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

संख्या / No. : Comb-60/1437/2014
माह / Month : June, 2014

TAFE, HARVESTRAC 8060T SELF PROPELLED, COMBINE HARVESTER (TRACK TYPE)

सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

कृषि मंत्रालय (कृषि एवं सहकारिता विभाग, मशीनीकरण एवं प्रोद्योगिकी प्रभाग)

Ministry of Agriculture (Deptt. of Agri. & Co-op, Mechanization & Technology Division

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001-2008 Certified Institute)

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५ TRACTOR NAGAR, BUDNI (M.P.) 466445

Phone : 07564-234729 Fax : 07564-234743 E-mail : fmti-mp@nic.in Website: http://cfmtti.dacnet.nic.in

3. SPECIFICATIONS

3.1	**Combine Harvester**		
	Make	:	Tractor and Farm Equipment Linited.
	Model	:	Harvestrac 8060T
	Serial Number/Chassis No.	:	C13002
	Type	:	Self propelled track type
	Year of manufacture	:	2013
3.2	**Prime mover (Engine)**		
	Make	:	Simpsons
	Model	:	S433
	Serial number	:	AP 550
	Type	:	Four stroke, Naturally Aspirated, liquid cooled, direct injection, diesel engine.
	Engine speed (Manufacturer's recommended production setting), (rpm) :		
	- Maximum speed at no load,	:	2500 ± 50
	- Low idle speed	:	725 ± 25
	- Speed at maximum torque	:	1375 ± 50
	- Rated speed	:	2300
	- Rated speed for field operation	:	2300
	Location	:	Below the Grain tank
	Mounting	:	On M.S. frame with anti vibration mountings
3.2.1	**Cylinder & Cylinder Head:**		
	Number	:	Four
	Disposition	:	Vertical, inline
	Bore/stroke, (mm)	:	91.4/127
	Capacity as specified by the applicant, (cc) (apa)	:	3330
	Compression ratio	:	18.5 : 1
	Type of cylinder head	:	Monoblock
	Type of cylinder liners	:	Dry
	Type of combustion chamber	:	Direct injection
	Arrangement of valves	:	Overhead
	Valve clearance (cold):		
	- Inlet valve, (mm)	:	0.25
	- Exhaust valve, (mm)	:	0.30
3.2.2	**Fuel System:**		
	Type of fuel feed system	:	Force feed
3.2.2.1	**Fuel tank:**		
	Capacity, (l)	:	65.0
	Location	:	On LHS of combine
	Provision for draining of sediments / water	:	Drain plug provided
	Material of fuel tank	:	M. S. Sheet

17.11 Category of breakdowns / defects:

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 15806- 2008, Annexure A1,A2 & A3	As observed	Whether meets the requirements (Yes/No.)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than Three 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 breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (3 major + 2 minor) or 5 minor breakdowns.	None	Yes

18. SUMMARY OF OBSERVATIONS. COMMENTS AND RECOMMENDATIONS

18.1.1 The maximum power output of the engine was observed as **38.9** kW at 2250 rpm of engine at full throttle.

18.1.2 The specific fuel consumption corresponding to maximum power at full throttle setting measured as **0.254**kg /kwh

18.1.3 The back-up torque of the engine was measured as **23.62 %** under natural ambient condition at full throttle.

18.1.4 The maximum smoke density was recorded as 0.06 m−1 (Bosh No.).

18.1.5 The maximum temperature of engine oil, coolant (water) and exhaust gas were observed as 109, 78 and 661 respectively.

18.1.6 The lubricating oil & coolant consumption during five hours rating test were measured as 1.1g/kwh & 0.69 % of total coolant capacity respectively.

18.2 Turning Ability:
The radius of turning circle of LHS and RHS was observed satisfactory.

18.3 Visibility:
The visibility around the cutter bar from operator's seat in normal siting position is satisfactory.

18.4 Braking Performance:
No specific brake mechanism is provided. The combine stop by bringing the control levers of LHS and RHS driving roller/track to the neutral position.

18.5 Mechanical Vibration:
The amplitude of mechanical vibration of components are given in the chapter 8 of this report. The observation reading marked (*) for various assemblies on higher side and suitable arrangement should be provided to dampen the vibration for the operator's comfort.

18.6 Noise Measurement:

i) The ambient noise emitted by the machine was measured as **91 db** (A). Which is on higher side.

ii) The noise at drivers ear level was measured as **99** db(A) which is on higher side when compared to warning levels of 98 db (A).Which does not meet the requirement of IS:12180 part –I & II which is looked for corrective action.

