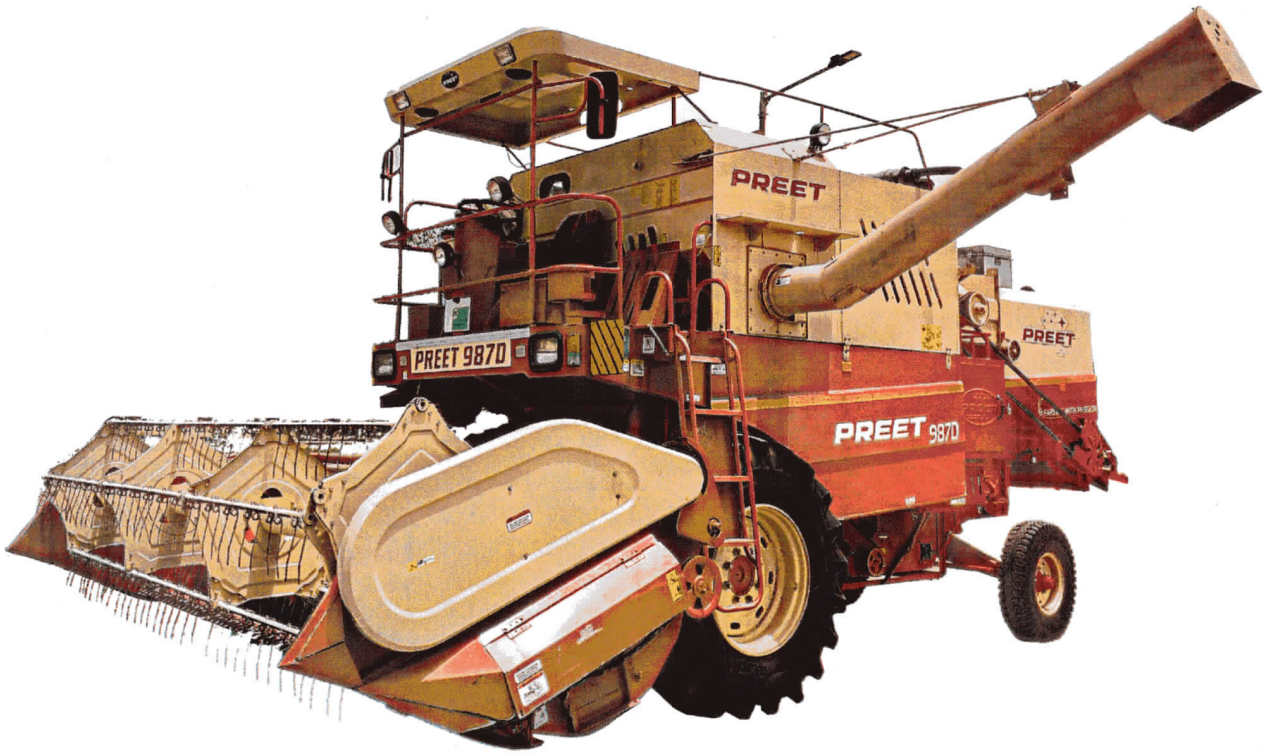
व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL **TEST REPORT**

संख्या/ **No.: COMB.-213/2480/2020**
माह/**Month**: June, 2020

THIS TEST REPORT VALID UP TO : 30th JUNE, 2027



PREET 987D
SELF PROPELLED COMBINE HARVESTER

सत्यमेव जयते

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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15. FIELD TEST

15.1 Combine harvester was operated in field for 26.65 and 26.22 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:-

Crop Parameters

Sl. No.	Parameters		Observations	
			Wheat	Paddy
1.	Average plant height, cm	:	95 to 112	80 to 121
2.	Average number of tillers/m^2	:	310 to 461	127 to 260
3.	Average length of ear head, cm	:	8 to 13	22 to 30
4.	Average straw/grain ratio	:	0.9:1 to 1.2:1	1.5:1 to 1.9:1
5.	Average moisture, %			
	- Grain	:	10.5 to 11.5	13.5 to 14.5
	- Straw	:	9.1 to 10.2	63.1 to 68.4

