Extract from profi 3/2014

profi – Test on tractors

Test on the Deutz-Fahr 6180 P tractor:

Not just for the eyes

With the introduction of standard IIIB on emissions, Deutz-Fahr has presented the 6 series (profi 10/2012) featuring SCR technology and a new eye-catching look. Discover what else the 123 kW/167 HP 6180 P has to offer besides its new design during our test.

Hubert Wilmer

Dark grey rims, engine hood with a silver grey stripe, rear mudguards with LED lights. When it comes to aesthetics, the work of Italian designer Giugiaro stands out: the candidate of our test, i.e., the 6180 P with rated power of 123 kW/167 HP (according to ECE-R 120, without fan), the second most powerful of the 6 series, is definitely elegant.

But before focusing on the aesthetics, let's look at what's inside. TCD 6.1 L06 4V Tier 4i is the name of the Deutz engine, where T stands for turbocharger, C for intercooler (Cooling), D for diesel, 6.1 for capacity, L for in line (L=Line), 06 for six cylinders, and 4V for four valves per cylinder. In addition, this engine complies with European emissions standard IIIB (Tier 4i) thanks to the SCR catalytic converter mounted in the lower part of the exhaust. The successor of the Agrotron M640 (profi 3/2009) was given the chance to prove what it's worth on the test bench of the DLG testing centre. The rear PTO shaft received at rated engine speed 105.1 kW of the 123 kW/167 HP and 113.4 kW at maximum power (1,700 rpm) – quite good! Power too was good with a constant range 28% (with over 8 kW of extra power) and a torque backup of almost 41%. The constant behaviour of torque at low engine speeds provided an excellent pull-away torque of 140%!

We were really curious to see diesel consumption. It is true that compared to its predecessor, diesel consumption of the 6180 P at PTO was slightly higher, i.e., 265 g/kWh at rated speed (especially considering that you need to add nearly 21 g/kWh of AdBlue). However, since its maximum power was reached at 1,700 rpm and not 1,900, diesel consumption dropped to 230 g/kWh – a bit less than its predecessor. Though adding AdBlue, the tractor continues to be just as frugal as before.
This also applies to towing applications: at rated speed, consumption was slightly greater at 293 kWh, but at maximum power it returns to the same level of the M640 (248 g/kWh) – plus AdBlue, of course. Although the tractive power of the 6180 P, equivalent to 94.1 kW at rated speed and 104.4 kW at maximum power, did not reach the top-performing values of its predecessor, the consumption of this tractor in Powermix measurements puts it at the top of its power class: 266 g/kWh means almost 10% less on average than all the other tractors tested until now!

We cannot compare the new transport measurements with the 6180 P's predecessor, but looking at those available, our test candidate fares quite well: diesel consumption was lower on average both uphill and on level ground. On average, the 6180 P is almost 8% better at 40 km/h and over 2% better at 50 km/h.
In the final analysis, the reason must surely lie also in the time-tested six-speed manual transmission with four Powershift ratios - at 40 km/h you can reduce the speed to 1,680 rpm, while 50 km/h is reached at rated speed only. For the rest, there is little to say about this transmission. Once you get used to the slanted position of the lever which points towards the driver, the long shifting travel has been left the same making shifting gears easy to handle. The new joystick is rather the fruit of design, but we appreciated the advantages of smooth shifting in Powershift ratios (Deutz-Fahr calls it “SenseShift”) and for the possibility to adjust the shuttle. A small slider on the lever located on the left-hand side under the steering wheel allows you to adjust how sharp the change of direction is. But we still cannot get used to the fact that the lever under the steering wheel cannot be used alternating with the buttons on the PowerCom S joystick to the right on the armrest.

As for the armrest: it is the same on all models, while the "PowerCom S" multifunction lever is reserved for the "P" version, recognizable from the outside for the small "P" in the model's name. We need to repeat here

our criticism concerning this lever: despite its many features, its ergonomics is far from that featured on the 6TTV and 7 series!

But let's go to the lift and the hydraulics: a continuous lifting capacity of 7,317 daN is more than enough even for heavier equipment and the oil flow of 121 l/min of the standard axial piston pump and the hydraulic power of 35.4 kW are equally good.
The oil can supply up to seven (!) valves (5 of which on the rear). Really impressive! The controls of a maximum of three valves, handled by the small knobs on the console, are not equally good. However, it is possible to change the lever-valve combination.

