



John Deere 7310R e23

Data sheet DLG PowerMix

Applicant

John Deere GmbH & Co. KG
John Deere-Straße 90
68163 Mannheim
Germany
www.deere.de

Test performed by

DLG e.V.
Test Center
Technology and Farm Inputs
Max-Eyth-Weg 1
64823 Groß-Umstadt
Germany
www.dlg-test.de

Test No.

2014-0437



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Specifications

Engine			
Manufacturer	John Deere		
Stage of emission	IV		
Exhaust aftertreatment device			
Nitrous gaseous emission*	Selective Catalytic Reduction (SCR)		
Particulate matter emission	Active regenerating Diesel particulate filter (DPF)		
Time for regeneration DPF (average)	39	min	
Time between regeneration:			
- maximum*	25	h	
- under PowerMix conditions*	-	h	
- checked			
Exhaust gas recuperation			
	Extern, cooled		
Number of cylinders*			
	6		
Bore*			
	118	mm	
Stroke*			
	136	mm	
Displacement*			
	8984	cm ³	
Rated speed			
	2100	min ⁻¹	
Power by 97/68 EC			
	standard		boost
Rated power	228	kW	251 kW
Maximum power	251	kW	259 kW
at engine speed	1900	min ⁻¹	1900 min ⁻¹
Loss of power during regeneration	-		
Main fan			
Diameter	695	mm	
Number of fan blades	11		
Transmission			
Manufacturer	John Deere		
Type of construction	Powershift e23		
Ranges			
	-		
Powershift gear			
	-		
Forward	23		
Reverse	11		
Design speed			
	50	km/h	

Power take off				
Profile	Form 2: 21 tooth (1 3/8")			
Transmission ratio*				
Standard pto speed	540	540E	1000	1000E
Engine speed [min ⁻¹]	-	1763	1967	1756
Chassis				
Front axle				
Manufacturer	John Deere			
Type	Rigid axle, suspended			
Tires		front	rear	
Manufacturer	Michelin MACHXBIB		Michelin MACHXBIB	
Tire size	600/70 R30		710/70 R42	
Axle load		front	rear	total
Permissible*	6500 kg		11000 kg	16000 kg
Empty weight	4815 kg		6535 kg	11350 kg
Hydraulic				
System*				
	Load Sensing PFC (Pressure and Flow Compensated)			
Supply of oil				
	Common with transmission oil			
Fluid type*				
	John Deere HY-GARD			
Capacity*				
	160		l	
Extractable*				
	85		l	
Auxiliary valves				
Number	4			
Max. flowrate*	162		l/min	
Max. pressure*				
	204		bar	
Fitted options				
Free return flow	Yes			
Air condition	Yes			
Air compressor	Yes			
Front hydraulic power lift	Yes			
Front pto (disengageable)	No			
	-			
	-			

Test conditions

Axle load	front	rear
With ballast	5780 kg	7630 kg
Ballast		
on frame	1150 kg	950 kg
on axle	- kg	- kg
Axle load distribution		
	43 %	57 %
Tire pressure		
	front	rear
Field work	1,2 bar	1,2 bar
Transporttest	1,6 bar	1,6 bar

