Mild steel
	No. of slats	:	6
	No. of teeth on blade	:	7
	Type of drive	:	Gear Drive
	No. of teeth on drive gear	:	18
	No. of teeth on driven gear	:	67
	Reduction ratio	:	1:0.27
4.5.4	Mobile cutting unit		
	Type	:	Disc
	Dia. of disc, mm	:	295
	Thickness of disc, mm	:	4.9
	No. of teeth of cutting disc	:	60
	Speed of disc corresponding to 540 rpm of PTO, (rpm)	:	118
	Method of fixing	:	Bolted
4.5.5	Trash cutting unit		
4.5.6	Flywheel		
	Type	:	Circular plate
	Root Dia. mm	:	620
	Overall dia. mm	:	740
	Thickness, mm	:	185
	Speed of disc corresponding to 540 rpm of PTO, (rpm)	:	1410
	Peripheral speed, (m/s)	:	56
	No. of plate	:	12

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	Size and spacing of palate	:	98×85×7.5 (t)
	No. of blade	:	12 Nos (12 nos optional)
	Size of blade, mm		
	Top width	:	90
	Length	:	270
	Thickness	:	6.75
	Method of fixing	:	Bolted
4.5.7	Flywheel drive bevel gear		
	No. of teeth on bevel pinion	:	30
	No. of teeth on crown gear	:	16
	Reduction ratio	:	
	Type of lubricant recommended	:	EP-140
	Lubricating oil capacity, (l)	:	6.0
	Length & max dia. of PIC of secondary gear input, (mm)	:	456
	No. of bearings on PIC of secondary gear input	:	09
	No. of oil seals provided on PIC of secondary gear input	:	05
	Oil level plug	:	Provided
	Breather Plug	:	Provided
4.5.8	Concave		
	Type	:	Rasp bar
	No. of adjustment plate, mm	:	02
	Size of plate, mm		
	Length	:	114
	Width	:	92
	Height	:	21
	No. of spacing of flat pieces in between distance, mm	:	02 & 110
	Clearance between concave plate of flywheel palate	:	8.5 to 18.28 mm
	Method of fixing	:	Bolted
4.5.9	Exhaust chute (Long)		
	Type	:	Angled rectangular
	Size, mm	:	2780×113×150 (2.0t)
	Height from ground level, mm	:	3255
	Tilting option if any	:	Provided
4.5.10	Exhaust chute (Short)		
	Type	:	Angled rectangular
	Size, mm	:	615×190×125 (3.2t)

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	Height from ground level, mm	:	1500
	Tilting option if any	:	None
4.5.11	Grinding wheel		
	Dia. of wheel (mm)	:	285
	Thickness of wheel (mm)	:	21.28
	Adjustment of wheel	:	Provided

5. THREE POINT LINKAGE (Cat. II) (Refer fig.1)				
Sl. No.		As per IS:4468-2007 (pt.- I) (mm)	As measured mm	Remarks
I	Upper hitch points			
(a)	Diameter of hitch pin (A)	25.27 to 25.40	25.39	Conforms
(b)	Diameter of hitch pin hole (B)	25.70 to 25.91	25.63	Does not Conform
(c)	Width between outer faces of yoke (E)	86 (Max.)	74.68	Conforms
(d)	Width between inner faces of yoke (F).	52 (min)	53.92	Conforms
(e)	Linch pin hole distance (D)	93 (min)	66.77	Does not Conform
II	Lower hitch points			
(a)	Dia. of hitch pin	27.79 to 28.0	28.26	Does not Conform
(b)	Linch pin hole distance (K)	49 (Min.)	50.97	Conforms
(c)	Width between outer faces of yoke (E)	86 (Max.)	75.40	Conforms
(d)	Width between inner faces of yoke (F).	52 (min)	54.85	Conforms
III	Diameter of linch pin hole			
(a)	Upper hitch pin (L)	12 (min)	12.0	Conforms
(b)	Lower hitch pin	12 (min)	12.6	Conforms
IV	Mast height (M)	510 (min.)	445	Does not Conform
V	Lower hitch point span (N)	823.5 to 826.5	570 (Fixed)	Does not Conform

