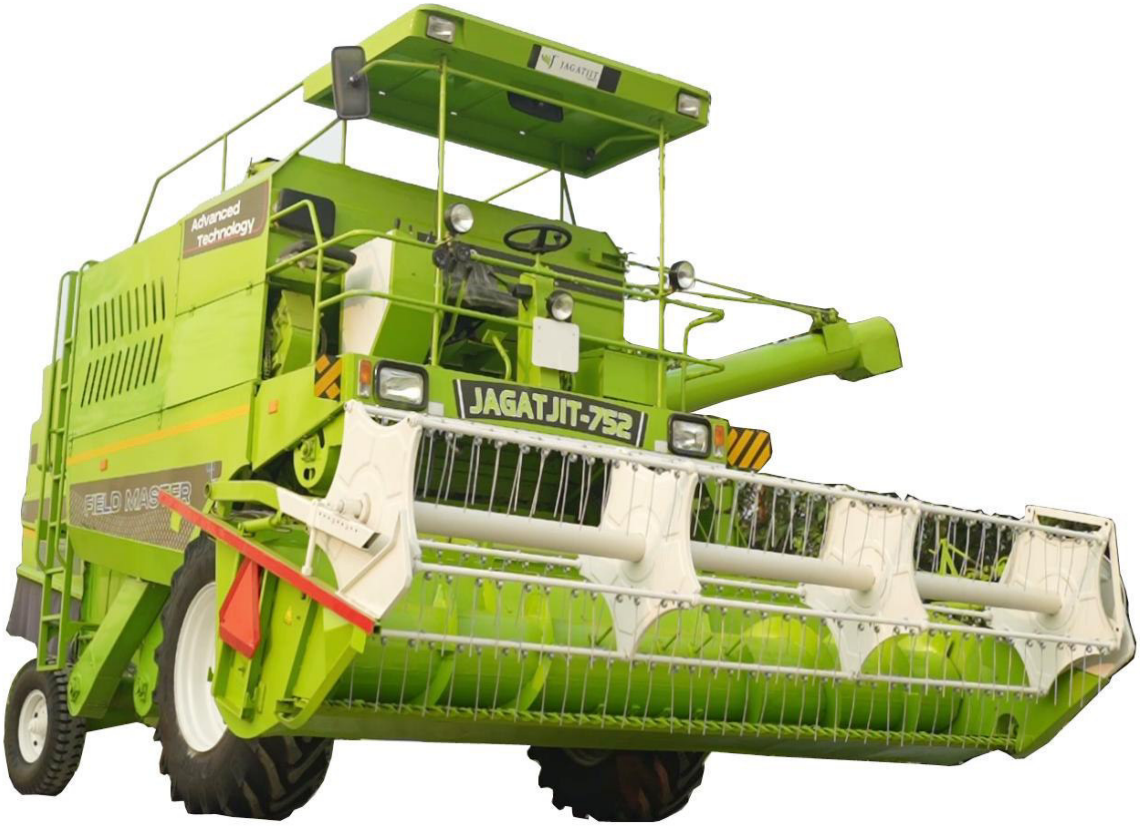
व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ **No.: Comb- 272/2868/2022**

माह/**Month: July, 2022**

THIS TEST REPORT VALID UP TO : 31st July, 2029



JAGATJIT 752
SELF PROPELLED COMBINE HARVESTER

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

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

ट्रैक्टर नगर, सिरसा रोड, हिसार, (हरियाणा) - 125 001

Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001

[ISO 9001:2015 CERTIFIED]

Website: http://nrfmtti.gov.in/

E-mail: fmti-nr@nic.in

Tele./FAX: 01662-276984

3.	Fuel consumption: - (l/h) - (l/ha)	 7.43 to 8.22 11.35 to 13.97	 7.81 to 8.72 12.46 to 14.31
4.	Crop throughput (tonne/h)	5.45 to 8.66	7.53 to 11.69
5.	Grain breakage in main grain outlet (%)	1.10 to1.59	0.53 to 0.97
6.	Header losses (%)	0.09 to 0.38	0.28 to 0.48
7.	Total non-collectable losses (%)	0.2 to 0.6	0.4 to 0.7
8.	Total collectable losses (%) (un threshed + broken from main outlet)	2.0 to 2.5	1.4 to 1.9
9.	Total processing losses (%)	2.1 to 2.7	1.6 to 2.0
10.	Threshing efficiency (%)	98.7 to 99.4	99.1 to 99.3
11.	Cleaning efficiency (%)	96.8 to 97.2	97.2 to 98.0

