

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: SCH-04/2681/2021

माह/Month : March , 2021

THIS TEST REPORT VALID UP TO : 31st MARCH, 2028



**CNH INDUSTRIAL (INDIA) PRIVATE LIMITED,
CASE IH AUSTOFT 4010,
SELF PROPELLED SUGARCANE HARVESTER**



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

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Steering effort and time to achieve 12 m turning radius at 10 kmph.

Harvester State	Turning Direction	Steering/Effort (N)	Maximum Turning Angle, (degree)	Time (s)
With steering pump running	Left Turn	30.8	197	2.60
	Right Turn	9.4	139	4.60
Without steering pump running		Not conducted as Servo transmission is provided.		

16. FIELD TEST

The sugarcane harvester CNH Industrial (India) Pvt. Ltd., CASE IH AUSTOFT 4010 was operated in field for 51.89 hours (excluding running in 1.63 hours) at recommended field setting. During the test, different available varieties of sugarcane such as CO 86032, CO VSI 9938, CO VSI 8005, and MS 10001 were harvested to assess the field performance of harvester with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction etc.

16.1 The crop and field parameters as under:

Parameters	Observations range
Row spacing, cm	: 135 to 160
Height of ridge, cm	: 8 to 22
Total cane height, cm	: 195 to 510
Height of millable portion of cane, cm	: 142 to 291
Plant population, /3 meter length of row	: 18 to 39
Plant spacing, cm	: 13 to 36
Cane diameter, mm	
Top	: 13 to 32
Middle	: 15 to 38
Bottom	: 17 to 42

Dimension of billets delivered after harvesting, mm	
Length	: 75 to 220
Diameter	: 14 to 37
Cutting height, mm	: 0 to 50
Maturity age of crop, months	: 12 to 14



16.2 Manual Sugarcane harvesting observations

During test for comparatively analysis of harvesting by machine in view of Cane collection efficiency manual harvesting is also conducted in marked area and data recorded as given below

Parameter	Observation range
Percentage of lodging	
Lodged :	2.25 to 9.28
Recumbent :	5.56 to 15.31
Sprawled :	8.99 to 30.93
Percentage of standing/ erect cane	47.42 to 83.15
Gross cane weight, t/ha	78.889 to 149.412
Extraneous matter,	
t/ha :	15.022 to 31.485
Percentage :	19.04 to 21.40
Net cane, t/ha	62.973 to 117.926

16.3 Rate of work and fuel consumption:

During test the rate of work and fuel consumption observed is as given below:-

Average travel speed, kmph	:	1.98 to 3.12
Average width of cut, m	:	1.37 to 1.51
Actual area covered, ha/h	:	0.208 to 0.347
Field efficiency, %	:	67.08 to 87.61
Fuel consumption,		
l/h :		19.46 to 22.58
l/ha :		65.04 to 102.79
l/t :		0.65 to 1.35
Net cane harvested,		
t/h :		15.118 to 34.841
t/ha :		63.727 to 115.352
Gross yield		
t/ha :		65.696 to 117.113



16.4 Quality of the work

Percentage of extraneous matter in the sample collected at outlet of the elevator, %	
Tops :	0.30 to 1.45
Leaf and Trash :	0.41 to 1.68
Soil :	0.00 to 1.77
Dead cane :	0.00 to 0.92
Total Extraneous matter :	1.22 to 3.93
Total Extraneous matter in sample collected at outlet of the elevator, t/h	1.244 to 3.542
Total collectable losses, t/ha	0.075 to 1.379
Total non-collectable losses, t/ha	0.210 to 0.785
Total losses, t/ha	0.285 to 2.165
Cane collection efficiency, %	92.79 to 108.46
Extraneous matter removal efficiency, %	83.70 to 94.41
The detail filed operation observations are given in Annexure-III to Annexure-VII	

16.5 General observation

- 1) Base cutter hydraulic oil pressure ranges from 43 to 62 bar.
- 2) Chopper hydraulic oil pressure ranges from 55 to 72 bar.
- 3) Diesel Exhaust fluid consumption ranges from 0.93 to 1.24 l/h which is 4.93 to 8.68 percent respectively of HSD consumption.
- 4) Average moisture content of extraneous matter ranges from 24.3 to 32.4 percent.

16.6 Time required for daily maintenance:

During test period the servicing and maintenance were done as per recommendation of manufacturer. The average labour required for daily maintenance was approximately 1.5 man hours.

16.7 Ease of Operation and Safety Provisions:

No noticeable difficulty was observed during the test



18.12 Starter motor & Alternator

Presence of oil in housing : None
 Visual Inspection of bearings and other components : No noticeable defect observed.

