



**TAIZHOU CHANGFA, CF 805 SD  
SELF PROPELLED COMBINE HARVESTER (TRACK TYPE)**



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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### 17. SUMMARY OF OBSERVATIONS

17.1 Engine Performance Test:					
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
<b>i) Maximum power – Two hour test:</b>					
64.8	2376	19.95	16.84	0.260	3.248
61.9	2150	18.16	15.33	0.248	3.405*
<b>ii) Power at rated engine speed: ( 2400 rpm)</b>					
64.3	2400	19.95	16.84	0.262	3.223

\* Under part throttle setting recommended for field work.

#### 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)
<b>a) Maximum power-</b>					
60.3	2375	19.50	16.46	0.273	3.094
<b>b) Power at rated engine speed: (2400 rpm)</b>					
60.2	2400	19.43	16.40	0.272	3.098

#### 17.2 Field Test:

##### 17.2.1 Summary of field tests:

The results of the field test are summarized below:

S. No.	Parameters	Observed Range	
		Wheat Harvesting	Paddy Harvesting
1.	Average speed of operation (kmph)	3.57 to 3.93	2.60 to 3.41
2.	Average area covered (ha/h)	0.349 to 0.504	0.226 to 0.339
3.	Average fuel consumption:		
	- (l/h)	8.87 to 9.95	8.59 to 10.66
	- (l/ha)	17.59 to 24.39	31.43 to 41.14
4.	Average crop throughput (tonne/h)	4.59 to 6.32	5.03 to 12.58
5.	Average grain breakage in main grain outlet (%)	0.3 to 0.9	0.2 to 0.6
6.	Average header losses (%)	0.841 to 2.223	0.656 to 1.511
7.	Average total non-collectable losses (%)	1.1 to 2.4	0.9 to 1.8
8.	Average total collectable losses (%) (un threshed from main outlet)	0.788 to 1.432	0.216 to 0.583
9.	Average total processing losses (%)	1.296 to 1.925	0.876 to 1.330
10.	Average threshing efficiency (%)	98 to 99	99
11.	Average cleaning efficiency (%)	97 to 98	98

**17.3 Conformity to Indian Standard**

- (i) IS: 6025-1982 (Reaffirmed 2014)-Specification for : **Does not conform**  
knife section for harvesting machine.
- (ii) IS: 6024-1983 (Reaffirmed 2014)-Specification for : **Does not conform**  
guards for harvesting machines.
- (iii) IS: 10378-1982 (Reaffirmed 2016)-Specification of : **Does not conform**  
knife back for harvesting machine.
- (iv) IS: 15806-2008(Reaffirmed 2013)-Combine harvester : **Does not conform**  
thresher selected performance and other characteristics  
recommendations.
- (v) IS: 6283 (Part II)-2007(Reaffirmed 2014)-Tractors and : **Does not conform**  
machinery for agriculture and forestry-symbol for  
operator controls and other displays.
- (vi) IS: 8133-1983 (Reaffirmed 2014)-Guidelines for : **Does not conform**  
location & operation of operator controls on agricultural  
tractors and machinery.

**18. SELECTED PERFORMANCE AND OTHER CHARACTERISTICS AS PER IS: 15806-2008.**

S. No	Characteristics	Requirement	Declared	Observed	Remark	
1.	<b>Prime mover performance</b>					
	i)	Max. power (absolute) Average max. power observed during 2 hrs. max. power test in natural ambient condition, kW	-5% of declared value	63.4	64.8	Conforms
	ii)	Max. power observed during test after adjusting the no load engine speed as per recommendation of the manufacturer for field work, kW	-5% of declared value	53.7	61.9	Conforms
	iii)	Power at rated engine speed, kW	-5% of declared value.	59.7	64.3	Conforms
	iv)	Specific fuel consumption g/kWh.	±5% of declared value	285	260	Conforms
v)	Max. smoke density at 80% load between the speed at max. power & 55% of speed at max power. or 1000 rpm whichever is higher.	As pre CMV rules. Maximum smoke density Light absorption coefficient 3.25 m/Hartridge units 75	--	0.60	Conforms	