17.3 Conformity to Indian Standard

(i)	IS: 6025-1982 (Reaffirmed 2014)-Specification for knife section for harvesting machine.	:	**Does not conform in toto**
(ii)	IS: 6024-1983 (Reaffirmed 2014)-Specification for guards for harvesting machines.	:	**Does not conform in toto**
(iii)	IS: 10378-1982 (Reaffirmed 2016)-Specification of knife back for harvesting machine.	:	**Does not conform in toto**
(iv)	IS: 6283 (Part II)-2007(Reaffirmed 2014)-Tractors and machinery for agriculture and forestry-symbol for operator controls and other displays.	:	Conforms
(v)	IS: 8133-1983 (Reaffirmed 2014)-Guidelines for location & operation of operator controls on agricultural tractors and machinery.	:	**Does not conform in toto**
(vi)	IS: 15806-2018-Combine Harvester- Recommendations on Selected Performance and Other Characteristics.	:	Conforms

18. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS

18.1	**Acceptance criteria for performance characteristics as per clause 4.1 of IS 15806:2018**						
Sr. No	**Characteristics**		**Category (Evaluative/ Non evaluative)**	**Requirement (R)/ Declaration (D)**	**Tolerance**	**Observed**	**Remarks**
1	**2**		**3**	**4**	**5**	**6**	**7**
I.	**Prime mover performance**						
	a)	Max. power (absolute) Average max. power observed during 2 hrs. max. power test in natural ambient condition, kW	Evaluative	71.7 **(D)**	±5% of declared value	73.8	Conforms

	b)	Max. power observed during test after adjusting the no load engine speed as per recommendation of the manufacturer for field work, kW	Evaluative	69 **(D)**	±5% of declared value	70.3	Conforms
	c)	Power at rated engine speed, kW (under natural ambient condition)	Non-Evaluative	72 **(D)**	±5% of declared value	73.1	Conforms
	d)	Specific fuel consumption corresponding to average maximum power under 2h maximum power test, g/kWh.	Evaluative	240 **(D)**	±5% of declared value	244.7	Conforms
	e)	Max. smoke density at 80% load between the speed at max. power & 55% of speed at max. power or 1000 rpm whichever is higher	Evaluative	As per CMV rules. Maximum smoke density Light absorption coefficient is 5.2 units **(R)**	Nil	2.18	Conforms
	f)	Max. crank shaft torque, (N–m) observed during the test after no load engine speed is adjusted as per manufacturer's recommendation for field work	Evaluative	419 **(D)**	±8% of declared value	430.1	Conforms
	g)	Back up torque, % (Natural ambient)	Evaluative	7 % min. **(R)**	Nil	42.27	Conforms

1		2	3	4	5	6	7
	h)	Max. operating temperature, ^{o} C i) Engine oil ii) Coolant	Evaluative	120 **(D)** 105 **(D)**	Should not exceed the declared value	115.0 98.0	Conforms Conforms
	i)	Lubrication oil consumption, g/kWh	Evaluative	1 % of SFC at maximum power (high ambient) **(R)**	Nil	0.387	Conforms
II. Brake performance							
	i)	Max. stopping distance at a force equal to or less than 600 N on brake pedal (m)-(cold brake and hot brake) **CMVR does not prescribe hot brake test.**	Evaluative	As per requirement of CMVR **(R)**	Nil	Cold: 2.4	Conforms
	b)	Max. force exerted on brake pedal to achieve declaration of 2.5 m/sec^2 (N)	Evaluative	≤ 600 N **(R)**	--	Cold 470	Conforms
	i)	Effectiveness of parking brake at a force of 600 N at foot pedal or 400 N at hand lever	Evaluative	As per requirement of CMVR **(R)**	Nil	Yes	Conforms
III. Mechanical vibration							
	i)	Operator's platform	Non evaluative	120 µm max. **(R)**	Nil	235	**Does not conform**
	ii)	Steering wheel	Non evaluative	150 µm max. **(R)**	Nil	287	**Does not conform**
	iii)	Seat with driver seated	Non evaluative	120 µm max. **(R)**	Nil	238	**Does not conform**
IV. Air cleaner oil pull over							
	a)	Air cleaner oil pull over in % when tested in accordance with IS 8122 part (II) 2000	Evaluative	0.20 max. **(R)**	Nil	Dry type air cleaner provided hence test is not applicable	Not applicable

