व्यावसायिक परीक्षण रिपोर्ट COMMERCIAL TEST REPORT (Initial Test) संख्या / No. : T-1047/1572/2016 माह / Month : November, 2016



# **DEUTZ FAHR, 3040 E TRACTOR**



भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय (कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)

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

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

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# **DEUTZ FAHR 3040 E TRACTOR – Commercial (Initial)**

Manufacturer : M/s. SAME DEUTZ FAHR INDIA (P) LTD.,

72M, SIPCOT Industrial Complex,

Ranipet - 632403, Tamilnadu

Test requested by : The manufacturer Place of running-in : At applicant's works.

Duration of said running-in, (h):

- Engine : 4 - Transmission : 25

Method of Selection : The tractor was submitted directly by the

applicant for test. Hence, method of selection

is not known.

#### 1. SPECIFICATIONS

1.1 Tractor:

Make : DEUTZ- FAHR

Model : 3040 E

Type : Four wheeled, rear-wheel driven, General

purpose, Agricultural Tractor.

Year of manufacture : 2015

Chassis number : M1TT151RDDA000001

Country of origin : India Variants, if any \* : None

1.2 Engine:

Make : SIMPSON
Model : T III A S325.1-F2

Type : Four stroke, naturally aspirated, water cooled,

direct injection, diesel engine.

Serial number : S325.1F71989

1.2.1 Engine speed(Manufacturer's recommended production setting), (rpm):

Maximum speed at no load
Low idle speed
Speed at maximum torque
2170 to 2230
600 to 750
1100 to 1400

Rated speed, (rpm):

- For PTO use : 2000 - For drawbar use : 2000

1.3 Cylinder & Cylinder Head:

Number : Three

Disposition : Vertical, Inline Bore/stroke, (mm) : 91.4 / 127
Capacity as specified by the applicant, : 2500

(cc)

Compression ratio :  $18.5 \pm 0.3 : 1$ Type of cylinder head : Monoblock Type of cylinder liners : Dry, replaceable

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Clearance between centre pin and bushes, : 0.15 to 0.17 | Against the discard limit

(mm) of 0.85 mm

14.6 Steering system:

Visual condition of the components of : Normal

complete steering assembly

14.7 Starter motor & Alternator:

Presence of soil/oil in housing : None Condition of bearings and other : Normal

components

# 15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

SI. No.	Adjustments/Defects/Breakdowns and Repairs	Categories of Breakdowns	Tractor run hours
	None	-	-

# 16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

Evaluative (mandatory) / Non-evaluative (Non-mandatory) parameters applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2014 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

SI. No	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	Values declared by the applicant(D)/ Requirement (R)	As observed	Whether meets the require- ments (Yes/No.)
1	2	3	4	5	6	7
16.1.1	PTO Performance					
a)	Maximum power under 2 h test, (kW ) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >26 kW7.5/+10% for PTO power $\leq$ 26 kW or-5 / +10% for Engine power >26 kW7.5/+10% for Engine power $\leq$ 26 kW	25.5 (D)	26.1	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	25.5	26.1	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	255	263	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	145	150.69	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (R)	21.14	Yes

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1	2		3	4	5	6	7
f)	Max	cimum operat	ing tempera	ture, ( <sup>o</sup> C)			
	1)	Engine oil	Non Evaluative	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	130 (D)	119	Yes
	2)	Coolant (water)	Evaluative	The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration.	115 (D)	85	Yes
g)	con	ine oil sumption,	Evaluative	Not exceeding 1% of SFC at max. power under High ambient	2.65(R)		
		Wh)		conditions	1% of SFC (D)	2.32	Yes
h)	Smoke level		Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 per meter (R)	0.19	Yes
16.1.2	Dra	wbar perform	ance :			I	
a)	with	drawbar pull ballast esponding to	Non Evaluative	Minimum 65% of static mass with ballast	15.7 (D)	19.20	Yes
	15	percent wheel (kN)			16.0 (R) Minimum		
b)	pull	imum drawbar without ballast	Evaluative	Minimum 65% of static	10.3 (D)		
	corresponding to 15 percent wheel slip, (kN)			mass of tractor without ballast	10.55 (R) Minimum	13.54	Yes
c)	pow balla	ast, (kW).	Evaluative	Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in SI No. i) a) of PTO performance in case of light weight tractors having 1500 kg total static mass of tractor Minimum 75 % of the engine power as referred in SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	20.4 (D) 20.9 (R) Minimum	25.1	Yes
d)		. transmission emperature	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	81	Yes

