



FORCE MOTORS LTD, BALWAN 400 DLX TRACTOR



भारत सरकार
कृषि मंत्रालय
(कृषि एवं सहकारिता विभाग)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & CO-OPERATION)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

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Subsequent to the examination of the case in light of Indian Standard IS 12207-2008, the following tests were considered to be carried out:

- Specification checking
- Nominal speed test
- Two hour maximum power PTO performance test, under normal ambient condition
- Un-ballasted gear performance test (Drawbar test performance)

2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.836 g/cc at 15°C was used.

2.2 Lubricants:

Sl. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine and Air cleaner oil	15W40 API CI 4	SAE 20W40
2.	Transmission and Hydraulic system	Servo Gear oil HP-90	Oil originally filled in the tractor was not changed
3.	Steering housing	Servo Gear oil HP-90	-do-
4.	Grease	Servo grease MP 2	Servo grease MP

3. ESSENTIAL TESTS

3.1. SPECIFICATIONS

	<u>Base Model</u>	<u>Variant Model</u>
3.1.1 Tractor:		
Make	: Bajaj Tempo	Force Motors Ltd.
Model	: Tempo balwan 400	Balwan 400 DLX
Type	: Four wheeled, Rear-wheel driven, General Purpose, Agricultural Tractor	
Year of manufacture	: 2003	2011
Chassis number	: T07007524 G-03	T 07020925H11
Country of Origin	: INDIA	INDIA
3.1.2 Engine:		
Make	: Bajaj Tempo	Force motors ltd.
Model	: TD1950F	TD 1950 F (36)
Type	: Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.	
Serial number	: D 1000 7666	D 10 021 670



1	2	3	4	5	6
		Model/Group combination No.	FP/KE22 AD 310, 9 440 030 028	FP/KE22 AD 310, 9 440 030 028	No Change
	b)	Fuel filters:			
		Make	MICO LIC BOSCH	MICO LIC BOSCH	No Change
		Model/Group combination No.	9 450 030 117	9 450 030 117	No Change
	c)	Fuel injectors:			
		Make	MICO LIC BOSCH	MICO LIC BOSCH	No Change
		Model/Group combination No.	9 430 030 100	9 430 030 100	No Change
	d)	Governor:			
		Make	MICO LIC BOSCH	MICO LIC BOSCH	No Change
		Model/Group combination No.	RSV 375...1100 A5C 1242 R	Not visible on tractor	–
	e)	Front axle	Rigid type	Rigid type	No Change
	f)	Wheel base (mm)	1890	1890	No Change
	g)	Overall length (mm)	3330	3315	Changed

7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of Indian Standard 12207: 2008 for acceptance of tractor for the purpose of subsidies/NABARD financing for the applicable features for this tractor model.

S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant (D)/ Requirement (R)		As observed		Whether Variant model meets the requirements (Yes/No.)
				Base	Variant	Base	Variant	
1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.1	PTO Performance :							
a)	- Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >35hp. -7.5/+10% for PTO power ≤ 35 hp	23.9 (D)	24.0 (D)	24.0	22.6	Yes
b)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	± 5%	247 (D)	247 (D)	253	255	Yes



1	2	3	4	5 a	5 b	6 a	6 b	7
7.1.2 Labelling of tractors (Provision of labelling plate):								
1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--		Force Motors Ltd.		Yes
2)	Model	Evaluative		--		BALWAN 400 DLX		Yes
3)	Year of manufacture	Evaluative		--		2011		Yes
4)	Engine serial number	Evaluative		--		D 10021670		Yes
5)	Chassis serial number	Evaluative		--		T 07020925H11		Yes
6)	Declaration of PTO power, kW	Evaluative		--		24 kW		Yes
7)	Specific Fuel Consumption (gm/kWh)	Evaluative		--		247		Yes

7.2 Salient Observations:

7.2.1 Laboratory tests:

7.2.1.1 PTO Performance:

- i) The maximum PTO power in case of base and variant models was observed as 24.0 & 22.6 kW respectively against the declaration of 23.9 & 24.0 kW which is within the specified limit.
- ii) The specific fuel consumption in case of base and variant models corresponding to maximum power was observed as 253 & 255 g/kWh respectively against the declaration of 247 g/kWh. Which is within the tolerance limit of IS: 12207:2008.

