

AMONGST 6 AND 7 LITERS

EUROPE VERSUS USA



A hinge between thermal and mechanical past and decarbonised future, 2020 has instead been frozen by the consequences of the pandemic. Among these it is worth mentioning the extension of the transitional period which postpones the deadlines of 30 June and 31 December 2020 for production and distribution of NRMM equipped with engines under 56 kW and over 130 kW. The vote on last 10th July paved the way for the final publication in the Official Gazette of the European Union of the amended version of (EU) 2016/1628 Regulation. Most notably, however, the very identity of certain power ranges, including the one from 6 to 7 liters, is in search of an immediate alternative: gasification, hybridization or combustion optimization? Since November 2019, NEF has

been a candidate for this role. We've seen the N67 at Agritechnica in the NG version, 180 kW at 1,800 rpm and 1,035 Nm at 1,500 rpm, featuring multipoint injection, three-way catalyst and waste gate. But let's get back to our topic. It was 2016 when the CEO of Cummins, Tom Linebarger, unveiled at Bauma Monaco what would later be called the Performance Series which brought the B6.7 to 240 kW and 1.375 Nm, a 30 percent more. The Diesel Index became red, showing FPT NEF and D08 MAN fundamentally paired. kW outperform - albeit by a little the 235 of MAN, Nm on the other hand leave behind the Cat - Perkins - FPT Industrial trio by a 6.4 percent. The 6.7 liters seen at Agritechnica featured a structural sump. Cat pushed for performances, which were improved in Stage V espe-

cially on C7.1, C9.3 and C13B engines. **Jeff Moore**, Product director, research and development for 7.2 to 18 liters engines, commented on the performance of 9.3 and 7 litres. «End users will be rewarded with improved performance. Up to 3 percent less fuel consumption and exceptional cold start capacity», says Moore. «Our patented after-treatment technology provides a compact and lightweight design, 39 percent smaller and 55 percent lighter than Stage IV/ Tier 4 Final configuration. The new design also provides transparent regeneration to ensure optimal performance and uptime». Perkins also uses this engine block. The design is balanced, featuring a 10 m/s piston speed and low stress threshold: despite the performance being competitive, specific curves show a profile low-

er than it could be if working on mep. Also available in 4-cylinder version, it is the smallest MAN cylinder and keeps just like the other Bavarians its automotive inspiration. Four valves, Bosch common rail and EDC17 control unit. After the renovation of its upper range (9 liters, 15.3 and 16.2 liters), should we expect further news? AGCO Power believes in its engine hub and keeps investing on it - over 100 million euros for the renovation of its Finnish production hub. In this range, the 6.6 litres is below the 200 kW threshold. Mep, by the way, speaks clearly: at 16.3 bars the aim of AGCO Group specialist is crystal clear, don't push too hard and deliver reliable engines for captive applications, which as we know mainly target open field agricultural applications. We highlighted the resilience of Deutz one liter cylinder, which found a shelter in Cologne. Peeking into the figures, specific curves award Deutz, which gives way only to Cummins for torque/displacement ratio while featuring the same power rate. FPT strategy in the

Regulation (EU) 2020/1040 to amend Regulation (EU) 2016/1628 on Stage V emissions from non-road mobile machinery was published on the 17th of July 2020 on the Official Journal of the EU