As for the chassis, a new braking system ensures excellent deceleration of 5.8 m/s^2 and an extra tonne of maximum permissible weight (11 t). It IS true though that the trial model weighs 7,090 kg, i.e., 300 kg more than its predecessor, but the payload now is still 3,910 kg. The turning radius of 13.00 metres (front tyres 540/65 R 28, track 1.88 m) is slightly greater than the previous model's. But as regards the suspended front axle, combined with the cab suspension, we cannot say enough about the manoeuvrability and driver comfort.

The cab, in itself, is a rather dated and the noise level of 76.6 dB(A) is higher than the levels that can be reached nowadays. On the other hand, visibility remains very good, especially on the front, despite the six posts. The doors, however, are difficult to close and the list of optional extras lacks automatic air conditioning. Deutz-Fahr says though that the ISOBUS-compatible "iMonitor" will soon be available.

Now for maintenance: 500 hours for the replacement of 15 litres of engine oil are okay, as are 1,000 hours for 80 litres of gearbox/hydraulic oil, although not everyone might like the shared oil circuit. The 300-l fuel tank is the same as before, but now to the right there is a built-in 35-l AdBlue tank. This means though that you can only refuel diesel and AdBlue at the same time on the right side only.

To sum things up: our trial model deserves special appreciation particularly for the low diesel consumption in Powermix. Apart from compliance with the more stringent limits set by the emissions standard and the new design, only details have been changed on the 6 series. Among these is the gearbox with the redesigned lever, the Powershift "SenseShift" with automatic functions and the adjustable shuttle. However, it still features long shifting and 50 km/h at rated speed only.
Some details of the 6-post cab are in need of improvement. For an idea of the result, see the TTV version of the Agrotron 6 with continuously variable transmission. But we will be coming back to this model with a separate test.
However, those who can easily give up these details, will find that the 6180 P is a tractor with a thrifty and powerful manual gearbox, whose list price of 121,500 euro plus VAT is not just something for the eyes.

Charts on page 14

Deutz-Fahr 6180 P

Consumption working in the open field DLG

Towing applications: average value of AdBlue diesel 19.8 g/kWh
262 g/kWh and 9.87 l/ha and 0.56 l/ha

1	**Heavy** (100% load)	plough grubber
2	**Moderately heavy** (60% load)	plough grubber

Applications with PTO: average value of AdBlue diesel 21.0 g/kWh
265 g/kWh and 3.81 l/ha and 0.23 l/ha

3	**Heavy** (100% load)	rotary harrow mower
4	**Moderately heavy** (70% load)	rotary harrow mower
5	**Light** (40% load)	rotary harrow mower

Mixed applications: average value of AdBlue diesel 19.8 g/kWh
277 g/kWh and 3.82 l/ha and 0.21 l/ha

6 Manure spreader
7 Press

Powermix 266 g/kWh 20.4 g/kWh

In the bottom left hand you will find the 'Powermix' value in g/kWh, calculated as the average of all seven cycles measured. The average values for "towing applications", "applications with PTO" and "mixed applications" are indicated in the table in red along with the fuel consumption, expressed in grams per kilowatt hour and in litres per hectare.
The consumption of AdBlue, which is not a fuel, but a consumable, is shown in the graph on the right. The bars are thinner because AdBlue is less expensive than diesel fuel; the average values are shown in blue. The average values are shown in blue. The yellow base line in the graph to the left marks the average of all the 'Powermix' candidates tested up to now. The length of the bars shows to what extent the tractor is better (green) or worse (red) in percent, in the various cycles, compared with the average of all the 'Powermix' candidates tested up to now. The average 'Powermix' value of all the candidates tested is currently 295 g/kWh.
The diesel consumption of the Deutz-Fahr 6180 P in Powermix is below average in all applications. The total 'Powermix' value for diesel is almost 10% better compared to the average of all the candidates tested up to now. The additional consumption of AdBlue was an average of 5.3 litres per 100 litres of diesel.