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 grain tank (Max.) (%)	Forward speed (kmph)	Area covered (ha/h)	Fuel consumption		Grain output (kg/h)	Crop through-put (t/h)
									(l/h)	(l/ha)		
1	2	3	4	5	6	7	8	9	10	11	12	13
WHEAT												
HD 3237	2.1	0.8	2.6	98.9	97.3	1.17	1.71 to 1.80	0.525 to 0.583	7.79 to 9.10	13.35 to 15.63	3386.69 to 5327.91	7.12 to 10.61
PADDY												
HD 53	2.1	0.8	2.5	98.7	96.8	1.16	1.22 to 1.45	0.349 to 0.461	9.40 to 10.25	20.37 to 28.43	2126.70 to 3909.65	6.26 to 10.35
2 lakh 12	1.4	0.6	1.7	99.4	97.8	0.78	1.31	0.396	10.25	25.88	3065.75	8.52

SUMMARY OF FIELD PERFORMANCE OF CHOPPER CUM SPREADER

Uniformity of straw spread, CV	17.2
Weighted mean size of chopped straw, cm	8.6

15.2 Unloading of grains

The time to unload the grain tank ranged from 68 to 95 second in Wheat operation & 56 to 89 seconds in Paddy operation.

15.3 Time required for daily maintenance

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

15.4 Harvesting of any other crop

Not done , as not recommended

16. DEFECTS, ADJUSTMENTS, BREAKDOWNS AND REPAIRS

No noticeable defect observed

17. INSPECTION AND ASSESSMENT OF WEAR

	The engine and other assemblies were dismantled after 73.27 hours of engine operation.						
17.1	**Engine**						
17.1.1	**Cylinder bore**						
Cylinder No.	Cylinder bore dia. (mm)						Max. permissible wear limit (mm)
	Top position		Middle position		Bottom position		
	Thrust side	Non- thrust side	Thrust side	Non-thrust side	Thrust side	Non-thrust side	
1.	104.03	104.04	104.03	104.01	104.04	104.02	104.15
2.	104.02	104.01	104.01	104.02	104.01	104.02	
3.	104.01	104.02	104.03	104.03	104.03	104.03	
4.	104.03	104.02	104.02	104.02	104.02	104.02	
5.	104.02	104.03	104.01	104.03	104.01	104.02	
6.	104.03	104.01	104.02	104.00	104.01	104.00	

17.1.2 Piston

Piston No.	Piston dia. (mm)				Clearance between cylinder liner and piston (mm)	
	Top position		At skirt			
	Thrust side	Non-thrust side	Thrust side	Non-thrust side	Observed	Discard limit
1.	103.36	103.24	103.95	Not measured due to piston design constraint	0.10	0.15
2.	103.31	103.16	103.92			
3.	103.33	103.11	103.93			
4.	103.32	103.12	103.95			
5.	103.35	103.12	103.96			
6.	103.30	103.21	103.94			

17.1.3 Ring end gap

Cylinder No.	Ring end gap (mm)									Max. Permissible wear limit (mm)
	1st Compression Ring			2nd Compression Ring			Oil Ring			
	Top	Middle	Bottom	Top	Middle	Bottom	Top	Middle	Bottom	
1.	0.45	0.40	0.45	0.45	0.45	0.45	0.35	0.35	0.30	1.2
2.	0.45	0.40	0.40	0.45	0.45	0.45	0.30	0.35	0.35	
3.	0.40	0.40	0.40	0.45	0.40	0.45	0.30	0.35	0.35	
4.	0.45	0.40	0.40	0.45	0.45	0.45	0.30	0.35	0.30	
5.	0.40	0.45	0.45	0.40	0.45	0.45	0.35	0.35	0.35	
6.	0.40	0.40	0.35	0.45	0.45	0.40	0.35	0.35	0.35	

17.1.4 Ring side clearance

Rings	Ring side clearance (mm)						Max. Permissible wear limit, mm
	Piston 1	Piston 2	Piston 3	Piston 4	Piston 5	Piston 6	
1st Comp. Ring	Taper ring						
2nd Comp. Ring	0.07	0.08	0.07	0.08	0.09	0.08	0.20
Oil ring	0.03	0.04	0.04	0.03	0.04	0.04	0.10

