

**TRACTOR MOUNTED “HALF CAGE WHEEL”
(S KUMAR)**

TESTED AT

**STATE LEVEL FARM MACHINERY TRAINING AND TESTING
INSTITUTE, REHMANKHERA, HARDOI ROAD
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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 09.05.2023 TO 08.05.2030

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP- 2011/404	TRACTOR MOUNTED "HALF CAGE WHEEL" (S KUMAR)	MAY	2023



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Type of test	:	COMMERCIAL
Name of machine	:	TRACTOR MOUNTED “HALF CAGE WHEEL” (S KUMAR)
Test Code referred	:	IS: 2062 (2011) (7 TH REVISION) HOT ROLLED MEDIUM AND HIGH TENSILE STRUCTURAL STEEL- SPECIFICATION. IS: 7201 (PT.-I)- 1987 METHOD OF SAMPLING FOR AGRICULTURAL MACHINERY AND EQUIPMENT: (PT.-I)- HAND TOOLS AND HAND OPERATED/ANIMAL DRAWN EQUIPMENT. IS:11081:1993(REAFFIRMED) - SPECIFICATION OF AGRICULTURAL TRACTORS HALF CAGE WHEEL. IS: 8132: 1999 TEST CODE FROM DEVELOPING LITERATURE.
Test requested by	:	M/S- GOBIND INDUSTRIES PVT. LTD. VILLAGE- DHARSANIYA LUCKNOW ROAD BARABANKI- 225001
Testing Authority	:	STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, REHMANKHERA, HARDOI ROAD, LUCKNOW, U.P. - 226101
Period of test	:	JANUARY 2023 TO MAY 2023

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.

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 & chemical analysis of material of half cage wheel.

2. TEST PROCEDURE / CODES

- i) IS: 2062 (2011) (7th Revision) Hot rolled medium and high tensile structural steel-specification.
- ii) IS: 7201 (Pt.-I)- 1987 Method of sampling for agricultural machinery and equipment: (Pt.-I)- hand tools and hand operated/animal drawn equipment.
- iii) IS: 11081:1993 (Reaffirmed)-Specification of Agricultural tractors half cage wheel.
- iv) IS: 8132: 1999 Test code from developing Literature.

3. METHOD OF SELECTION

The machine was Randomly selected by representative of the testing authority out of 10 machines made available for selection from their periodical production line at manufacturer’s site. Machines of Sr. No 501 was selected for testing.

4. SPECIFICATION

4.1	General		
	Name of manufacturer/applicant	:	M/S- GOBIND INDUSTRIES PVT. LTD. VILLAGE- DHARSANIYA, LUCKNOW ROAD, BARABANKI- 225001
	Type	:	Tractor Mounted.
	Make	:	S KUMAR
	Model	:	S.KUMAR (12×4×28 L)
	Year of manufacture	:	2022-23
	Serial No.	:	501
	Type of Wheel	:	Half cage wheel.
	Working width of cage wheel, mm	:	350
4.2	LUG		
	Type	:	M.S Flat.
	No. of Lug	:	18
	Size, mm	:	350×50×5.5
	Spacing between two lug , mm	:	200
	Method of fixing	:	Welded over the outer rim of cage wheel.
4.3	BRACE		
	Type	:	M.S Flat.
	No. of Brace	:	06
	Size, mm	:	590×38×8
	Brace support size, mm	:	210×38×8
	Spacing between two brace , mm	:	215 (hub rim side) & 365 (outer rim side) respectively.
	Method of fixing	:	One end Welded with hub and side welded with outer rim of cage wheel.
4.4	RIM		
	Material	:	M.S Flat.
	Inner dia. of rim, mm (Ø)	:	970

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	Outer dia. of rim ,mm (Ø)	:	1040
	Method of fixing	:	Welded with brace support and brace of cage wheel.
	Support of rim, size mm	:	380×50×5.5
	Method of fixing	:	One end Welded with hub and other end welded with outer rim of cage wheel.
4.5	HUB RIM		
	Material	:	M.S Flat.
	Inner dia. of rim, mm	:	384
	Outer dia. of rim ,mm	:	448
	No. of holes	:	7.0
	Size of hole (Ø)	:	19-80
	No. of bolts	:	Three
	Size of bolts, mm	:	63×15.50Ø×2.0
	Method of fixing	:	Welded with brace of cage wheel.

5. TYPE OF HALF CAGE WHEEL

Sr. N0.	Requirement	Observation	Remark
1.	a) Type 1 - Suitable for 11'2/10-28 size of tractor tyres. b) Type 2 - Suitable for 12'4/11 - 28 size of tractor tyres. c) Type 3 - Suitable for 13'6/12 - 28 size of tractor tyres. d) Type 4 - Suitable for 16'9/14 - 28 size of tractor tyres.	Type-3 Provided	Conforms