V. Noise measurement							
	i)	Max. ambient noise emitted by combine at by-sanders position dB(A)	Evaluative	88 dB(A) as per CMVR **(R)**	Nil	87.5	Conforms
	ii)	Max. noise at operator's ear level dB(A)	Evaluative	98 dB(A) as per CMVR **(R)**	Nil	94.2	Conforms
VI. Header lifting Test							
	i)	Satisfactory completion of header lifting test	Evaluative	-	Nil	Satisfactorily completed	Conforms

VII. Discard limit							
	a)	Cylinder bore diameter, mm	Evaluative	104.15 **(D)**	Should not exceed the values declared by the manufacturer	104.03	Conforms
	b)	Piston diameter, mm	Evaluative	103.826 **(D)**	-do-	103.95	Conforms
	c)	Piston to cylinder liner clearance at skirt	Evaluative	0.15 **(D)**	-do-	0.08	Conforms
	d)	Ring end gap, mm i) Top compression ring ii) 2nd compression ring iii) Oil ring	Evaluative	 i) 1.2 **(D)** ii) 1.2 **(D)** iii) 1.2 **(D)**	-do-	 i) 0.40 ii) 0.40 iii) 0.40	Conforms
	e)	Ring groove clearance, mm 1. Top compression ring 2. 2nd compression ring 3. Oil ring	Evaluative	 i) Tapered ii) 0.5 **(D)** ii) 0.5 **(D)**	-do-	 i) Tapered ii) 0.08 ii) 0.03	Conforms
	f)	Diametrical and axial clearance of big end bearing, mm Diametrical Axial	Evaluative	 0.12 **(D)** 0.60 **(D)**	-do-	 0.13 0.38	Conforms

	g)	Diametrical and axial clearance of main bearings, mm Diametrical Crank shaft end float	Evaluative	 0.30 **(D)** 0.40 **(D)**	-do-	 0.11 0.23	Conforms
	h)	Thickness of brake lining, mm	Evaluative	Up to rivet **(D)**	-do-	8.09	Conforms
	i)	Thickness of clutch plate, mm	Evaluative	Up to rivet head **(D)**	-do-	2.30 to 2.42 mm above the rivet head	Conforms
VIII. Field performance							
	a)	Suitability for crops	Evaluative	Wheat & paddy (Wheel type) Paddy (Track type)	Nil	Wheat and paddy	Conforms
	b)	Average processing losses (%)	Evaluative Wheat Rice/ Paddy	Max. (of average) 3% 4% **(R)**	Nil	 Wheat Max. 2.7% Paddy max. 2.0%	Conforms Conforms
	c)	Threshing efficiency	Evaluative	≥98 percent for wheat & Paddy **(R)**	Nil	Min. 98.7 % for wheat min. 99.1 % for paddy	Conforms
	d)	Cleaning efficiency	Evaluative	≥96 percent for wheat & Paddy **(R)**	Nil	Min. 96.8 % for wheat min. 97.2 % for paddy	Conforms
	e)	Grain breakage in main grain tank	Evaluative	≤ 2.5 percent **(R)**	Nil	Max. 1.59 % for wheat max. 0.97 % for paddy	Conforms