Remarks

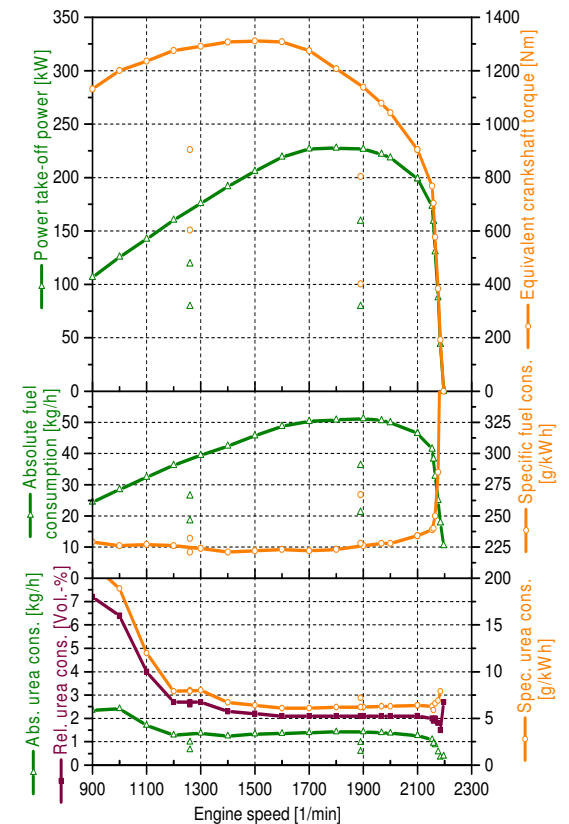
* Manufacturer's data

Results of measurement at pto dynamometer – standard

Full load	
Rated speed	
Pto power	198,8 kW
Absolute fuel consumption	46,4 kg/h
Specific fuel consumption	234 g/kWh
Specific urea consumption	6,4 g/kWh
Ratio urea to fuel	2,1 Vol-%
Maximum power	
Engine speed	1800 min ⁻¹
Pto power	227,6 kW
Absolute fuel consumption	50,8 kg/h
Specific fuel consumption	223 g/kWh
Specific urea consumption	6,2 g/kWh
Ratio urea to fuel	2,1 Vol-%
Maximum torque	
Engine speed	1500 min ⁻¹
Pto power	206,0 kW
Absolute fuel consumption	45,7 kg/h
Specific fuel consumption	222 g/kWh
Specific urea consumption	6,4 g/kWh
Ratio urea to fuel	2,2 Vol-%
1000 rpm at pto	
Engine speed	1967 min ⁻¹
Pto power	222,0 kW
Absolute fuel consumption	50,6 kg/h
Specific fuel consumption	228 g/kWh
Specific urea consumption	6,3 g/kWh
Ratio urea to fuel	2,1 Vol-%

Part load	
Full throttle, 80 % of power at rated speed	
Absolute fuel consumption	38,3 kg/h
Specific fuel consumption	240 g/kWh
Specific urea consumption	5,9 g/kWh
Ratio urea to fuel	1,9 Vol-%
90 % of rated speed, 80 % of power at rated speed	
Absolute fuel consumption	36,2 kg/h
Specific fuel consumption	228 g/kWh
Specific urea consumption	6,2 g/kWh
Ratio urea to fuel	2,1 Vol-%
90 % of rated speed, 40 % of power at rated speed	
Absolute fuel consumption	21,2 kg/h
Specific fuel consumption	267 g/kWh
Specific urea consumption	7,2 g/kWh
Ratio urea to fuel	2,1 Vol-%
60 % of rated speed, 40 % of power at rated speed	
Absolute fuel consumption	18,5 kg/h
Specific fuel consumption	232 g/kWh
Specific urea consumption	8,0 g/kWh
Ratio urea to fuel	2,6 Vol-%
60 % of rated speed, 60 % of power at rated speed	
Absolute fuel consumption	26,4 kg/h
Specific fuel consumption	221 g/kWh
Specific urea consumption	7,9 g/kWh
Ratio urea to fuel	2,7 Vol-%

Graphical analysis



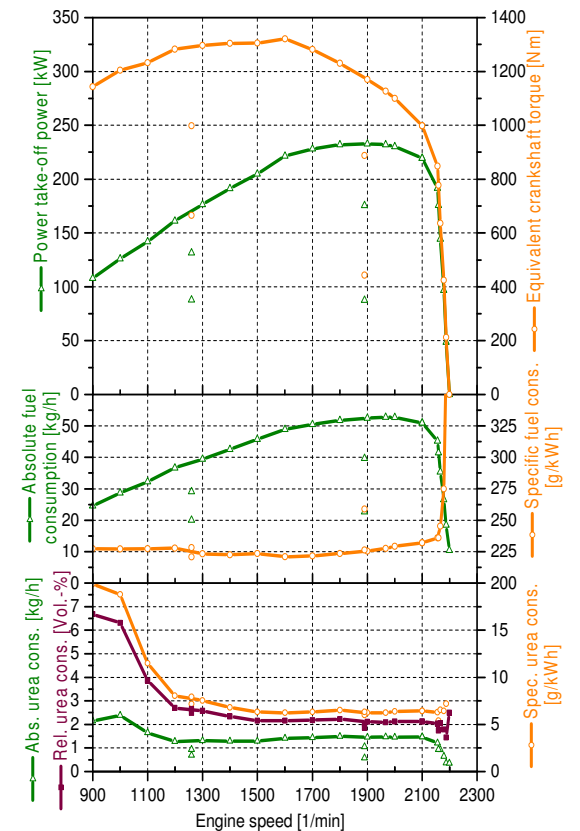
Torque rise	45 %
Engine speed drop	29 %
Pulling off torque	133 %