17.1.5 Main and big end bearings

17.1.5.1 Main bearings

Bearing No.	Diametrical clearance (mm)	Crank shaft end float (mm)	Permissible wear limit (mm)	
			Diametrical clearance	Crank shaft end float
1	0.09	0.15	0.13	0.40
2	0.07			
3	0.07			
4	0.04			
5	0.06			
6	0.08			
7	0.08			

17.1.5.2 Big end bearings

Bearing No.	Clearance(mm)		Permissible wear limit (mm)	
	Diametrical	Axial	Diametrical	Axial
1	0.06	0.30	0.12	0.40
2	0.06	0.30		
3	0.10	0.35		
4	0.09	0.35		
5	0.09	0.30		
6	0.07	0.35		

17.1.6 Valves and valve guides

		Observation
Any marked sign of overheating of valves	:	None
Pitting of seat/faces of valves	:	None
Spring stiffness, N/mm (kgf/mm)		
Inlet valve spring	:	17.95 (1.83) to 20.93 (2.13)
Exhaust valve spring	:	20.84 (2.12) to 21.27 (2.17)

Clearance between valve guide and valve stem(mm):		Observations	Discard limit
- Inlet valve	:	0.03 to 0.08	Not Specified
- Exhaust valve	:	0.05 to 0.09	

17.2 Steering system

Visual condition of the components of complete steering assembly. : No noticeable defect observed.

17.3 Chains, sprockets and belts

Visual condition of the components of complete assembly : No noticeable defect observed.

17.4 Bearings

Visual condition of the components of complete assembly : No noticeable defect observed.

17.5 Wear of rasp bar

Sr. No.	Mass of rasp bar before test (g)	Mass of rasp bar after 25.97 h test (g)	Wear (%) by weight
1	5867.6	5801.8	1.12
2	5750.1	5680.3	1.21
3	5814.2	5741.7	1.25
4	5867.3	5801.4	1.12
5	5957.6	5882.3	1.26

17.6 Wear of the peg teeth

The wear of the peg teeth of the threshing cylinder and concave was measured. The percentage wear on mass basis was computed and the results are given below:

Sl. No.	Original mass before test (g)	Mass after 25.73 h of test (g)	Percent wear by weight (%)
a)	**Peg teeth of threshing cylinder**		
1.	219.00	217.4	0.73
2.	221.35	219.6	0.79
3.	217.36	216.0	0.63
4.	210.81	209.3	0.72
5.	220.28	218.2	0.46
6.	221.54	219.8	0.79
7.	223.43	221.8	0.73
8.	223.66	221.3	1.06

9.	215.52	214.1	0.66
10.	224.48	222.6	0.84
11.	217.31	215.7	0.74
12.	226.88	225.4	0.65
13.	219.88	218.5	0.63
14.	209.14	207.9	0.59
15.	219.88	218.2	0.76
16.	223.47	221.7	0.79
b)	**Peg teeth of concave**		
1	209.87	208.20	0.80
2	226.15	224.50	0.73
3	225.00	222.90	0.93
4	219.22	217.70	0.69
5	223.80	222.20	0.71
6.	210.33	208.30	0.97

18. SUMMARY OF OBSERVATIONS

18.1 ENGINE PERFORMANCE TEST

Table-1 : ENGINE PERFORMANCE TEST (NATURAL AMBIENT)

Brake Power kW	Engine speed (rpm)	Fuel consumption			Specific energy, kWh/l
		l/h	kg/h	Specific, kg/ kWh	
(1)	(2)	(3)	(4)	(5)	(6)
a) Maximum power – 2 hours test					
73.75	2299	21.87	18.05	0.245	3.37
70.30	1649	18.73	15.53	0.221	3.75*
b) Power at rated engine speed: (2200 rpm)					
73.1	2199	21.87	18.04	0.247	3.34

***High idle at no load was 1750 rpm recommended for field operation.**

Table-2 : ENGINE TEST (HIGH AMBIENT)

Brake power (kW)	Engine speed (rpm)	Fuel consumption			Specific energy, kWh/l
		l/h	kg/h	Specific, kg/kWh	
(1)	(2)	(3)	(4)	(5)	(6)
a) Maximum power -					
71.6	2299	21.92	17.93	0.250	3.27
b) Power at rated engine speed (2200 rpm)					
71.2	2199	21.51	17.62	0.247	3.31

