

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



**SYAN, SYAN 998VX
SELF PROPELLED COMBINE HARVESTER**



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
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Atmospheric conditions:

Temperature, °C	:	47.1
Pressure, kPa	:	98.1
Relative humidity, %	:	12.2
Wind velocity, m/s	:	2.4 to 2.9

TEST DATA:

S. No.	Gear Used	Travelling speed before acceleration (kmph)	Noise level, dB (A)	
			Silencer facing microphone	Silencer facing away from microphone
1.	L1	1.77	77.6	75.7
2.	L2	4.03	78.2	75.9
3.	L3	9.85	77.9	76.8
4.	H1	3.07	79.5	76.8
5.	H2	7.14	78.9	77.5
6.	H3	17.15	82.9	81.4

13.2 Noise at operator's ear level

Date of test	:	23.05.2022
Type of track	:	Concrete
Background noise level, dB(A)	:	47.7
Height of microphone from the foot board, mm	:	1250

Atmospheric conditions:

Temperature, °C	:	47.1
Pressure, kPa	:	98.1
Relative humidity, %	:	12.2
Wind velocity, m/s	:	2.4 to 2.9

TEST DATA:

Maximum noise level observed, dB(A)	:	94.2
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14. FIELD TEST

- 14.1** Combine harvester was operated in field for 26.18 and 27.62 hours (excluding running-in of 1.47 and 3.63 hours) for wheat and paddy harvesting respectively. During the test, available varieties of crop were harvested to assess the field performance of combine with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction etc. The crop and atmospheric conditions during field test are given in **Appendix - II & IV** respectively. The crop parameters recorded during the test for all crops are as under:-

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)	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	0.46 m ⁻¹	Conforms

COMB-296/2944/2022	SYAN 998 VX SELF PROPELLED COMBINE HARVESTER (COMMERCIAL)
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	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	Conforms
	g)	Back up torque, % (Natural ambient)	Evaluative	7 % min. (R)	Nil	42.12	Conforms
	h)	Max. operating temperature, ° C i) Engine oil ii) Coolant	Evaluative	120 (D) 105 (D)	Should not exceed the declared value	100.0 91.0	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)	Evaluative	As per requirement of CMVR (R)	Nil	Cold: 2.10 Hot: 2.60	Conforms
	ii)	Max. Force exerted on brake pedal to achieve deceleration of 2.5 m/s ²	Evaluative	≤600	Nil	495	Conforms
	iii)	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	146	Does not conform
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COMB-296/2944/2022	SYAN 998 VX SELF PROPELLED COMBINE HARVESTER (COMMERCIAL)
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	ii)	Steering wheel	Non evaluative	150 µm max (R) .	Nil	156	Does not conform
	iii)	Seat with driver seated	Non evaluative	120 µm max. (R)	Nil	159	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
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V. Noise measurement

	i)	Max. ambient noise emitted by combine at by-standers position dB(A)	Evaluative	88 dB(A) as per CMVR (R)	Nil	82.9	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
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VII. Discard limit

	a)	Thickness of brake lining, mm	Evaluative	Up to rivet head	-do-	1.8 to 2.1 mm above rivet head	Conforms
	b)	Thickness of clutch plate, mm	Evaluative	Up to rivet head	-do-	1.8 to 2.0 mm above 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	Max. (of average)	Nil	Wheat Max. 2.5 %	Conforms
			Wheat	3%		Paddy Max. 3.2 %	Conforms
			Rice/ Paddy	4% (R)			

COMB-296/2944/2022	SYAN 998 VX SELF PROPELLED COMBINE HARVESTER (COMMERCIAL)
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	c)	Threshing efficiency (%)	Evaluative	≥98 percent for wheat & Paddy (R)	Nil	Min. 98.7 % for wheat min. 97.9 % for paddy	Conforms
	d)	Cleaning efficiency (%)	Evaluative	≥96 percent for wheat & Paddy (R)	Nil	Min. 97.4 % for wheat min. 97.01 % for paddy	Conforms
	e)	Grain breakage in main grain tank (%)	Evaluative	≤ 2.5 percent (R)	Nil	Max. 1.28 % for wheat max. 1.37 % for paddy	Conforms
	f)	Non collectable losses (%)	Evaluative	≤ 2.5 percent for wheat & paddy & grain ≤ 4.0 percent for Soybean (R)	Nil	Max. 1.2 % for wheat Max. 1.3 % 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 fitted engine is provided	--
	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	Provided