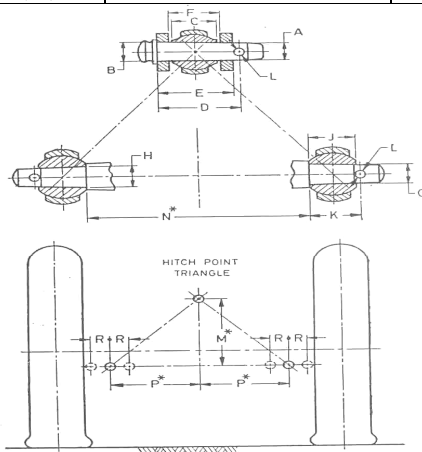


FIG. 1. DIMENSIONS OF HITCH POINTS

Fig.:1 Dimension of Hitch Points

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5.1	POWER TRANSMISSION SYSTEM:		
	Method of transmission	:	Propeller shaft receives drive from PTO and transmits power to rotary shaft through two spur gear & one Pinion beveled gear reduction units, primary and secondary, consisting of gear reduction respectively.

5.1.1 Dimensions Of Power Input Shaft At Primary Gear Box (Fig No.2)			
Notation	As per IS:4931-1996 (mm)	As observed (mm)	Remarks
Nominal speed (rpm)	540 ± 10	540	Conforms
No. of splines	6	6	Conforms
Direction of rotation	Clockwise	Clockwise	Conforms
d ø	28.91 ± 0.05	28.82	Does not Conform
S	8.69 (max.)	8.64	Conforms
R	6.7 ± 0.25	5.84	Does not Conform
α	30°	30°	Conforms
Q	7.0	6.05	Does not Conform
H	38.0	38.0	Conforms
A	54.0 (min.)	56.24	Conforms
B	76.0 (min.)	61.63	Does not Conform

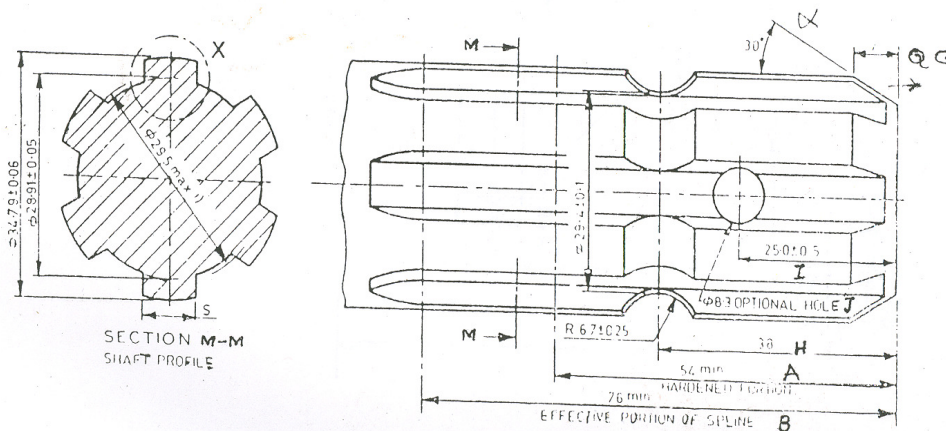


Fig. 2: Dimensions of forage master Power Input Shaft, mm

Dimensions Of Power Output Shaft At Primary Gear Box (Ref Fig No.2)			
Notation	As per IS:4931-1996 (mm)	As observed (mm)	Remarks
Nominal speed (rpm)	540 ± 10	540	Conforms
No. of splines	6	6	Conforms

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Direction of rotation	Clockwise	Clockwise	Conforms
D ϕ	34.79 \pm 0.06	34.76	Conforms
d ϕ	28.91 \pm 0.05	29.40	Does not Conform
S	8.69 (max.)	8.65	Conforms
R	6.7 \pm 0.25	5.66	Does not Conform
α	30°	30°	Conforms
Q	7.0	6.61	Does not Conform
H	38.0	38.0	Conforms
A	54.0 (min.)	56.09	Conforms
B	76.0 (min.)	60.61	Does not Conform