18.2 Field test

18.2.1 Summary of field tests

The results of the field test are summarized below:-

S. No	Parameters	Observed range	
		Wheat harvesting	Paddy harvesting
1.	Range of average speed of operation (kmph)	1.71 to 1.80	1.22 to 1.45
2.	Range of average area covered (ha/h)	0.525 to 0.583	0.349 to 0.461
3.	Maximum average fuel consumption: - (l/h) - (l/ha)	 7.79 to 9.10 13.25 to 15.63	 9.40 to 10.25 20.37 to 28.43
4.	Range of average crop throughput (tonne/h)	7.12 to 10.61	6.26 to 10.35
5.	Reported average grain breakage in main grain outlet (%)	1.17	1.16
6.	Reported average header losses (%)	0.39	0.36
7.	Reported average total non-collectable losses (%)	0.8	0.8
8.	Reported average total collectable losses (%) (un threshed + broken from main outlet)	2.1	2.1
9.	Reported average total processing losses (%)	2.6	2.5
10.	Reported average threshing efficiency (%)	98.9	98.7
11.	Reported average cleaning efficiency (%)	97.3	96.8
Performance of straw chopper cum spreader			
12	Uniformity of straw spread, CV	-	17.2
13	Weighted mean size of chopped straw, cm	--	8.6

18.3 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 I & 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 recommendation on selected performance and other characteristics	:	**Does not conform in toto**

19. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS

S. No	Characteristics		Category (Evaluative/ Non evaluative)	Requirement Declaration	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	±5% of declared value	73.75	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	±5% of declared value	70.30	Conforms
	c)	Power at rated engine speed, kW (under natural ambient condition)	Non-evaluative	72	±5% of declared value	73.1	Conforms
	d)	Specific fuel consumption corresponding to average maximum power under 2 h maximum power test, g/kWh.	Evaluative	240	+5% of declared value	245	Conforms
	e)	Max. Smoke density(Bosch no) at 80% load between the speed at max. Power and 55% of speed at max. Or 1000 rpm whichever is higher	Evaluative	As per central motor vehicles rules (CMV) rules	Nil	2.18 m^{-1}	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	419	±8%	430	Conforms

1		2	3	4	5	6	7
	g)	Back up torque, % (Natural Ambient)	Evaluative	7 % min.	Nil	42.27	Conforms
	h)	Max. Operating temperature, C° i) Engine oil ii) Coolant	Evaluative	 i) 120 ii) 105	Nil	 i) 115 ii) 98	Conforms
	i)	Lubrication oil consumption, g/kWh	Evaluative	Not exceeding 1 % of SFC at maximum power (high ambient condition)	Nil	0.387	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)	Evaluative	As per requirement of CMVR	Nil	Cold: 7.8 Hot: 8.0	Conforms
	b)	Max. Force exert on brake pedal to achieve a declaration of 2.5 m/sec^2 (N)	Evaluative	≤ 600 N	Nil	Cold: 320 Hot: 390	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 CMVR	Nil	Effective	Conforms
III. Mechanical vibration							
	a)	Operator's platform	Non-evaluative	120 µm max.	Nil	1322	**Does not conform**
	b)	Steering control wheel	Non - evaluative	150 µm max.	Nil	683	**Does not conform**
	c)	Seat with driver seated	Non - evaluative	120 µm max.	Nil	492	**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	0.20max.	Nil	Dry type air cleaner provided hence test is not applicable	Not applicable
V. Noise measurement							
	a)	Max. ambient noise emitted by combine at bystanders position dB (A)	Evaluative	As per CMV rules	Nil	86	Conforms
	b)	Max. noise at operator's ear level dB (A)	Evaluative	As per CMV rules	Nil	96	Conforms