18.7 Field Test:

Summary of field test:

The result of the field test for the paddy harvesting is summarized below.

18.7.1 Paddy Harvesting

i) The grain breakage range from 0.002 to 0.025% which is considered to be normal.

ii) The total collectable losses ranged from 0.259 to 1.279% & non-collectable losses ranges from 0.814 to 1.472% which is considered to be normal.

iii) The total processing losses ranged from 1.052 to 2.196% which is considered to be on normal against max. Limit of 2.5 % as per IS.

iv) The threshing efficiency ranged from 98.70 to 99.85% which is considered to be normal.

v) The cleaning efficiency ranged from 98.09 to 99.35% which is considered to be normal.

18.7.2 Harvesting of any other crops:

The performance of combine harvester to harvest the paddy crop was evaluated as recommended by the applicant.

18.7.3 Operation in Wet land : The operation of combine harvester was found satisfactory in dry as well as wet fields.

18.7.4 Ease of operation and safety provision:

i) The control provided around the operator is within easy reach clearance between operating liver of reel header less than 80 mm. It is looked for corrective action.

ii) The stone trap is not of adequate size and can't trap lease size stones provided on the combine harvester.

iii) Slip clutch/ safety devices in knife drive, crop auger and threshing drum drive are considered essential from safety point of view which needs to be provided.

iv) The provision for adjusting the reel speed is not provided, which needs to be provided.

v) Mechanical lock for reel in raised position needs to be provided to ensure safety while working on cutter bar.

18.7.5 Assessment of Wear:

i) The wear of engine components i.e. cylinder liners, piston, piston rings, valves, valve guides, springs, big-end bearing were observed within the permissible limit.

ii) The transmission gears and components wear found normal.

iii) The timing gears in normal condition.

iv) The condition of the component of hydraulic system and steering system was observed to be normal.

v) The condition of the bearing, chains, sprockets and belts was observed to be normal.

vi) The component of starter motor and alternator were found to be normal.

vii) The rate of wear of peg teeth bar of threshing cylinder & cylinder concave were observed to be normal.

18.7.6 Hardness and chemical composition:

I) The hardness of knife blade in reminder zone is not within the permissible limit of IS: 6025-1999.

II) The chemical composition of manganese is not within the limit.

18.7 Maintenance / service problems:

No noticeable maintenance / service problem was observed during the course of test at this institute however the following provisions needs to be provided in the machine

i) Provision of threshing drum speed variation to cater for varying crop conditions

18.8 Safety provisions

i) The slip clutch should be provided in all the drives to prevent the damage to the drive belts and fire hazard in case of choking of combine harvester during the crop harvesting.

ii) The tail lights hazard indicator lights should be provided on combine harvesters to prevent any accident during crossing of village roads in night during the harvesting operation.

iii) The provision for mechanical lock of cutting platform in raised position should be provided for safety during maintenance work.

18.9 Identification plate of combine:

The identification plate was provided on the combine harvester as specified in IS: 10273- 1999.

18.10 Literature supplied with the machine:

The following literature supplied in English were supplied with the machine for reference during testing and these where found adequate, however, it needs to be modified in Hindi and other regional language for the guidance of the users in accordance with IS :8132-1983.

1. Operator manual cum parts catalogue of harvestrac 8060T Harvester Combine.
2. Operator's Service book& Part's Catalogue Simpsons engine S 433 (BSIII)

19.0 Citizen charter

Duration of Test	Test duration under citizen charter	Whether the report released within time frame given in the citizen charter	Remark
September 2013 to May 2013 09 Months	10 Months	Yes	--

TESTING AUTHORITY:

R.K.NEMA
AGRICULTURAL ENGINEER

H.L.YADAV
SENIOR AGRICULTURAL ENGINEER

C.R.LOHI

DIRECTOR

Test Report compiled by: **Pratyush Satya,** Senior Technical Assistant

20. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
Nil		

Combine Run Hours During Test

Annexure-I

A	Laboratory Tests:	Hours
1.	Running-in	3.5
2.	Engine Performance test	14.88
3.	Radius of turning space & turning circle	0.50
4.	Location of center of Gravity	0.50
5.	Visibility test	0.00
6.	Brake performance Test	0.75
7.	Noise measurement	1.25
8.	Mechanical vibration Test	1.25
9	Header Lifting Test	3.00
B	**Field Test:**	
1	Paddy Harvesting	56.9
2	Miscellaneous test and other run hours including ideal run, transportation, trails and preparation for test	12.33
	TOTAL	**94.86**