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vi)	Max. crank shaft torque, (N-m) observed during the test after no load engine speed is adjusted as per manufacture's recommendation for field work	-8% of declared value	290	338.3	Conforms
vii)	Back up torque, %	7% min.	--	27.4	Conforms
viii)	Max. Operating temperature, °C	To be declared by the manufacturer			
	i) Engine oil		125	128	<b>Does not conform</b>
	ii) Coolant		99	84	Conforms
ix)	Lubrication oil consumption, g/kWh	1 % of SFC at maximum power (high ambient), (tolerance+10%)	--	0.81	Conforms

**2. Brake performance**

i)	Whether parking brake is effective at a force of 600 N at foot pedal or 400 N at Hand and lever	Yes or No	--	Yes	Conforms
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**3. Mechanical vibration**

i)	Operator's platform	120 µm max.	--	5100	<b>Does not conform</b>
ii)	Steering lever	150 µm max.	--	5700	<b>Does not conform</b>
iii)	Seat with driver seated	120 µm max.	--	4800	<b>Does not conform</b>

**4. Air cleaner oil pull over**

i)	Max. oil pull over in % age when tested in accordance with IS: 8122 pt. (II)-2000	0.25% max.	Machine is provided with dry type air cleaner hence test is not applicable	NA	--
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**5. Noise measurement**

i)	Max. ambient noise emitted by combine dB (A)	88 dB (A) as per CMVR	--	86.0 dB(A)	Conforms
ii)	Max. noise at operator's ear level dB (A)	98 dB (A) as per CMVR	--	98.9 dB(A)	<b>Does not conform</b>

<b>6. Discard limit</b>						
i)	Cylinder bore diameter, mm	Should not exceed the values declared by the manufacture	102.04	102.02	Conforms	
ii)	Piston diameter, mm	-do-	101.89	101.93	Conforms	
iii)	Clearance between piston and cylinder liner at skirt	-do-	0.15	0.09	Conforms	
iv)	Ring end gap, mm	-do-				
	1. Top compression ring		0.7	0.40	Conforms	
	2. 2 <sup>nd</sup> compression ring		0.9	0.60	Conforms	
	3. Oil ring		0.7	0.50	Conforms	
v)	Ring groove clearance, mm	-do-				
	1. Top compression ring		--	--	--	
	2. 2 <sup>nd</sup> compression ring		0.11	0.090	Conforms	
	3. Oil ring		0.10	0.055	Conforms	
vi)	Diametrical and axial clearance of big end bearing, mm	-do-				
	Diametrical		0.15	0.12	Conforms	
	Axial		0.50	0.25	Conforms	
vii)	Diametrical and axial clearance of main bearings, mm	-do-				
	Diametrical		0.15	0.14	Conforms	
	Axial/crank shaft end float		0.35	0.19	Conforms	
viii)	Thickness of brake lining, mm	-do-	NA	--	--	
ix)	Thickness of clutch plate, mm	-do-	NA	--	--	
<b>7. Field performance</b>						
i)	Suitability for crops	Wheat & paddy essential	--	Wheat & Paddy	Conforms	
ii)	Grain breakage in grain tank	≤ 2.5 %	--	Wheat-	Conforms	
				0.3 to 0.9		
				Paddy-	Conforms	
				0.2 to 0.6		
iii)	Non collectable losses	≤ 2.5% for wheat, paddy & gram ≤ 4.0% for soya bean	--	Wheat-	Conforms	
				1.1 to 2.4		
				Paddy-	Conforms	
				0.9 to 1.8		

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iv)	Threshing efficiency	≥ 98% wheat & paddy	--	Wheat-98 to 99 Paddy-99	Conforms  Conforms
v)	Cleaning efficiency	≥ 96 % wheat & paddy	--	Wheat-97 to 98 Paddy-98	Conforms  Conforms

**8. Safety requirement**

i)	Guards against all moving parts	Essential	Provided	Provided	Conforms
ii)	Lighting arrangement a) Head light b) Parking light c) Indication d) Reverse gear e) Brake f) Number plate	Essential as per CMVR	NA	--	--
iii)	Grain tank cover	Essential		Provided	Conforms
iv)	Spark arrester in engine's exhaust	Essential		Not provided where as turbo charger in engine exhaust.	--
v)	Stone trap before concave	Essential		Not provided	<b>Does not conform</b>
vi)	Rear view mirror	Essential		provided	Conforms
vii)	Slip clutch at following drives – a) Cutting platform auger b) under shot conveyor drive c) Grain & tailing elevator	Essential		Not provided Not provided Not provided	<b>Does not conform</b> <b>Does not conform</b> <b>Does not conform</b>
viii)	Anti slip surfaces at operator platform & ladder & proper gripping for the control levers.	Essential		Provided	Conforms
ix)	Working clearance around the controls	Essential 70 mm, min.		Provided	Conforms
x)	Labelling of control and gauges	Essential		Not provided	<b>Does not conform</b>