7.2.1.2 Three point linkage:

- i) Some of the parameters for three point linkage & linkage drawbar of present variant model conforms to Cat. II, that was conforms to Cat. I in base model. This should be looked into

7.2.1.3 Operator's seat (Conformity with IS: 12343-1998):

- i) Longitudinal and vertical distance from SIP to the centre of steering control wheel does not conform to required IS. This may be improved at production level.

7.2.1.4 Symbols of operator's control and other displays [Conformity with IS: 6283 (Part 1 & 2)-1998]:

- i) A colour zone of engine revolution gauge and fuel gauge has not been provided as per requirements of Indian Standard and calls for necessary improvements.
- ii) Turn signals for left-right movement and oil lubricant type & its frequency are not identifiable with symbols. This should be improved at production level.

7.2.1.5 Labelling plate:

The make of the tractor is not clearly identified on the labeling plate. Hence the separate column/rows should be provide for "Make" of the tractor.

7.3 Maintenance / Service Problems:

No noticeable maintenance or service problem was observed during the test. However, suitable provision for draining the sediments/water may be provided at the fuel tank.

7.4 Recommendation with regard to safety on tractor:

The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Provision of vertical retainer at step.
- ii) Provision of spark arresting device in exhaust system.



- iii) Provision of power take-off master shield
- iv) Provision of working clearance around hydraulic lever and mudguard as per the requirements of Indian Standards.
- v) Provision of Cautionary notice as per para 11.2

7.5 Adequacy of Literature supplied with machine:

7.5.1 The following literature was supplied with the tractor for reference during the test.

- a) Operation and maintenance owner's manual for Balwan 400/400DLX/450/500/500DLX
- b) Spare Parts Catalogue for Balwan Balwan 400/400DLX/450/500/500DLX


7.5.2 The revised literature supplied was found adequate. However, the following points needs to be incorporated in owners/operator's manual.


- i) The specification details as max .power, specific fuel consumption, drawbar pull and power, hydraulic power, haulage requirement and its performance, recommendation of ballasting for various operation, preparation and maintenance of tractor for wet land cultivation should be update in owner's manual in secured binding form.
- ii) The hydraulic external circuit lever details should be provided in owner's manual.

7.5.3 These literatures may also be brought out in National & other regional languages for guidance of user's.

TESTING AUTHORITY:


PRADIPKUMAR C. MESHAM
AGRICULTURAL ENGINEER


H. L. YADAV
SENIOR AGRICULTURAL ENGINEER


V.N. KALE
DIRECTOR



T-846/1356/2012

Force Motors Ltd., BALWAN 400 DLX TRACTOR –
Commercial (Variant)**8.0 APPLICANT'S COMMENTS**

Para No.	Our Reference	Applicant's comments
8.1	3.1.20.2 (i) & (ii)	We have noted the point and care will be taken to establish the compliance.
8.2	3.1.20.5 (i)	The error in working clearance around the hydraulic lever and mudguard could be only manufacturing error and this will be taken care in series production.
8.3	7.2.1.5	We conform that make of the Tractor is "Force Motors Ltd." and the same will be mentioned on labelling plate.
8.4	7.5.2 (i)	The technical details suggested will be added in owner's manual.
8.5	7.5.2 (ii)	It will be added in owner's manual.
8.6	7.5.3	Literature is made available in English and Hindi languages.

ANNEXURE-I**TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	--
2.	PTO Performance Test	3.06
3.	Nominal speed test	0.92
4.	Un-ballasted drawbar performance test	2.33
B.	Miscellaneous test and other run hours, including idle run transportation, trial and preparation for test.	0.79
	TOTAL	7.10