BRAND MODEL	AGCO POWER 66L HD	CATERPILLAR C7.1 ACERT	CUMMINS B6.7	DEUTZ TTCD6.1	FPT INDUSTRIAL N67 ENT210	JOHN DEERE PSS6.8L	LIEBHERR D934 A7-04	MAN D0836	PERKINS 1206E-ETTA
I. D.									
B x S mm - S/B	108 x 120 - 1,11	105 x 135 - 1,29	107 x 124 - 1,16	101 x 126 - 1,25	104 x 132 - 1,27	106 x 127 - 1,20	122 x 150 - 1,23	108 x 125 - 1,16	105 x 135 - 1,29
N. cil. - dm³	6 - 6,59	6 - 7,01	6 - 6,69	6 - 6,05	6 - 6,72	6 - 6,72	4 - 7,01	6 - 6,87	6 - 7,01
Maximum power kW - rpm	185 - 2.100	225 - 2.200	243 - 2.200	211 - 2.100	228 - 2.100	224 - 2.400	200 - 1.900	235 - 2.100	225 - 2.200
Mep at max power bar	16,3	17,8	20,2	20,3	19,8	17	18,4	19,9	17,8
Piston speed m/s	8,4	9,9	9,1	8,8	9,2	10,2	9,5	8,8	9,9
Maximum torque Nm - rpm	1.000 - 1.500	1284 - 1.400	1.372 - 1.500	1229 - 1.450	1284 - 1.400	1058 - 1.600	1245 - 1.150	1254 - 1.200	1284 - 1.400
Mep at max torque bar	19,4	23,5	26,3	26	24,5	20,2	22,8	23,4	23,5
% power at max torque (kW)	44	47,1	46,5	48,2	46,3	37,2	52,3	43,3	47,1
Torque at max power Nm	843	980	1.049	960	1.039	892	1.009	1.068	980
% power at max torque (kW)	85 (157)	83,70 (188)	88,70 (216)	88,50 (187)	82,60 (188)	79,20 (177)	75 (150)	67,10 (158)	83,70 (188)
DETAILS									
Specific power kW/dm³	28	32	36,2	34,8	33,8	33,3	28,5	34,2	32
Specific torque Nm/dm³	151,6	183	205	202,9	190,8	157,3	177,5	182,5	183
Areal spec. power kW/dm²	33,64	43,27	45	43,87	44,71	42,34	42,74	42,73	43,27
RULES AND BALANCE									
Dry weight kg	750	715	583	715	520	750	900	642	715
L x W x H mm	1.248x637x1.108	1.063x820x907	1.156x768x1.100	767x639x1.205	1.062x681x1.018	1.161x768x1.144	1.173x918x1.131	1.180x877x994	1.063x820x907
Volume m³	0,88	0,79	0,98	0,59	0,74	1,02	1,22	1,03	0,79
Weight/power kg/kW	4,1	3,2	2,4	3,4	2,3	3,3	4,5	2,7	3,2
Weight/displacement kg/dm³	113,7	101,9	87,1	118,0	77,3	111,5	128,3	93,4	101,9
Power density kW/m³	210,2	284,8	248,0	357,6	308,1	219,6	163,9	228,2	284,8
Total density t/m³	0,85	0,91	0,59	1,21	0,70	0,74	0,74	0,62	0,91
Displacement/volume dm³/m³	7,50	8,88	6,83	10,27	9,09	6,59	5,75	6,67	8,88

McCormick and Beta Power (aka N67)

McCormick’s X7,624 VT-Drive works in a segment where versatility is the masterkey. With its 230 HP, it has to be able to do everything from transport and heavy field work to handling on the farm, ensuring the highest levels of performance and reliability. This is also confirmed by its tonnage with 8 thousand kilos of weight in running order, 46 percent of which are distributed at the front and 54 at the rear with a maximum load of 13 thousand kilos. In order to guarantee the right approach when it comes to pulling, McCormick has once again relied on FPT Industrial with the tried and tested NEF6.7 renamed Beta Power, Stage V compliant.

range above 120 kW is clear: the NEF and Cursor ranges are based on Hi-eSCR. Technical urea sets the pace, leaving behind recirculation.

The transition from Stage IV to Stage V delivers a 13 percent increase in performance. OEMs seems to appreciate this strategy: the 6.7 engine was chosen by Arbos, McCormick and Landini, Dieci, Claas and others.

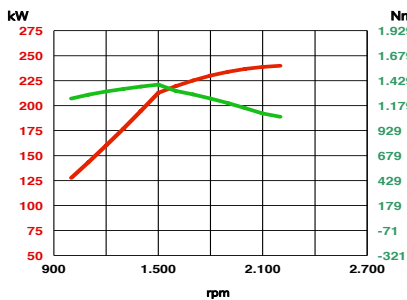
A final comment on Liebherr, which comes with the low entry in its portfolio, seven litres of displacement, 2000 bar pressure common rail and a specific consumption of less than 200 g/kWh (192 g/kWh to be precise). ■

	AGCO POWER	CATERPIL-LAR	CUMMINS	DEUTZ	FPT INDUSTRIAL	JOHN DEERE	LIEBHERR	MAN	PERKINS
INDEX									
Torque	8,6	11	10,3	9,7	10	10,7	10,4	11,8	11
Performance	5,7	6,7	7,2	7,1	6,9	6,2	6,6	6,7	6,7
Stress	9,3	11,1	11,8	11,6	11,2	10,1	10,8	10,7	11,1
Lightness	14	12,3	10,2	14	9,2	13,9	16,3	11,1	12,3
Density	10,4	14	12,5	20,2	15,5	9,5	9,3	10,8	14
DIESEL INDEX	6,8	7,6	8,1	7,5	8	7,3	7	7,8	7,6

1 CUMMINS



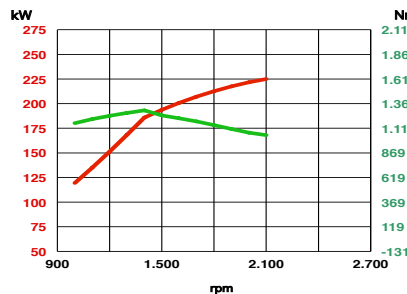
CUMMINS



2 FPT



FPT N67



3 MAN



MAN D08