Dimensions Of Power Input Shaft At Secondary Gear Box (Ref Fig No.2)

Notation	As per IS:4931-1996 (mm)	As observed (mm)	Remarks
Nominal speed (rpm)	540 \pm 10	540	Conforms
No. of splines	6	6	Conforms
Direction of rotation	Clockwise	Clockwise	Conforms
D ϕ	34.79 \pm 0.06	35.84	Conforms
d ϕ	28.91 \pm 0.05	28.90	Does not Conform
S	8.69 (max.)	8.65	Conforms
R	6.7 \pm 0.25	5.96	Does not Conform
α	30°	30°	Conforms
Q	7.0	6.28	Does not Conform
H	38.0	38.0	Conforms
A	54.0 (min.)	54.97	Conforms
B	76.0 (min.)	60.60	Does not Conform

5.1.2	Primary Propeller shaft (Ref. Fig.4)		
	Type	:	Telescopic (in two segments having 06 splines at both ends).
	Length of shaft (mm)		
	-- Minimum	:	858
	-- Maximum	:	1100
	Mass of shaft, kg	:	15.120
	Provision for locking	:	Spring loaded locking pins on both sides are provided and shear bolt also provided.

5.1.3	Primary Propeller shaft hub dimensions (Ref. Fig.3)		
Notation	As per IS:4931-1996 (mm)	As observed (mm)	Remarks
D ϕ	34.93 \pm 0.03	34.92	Conforms
d ϕ	29.7 \pm 0.1	29.79	Conforms

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W	8.69 (min)	8.48	Does not Conform
B	54 (min)	55.0	Conforms

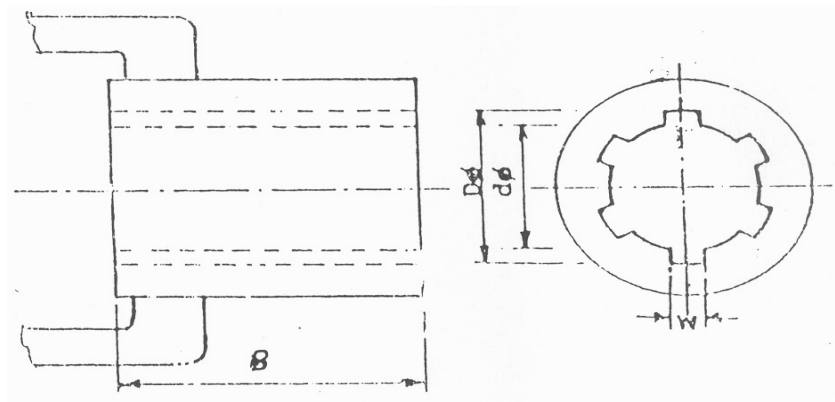


Fig. 3: Propeller Shaft Insert Dimensions, (mm)

5.1.4	Secondary Propeller shaft		
	Type	:	Telescopic (in two segments having 06 splines at both ends).
	Length of shaft (mm) (Ref. Fig.4)		
	-- Minimum	:	860
	-- Maximum	:	1090
	Mass of shaft, kg	:	14.980
	Provision for locking	:	Spring loaded locking pins on both sides are provided and shear bolt also provided.
5.1.5	Secondary Propeller shaft hub dimensions at primary gear box output side (Ref. Fig.3)		
Notation	As per IS:4931-1996 (mm)	As observed (mm)	Remarks
D ϕ	34.93 \pm 0.03	34.91	Conforms
d ϕ	29.7 \pm 0.1	29.74	Conforms
W	8.69 (min)	8.50	Does not Conform
B	54 (min)	54.38	Conforms