On-road consumption		**DLG**
Level surface (40%)		**AdBlue consumption**
At 40 km/h		
At 50 km/h		
At 60 km/h		
Uphill (50%)		
Maximum slope under load		
At idle speed (10%)		
In idling position		

Total consumption in mixed transport

At 40 km/h	556 g/kWh	46.0 g/kWh
At 50 km/h	572 g/kWh	46.5 g/kWh
At 60 km/h		

The DLG transport test is currently carried out on road. The test candidate travels in a circular path with a trailer (properly ballasted with respect to the power measured at PTO); each measurement is repeated three times. The overall result is calculated from the individual weighted results going uphill (50%), on level ground (40%) and with the engine idling (10%).
The yellow base line in the graph marks the average of all the tractors tested up to now for on-road transport. The length of the bars shows to what extent the test candidate is better (green) or worse (red) in percent than the average. The average value for the on-road test is currently 603 g/kWh at 40 km/h and 584 g/kWh at 50 km/h.
The consumption values of the Deutz-Fahr 6180 P at 40 km/h were lower than the average in almost all measurements, while those at 50 km/h were slightly lower than the average. The total diesel consumption at 40 km/h, equal to 556 g/kWh, and at 50 km/h was below average by 7.8% and 2.1% respectively.

Box at page 15

Gear speed

The 6 speeds, 4 Powershift ratios and power shuttle produce 24/24 ratios, of which eight in the main operating range, plus 16/16 supercreepers.

24 forward and reverse ratios

Speed (km/h)

8 ratios from 4 to 12 km/h

Speed (km/h)

Chart at the top of page 16

Lifting capacity and lifting capacity requirement

Deutz-Fahr 6180 P: *the red curve shows the lift capacity measured (90% of the maximum value) as continuous lifting capacity at the connection points of the lower link arms. The yellow curve shows the lifting capacity with shorter link arms - 315 daN more capacity with 4 cm less stroke. Thanks to lift capacity that rises upwards, the tractor has no problem at all raising even the heaviest combinations.*

Lifting capacity (daN)

4,143-kg combination

Plough: 1,706 kg

Front lift: 2,511 daN continuous, lifting stroke 74.7 cm

Long lifting link arms: 7,317 daN continuous, lifting stroke 72.2 cm

Short lifting link arms: 7,632 daN continuous, lifting stroke 68.6 cm

Lifting stroke (cm)

Further details about our test (p. 16)

This is not a summary of the overall assessment, but a list of positive and less positive practical details.

+ Positive

+ Front lift with external controls and auxiliary hook
+ Single key for doors and ignition
+ Ready-configured for speakers and radio
+ Rear window with large opening radius
+ Adjustable front mudguards
+ Incorporated remote control for tow hook

Safe: the main battery switch protects against unused user devices.

Large: the glove compartment and cool box are spacious enough.

Complete: both on the right and left there are external controls for the lift, the hydraulic system and PTO.

- Negative

- The cab air filter is hard to reach
- Activating the rear lift is annoying
- The doors often don't close well
- No indication of lifting height
- To start the engine, the gear lever needs to be positioned in “N”

Always pressed: the fan has four speeds only and there is no automatic air-conditioning. Plus, the new pushbuttons often remain pressed.

Annoying: the safety belt buckle gets caught in the door and the seat belt does not unroll.

Delicate: small knobs on the console (marked with simple stickers on the disc) for a maximum of three valves.

Captions

Page 14, top right

The IIIB six-cylinder engine has proven to be frugal both on the road and in the open field and its power is good.

Page 15

Top

Visibility is good despite the six posts. Nonetheless, many details in the cab are in need of improvement. Not even the noise level of 76.6 dB(A) is a record value.
Photo: Tovornik, operators

Centre, left to right

The new lever is okay, but it takes time to get used to the oblique position of the joystick. Shifting is long and the multi-function lever is too bulky for many operators.

The shuttle on the left cannot be activated alternatively to the pushbuttons on the right. The SCR catalytic converter on the right in front of the window slightly disturbs visibility during daily work.

Page 16, top right

Lifting capacity is always sufficient, but the oil connectors could be marked better and link hooks on the back too wouldn't be a bad idea.