COMB-296/2944/2022	SYAN 998 VX SELF PROPELLED COMBINE HARVESTER (COMMERCIAL)
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	h)	Slip clutch at following drives –			-		
		i) Cutting platform	Evaluative	Essential (R)		Provided	Conforms
		ii) Undershot conveyor drive	Non evaluative	Optional		Provided	Conforms
		iii) Grain & tailing elevator	Non evaluative	Optional		Not provided	Does not conform
	i)	Anti slip surface 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 of 163 HB (R)	-	15.4 (Average)	Conforms
	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= 0.5262 Mn= 0.5469	Does not conform Conforms
	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)	-	0.1855	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

19.2.1 No noticeable defect observed during field test.

19.3 Ease of operation and safety provision

No noticeable difficulties observed during operation of combine harvester.

19.4 Hardness and chemical composition

19.4.1 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.

19.4.2 Hardness of the knife guard does not conform to their relevant IS code. It should be looked into for improvement.

Crop Parameters

Sr. No.	Parameters		Observations	
			Wheat	Paddy
1.	Plant height, cm	:	85 to 130	92 to 125
2.	Number of tillers/m ²	:	240 to 270	265 to 367
3.	Length of ear head, cm	:	8 to 13	20 to 28
4.	Straw/grain ratio	:	0.8 to 1.0	2.0 to 2.8
5.	Moisture, %			
	- Grain	:	12.5 to 13.5	14.5 to 15.0
	- Straw	:	11.5 to 12.4	51.8 to 60.5

The results of field performance test of wheat and paddy crops harvesting are summarised in Table - 5 and presented in detail in **Appendix – II to V.**

Table- 5 : SUMMARY OF LOSSES & EFFICIENCIES OBSERVED DURING FIELD PERFORMANCE TEST.

Crop variety	Collectable losses (Max.) (%)	Non-collectable losses (Max.) (%)	Total processing losses (Max.) (%)	Threshing efficiency (Min.) (%)	Cleaning efficiency (Min.) (%)	Grain breakage in main tank (Max.) (%)	Forward speed (kmph)	Area covered (ha/h)	Fuel consumption		Grain output (kg/h)	Crop throughput (t/h)
									(l/h)	(l/ha)		
WHEAT												
DBW-187	2.2	1.2	2.5	98.7	97.6	1.02	2.81 to 3.10	0.913 to 1.050	7.25 to 8.40	7.40 to 9.16	5252 to 5935	9.99 to 10.58
DBW-303	2.2	1.1	2.5	98.9	97.4	1.28	3.06 to 3.17	0.990 to 1.050	6.94 to 7.49	6.37 to 7.55	6294 to 6606	11.81 to 12.56
PADDY												
IR-64 DRI I st	2.5	2.3	3.6	97.9	97.1	1.37	1.54 to 1.72	0.378 to 0.554	6.66 to 8.98	14.04 to 17.54	2387 to 3267	7.06 to 11.94

14.2 Unloading of grains

The time to unload the grain tank ranged from 62 to 76 second in paddy operation & 61 to 79 seconds in wheat operation.

14.3 Time required for daily maintenance

The average labour required for daily maintenance was approximately two man hours.

14.4 Harvesting of any other crop

Not done , as not recommended

15. DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS

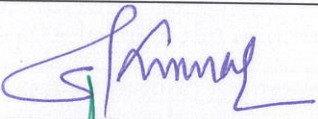
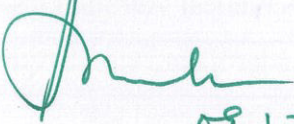
No noticeable defect or breakdown was observed during test.

19.7 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

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 09.12.2022

Draft test report compiled by Er. V.S Shinde, Senior Technical Assistant

20. APPLICANT'S COMMENTS

We will improve all the requisite parameters at our production level.