18.13 Chains, sprockets, Belts and bearings

All the chains, sprockets and belts : No noticeable defect observed.
 were visually inspected

19. SUMMARY OF OBERVATIONS**19.1 Engine Performance Test****Table-1 Engine Performance Test (Natural Ambient)**

Brake Power (kw)	Crankshaft torque, Nm	Engine speed (rpm)	Fuel consumption			Specific Energy kwh/l
			4	5	6	
1	2	3	4	5	6	7
a) Maximum Power- 2 hours test						
119.6	637.4	1792	31.48	26.00	0.217	3.80
b) Power at rated Engine speed (1900 rpm)						
114.1	573.6	1900	30.93	25.55	0.224	3.69

Table-2 Engine Performance Test (High Ambient)

Brake Power (kw)	Crankshaft torque, Nm	Engine speed (rpm)	Fuel consumption			Specific Energy kwh/l
			l/h	Kg/h	Specific kg/kwh	
1	2	3	4	5	6	7
a) Maximum Power						
118.3	625.7	1806	31.87	26.07	0.220	3.71
b) Power at rated engine Speed (1900 rpm)						
113.5	570.5	1900	30.81	25.20	0.222	3.68

19.2 Summary of field test:-**Table:-1 Rate of work**

Sr. No.	Parameter	Range
1.	Speed of operation, kmph	1.98 to 3.12
2.	Area covered, ha/h	0.208 to 0.347

3.	Fuel consumption	l/h	19.46 to 22.58
		l/ha	65.04 to 102.79
		l/t	0.65 to 1.35
4.	Net cane harvested	t/h	15.118 to 34.841
		t/ha	63.727 to 115.352

Table:-2 Quality of work

Sr. No.	Parameter	Hand Harvesting	Machine harvesting
	Gross cane delivered (t/ha)	78.889 to 149.412	65.696 to 117.113
	Extraneous matter (%)	19.04 to 21.40	1.22 to 3.93
	Extraneous matter (t/ha)	15.022 to 31.485	1.244 to 3.542
	Net cane delivered (t/ha)	62.973 to 117.926	63.727 to 115.352
	Left behind in field (non-collectable) (t/ha)	-	0.210 to 0.785
	Cane harvesting /efficiency collection	-	92.79 to 108.46

19.3 Conformity to Indian Standard

- | | | | |
|------|---|---|--------------------------|
| i. | IS: 6283 (Part I) -2006 & IS: 6283 (Part II) -2007 Tractors and machinery for agriculture and forestry-symbol for operator controls and other displays. | : | Conforms |
| ii. | IS: 8133-1983 -Guidelines for location & operation of operator controls on agricultural tractors and machinery. | : | Conforms. |
| iii. | IS:12239 (Part-I): 2018- Guide for safety and comfort of operator of agricultural tractors and power tillers- General Requirments | : | Conforms. |
| iv. | IS: 12239 (Part-II), 1999 Tractors and machinery for agriculture and forestry – Technical means for ensuring safety- Tractor | : | Conforms |
| v. | IS:12343:1998 Agricultural tractors- Operator's seat- Technical requirements | : | Does not conform in toto |
| vi. | IS 14683: 1999 -Agricultural tractors and machinery- Lighting devices for travel on public roads | : | Conforms |



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20. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS AS PER IS: 15806-2018.

S. No.	Characteristics	Category (Evaluative/ Non evaluative)	Requirement Declaration	Tolerance	Observed	Remark
1	2	3	4	5	6	7
Prime mover performance						
a)	Max. Power (absolute) Average max. power observed during 2 hrs. max. power test in natural ambient condition kW	Evaluative	117.8	± 5 % of declared value	119.6	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	117.8	± 5 % of declared value	119.6	Conforms
c)	Power at rated engine speed, kW (under natural ambient condition)	Evaluative	113.8	± 5 % of declared value	114.1	Conforms
d)	Specific fuel consumption corresponding to average maximum power under 2 h maximum power test, g/k Wh.	Evaluative	228	+5 % of declared value	217	Conforms
e)	Max. Smoke density at 80 % load between the speed at max. Power & 55 % of speed at max. or 1000 rpm whichever is higher	Evaluative	As per CMV Rules, Maximum smoke density Light absorption coefficient 3.25 per meter/Hart ridge units 75	5.2	0.017	Conforms



f)	Max. Crank shaft torque, (Nm) observed during the test after no load engine speed is adjusted as per manufacture's recommendation for field work	Evaluative	750	± 8 % of declared value	752.9	Conforms
g)	Back up torque, %	Evaluative	7 % min.	Nil	18.3	Conforms
h)	Max. Operating temperature, C°	Evaluative	i) 125 ii) 106	Should not exceed the declared value	i) 122 ii) 95	Conforms Conforms
	i.) Engine oil					
	ii.) Coolant					
i)	Lubrication oil consumption, g/kWh	Evaluative	Not exceeding 1 % of SFC at maximum power (high ambient)	Nil	0.237	Conforms
II Brake performance at 24 km/h or maximum speed whichever is less						
a)	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	Evaluative	As per requirement of CMVR	Nil	Cold: 2.30	Conforms
b)	Max. Force exert on brake pedal to achieve a deceleration of 2.5 m/sec ²	Evaluative	≤ 600 N	Nil	Cold: 264	Conforms
c)	Effectiveness of parking brake at a force of 600 N at foot pedal or 400 N at hand lever	Evaluative	As per requirement of CMV Rules	--	Effective	Conforms
III Mechanical vibration						
a)	Operator's platform	Non evaluative	120 µm max.	Nil	80	Conforms
b)	Steering wheel	Non evaluative	150 µm max.	Nil	35	Conforms
c)	Seat with driver seated	Non evaluative	120 µm max.	Nil	26	Conforms