Results of measurement at pto dynamometer – boost

Full load	
Rated speed	
Pto power	219,5 kW
Absolute fuel consumption	50,9 kg/h
Specific fuel consumption	232 g/kWh
Specific urea consumption	-* g/kWh
Ratio urea to fuel	0 Vol-%
Maximum power	
Engine speed	1900 min ⁻¹
Pto power	232,8 kW
Absolute fuel consumption	52,5 kg/h
Spec. Fuel consumption	225 g/kWh
Spec. urea consumption	6,5 g/kWh
Ratio urea to fuel	2,2 Vol-%
Additional fuel consump. during regeneration	1,5 kg
Additional fuel consump. turned-over**	0,1 %
Spec. fuel consump. with regen. (calculated)	226 g/kWh
Maximum torque	
Engine speed	1600 min ⁻¹
Pto power	221,4 kW
Absolute fuel consumption	48,9 kg/h
Spec. Fuel consumption	221 g/kWh
Spec. urea consumption	6,2 g/kWh
Ratio urea to fuel	2,2 Vol-%
1000 rpm at pto	
Engine speed	1967 min ⁻¹
Pto power	232,0 kW
Absolute fuel consumption	52,8 kg/h
Spec. Fuel consumption	228 g/kWh
Spec. urea consumption	6,2 g/kWh
Ratio urea to fuel	2,1 Vol-%

Part load	
Full throttle, 80 % of power at rated speed	
Absolute fuel consumption	39,7 kg/h
Spec. Fuel consumption	226 g/kWh
Spec. urea consumption	6 g/kWh
Ratio urea to fuel	2 Vol-%
90 % of rated speed, 80 % of power at rated speed	
Absolute fuel consumption	22,7 kg/h
Spec. Fuel consumption	259 g/kWh
Spec. urea consumption	6 g/kWh
Ratio urea to fuel	2 Vol-%
90 % of rated speed, 40 % of power at rated speed	
Absolute fuel consumption	20,0 kg/h
Spec. Fuel consumption	228 g/kWh
Spec. urea consumption	8 g/kWh
Ratio urea to fuel	3 Vol-%
Additional fuel consump. during regeneration	2,7 kg
Additional fuel consumption turned-over**	0,5 %
Spec. fuel consump. with regen. (calculated)***	230 g/kWh
60 % of rated speed, 40 % of power at rated speed	
Absolute fuel consumption	29,1 kg/h
Spec. Fuel consumption	221 g/kWh
Spec. urea consumption	7 g/kWh
Ratio urea to fuel	3 Vol-%
60 % of rated speed, 60 % of power at rated speed	
Absolute fuel consumption	52,8 kg/h
Spec. Fuel consumption	228 g/kWh
Spec. urea consumption	6 g/kWh
Ratio urea to fuel	2 Vol-%
Additional fuel consump. during regeneration	1,2 kg
Additional fuel consumption turned-over**	0,2 %
Spec. fuel consump. with regen. (calculated)	229 g/kWh