5.1.6	Secondary Propeller shaft hub dimensions at secondary gear box output side (Ref. Fig.3)		
Notation	As per IS:4931-1996 (mm)	As observed (mm)	Remarks
D ϕ	34.93 \pm 0.03	35.3	Does not Conform
d ϕ	29.7 \pm 0.1	29.78	Conforms
W	8.69 (min)	8.53	Does not Conform
B	54 (min)	55.3	Conforms

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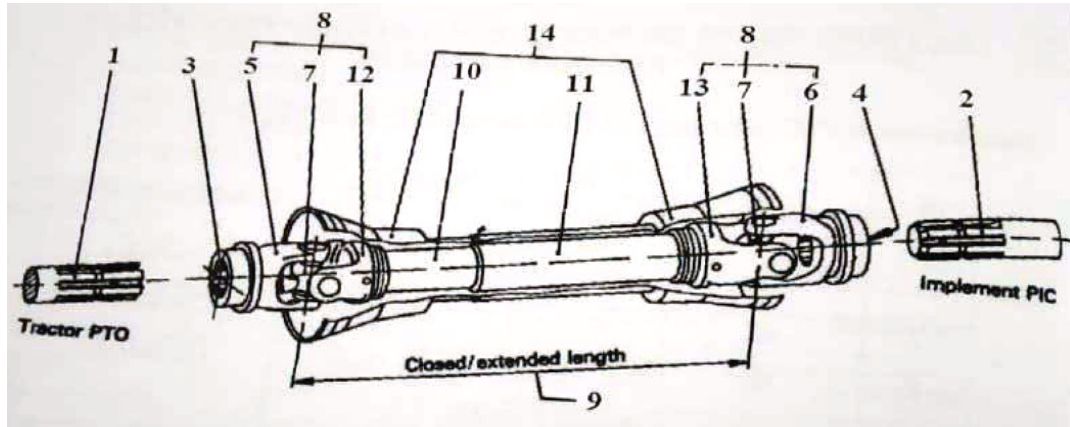


Fig. 4 PTO DRIVE SHAFT

1	PTO	8	Universal Joint
2	PIC	9	PTO Drive shaft, closed and Extended Length.
3	PTO Yoke Bore	10	Inner Shaft
4	PIC Yoke Bore	11	Outer Shaft
5	PTO Yoke	12	Inner Shaft yoke
6.	PIC Yoke	13	Outer Shaft yoke
7.	Journal Cross- Assembly	14	PTO Drive Shaft Guard

5.1.6	Gear box Assembly (primary reduction) Multispeed gear box	
	Type	: Bevel gear
	No. of teeth on pinion	: 25
	No. of teeth on bevel gear	: 14
	Reduction ratio at gear box	: 1:0.56
	Oil capacity, l	: 4.0
	Oil change period hours	: 200 hours
	Recommended grade of oil	: EP-140
	Length of power transmission shaft, mm (from gear box to secondary reduction unit)	: 305
	Dia. of shaft, mm	: 50 Ø
	No. of bearing	: 05-Tapper Roller bearing, (Three-30209), (One- 32212), (One- 32214)
	Provision for dipstick/breather	: Provided
5.1.7	Gear drive (secondary reduction)	
	Type	: Spin and bevel gear
	No. of teeth drive gear	: 18
	No. of teeth driven idler spur gear	: 26
	No. of teeth driven spur gear	
	Reduction ratio at gear box	: 1:0.69

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	Oil capacity, l	:	4.0
	Recommended grade of oil, apa	:	EP-140
	Oil change period, h (apa)	:	200 hours
	Provision for oil level checking	:	Provided
	Provision for dipstick/breather	:	Provided
	Oil filling arrangement	:	Provided
	No. of bearing	:	04- (03) Tapper Roller 30210 (Two), 32210 (One) ball bearing 6311, (One)

5.1.8	Overall Dimensions, mm		
	Length	:	1640
	Width	:	2370
	Height	:	3255
	Weight, Kg (apa)	:	730 approx
5.1.9	Color	:	Red

6. On Mass basis

Wear of blades on mass basis after 24.5 hrs. of field operation are tabulated in Table-4.