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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	Nil	Not applicable as dry type air cleans provided	--
V.	Noise measurement						
	a)	Max. ambient noise emitted by combine at by standards position dB (A)	Evaluative	88 dB (A) as per CMVR	Nil	82	Conforms
	b)	Max. noise at operator's ear level dB (A)	Evaluative	98 dB (A) as per CMVR	Nil	87	Conforms
VI.	Lifting test of different unit(s)						
	a)	Satisfactory completion of base cutter, topper and crop divider	Evaluative	-	Nil	Satisfactory completed	Conforms
VII.	Discard limit						
	a)	Cylinder bore diameter, mm	Evaluative	104.218	Should not exceed the values declared by the manufacture	104.02	Conforms
	b)	Piston diameter, mm	Evaluative	103.758	--do--	103.824	Conforms
	c)	Piston to cylinder liner clearance at skirt	Evaluative	0.375	--do--	0.194	Conforms
	d)	Ring end gap, mm i) Top compression ring ii) 2 nd compression ring iii) Oil ring	Evaluative	i) 0.9 ii) 1.3 iii) 1.8	--do--	i) 0.40 ii) 0.90 iii) 0.55	Conforms
	e)	Ring groove clearance, mm i) Top compression ring ii) 2 nd compression ring iii) Oil ring	Evaluative	i) Taper ii) 0.16 iii) 0.20	--do--	i) NA ii) 0.05 iii) 0.05	Conforms



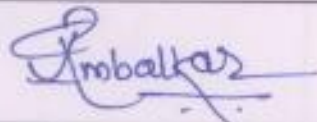
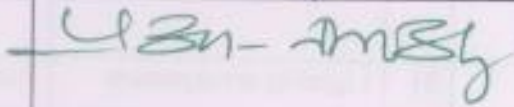
f)	Diametrical and axial clearance of main bearings, mm Diametrical Axial/ Crank shaft end float	Evaluative	0.350 0.765	--do--	0.12 0.29	Conforms
g)	Diametrical and axial clearance of big end bearings, mm Diametrical Axial	Evaluative	0.25 0.50	--do--	0.06 0.15	Conforms
h)	Thickness of brake disc, mm	Evaluative	1.15	--do--	2.76	Conforms
i)	Thickness of clutch plate, mm	Evaluative	NA	--do--	-	-
VIII	Safety requirement					
a)	Guards against all moving parts	Evaluative	Belt and chain drives pulleys hydraulic pipes around operations work place	-	provided	Conforms
b)	Lighting arrangement	Evaluative	As per CMVR	-	Provided	Conforms
c)	Spark arrester in engine's exhaust in case naturally aspirated engine	Evaluative	Essential	-	After treatment system in exhaust	Not applicable
d)	Rear view mirror	Evaluative	Essential	-	Provided	Conforms
e)	Fire extinguisher	Evaluative	Essential	-	Provided	Conforms
f)	Anti slip surfaces at operator platform & ladder & proper gripping for the control levers.	Evaluative	Essential	-	Provided	Conforms
g)	Labelling of control and gauges	Evaluative	Essential	-	Provided	Conforms



21. COMMENTS AND RECOMMENDATIONS

21.1	Make of DOC is given as "CNH Industrial" in the labelling plate, whereas it is declared as "KATCON" in the emission certificate provided by the applicant. This needs to be looked into for corrective action
21.2	Make of SCR is given as "CNH Industrial" in the labelling plate, whereas it is declared as "CORNAGLIA (CORTUBI)" in the emission certificate provided by the applicant. This needs to be looked into for corrective action
21.3	The vertical adjustment and backrest adjustment is not provided at operator seat it may be provided for operator comfort.
21.4	Mechanical vibration
	The amplitude of mechanical vibration of components marked as (*) in chapter 13 of this report are observed on higher side. This calls for providing suitable remedial measure to damper the vibration in order to improve the operational comfort and service life of various component & sub assemblies.

TESTING AUTHORITY

G.R.AMBALKAR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

22. Applicant's comments

Cl. No.	Our reference	Applicant's comments
22.1	21.1	We will correct the label of DOC unit in regular production
22.2	21.2	We will correct the label of SCR unit in regular production
22.3	21.3	We will look into to provide this provision of operator seat in future.
22.4	21.4	We will look into for minimizing the vibration level on recommended components.