1		2	3	4	5	6	7
VI. Header lifting Test							
	a)	Satisfactory completion of header lifting test	Evaluative	-	Nil	Satisfactory completed	Conforms
VII. Discard limit							
	a)	Cylinder bore diameter, mm	Evaluative	104.15	Nil	104.04	Conforms
	b)	Piston diameter, mm	Evaluative	103.826	Nil	103.92	Conforms
	c)	Piston to cylinder liner clearance at skirt	Evaluative	0.15	Nil	0.10	Conforms
	d)	Ring end gap, mm i) Top compression ring ii) 2nd compression ring iii) Oil ring	Evaluative	i) 1.2 ii) 1.2 ii) 1.2	Nil	i) 0.45 ii) 0.45 ii) 0.35	Conforms
	e)	Ring groove clearance, mm 1. Top compression ring 2. 2nd compression ring 3. Oil ring	Evaluative	i) Tapered ii) 0.20 ii) 0.10	Nil	i) Tapered ii) 0.09 ii) 0.04	Conforms
	f)	Diametrical and axial clearance of big end bearing, mm Diametrical Axial	Evaluative	0.12 0.40	Nil	0.10 0.35	Conforms
	g)	Diametrical and axial clearance of main bearings, mm Diametrical Crank shaft end float	Evaluative	0.13 0.40	Nil	0.09 0.15	Conforms
	h)	Thickness of brake lining, mm	Evaluative	3 mm	Nil	4.9	Conforms
	i)	Thickness of clutch plate, mm	Evaluative	7 mm Up to Rivet head	Nil	11.30	Conforms

1		2	3	4	5	6	7
VIII. Field performance							
	a)	Suitability for crops	Evaluative	Wheat & paddy (Wheel type) Paddy (Track type)	Nil	Wheat and paddy (Wheel type)	Conforms
	b)	Processing losses (%)	Evaluative Wheat Rice	 Max (of average) 3% Max (of average) 4%	Nil	Wheat (max of average) 2.6% Rice (max of average) 2.5 %	 Conforms Conforms
	c)	Threshing efficiency	Evaluative	≥98 percent for wheat & Paddy	Nil	98.9 % for Wheat 98.7% for Paddy	Conforms
	d)	Cleaning efficiency	Evaluative	≥96 percent for wheat & Paddy	Nil	97.3% for Wheat 96.8% for Paddy	Conforms
	e)	Grain breakage in main grain tank	Evaluative	≤ 2.5 percent	Nil	1.17 % for Wheat 1.16 % for Paddy	Conforms
	f)	Non collectable losses	Evaluative	*i*) ≤ 2.5 percent for wheat, Paddy & gram *ii*) ≤ 4.0 percent for Soybean	Nil	0.80 % For Wheat 0.80 % For Paddy	Conforms
IX	**Field performance for straw management system (if fitted)**						
	a)	Uniformity of straw spread, C.V. (percent)	Evaluative	20, Max	--	17.2	Conforms
	b)	Weighted mean size of chopped straw , cm	Evaluative	20, Max	--	8.6	Conforms
X	**Safety requirement**						
	a)	Guards against all moving parts/ drives and hot part	Evaluative	Belt and chain drives, pulleys hydraulic pipes (Around operators work place)	--	Provided	Conforms

1		2	3	4	5	6	7
	b)	Lighting arrangement	Evaluative	Essential as per CMVR	-	Provided	Conforms
	c)	Grain tank cover	Evaluative	Essential	-	Provided	Conforms
	d)	Spark arrester in engine's exhaust in case naturally aspirated engine	Evaluative	Essential	-	Turbo charger provided in exhaust system	Not Applicable
	e)	Stone trap before concave bars	Evaluative	Essential	-	Provided	Conforms
	f)	Rear view mirror	Evaluative	Essential	-	Provided	Conforms
	g)	Fire extinguisher	Evaluative	Essential	-	Provided	Conforms
	h)	Slip clutch at following drives –					
		i) Cutting platform	Evaluative	Essential		Provided	Conforms
		ii) Undershot conveyor drive	Non - evaluative	Optional	-	Provided	Conforms
		iii) Grain & tailing elevator	Non - evaluative	Optional		**Not provided**	**Not applicable**
	i)	Anti-slip surfaces at operator platform and ladder and proper gripping for the control levers.	Evaluative	Essential	-	Provided	Conforms
	j)	Working clearance around the controls	Evaluative	Essential 70mm,min	-	Provided	Conforms
	k)	Labelling of control and gauges and all operating controls	Evaluative	Essential	-	Provided	Conforms

XI	**Material of construction** :						
	i)	Knife guard should conforms to IS: 6024 - 1983	Non evaluative	Should have maximum hardness 163HB	-	203 to 208	**Does not conform**