9.	<b>Material of construction</b>				
i)	Knife guard should conform to IS: 6024 - 2004	The guard (except ledger plate) shall be manufactured from malleable iron casting (IS: 2108-1977), steel casting (IS: 1030-1974) or steel forging (IS: 2004-1978) Hardness 163HB max.	--	Not declared by the applicant  219 to 229	Unascertainable  <b>Does not conform</b>
ii)	Knife blade As per IS :6025 -2004	It must have chemical composition as C=0.70-0.95 %  Mn=0.30-0.50%	--	C= 0.5383%  Mn=0.6285%	<b>Does not conform</b>  <b>Does not conform</b>
iii)	Knife back should meet the requirement of IS:10378-2006	The knife back shall be manufactured from Carbon Steel having minimum carbon content of 0.35 %	--	C= 0.5292%	<b>Does not conform</b>

<b>10. Break down (critical, major &amp; minor)</b>					
Sr. No.	Category of breakdowns	Category (Evaluative/ Non evaluative)	Requirements as per IS: 15806-2008	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 three	None	Yes

## 19. COMMENTS AND RECOMMENDATIONS

### 19.1 Engine performance test

- i) The back-up torque of the engine under natural ambient condition was reported to be 27.4 and 17.5 percent at full throttle and at setting recommend for field operation respectively.
- ii) The maximum operating temperature of engine oil was observed as 128 °C against the declared value of 125 °C. **It is on higher side. It should be looked into.**

### 19.2 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.

### 19.3 Noise measurement

The noise emitted by the machine at operator's ear level was measured as 98.9 dB(A), which does not meet the requirements of IS: 15806-2008. This should be looked into.

### 19.4 Field performance test

**19.4.1 During paddy harvesting, frequent chocking of unloading auger was observed. It should be looked into.**

### 19.5 Ease of operation and safety provision

- i) **It is recommended that the symbols as per the requirement of IS-6283 (Part 2)-2007 may be provided.**
- ii) **Drive safety arrangement (slip clutch) is not provided at cutting platform auger, under shot conveyor, grain and tailing elevator. It is recommended to provide drive safety as it is essential requirement as per IS:15806-2008.**
- iii) First aid box is not provided on machine. It may be provided for safety.
- iv) Stone trap is not provided before the threshing cylinder and concave, it may be provided for safety.
- v) The location of hand accelerator lever should preferably be at front or to the right side of operator as per IS: 8133:1983.
- vii) Safety against accidental start of engine as per IS: 8133:1983 is not provided. It should be looked into.

**19.6** Service schedule of air cleaner is not specified. It **MUST** be specified for proper maintenance of machine.

**19.7** On labelling plate of the combine SFC of engine is provided as  $\leq 30$  kg/hm<sup>2</sup>. It may be provided in kg/kwh unit.



**19.8 Hardness and chemical composition**

- 19.8.1 Hardness & chemical composition of knife blade does not conform to the limits as specified in IS: 6025-1982. It should be looked into at regular production level.
- 19.8.2 Hardness of knife guard is not within the limit as specified in IS:6024-1983. It should be looked into for improvement.
- 19.8.3 The carbon content of the knife back does not conform to the requirement of relevant IS code. It should be looked in to for improvement.
- 19.8.4 Equivalent Indian brand name & capacity of battery should be specified by applicant.
- 19.8.5 The equivalent Indian grades and brands of oil are not provided. It **MUST** be provided for guidance of user.

**19.9 Literature supplied with the Machine:**

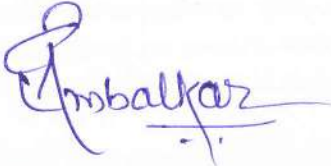

Following literatures are provided by the applicant for reference during test with test sample

1. Operation instruction – CF 805 SD (English)
2. Parts Catalogue – CF 805 SD (English)
3. Parts catalogue – CF 4C95G-Z (English)

The operation manual for engine is not provided, it should be brought out as per IS 8132:1999.

The operation manuals of combine should be updated as per IS 8132:1999.

**TESTING AUTHORITY**

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