

## O. Engine Testing on Roller Test Stand

**Performance:** The performance data given in HP are based on an inlet air temperature of + 20°C and a barometer value of 760 mm Hg (mercury column).

**Fuel Consumption:** Fuel consumption measurements are based on the flow period for 100 cc or 200 cc measuring vessel capacity.

**Note:** a) When these measurements are taken, the cooling water and oil temperature of the engine should not be below 75°C.

b) When the car is tested on the roller test stand, the tire pressure should be adjusted to the values for free-way driving given in the Owner's Manual.

### Performance Correction

The measured engine output must be corrected to the reference values of + 20°C and 760 mm Hg (mercury column) in accordance with the formula

$$N_k = N_m \times K$$

where  $N_k$  is the corrected value,  $N_m$  the measured value, and  $K$  the correction factor.

The correction factor  $K$  is determined in relation to temperature and atmospheric pressure according to the following formula:

$$K = \frac{760}{b} \sqrt{\frac{273 + t}{273 + 20}}$$

where  $b$  is the atmospheric pressure in mm Hg and  $t$  the temperature in °C.

**Example:** Engine performance  $N_m = 100$  HP is measured at  $b = 740$  mm Hg and  $t = 35^\circ\text{C}$ .

$$K = \frac{760}{740} \sqrt{\frac{273 + 35}{273 + 20}} = 1.053$$

$$N_k = 100 \times 1.053 = 105.3 \text{ HP}$$

The correction factor  $K$  can be read off the following diagram with sufficient accuracy for all practical purposes (Fig. 01-3/23). For the above example the necessary procedure for finding the correction factor is indicated in the diagram.

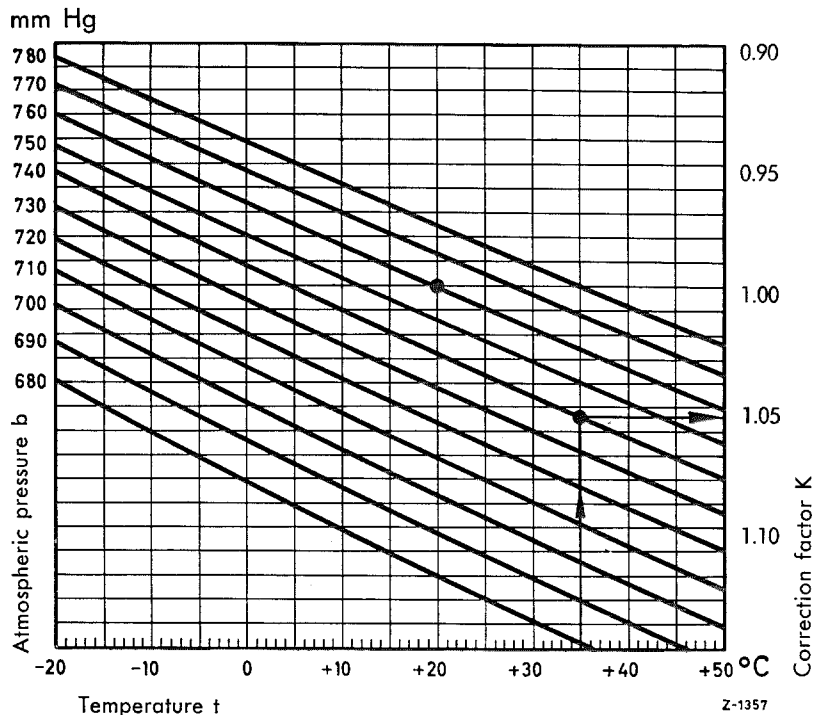


Fig. 01-3/23

# **Guide Values for Testing the Engine on the Clayton Roller Test Stand**

Test			Model				
			180 a	180 b	190	190 b	190 SL
Full-load output	2nd gear n = 4000 rpm	Output HP	47.5	50	—	—	—
	2nd gear n = 4400 rpm		48	51	58	59	67
	2nd gear n = 4800 rpm		—	—	56	61	72
Fuel consumption	Full load 2nd gear n = 4800 rpm	Vacuum mm Hg	60—100				
		Exhaust-gas analysis %	81—86	80—85	80—84		82—86
		Sec. per 200 cc	30—32	28.5—31	27.5—30	27—29.5	22—24
	3rd gear n = 3000 rpm	Exhaust-gas analysis %	79—83	78—82	76—80		80—84
		Sec. per 200 cc	42—45	40.5—43.5	40—43		37—40
	4th gear n = 1500 rpm	Exhaust-gas analysis %	74—78		74—80	74—78	80—84
		Sec. per 100 cc	39—42.5		41—44.5	40—43.5	33.5—39
	Partial load 4th gear 60 km/h load 10 HP	Vacuum mm Hg	300—340				
		Exhaust-gas analysis %	85—90		84—88		86—90
Acceleration	20—80 km/h in 3rd gear with flywheel (adjust to 10 HP load at 60 km/h in 4th gear)	Stop-watch time in sec.	22		20		