	f)	Non collectable losses	Evaluative	≤ 2.5 percent for wheat & paddy & grain ≤ 4.0 percent for Soybean **(R)**	Nil	Max. 0.6% for wheat max. 0.7 % for paddy	Conforms
IX. Safety requirement							
	a)	Guards against all moving parts	Evaluative	Belt and chain drives, pulleys hydraulic pipes **(R)**	--	Provided	Conforms
	b)	Lighting arrangement	Evaluative	As per CMVR **(R)**	-	Provided	Conforms
	c)	Grain tank cover	Evaluative	Essential **(R)**	-	Provided	Conforms
	d)	Spark arrester in engine's exhaust in case naturally aspirated engine	Evaluative	Essential **(R)**	-	Turbo charger is provided in exhaust system	--
	e)	Stone trap before concave	Evaluative	Essential **(R)**	-	Provided	Conforms
	f)	Rear view mirror	Evaluative	Essential **(R)**	-	Provided	Conforms
	g)	Fire extinguisher	Evaluative	Essential **(R)**	-	Provided	Conforms
	h)	Slip clutch at following drives – i) Cutting platform ii) undershot conveyor drive iii) Grain & tailing elevator	 Evaluative Non evaluative Non evaluative	 Essential **(R)** Optional Optional	-	 Provided Provided **Not provided**	 Conforms Conforms **Does not conform**
	i)	Anti slip surfaces at operator platform & ladder & proper gripping for the control levers.	Evaluative	Essential **(R)**	-	Provided	Conforms

	j)	Working clearance around the controls	Non evaluative	Essential 70 mm, min **(R)**	-	Provided	Conforms
	k)	Labelling of control and gauges	Evaluative	Essential **(R)**	-	Provided	Conforms
X	**Material of construction :**						
	i)	Knife guard should conform to IS: 6024 -1983	Non evaluative	Should have maximum hardness 163HB **(R)**	-	203 (Average)	**Does not conform**
	ii)	Knife blade as per IS :6025 -1982	Non evaluative	It must have Chemical composition as C=0.70 - 0.95 % Mn= 0.30-0.50% **(R)**	-	C= 0.68 Mn= 0.67	**Does not conform** **Does not conform**
	iii)	Knife back should meet the requirement of IS:10378-1982	Non evaluative	The knife back shall be manufactured from Carbon Steel having minimum carbon content of 0.35 % **(R)**	-	0.24	**Does not conform**

18.2 Acceptance criteria in case of Breakdowns/Defects as per clause 4.2 of IS:15806-2018

XI. Break down (critical, major & minor)

Sr. No.	Category of breakdowns	Category (Evaluative/ Non evaluative)	Requirements as per OM	As observed	Whether meets the requirements (Yes/No)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two	None	Yes
4.	Total breakdown	Evaluative	In no case total no of (major + minor) breakdowns exceed five	None	Yes

19. COMMENTS AND RECOMMENDATIONS

19.1 The amplitude of mechanical vibration of components marked as (*) in chapter 13 of this test report are observed on higher side. This calls for providing suitable remedial measures to dampen the vibration in order to improve the operational comfort and service life of various components & sub-assemblies.

19.2 **Field performance test**

No noticeable defect observed during field test.

19.3 **Ease of operation and safety provision**

i) Safety against the accidental start of engine is not provided on combine harvester. It **MUST** be provided.

ii) No noticeable difficulties observed during operation of combine harvester.

iii) Slip clutch at grain and tailing elevator drive are not provided. It should be provided as per the requirement of IS:15806-2018

19.4 **Hardness and chemical composition**

Hardness & chemical composition of knife blade is not within the limits specified in IS: 6025-1982. It should be looked into for corrective action at regular production level.

19.5 Individual brake pedals for LHS & RHS brake is not provided. It may be considered for provided.

19.6 There is no safety provision for grain unloading auger. It should be provided.

19.7 The height of first step of ladder is observed as 720 mm against the requirement of 550 mm. It should be locked into for corrective action for operator's comfort.

19.8 Literature supplied with the machine

The following literatures were supplied by the applicant as below

1. Operator's manual for combine harvester
2. Operator manual –Engine
3. Parts catalogue for combine harvester

However, the operator manual needs to be updated as per IS:8132-1999

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN **DIRECTOR**	05.07.2022

Draft test report compiled by E. Bhaskar, Senior Technician

20. APPLICANT'S COMMENTS

We will comply during our regular production of the combine harvester.