Table-4

Sl. No.	Initial mass of blade (g)	Mass after 24.5 h of operation	Loss in mass		Wear / h
			g	%	
Flywheel blade					
1.	900	890	10.00	1.11	0.04
2.	930	915	15.00	1.61	0.06
3.	910	900	10.00	1.10	0.04
Remark:- Rate of hourly wear (%) on mass basis was observed as 0.04 to 0.06 (%)					
Feeding drum blade					
1.	1580	1570	10.00	0.63	0.02
2.	1600	1580	20.00	1.25	0.05
Remark:- Rate of hourly wear (%) on mass basis was observed as 0.02 to 0.05 (%)					
Cutting disc blade					
LHS					
1.	535	520	15.00	2.80	0.11
2.	530	520	10.00	1.89	0.08
3.	540	530	10.00	1.85	0.07
Remark:- Rate of hourly wear (%) on mass basis was observed as 0.07 to 0.11 (%)					
RHS					
1.	530	520	10.00	1.89	0.08
2.	525	510	15.00	2.86	0.12
3.	530	515	15.00	2.83	0.11
Remark:- Rate of hourly wear (%) on mass basis was observed as 0.08 to 0.12 (%)					

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7. LABORATORY TEST

7.1 The hardness of cutting disc blade was determined at hardened and portion. The results of hardness test are tabulated in Table-I.

TABLE-1

S. No	Portion of blade	Hardness (HRC)		Remark
		As per IS: 6025-1982	As observed	
1-	On hardened zone	(48 to 58 HRC)	50.8,52.9,54.9	Conforms
2-	On remainder zone	(20 to 35 HRC)	23.8,25.9,32.5	Conforms

7.2	Chemical composition			
A.	The chemical composition of Disc blade is tabulated in Table-2			
				TABLE-2
Sl. No.	Material	Requirement as per IS: 6025-1982	As observed (% by weight)	Remark
1.	Carbon (C)	0.70 to 0.95	0.88	Conforms
2.	Silicon (Si)	0.1 to 0.4	0.17	Conforms
3.	Manganese (Mn)	0.3 to 0.05	0.39	Conforms
4.	Sulphur (S)	0.05 (Max)	0.002	Conforms
5.	Phosphorous (P)	0.05 (Max)	0.010	Conforms

7.3 FIELD PERFORMANCE TEST

The field tests of forage master were conducted at Chak Muafi, Khanna (Punjab) site for 24.5 hours consisting of 4 trials. The forage master was used for harvesting standing maize crop to assess the performance of the forage master. The detailed test results are given in Annexure-II and are summarised as under :-

The tractor PTO speed was maintained at 540±10 rpm. The performance of implement is reported in Annexure-II and summarized in Table-3.

Table-3

Summary of field test results :

Sl.No.	Parameters	Range of measurement	
i	Tractor used	Sonalika-55 (DI)	
ii	Name and variety of crop	Maize- (Pioneer-1899)	
iii	Engine speed (rpm);	No load	1700
		On load	1600
iv	Primary gear box speed (rpm);	No load	748 to 760
		On load	495 to 530
v	Fly wheel (rpm);	No load	1360 to 1425
		On load	1000 to 1050
vi	Av. Forward speed, kmph	3.20 to 3.25	
vii	Length/Height Of Stalk Before Operation (Cm)	255.0 to 266.93	
viii	Length/Height Of Stalk After Operation (cm)	10.33 to 12.5	

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ix	Dia. Of Stalk (mm)	24.98 to 27.43
x	Weight Of Stalk Before Operation (kg/m ²)	7.917 to 7.983
xi	Output of forage master (kg/h)	10980 to 11850
xii	Field efficiency ,%	75.30 to 83.0
xiii	Fuel consumption- l/h.	3.700 to 3.900

7.4 Rate of Work

7.4.1 - The forward speed was observed as 3.20 to 3.25 kmph.