## Guide Values for Testing the Engine on the Clayton Roller Test Stand

Test			Model	
			180 D, 180 Db	190 D, 190 Db
Full-load output	2nd gear n = 3000 rpm	Output HP	32	—
	2nd gear n = 3200 rpm		33	—
	2nd gear n = 3600 rpm		—	36
	2nd gear n = 4000 rpm		—	38
Fuel consumption Full load	2nd gear n = 3200 rpm	Sec. per 100 cc	29—31	—
	2nd gear n = 3600 rpm		—	26—28
Acceleration	20—65 km/h <sup>1)</sup> in 3rd gear with flywheel (adjust to 5 HP load at 60 km/h in 4th gear)	Stop-watch time in sec	22	—
	20—75 km/h <sup>1)</sup> in 3rd gear with flywheel (adjust to 5 HP load at 60 km/h in 4th gear)		—	22

**Note:** When carrying out the performance test, make sure that the engine oil temperature is not less than 80° C.

<sup>1)</sup> Before carrying out the acceleration test with flywheel engaged, run the engine in 4th gear without the flywheel at 60 km/h and a load of 5 HP; then engage the flywheel.

## Guide Values for Testing the Engine on the Clayton Roller Test Stand

Test			Model			
			220 a 219 ( $\epsilon = 7.6 : 1$ )	219 ( $\epsilon = 8.7 : 1$ )	220 S ( $\epsilon = 7.6 : 1$ )	220 S ( $\epsilon = 8.7 : 1$ )
Full-load output	2nd gear n = 4000 rpm	Output HP	61	64	71	73
	2nd gear n = 4400 rpm		64	67	75	77
	2nd gear n = 4800 rpm		63	68	77	81
Fuel consumption	Full load	2nd gear n = 4800 rpm	Vacuum mm Hg		70—110	
		3rd gear n = 3000 rpm	Exhaust-gas analysis %		80—84	
			Sec. per 200 cc		25—27	
	Full load	3rd gear n = 3000 rpm	Exhaust-gas analysis %		86—90	
			Sec. per 200 cc		23.5—25.5	
		4th gear n = 1500 rpm	Exhaust-gas analysis %		72—76	
			Sec. per 200 cc		84—88	
	Partial load	4th gear 60 km/h load 10 HP	Exhaust-gas analysis %		31—34	
			Sec. per 100 cc		35.5—39	
Acceleration	20—80 km/h in 3rd gear with flywheel (adjust to 10 HP load at 60 km/h in 4th gear)	Stop-watch time in sec	Vacuum mm Hg		310—350	
			Exhaust-gas analysis %		84—88	
Acceleration	20—80 km/h in 3rd gear with flywheel (adjust to 10 HP load at 60 km/h in 4th gear)	Stop-watch time in sec	84—88		86—90	
			16.5		16	
Acceleration	20—80 km/h in 3rd gear with flywheel (adjust to 10 HP load at 60 km/h in 4th gear)	Stop-watch time in sec	16.5		16.5	
			16		16	

**Note:** a) On Models 219 and 220 S with hydraulic automatic DB clutch, consumption measurement under full load and at an engine speed n=1500 rpm in 4<sup>th</sup> gear should not be carried out.

b) On Models 219 and 220 S with hydraulic automatic DB clutch, the acceleration test should not be repeated more than once in order to avoid excessive heating up of the hydraulic clutch.

# Guide Values for Testing the Engine on the Clayton Roller Test Stand

Test				Model	
				220 SE, 220 SE Convertible Engine type 127.980 (115 HP)	
Full-load output	3rd gear n = 4400 rpm		Outhut HP	83	
	3rd gear n = 4800 rpm			87	
Fuel consumption	Full load	3rd gear n = 4800 rpm	Vacuum mm Hg	20—40	
			Exhaust-gas analysis %	82—87	
			Sec. per 200 cc Inlet air temperature °C	30	21.5—23.5
				20	21—23
				10	20.5—22.5
				0	20—22
		3rd gear n = 3000 rpm	Exhaust-gas analysis %	79—84	
			Sec. per 200 cc Inlet air temperature °C	30	34—37
				20	33—36
				10	32—35
				0	31—34
			4th gear n = 1500 rpm	Exhaust-gas analysis %	80—85
	Sec. per 200 cc Inlet air temperature °C	30		38—41	
		20		37—40	
		10		36—39	
		0		35—38	
Partial load	4th gear 60 km/h load 10 HP	Vacuum mm Hg		300—340	
		Exhaust-gas analysis %	83—88		
Acceleration	20—80 km/h in 3rd gear with flywheel (adjust to 10 HP load at 60 km/h in 4th gear)		Stop-watch time in sec.	15	

**Note:** a) On cars with hydraulic automatic DB clutch, consumption measurement under full load and at an engine speed n = 1500 rpm in 4th gear should not be carried out.

b) On cars with hydraulic automatic DB clutch, the acceleration test should not be repeated more than once in order to avoid excessive heating up of the hydraulic clutch.