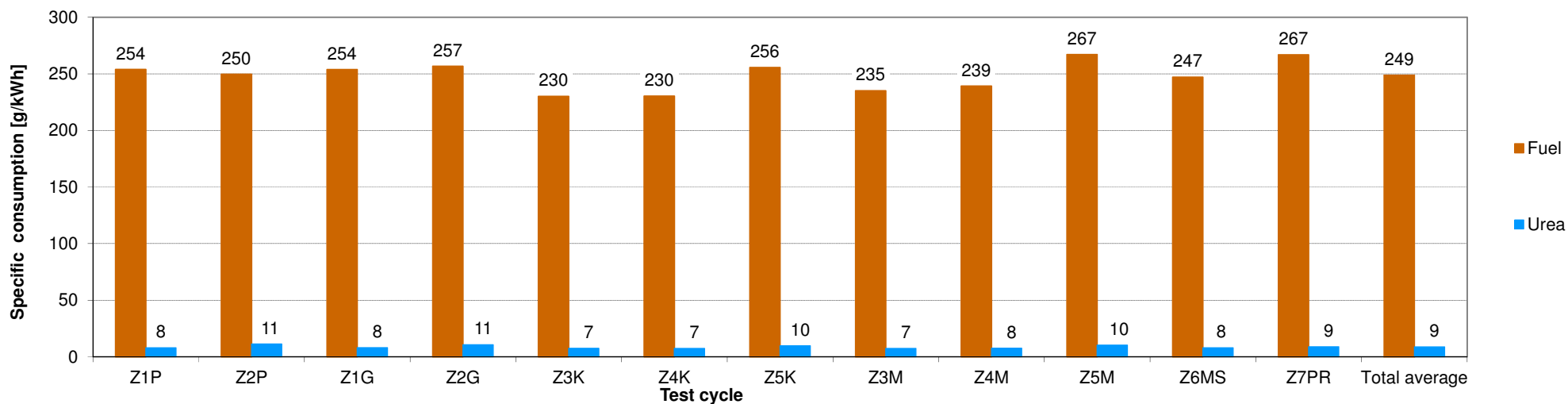
Graphical analysis



Torque rise	32 %
Engine speed drop	24 %

** Ratio of additional fuel for regeneration to total fuel consumption during two regenerations; calculated with maximum operating hours during regeneration (see Specification-Engine)