- Output of forage master 10980 to 11850 (kg/h)

7.4.2 Quality of Work

- Weight Of Stalk Before Operation 7.19 to 7.983 (kg/m²)

- Length/Height Of Stalk Before Operation 255.0 to 266.93 (Cm)

- Length/Height Of Stalk After Operation 10.33 to 12.5 (cm)

-The field efficiency was recorded as 75.30 to 83.0 %.

7.4.3 Fuel consumption was observed 3.700 to 3.900 l/h.

7.4.4 LABOUR REQUIREMENT

This skilled operators were needed for feeding the forage Master continuously.

7.5.5 EASE OF OPERATION, ADJUSTMENTS & SAFETY

There was no noticeable problem felt in operation and adjustable of the forage Master during the test.

The propeller shaft has telescopic sections with universals joints, to adjust the length of drive shaft which is adequate.

The drive shaft (universal coupling shaft) is provided with shear bolt for safety.

7.5.6 DEFECTS, BREAKDOWNS AND REPAIRS

No breakdown occurred during 24.5 h operation in the field.

8. COMMENTS & RECOMMENDATIONS

8.1 The dimensions of three point linkage system upper hitch S.No. I (b, e), II (a) & IV, V points are not conforming to the requirement of As per IS:4468-2007 (pt.- I) (mm)

8.2 Dimensions of power input shaft at primary gear box notation (d ø, R, Q, B) & corresponding propeller shaft hub notation (W) have not been provided as per requirement IS:4931-1996 (mm)

8.3 Dimensions of power Output shaft at primary gear box notation (d ø, S, Q, B) & corresponding secondary propeller shaft at primary gear box side notation (W) have not been provided as per requirement IS:4931-1996 (mm)

8.4 Dimensions of power input shaft at secondary gear box notation (d ø, S, Q, B) & corresponding secondary propeller shaft at secondary gear box side notation (D ø, W) have not been provided as per requirement IS:4931-1996 (mm)

8.5 Arrangement should be made to permanently display the quality and parameters obtained in the test in all commercially manufactured (agriculture machines by putting engraved seals or plates) on the machines, so that the farmers can get proper information about the quality of the equipment.

9. LITERATURE :





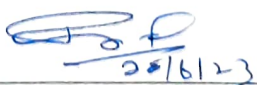
The specification of the implement operating manual, maintenance, safety instruction and spare parts catalogue provided in English. The literature developed is found to be adequate for the guidance of user and service personal. However, it need to developed (as per IS: 8132: 1999) in other regional languages.

10. APPLICANTS'S COMMENTS:

- We will modify the dimensions of three-point linkage system upper hitch SI. No. I (b, e), II (a) & IV, V points as per IS: 4468-2007 (pt.- 1) (mm) before the commercial use.
- We will Change the Dimensions of power input shaft at primary gear box notation (d ó, R, Q, B) & corresponding propeller shaft hub notation (W) to comply with IS:4931-1996 (mm)
- We will modify the dimensions of power Output shaft at primary gear box notation (d ó, S, Q, B) & corresponding secondary propeller shaft at primary gear box side notation (W) as per requirement IS:4931-1996 (mm)
- We will change the dimensions of power input shaft at secondary gear box notation (d ó, S, Q, B) & corresponding secondary propeller shaft at secondary gear box side notation (D ó, W) to comply with IS:4931-1996 (mm)
- We will make all Arrangement permanently display the quality and parameters obtained in the test in all commercial production level.

This report is being issued with the condition that the tested implement will be rectified as per recommendation and comments given by the Institute and applicant respectively and after rectification the implement should be manufactured on commercial basis.