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1		2	3	4	5	6	7
16.1.3.	Pow		draulic pump	performance :	<u>.                                    </u>		
a)				hout the range of lift, (kN)	):		
	1)	At hitch points	Non Evaluative	[Tolerance of minus 10%]	9.0 (D)	11.98	Yes
	2)	With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW. and it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft	6.0 (D) 6.14 (R) (Minimum)	10.78	Yes
b)	point of th	height of the of application ne force after	Non	Observed value should	50 (D)	05	Yes
interval for a tot		ral for a total ion of 30 te, (mm)	Evaluative	not exceed 50 mm.	50 (R)		100
16.1.4		ke performan					
a)	Maximum stopping distance at a force, equal to or less than 600 l road ballast, (m):						edal with
		Cold brake	Evaluative	10	10 (R )	8.43	Yes
		Hot brake	Evaluative	10	10 (R )	8.59	Yes
b)	Maxi exert brake	mum force ted on the e pedal to	Evaluative	600	600 (R)	330 to	Yes
	m/s <sup>2</sup>	leration of 2.5 (N)				334	
с)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever		Evaluative	Yes / No	Yes (R)	Yes	Yes
16.1.5	Nois	se measurem	ent:				
a)	noise	mum ambient e emitted by ractor dB(A)	Evaluative	As per CMVR	88 (R)	82	Yes
b)	oper	mum noise at ator's ear dB(A)	Evaluative	As per CMVR	96 (R)	94	Yes
16.1.6	Amr	olitude of med	hanical vibr	ations at :	<u> </u>		
	1)	Left foot rest	Non		100 (R)	130	No
	2)	Right foot rest	Evaluative	100 microns (max)	` ′	100	Yes
	3)	Seat (with driver seated)	Non Evaluative	100 microns (max)	100 (R)	100	Yes
	4)	Steering Wheel	Non Evaluative	100 microns (max)	100 (R)	150	No

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1		2	3	4	5	6	7	
16.1.7	Air Cleaner:							
		leaner oil pull	Non	0.25%	Dry type air			
	over	(%).	Evaluative	(maximum)	cleaner is provided	NA		
16.1.8	16.1.8 Haulage requirements :							
a)	a) Gross mass of the trailers, (tones):							
	1)	Two wheel	Non		4.0 (D)	4.0	Yes	
	2)	Four wheel	Evaluative		5.5 (D)	5.5	Yes	
b)	Dista	ance travelled /	litre of fuel co	onsumption, (kr	n/l):			
	1)	Two wheel	Non		4.0 to 7.5 (D)	6.27 to 6.36	Yes	
	2)	Four wheel	Evaluative		4.0 to 7.5 (D)	5.55 to 5.70	Yes	
c)	Fuel	consumption (	ml/km/tonne)					
	1)	Two wheel	Non		25 – 50 (D)	39 to 40	Yes	
	2)	Four wheel	Evaluative		25 – 60 (D)	32 to 33	Yes	

16.1.9	Wetland cultivation	:				
	Sealing for the following assemblies:  1) Clutch assembly	Evaluative -do-	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the	There should be no	No ingress of water	
	<ul><li>2) Brake housings</li><li>3) Front axle hubs</li></ul>	-do-	identified assembly given in column-2. If tractor does not meet the requirements of wetland	ingress of water and/or	and/or mud was	Yes
	4) Engine oil	-do-	cultivation, it may be	mud	observe d	
	5) Transmission oil	-do-	recommended for dry land operation only.			
16.1.10	Safety features :					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulley, silencer, hydraulic pipes (As per IS 12239 part 2)		Provided	Yes
b)	Lighting arrangement	Evaluative	As per CMVR		Provided	Yes
c)	Seating requirement (Tractors having more than 1150 mm rear track width)	Non- Evaluative	Should meet the requirements of IS 12343 (as amended from time to time)		Does not conform	No
d)	Technical requirements for PTO shaft	Non- Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)		Does not conform	No
е)	Dimension of three point linkage	Non- Evaluative	Should meet the requirements of IS 4468 (part 1) (as amended from time to time)		Does not conform	No
f)	Specification of linkage and swinging drawbars	Non- Evaluative	Should meet the requirements of IS 12953 and IS 12362 (part 3) (as amended from time to time)		Conforms	Yes