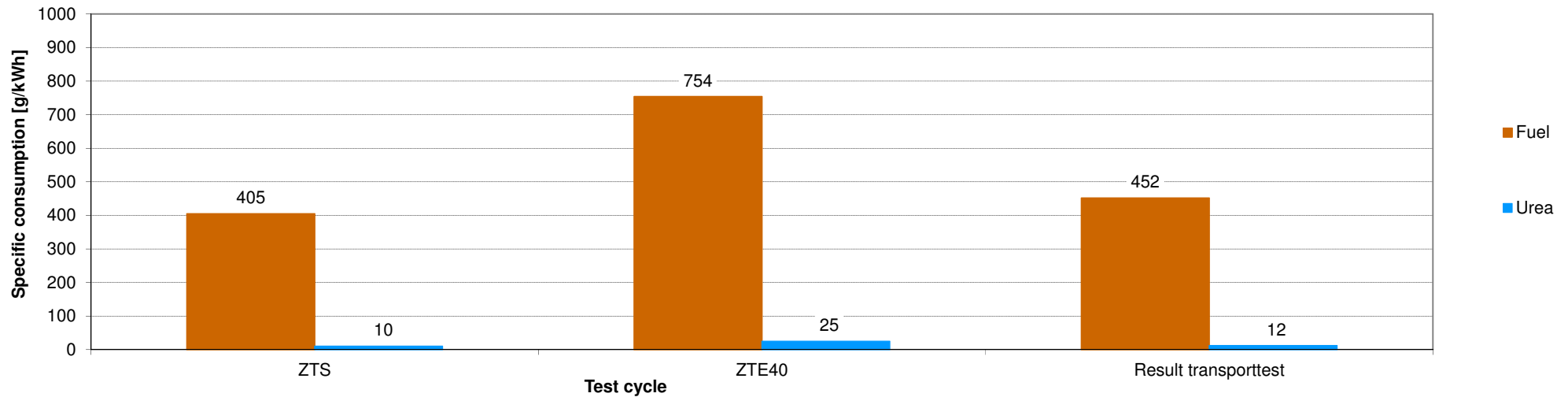
Results at DLG PowerMix - Field work



Load type	Test cycle	Engine speed [min ⁻¹]	Driving speed [km/h]	Total power [kW]	Absolute fuel consumption		Average values		Spec. urea cons. [g/kWh]	Ratio urea to fuel [Vol-%]	Relative additional fuel for DPF regeneration* [%]	Calculated spec. Fuel cons. with DPF regeneration [g/kWh]
					[kg/h]	[l/h]	Specific fuel consumption [g/kWh]	Spec. urea cons. [g/kWh]				
Drawbar work	Plough 100 %	Z1P	1667	7,4	169	42,8	51,6	253	8	2,4	0,1	254
	Plough 60 %	Z2P	1245	8,7	121	30,1	36,3	249	11	3,5	0,2	250
	Cultivator 100 %	Z1G	1753	9,6	183	46,3	56,0	253	8	2,4	0,1	254
	Cultivator 60%	Z2G	1323	10,9	130	32,7	39,4	256	11	3,2	0,1	257
Drawbar + PTO work	Rotary harrow 100 %	Z3K	1770	5,3	195	44,1	53,2	230	7	2,5	0,1	230
	Rotary harrow 70 %	Z4K	1580	5,5	138	31,2	37,7	230	7	2,5	0,2	230
	Rotary harrow 40 %	Z5K	1580	5,5	79	19,6	23,7	254	10	2,9	0,5	256
	Mower 100 %	Z3M	1765	13,2	191	44,9	54,4	235	7	2,4	0,1	235
	Mower 70 %	Z4M	1580	15,1	144	34,3	41,6	239	8	2,4	0,1	239
Mower 40 %	Z5M	1580	15,2	82	21,7	26,3	266	10	2,9	0,5	267	
Drawbar- + PTO + Hydraulic work	Manure spreader	Z6MS	1758	6,8	158	38,1	46,3	246	8	2,4	0,3	247
	Baler	Z7PR	1760	9,5	131	33,5	40,7	266	9	2,5	0,3	267
Total average DLG PowerMix - Fieldwork								248	9	2,7	0,2	249

* Ratio of additional fuel for regeneration to total fuel consumption during two regenerations; calculated with maximum operating hours during regeneration (see Specification-Engine)

Results at DLG PowerMix - Transporttest



Load type	Test cycle	Engine speed [min ⁻¹]	Driving speed [km/h]	Total power [kW]	Absolute fuel consumption		Average values				
					[kg/h]	[l/h]	Specific fuel consumption [g/kWh]	Spec. urea cons. [g/kWh]	Ratio urea to fuel [Vol-%]	Relative additional fuel for DPF regeneration** [%]	Calculated spec. Fuel cons. with DPF regeneration** [g/kWh]
Transportwork	only hill section ZTS	1849	42,4	116	47,0	56,3	404	10	2,0	0,1	405
	flat section 40 km/h ZTE40	1423	40,6	19	13,9	16,6	748	25	2,4	0,8	754
Idle*	ZLL	897	-	-	2,8	3,4	-	-	-	-	-
Result DLG-PowerMix - Transporttest (flat section with 40 km/h; 50 % ZTS : 40 % ZTE40 : 10 % ZLL)** *							450	12	2,1	0,4	452

Optional tests (e.g. ZTS with reduced (-R) engine speed, flat section with additional speed settings (-50, -60))

Transportwork	only hill section ZTSR	-	-	-	-	-	-	-	-	-	-
	flat section 50 km/h ZTE50	1779	50,0	25	19,3	23,1	760	17	0,4	0,5	764
	flat section 60 km/h ZTE60	-	-	-	-	-	-	-	-	-	-
Optional results based on	hill section with reduced engine speed ZTSR (50 % ZTSR : 40 % ZTE40 : 10 % ZLL)** *						-	-	-	-	-
	flat section with 50 km/h ZTE50 (50 % ZTS : 40 % ZTE50 : 10 % ZLL)** *						455	11	1,9	0,4	457
	flat section with 60 km/h ZTE60 (50 % ZTS : 40 % ZTE60 : 10 % ZLL)** *						-	-	-	-	-

* 70 % in parking position w/o driver, 30 % w/ inserted drive position and w/ driver, e.g. waiting at traffic lights

** Relation of additional fuel consumption caused by regeneration to conventional fuel consumption within two regeneration cycles; calculated for the maximum regeneration interval (see technical data - engine)

*** Results are calculated for a distance of 10 km. The fuel consumption in cycle ZLL is taken into the final result by a calculation based on the real measured fuel consumption during the test.