TESTING AUTHORITY

(UPENDRA KUMAR) -SENIOR TECHNICAL ASSISTANT-	
(ANAND CHAUDHARI) -TEST ENGINEER-	
(VIJAY KUMAR SINGH) -ASSOCIATE PROFESSOR – ENGG.	
(DR. PRAMOD KUMAR GUPTA) -ADDITIONAL DIRECTOR-	
(DR. PANKAJ TRIPATHI) - DIRECTOR-	 28/6/23

THIS TEST REPORT IS VALID FROM 19.06.2023 TO 18.06.2030

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ANNEXUR- 1

BRIEF SPECIFICATIONS OF THE TRACTOR USED DURING FIELD TEST

1	Make, model and type	Sonalika-55 (DI) (Agriculture purpose tractor)
2	Number of cylinders	03
3	Maximum PTO power, Kw	35.04
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	27.0
5	Rated engine speed, rpm	2000
6	No load engine speed during field test, rpm	1800
7	Drawbar power, Kw	23.4
8	Drawbar pull, kN :	
	- Without ballast	15.4
	- With ballast	22.3
9	Type of wheel equipment	Pneumatic
10	Number & size of tyre :	
	Front	Two, 275/70 R 16
	Rear	Two, 16.9-28.00 (12 PR)
11	Standard track width, mm :	
	- Front	1380
	- Rear	1420
12	Wheel base, mm	1810
13	Ballast condition	Used as un-ballasted
14	Total Operational Mass, kg :	
	- Front	740
	- Rear	1200
	- Total	1940

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ANNEXURE- II

Place of test : Chak Muafi, Khanna (Punjab)

Tractor used : Sonalika-55 (DI)

Gear Used : M-1

Soil moisture,% : 20.8 to 26.3

S. No.	Test Number	1	2	3	4
1.	Date of test	26.04.23	27.04.23	28.04.23	29.04.23
2.	Duration of test ,h	4.4	7.0	6.7	6.4
3.	Gear used	M-1			
4.	Name and variety of crop	Maize- (Pioneer-1899)			
5.	Engine speed (rpm); No load On load	1700 1800	1700 1800	1700 1800	1700 1800
6.	Primary gear box speed (rpm); No load On load	750/757 495/530	748/755 498/530	750/760 500/530	748/756 504/530
7.	Fly wheel (rpm); No load On load	1368/1423 1000/1040	1365/1420 1000/1050	1360/1425 1000/1042	1360/1423 1000/1046
8.	Av. Forward speed, kmph	3.23	3.25	3.22	3.20
9.	Length/Height Of Stalk Before Operation (Cm)	260.3	255.0	266.93	255.63
10.	Length/Height Of Stalk After Operation (cm)	10.67	12.5	10.33	11.83
11.	Dia. Of Stalk (mm)	27.43	24.98	26.7	26.17
12.	Weight Of Stalk Before Operation (kg/m ²)	7.917	7.927	7.933	7.983
13.	Output of forage master (kg/h)	11820	10980	11850	11220
14.	Field efficiency ,%	75.30	80.10	83.0	78.5
15.	Fuel consumption (l/h)	3.850	3.900	3.700	3.800

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ANNEXURE -III

SYMBOL AND ABBREVIATIONS

SYMBOLS:

I- SYMBOLS ASSIGNED TO BASIC SI UNITS			
S.N.	PHYSICAL QUANTITY	NAME OF SI UNIT	SYMBOL
1	Length	Meter	m
		Millimeter	mm
2	Mass	Kilogram	kg
		Gram	g
		Tone	t
3	Time	Second	s

II- SYMBOLS ASSIGNED TO SOME DERIVED UNITS			
S.N.	PHYSICAL QUANTITY	NAME OF SI UNIT	SYMBOL
1.	Area	Square centimeter	cm ²
		Square meter	m ²
		Hectare	ha
2	Speed/Velocity	Meter per second	m/s
		Kilometer per hour	kmph
3	Pressure	Newton per square millimeter	N/mm ²
4	Time	Minute	min
		Hour	h
5	Volume	Cubic centimeter	cm ³
		Milliliter	ml
		Liter	l
6	Minimum	Min	mi
7	Maximum	Max	ma

ABBREVIATIONS:

As per applicant	:	apa	Clause	:	Cl
Degree	:	deg	Figure	:	Fig
Indian Standard	:	IS	Kilowatt	:	kW
Number	:	No.	Not available	:	N.A.
Not Recorded	:	N.R.	Percent	:	%
Reference	:	Ref.	Revolution	:	rpm