Technical data, measurement values, test scores **Width: 252 cm; Length: 524 cm (with front lift); Height: 303 cm (cab)**

Deutz-Fahr 6180 P

Technical data

Engine: 123 kW/167 HP (ECE-R 120) at 2,100 rpm; water-cooled 6-cylinder DEUTZ - TCD 6.1 L06 4V, IIIB emissions (Tier 4i) with SCR catalytic converter and AdBlue, wastegate turbo, intercooler; 6.1-l capacity; 300-l fuel tank and 35-l AdBlue tank.

Transmission: 40/40; 6 speed, 4 Powershift ratios, 16/16 supercreeper ratios starting from 390 m/h, power shuttle, automatic gear change functions, 50 km/h at rated speed.

Brakes: multiple discs in oil bath on the rear, engagement of dual traction on the front; mechanical parking brake; standard pneumatic system (in the 50 km/h version).

Electrical system: 12V, 143 Ah battery, 200A alternator; 4.0 kW/5.4 HP starter.

Lift: cat. II/III; EHR with adjustable lower link arms and oscillation damping, front lift and optional front PTO.

Hydraulic system: 120 l/min axial piston pump (standard 83 l/min), 200 bar, up to 7 distributors (5 rear/2 front) with adjustment of oil flow and operating time; 32 + 8 litres of oil, collectable.

PTO: 540/540E/1,000/1,000E, 1 3/8" interchangeable output shaft, 6 or 21 grooves, electro-hydraulic control.

Axles and chassis: flanged axle with multi-disc differential lock and dual traction, both with electro-hydraulic control; suspended front axle, test tyres 540/65 R 28 front, 650/65 R 38 rear.

Care and maintenance: engine oil 15 litres (to be replaced every 500 hours); gearbox/hydraulic oil 80 litres (every 1,000 hours); 18-l cooling system.

Price: “P” version, 40 km/h, €117,500 (prices without VAT); 50 km/h, including suspended front axle and pneumatic cab suspension, €121,500; front lift €4,600, front PTO €3,000.

Values measured at the DLG test centre

Power to PTO

Max. (1,700 rpm)	113.4 kW
At rated speed 105.1 kW	

Diesel/AdBlue consumption

At max.	power 230 + 21.1 g/kWh
At rated speed	265 + 20.9 g/kWh
Absolute max./rated	31.1/33.3 l/h

Torque

Maximum 672 Nm (1,100 rpm)
Torque backup 40.6%
Speed drop 48%
Pull-away torque 140%

Transmission

Number of ratios from 4 to 12 km/h	8

Rear lifting capacity (90% of max. corr. oil pressure)

Bottom/centre/top 7,317/8,298/9,162 daN

Laden stroke	72.2 cm (23 to 95.2 cm)

Front lifting capacity (90% of max. corr. oil pressure)

Bottom/centre/top 2,511/2,844/3,438 daN

Laden stroke	74.7 cm (22.3 to 97.0 cm)

Hydraulic performance

Operating pressure	202 bar
Maximum flow rate	121 l/min
Maximum power	35.4 kW (109 l/min, 194 bar)

Tractive power

Max. 104.4 kW at 1700 rpm	248 g/kWh
At rated speed 94.1 293 g/kWh	

Noise level (laden, at height of the driver's ear)

Cab closed/open 76.6/83.9 dB(A)

Braking action

Average maximum deceleration	5.8 m/s^2
Force on pedal	32.9 daN

Turning radius

Without front traction	13.00 m

Weight during test

Front axle	2,820 kg
Rear axle	4,270 kg
Dry weight	7,090 kg
Maximum permissible weight kg	11,000 kg
Payload	3,910 kg
Weight per unit of power 55 kg/kW	
Wheelbase	277 cm
Front/rear track	188/187 cm
Ground clearance (with lower link end)	44.0 cm

Power and torque

Power (kW) **Torque (Nm)**

Engine speed (rpm)

Fuel consumption

Absolute (l/h) **Relative (g/kWh)**

Engine speed (rpm)

Fuel consumption on characteristic curve

Working ranges	Power	rpm	g/kWh	l/h
Normal PTO 540	100%	2,005	252	32.7
Economy PTO 540E	10096	1,608	228	30.0
Normal PTO 1,000	100%	1,995	252	32.7
Economy PTO 1,000E	100%	1,600	228	30.0
Engine in reduction range	80%	max	284	28.4
High power	80%	90%	261	26.3
Transport applications	40%	90%	326	16.4
Reduced power, half rpm	40%	60%	249	12.5
High power, half rpm	60%	60%	234	17.5

Test scores

Engine ++

Power characteristic curve	2.2
Fuel consumption 1.4	
Tractive power/power at PTO	1.9

Both the power and characteristic values good, fuel consumption very good in realistic Powermix testing, but AdBlue is needed.