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1		2	3	4	5	6	7
16.1.11	Lab	elling of tractors	(Provision o	of labelling plate	·):		
	1)	Make	Evaluative	Should conform		DEUTZ - FAHR	Yes
	2)	Model	Evaluative	to the		3040 E	Yes
	3)	Year of manufacture	Evaluative	requirements of CMVR along-		2015	Yes
	4)	Engine number	Evaluative	with declared		S325.1F71989	Yes
	5)	Chassis number	Evaluative	value of PTO HP		M1TT151RDDA 000001	Yes
	6)	Declaration of PTO power, (kW)	Evaluative			25.5	Yes

16.1.12	Discard limit for	<b>:</b>				
(a)	Cylinder bore diameter, (mm)	Evaluative	To be	91.68 (D)	91.482 to 91.492	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	specified by the manufacturer	0.50 (D)	0.145 to 0.174	Yes

(c)	Ring end gap (mm):								
	-	Top comp. ring		-do-	1.5	0.40 to 0.50	Yes		
	-	2 <sup>na</sup> comp. ring	Evaluative	-do-	1.5	0.35 to 0.50	Yes		
	-	Oil ring		-do-	1.8	0.30 to 0.50	Yes		

(d)	Ring groove clearance (mm):							
	-	Top comp. ring		-do-	0.25	0.038 to 0.040	Yes	
	-	2 <sup>nd</sup> comp. ring	Evaluative	-do-	0.25	0.022 to 0.037	Yes	
	-	Oil ring		-do-	0.25	0.048 to 0.049	Yes	

(e)	)	Clearance of main bearings (mm):							
		1	Diametrical clearance	Evaluative	-do-	0.50	0.073 to 0.120	Yes	
		ı	Crankshaft end float	Evaluative		0.75	0.25	Yes	

(f)	С	Clearance of big end bearings, (mm):							
	-	Diametrical	Evaluative	-do-	0.50	0.061 to 0.098	Yes		
	-	Axial	Evaluative	-do-	0.75	0.30 to 0.35	Yes		
(g)	be	learance etween king pin nd bush, (mm)	Non Evaluative	-do-	0.85	0.30 to 0.32	Yes		
(h)	be	learance etween centre pin nd bush, (mm)	Non Evaluative	-do-	0.85	0.15 to 0.17	Yes		

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16.1.13	Literature (Submission to test agency)						
(a)	Operator manual	Evaluative	Provided/Not				
			Provided	As	per	Provided	Yes
(b)	Parts Catalogue	Evaluative	Provided/Not	relevant	IS		
			Provided	Code		Provided	Yes
(c)	Workshop/	Evaluative	Provided/Not	(IS 8132)			
. ,	Service manual		Provided			Provided	Yes

16.1.14	CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	As observed	Whether meets the require- ments (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 breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or 5 minor breakdowns.	None	Yes	

16.2	Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:						
S. No.	Characteristic	as per IS: 12207-2014		Whether meets the require- ments (Yes/No.)			
1.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	No			
		If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	Not applicable			
2.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes			

### 16.3 Conformity with following IS:

 i) Guide lines for declaration of power and specific fuel: Conforms consumption and labelling of agricultural tractors (First revision) [IS10273: 1987 (Reaffirmed 2009)]

ii) Agricultural tractors - Rear mounted power take-off - Types : **Does not conform** 1, 2 and 3 (third revision) [IS:4931-1995 (Reaffirmed 2009)]

iii) Agricultural wheeled tractors - Three-point linkage: Part 2 : **Does not conform** Category 1N (Narrow Hitch) (Third Revision) [IS 4468 (Part-2):1993/ ISO 730-2:1979 (Reaffirmed 2009)]

iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 : Conforms (Reaffirmed 2007)]