1		2	3	4	5	6	7
	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%	-	C=0.6360 Mn= 0.3497	**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 %	--	C=0.0688	**Does not conform**
	iv)	Material of blades for straw management System (SMS)	Non evaluative	The flail and fixed blades shall be manufactured from steel having the following chemical composition or such other composition as shall be agreed to between the supplier and the purchaser. a) Carbon 0.70 to 1.0 percent. b) Manganese 0.6 to 0.97 percent. c) Chrome 0.1 percent. d) Nickel 0.1 percent	--	Flail blade C- 0.5330 Mn-0.4171 Cr-0.0120 Ni-0.8700 Fixed blade C-0.5670 Mn-0.3958 Cr-0.0902 Ni -0.9184	As the code itself accommodate the variation in chemical composition, there is little scope for declaration of conformity or otherwise
	v)	Bushes for flail blades	Non evaluative	Mild steel	-	**Not specified**	**Does not conform**

1		2	3	4	5	6	7
	vi)	Hardness of flail blades for Straw management system (SMS)	Evaluative	Bush section 20 to 35 HRC	-	21.4 to 25.5	Conforms
				Edge section (Hardened zone) : 48 to 58 HRC	-	49.5 to 53.2	Conforms
				Remainder zone : 20 to 35 HRC	-	27.8 to 32.4	Conforms
	vii)	Hardness of serrated blades for Straw Management System (SMS) :	Evaluative	Bush section 20 to 35 HRC	-	21.5 to 25.1	Conforms
				Edge section (Hardened zone) : 48 to 58 HRC	-	48.9 to 54.4	Conforms
				Remainder zone : 20 to 35 HRC	-	23.3 to 27.5	Conforms
	viii)	**Safety Requirements for Straw Management system, (if Fitted) :**					
		a) Guards against all moving parts/ drives and hot parts	Evaluative	Essential	-	Provided	Conforms
		b) RPM indicator for rotor	Evaluative	Desirable **(as written in code)**	-	Provided	Conforms
		c) Overlapping of final and fixed serrated blades	Evaluative	Essential	-	Provided	Conforms

XVII. Break down (critical, major & minor)

Sr. No.	Category of breakdowns	Category (Evaluative/ Non evaluative)	Requirements as per IS 15806:2018	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

20. CRITICAL TECHNICAL SPECIFICATIONS

Deferred till 31.12.2020 vide Ministry O.M. No 13-13/2020 M&T, (I&P) dated 24.04.2020

	21. COMMENTS AND RECOMMENDATIONS
21.1	**Mechanical vibration** The amplitude of mechanical vibration of components marked as (*) in chapter 12 of this 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.
21.2	Provision for varying oscillation of sieve is not provided. It **MUST** be provided.
21.3	There is no drive safety for grain unloading auger. It should be provided
21.4	Safety against the accidental start of engine is not provided on combine harvester. It **MUST** be provided.
21.5	The clearance between engine inlet valve and valve guide the discard limit is not specified. It **MUST** be specified.
21.6	**Field performance test** No noticeable defect observed during field test.
21.7	**Ease of operation and safety provision**
	Slip clutch at Gain and tailing elevator drive is not provided. It **MUST** be provided as per the requirement of IS 15806 : 2018
21.8	**Hardness and chemical composition**
	Hardness & chemical composition of knife blade, knife guard and knife back is not within the limits specified in their respective IS: 6025-1982. It should be looked into for corrective action at regular production level.
21.9	Material for bushes for flail blade is not specified. It should be specified as per the requirement of IS: 15806-2018

21.11 Literature supplied with the machine

The following literature was supplied by the applicant during the test

i) Operator's manual of combine harvester

ii) Combine harvester parts catalogue

The following literature should be provided

i) SMS operator and service manual
ii) SMS part's catalogue

The operator's manual should be updated as per IS: 8132-1999

TESTING AUTHORITY

RINKU PRASAD GUPTA TECHNICAL ASSISTANT	
P. K. PANDEY **DIRECTOR**	

Test Report compiled by, complied by C. Veeranjaneyulu, Senior Technician

22. APPLICANT'S COMMENTS

We will improve our future production