Transmission +/O

Gear scaling/functions	2.3
Ease of shifting gear	2.4
Clutch, accelerator	1.6
PTO	1.8

Some gearbox strokes are long, only four Powershift ratios and 50 km/h at rated speed only. Very good adjustable shuttle and four-speed PTO!

Chassis +

Steering wheel	2.4
Dual traction and differential lock	1.3
Parking brake and brake pedal	1.7
Front axle/cab suspension	1.5
Weight and payload	2.3

Handling and automatic management of traction okay, suspension good, brakes very good, average payload.

Lift/hydraulic system ++/+

Lifting capacity and stroke 1.1	
Controls	2.5
Hydraulic power	1.8
Distributors	1.8
Connectors	2.8

Lifting capacity and hydraulic power very good, distributors with many functions, connectors on the rear to be improved.

Cab +

Spaciousness and comfort	1.6
Visibility	1.5
Heating and ventilation	2.0
Noise level	3.3
Electrical system	2.0
Finish quality	2.0
Maintenance	2.0

Steps and visibility very good, noise level on average, but the lack of automatic air conditioning, the impractical seat belt for the passenger seat and the doors that don't close well are no longer in step with the times.

Application profile:	**--**	**-**	**O**	**+**	**++**
Basic requirements					●
Medium requirements				●	
High requirements			●		
Tillage				●	
Forage crops					●
Transport applications				●	
Applications with front loader					●
Price:	**Low**				**High**
€106,000 to 110,000			●		

plus VAT with basic equipment.
Data taken from profi 2014 tractors catalogue.

Evaluation:
++ very good + good O on average
- below average -- unsatisfactory

The single scores do not always provide a mathematical sum.

Box at page 17

Opinions of users

The Deutz-Fahr 6180 P judged by its users

The Powershift is absolutely sufficient

In the month of October the 6180 P replaced our Agrotron 150 MK2 and since then it has been working about 70 hours in front of a 3-metre Amazone combine seed drill. We especially liked the management system of repetitive headland manoeuvres, in addition to the electrical distributors. The automatic Powershift too worked excellently on the partially sloping surfaces. For transport with a 14-m^3 manure tanker, we chose the 40 km/h version with suspended front axle. Diesel consumption is okay. To fill up with AdBlue we use a 200-litre drum with hand pump that we share with a neighbouring farm.

Caption

Henning Grotjahn from Sehlem Evensen (ZIP code 31196) cultivates 60 hectares and, as a second job, he works at a biogas plant.

Ease of use is important

They delivered our 6180 P in November and since then we have already worked 165 hours. On our land, with slopes up to 14%, the tractor needs to tow a combine mower with 6-metre front and rear coupling, a two-rotor swather and a baler. We have an 8-m^3 manure tanker and we need to mulch protected natural areas, in addition to carrying hay with the flatbed trailer. Since we run the farm almost exclusively with outside labour, ease of use was important for us, along with the vicinity of a good workshop for servicing. The 6180 P has replaced an AGROSTAR 6.61 and up to now we are very satisfied.

Caption

Jakob Bissels from Hellenthal (ZIP code 53940) runs a 198-hectare forage farm using mainly outside labour.

Good visibility and manoeuvrability

We have worked over 520 hours already with the 6180 P from the month of May last year. The tractor mainly tows a Lemken plough with four ploughshares, a 4-metre Lemken rotary harrow and a 3-metre combine with Vogel & Noot rotary harrow and Amazone seed drill.
We are very satisfied with the power, visibility and manoeuvrability of the new tractor. We only had a problem with the engine at the beginning. It stopped all of a sudden, but the workshop that we contacted solved it very quickly.

Josef, Ludwig and Johannes Ederer (from left) have an 80-hectare farm with 350 pigs in Frontenhausen (ZIP code 84160).