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Agricultural tractors - Operator's seat technical requirement : Does not conform [IS 12343 –1998 (First revision) (Reaffirmed 2009)]

vi) Guide for safety & comfort of operator of agricultural tractors: : Does not conform Part 1 General requirements (first revision): 12239 (PT-1) 1996/ISO 4254-1:1989 (Reaffirmed 2009)]

Tractors and machinery for agriculture and forestry - : Does not conform vii) Technical means for ensuring safety Part 2: Tractors (first revision) (IS 12239 (PT-2) 1999) (Reaffirmed 2009)]

Guide lines for location and operation of operator controls on : Does not conform agricultural tractors and machinery (first revision) IS: 8133-1983 (Reaffirmed 2009)]

Tractors and machinery for agriculture and forestry, powered : Does not conform ix) lawn and garden equipment - Symbols for operator controls and other displays Part 2 Symbols for agricultural tractors and machinery [IS:6283 (Part-1)- 2006 and IS: 6283 (Part-2)-2007 (Reaffirmed 2009)]

Agricultural Tractors and Machinery - Lighting device for : Conforms travel on public roads (IS: 14683-1999) (Reaffirmed 2009)]

#### 16.4 **Salient Observations:**

#### 16.4.1 **Laboratory tests:**

#### 16.4.1.1 PTO performance:

- The maximum power was observed 26.1 kW against the declaration of 25.5 kW. Which is within the tolerance limit of IS: 12207-2014.
- The specific fuel consumption corresponding to maximum power was measured ii) as 263 g/kWh against the declaration of 255 g/kWh, which is within the tolerance limit of IS: 12207-2014.
- The backup torque was observed as 21.4%.

#### 16.4.1.2 **Drawbar performance:**

During ten hours drawbar test, the creeping on RHS rear tyre over the rim was observed 15 mm. This should be looked into for necessary corrective action.

#### 16.4.1.3 **Hydraulic Performance**

The moment of tractor about rear axle with standard frame was observed as 14.98 kN-m, which is on higher side when compared to the moment of tractor about front axle i.e. 9.34 kN-m. in view of the above, it is recommended that necessary improvements may be incorporated to avoid the front lifting of the tractor.

#### 16.4.1.4 Mechanical vibration:

The amplitude of mechanical vibration on various assemblies marked as (\*) in Chapter-8 of this test report is on higher side, especially on the foot rest and steering wheel. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

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#### 16.4.1.5 Three point linkage:

The lateral distance from lower hitch point to center line of tractor does not meet the requirements of IS-4468-(Part I)-1997. This should be looked into for necessary corrective action.

### 16.4.1.6 Specification of Power Take Off Shaft:

The dimensions "dø" & "A¢" of the PTO shaft does not meet the requirements of IS-4931-1995. This should be looked into for necessary corrective action.

#### 16.4.1.7 Operator's Seat

The dimension width of seat & distance from seat index point to the center of clutch pedals of operator's seat does not meets the minimum requirements of IS: 12343-1998 (Re-affirmed in March, 2009). This should be looked into for corrective action.

#### 16.4.1.8 Operator's work place:

Operator's work place meets the requirements of IS-12239(part-I)--1996.except the provision of spark arrester.

### 16.4.1.9 Location and movement of operator's controls:

The fuel shut-off knob does not remain in stop position without application of sustain manual effort. This should be looked into for corrective action.

### 16.4.1.10 Constructional requirement with regard to safety:

The working clearance around main gear shifting lever has not been provided as per IS: 12239(Part-II) 1999. This should be looked into for corrective action.

# 16.4.2 Field performance test:

#### 16.4.2.1 Wetland cultivation (Puddling operation):

No ingress of mud and / or water was noticed during puddling operation of the tractor and meet the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor is found suitable for wetland operation (Puddling).

### 16.5 Maintenance / Service Problems:

No noticeable maintenance or service problem was observed during the test.