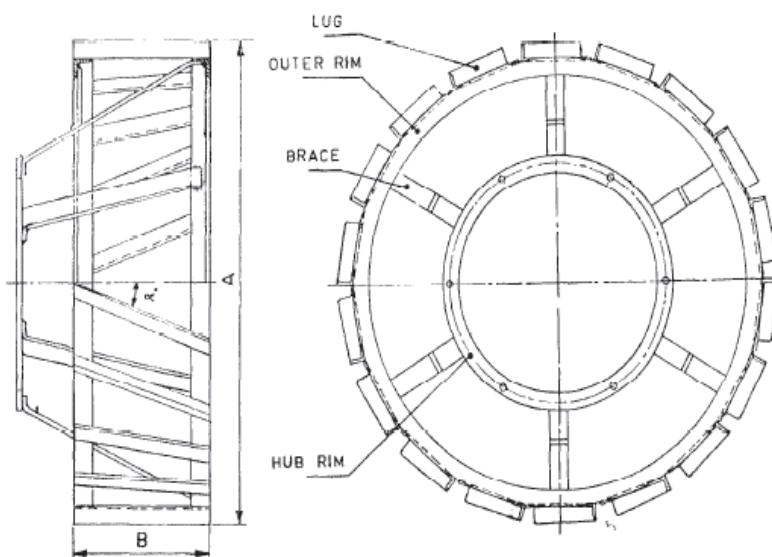


FIG. 1 HALF CAGE WHEEL FOR TRACTORS

Parts of Cage wheel

1. Lug

2. Outer Rim

3. Brace

4. Hub rim

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6.	OVERALL DIMENSIONS, (MM) (REF. FIG.1)		
	Length	:	1140
	Width	:	490
	Height	:	1140
	Weight, Kg (apa)	:	52 (approx)
	Color	:	Blue

7.	CONFORMITY WITH BIS REQUIREMENTS IS 11081:1993 (Reaffirmed)-Specification of Agricultural tractors half cage wheel.		
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S. No	Requirement	Observation	Remark
DIMENSIONS			
1.	The wheel shall be so designed that when mounted on a matching tractor the axial clearance between the tyre inflated to the recommended pressure and the cage wheel shall be 25+5 mm min.	The axial clearance observed 28 mm	Conforms
2.	The wheel shall be so designed that when mounted on a matching tractor, the radial clearance between the dynamic radius of tyre and the cage wheel lugs, when the tyre is new and in flatted to the recommended pressure, shall be minimum of 25 mm.	The radial clearance between the dynamic radius of tyre and cage wheel lugs observed 48 mm.	Conforms
3.	The recommended number of lugs should be 18.	18 lugs provided.	Conforms
4.	The lugs shall be equally spaced on the lug base. The deviation in the lug spacing shall be not more than 5 mm.	The lugs are equally spaced on the lug base	Conforms
5.	The recommended lug angle (Fig.1) shall be 15° to 20°.	18° observed	Conforms
6.	The minimum, nominal size of the angle for lug shall be 50×50×5 mm however, 65×65×5 mm size should be preferred.	The nominal size of the angle for lug provided (50×50×5 mm) as per requirement of IS: 11081:1993 (Reff.)	Conforms
7.	Equivalent T section may also be used instead of angle section. In case of angled lugs, the left hand and right hand wheels should be supplied as a set having angles as a mirror image of each other.	Wheel supplied with requirement.	Conforms
8.	In case mounted on the rim, the mounting dimensions such as size of hole, pitch circle diameter shall be in accordance with the corresponding dimensions of the steel rim.	The mounting dimension size hole (19.80 Ø) pitch (2.0) and diameter of bolt.	--
8. WORKMANSHIP AND FINISH			
1.	The components shall be free from pits, burrs, cracks and other visual defects.	Satisfactory	Conforms

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2.	The various components shall be rigidly attached and welding shall not be porous.	Satisfactory	Conforms
3.	The components shall be painted to prevent surface	Provided	Conforms
9.	MARKING		
	a) Manufacturer’s name or recognized trade mark; and b) Cage wheels may also be marked on the outer rim face as ‘L.H.’ or ‘R.H.’ c) Batch or Code No. d) Each cage wheel may also be marked the ISI Certification mark.	Provided	Conforms

10. LABORATORY TEST

10.1 The hardness of half cage wheel was observed. The results of hardness test are tabulated in Table-I.

TABLE-1

S. No	Component	Hardness (HRC) Requirement as per IS:2062 (2011) As observed
1-	Half cage wheel	28.7,32.3,34.5

S. No.	Material	Requirement as per IS:2062 (2011)	As observed (% by weight)	Remark
11.	CHEMICAL COMPOSITION			
A.	The chemical composition of half cage wheel is tabulated in Table-2			
				TABLE-2
1.	Carbon (C)	0.23 (Max)	0.20	Conforms
2.	Silicon (Si)	0.40 (Max)	0.17	Conforms
3.	Manganese (Mn)	1.50 (Max)	0.61	Conforms
4.	Sulphur (S)	0.045 (Max)	0.010	Conforms
5.	Phosphorous (P)	0.045 (Max)	0.014	Conforms

12. COMMENTS & RECOMMENDATIONS

Not applicable

13. LITERATURE :


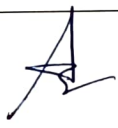



The specification of the implement operating manual, maintenance, safety instruction and spare parts catalogue provided in English. The literature developed is found to be adequate for the guidance of user and service personal. However, it need to developed (as per IS: 8132: 1999) in other regional languages.

14. APPLICANTS'S COMMENTS:

Not applicable

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-	

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ANNEXUR- 1

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