Table at page 19

Comparison of three tractors

We compared here three tractors in the 160 HP range that profi has tested in the past.

Tractor model	**Deutz-Fahr 6180 P**	**Case IH Puma 160 CVX**	**Valtra N 163 Direct**
Detailed test in	**profi 3/2014**	**profi 6/2012**	**profi 4/2013**
Engine Rated power	123 kW/167 HP (ECE-R 120)	118 kW/160 HP (ECE-R 120)	120 kW/163 HP (97/68 CE)
Cylinders/capacity/emissions standard	6/6.1 litres/IIIB (Tier 4 i)	6/6.7 litres/IIIB (Tier 4 i)	4/4.9 litres/IIIB (Tier 4 i)
Power at max. PTO/with boost	113.4 kW (1,700 rpm)/no boost	112.7/129.2 kW (1,800/1,500 rpm)	112.3/116.4 kW (1,800 rpm)
...at rated engine speed	105.1 kW (2,100 rpm)	96.2/116.7 kW (2,200 rpm)	94.6/101.2 kW (2,200 rpm)
Manufacturer/model	Deutz/TCD 6.1 L06 4V	FPT/NEF 6.7	AgcoPower/49-AWI-4V
Fuel consumption and AdBlue			
Specific at maximum power	230 + 21 g/kWh	232+20/230+17 g/kWh	239 + 15 g/kWh
Specific at rated speed	265 + 21 g/kWh	265+21/253+19 g/kWh	262 + 15 g/kWh
Absolute at maximum power	31.1 + 2.2 l/h	31+2/35+2 l/h	33.2 +1.6 l/h
Average Powermix value	266 + 20 g/kWh	278 + 20.2 g/kWh	294 + 17.0 g/kWh
Max. torque (without/with boost)	672 Nm (1,100 rpm)/no boost	702/784 Nm (1,400/1,500 rpm)	640/666 Nm (1,600 rpm)
Torque backup	415%	68/55%	56/52%
...with speed drop of	48%	36/32%	27/27%
Diesel/AdBlue tank	300 + 35 litres	330 + 48 litres	230 + 27 litres
Transmission Tot. number speeds	40/40	17/16	continuously variable
Powershift	4 ratios	continuously variable	continuously variable
Gear shift	6 speeds	none	none
Range change	2 ranges	none	4 ranges
Shuttle	under load	under load	under load
Number of ratios from 4 to 12 km/h	8	continuously variable	continuously variable
Lift Type of control	EHR, lower link arms	EHR, lower link arms	EHR, lower link arms
Lifting capacity bottom/middle/top	7,317/8,298/9,162 daN	7,550/7,659/7,435 daN	6,624/6,489/6,504 daN
Lifting stroke	72.2 cm	69.4 cm	78.3 cm
Hydraulic sys. Operating pressure	202 bar	196 bar	200 bar
Maximum flow rate	121 L/min	139.2 L/min	163.0 L/min
Maximum hydraulic power	35.4 kW	39.1 kW	47.4 kW
Collectable quantity of oil	32 + 8 litres	45 litres	47 litres
Maximum tractive power	104.4 kW	97.7 kW	95.4 kW
… with fuel consumption equal to	248 g/kWh	265 g/kWh	273 g/kWh
Noise level, cab closed	76.6 dB(A)	73.7 dB(A)	73.4 dB(A)
Brakes Average deceleration	5.8 m/s^2	4.4 m/s^2	5.8 m/s^2
...with force on the pedal equal to	32.9 daN	42 daN	38.9 daN
Turning radius without dual traction	13.00 m	13.25 m	12.40 m
Weight during test	7,090 kg	7,550 kg	6,710 kg
...of which on the front axle	2,820 kg (40%)	3,060 kg (38%)	2,900 kg (43%)
...on the rear axle	4,270 kg (60%)	4,490 kg (62%)	3,810 kg (57%)
Maximum permissible weight	11,000 kg	11,500 kg	11,000 kg
Payload	3,910 kg	3,950 kg	4,290 kg
Weight per unit of power	55 kg/kW	54 kg/kW	57 kg/kW
Manufacturer's list price (base version, without VAT)	€117,500 (2/2014)	€117,920 (6/2012)	€116,790 (4/2013)