# 16.6 Recommendation with regard to safety on tractor:

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

- i) Provision for spark arresting device in exhaust system.
- ii) The working clearance around main gear shifting levers should be provided as per the requirement of relevant Indian Standard.
- iii) The dimension width of seat & distance from seat index point to the center of clutch pedals of operator's seat should be within the limit of easy handling of tractor.
- iv) The fuel shut-off knob does not remain in stop position without application of sustainable manual effort.
- v) The rear tyres should be guarded fully so that operator's feet may not come in contact with the wheels.

#### T-1047/1572/2016 DEUTZ FAHR 3040 E TRACTOR - Commercial (Initial) Adequacy of Literature supplied with machine: 16.7 16.7.1 The following literature was supplied with the tractor for reference during the testing. Operator's Manual in respect of DEUTZ-FAHR 3040 E tractor. ii) Tractor Parts Catalogue in respect of DEUTZ-FAHR 3040 E tractor. iii) Service Manual in respect of DEUTZ-FAHR 3040 E tractor. The literatures supplied by applicant should also in national as well as other regional 16.7.2 languages for the guidance of users and service personnel. 17. Citizen charter Time frame for Testing Duration of Test Whether the Test Report is & Evaluation as per Remarks released within the time frame Citizen Charter given in Citizen Charter 15 Months Due to non 10 Months (August, 2015 to October, 2016) No availability of field for testing /Rainy TESTING AUTHORITY: seasons Vammin C.V.CHIMOTE Y.K.RAO TEST ENGINEER SENIOR AGRICULTURAL ENGINEER J.J.R.NARWARE DIRECTOR This test report is compiled by Shri. Shwetabh Singh, Senior Tech. Assistant 18. APPLICANT'S COMMENTS Para No. Our Reference Applicant's comments 16.3 ii), iii) (v), vi), vii), viii), & ix), 16.4.1.2, 16.4.1.3, 16.4.1.4, 16.4.1.5 & 16.4.1.10 18.1 Would be reviewed. 18.2 16.4.1.6 & 16.4.1.7 Will be taken up for necessary 18.3 16.6 & 16.8.2 correction. Recommendation is considered. User manual available in English, 18.4 16.7.2 Tamil. Telgu & Canada Attached copy of cover page for your reference CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE-BUDNI Page 48 of 50

# **ANNEXURE-I**

# BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S.No	Parameters	Disc Plough	Rotavator
1.	Make	Field king	Shaktiman
2.	Туре	Mounted	Mounted
3.	No. of Disc/blades	02	30
4.	Type of Disc/blades	Plain concave	Hatchet
5.	Size of bottoms/blades, (mm)	650	215x75x5
6.	Spacing of bottoms/flanges, (mm)	565	250
7.	Lower hitch point span, (mm)	865	710
8.	Mast height, (mm)	615	465
9.	Overall dimensions, (mm):		
	- Length	1850	1035
	- Width	850	1790
	- Height	1200	960
10.	Gross mass, (kg)	300	295

# ANNEXURE - II

## **BRIEF SPECIFICATION OF FULL CAGE WHEEL**

S. No.	Parameters	Specifications
1.	Туре	Full cage wheel
2.	Dia, (mm)	1210
3.	Width, (mm)	900
4.	No. and types of lugs	24, straight lugs made up of MS-angle section welded to angle iron frame.
5.	Size of angle section, (mm)	40 x 40 x 6
6.	Length of lugs, (mm)	444
7.	Spacing of lugs, (mm)	290
8.	Weight of each cage wheels (kg)	120

# ANNEXURE- III

# TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	
2.	PTO performance test	10.77
3.	Power lift and hydraulic pump performance test	2.92
4	Drawbar performance test	15.95
5.	Turning ability	0.4
6.	Location of centre of gravity	-
7.	Operator's field of vision	-
8.	Brake test	2.41
9.	Noise measurement	1.50
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.92
B.	FIELD TEST:	
1.	Disc ploughing	10.50
2.	Rotavation	10.25
3.	Puddling (including 5 hrs water proof test)	15.17
C.	HAULAGE TEST:	5.55
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	6.79
	TOTAL:	84.13

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