



ADF

**1.8ltr
Carburettor
engine**



The Volkswagen AG reserves the right to introduce modifications or improvements at any time. This does not entail any obligation to effect such changes subsequently on engines already delivered

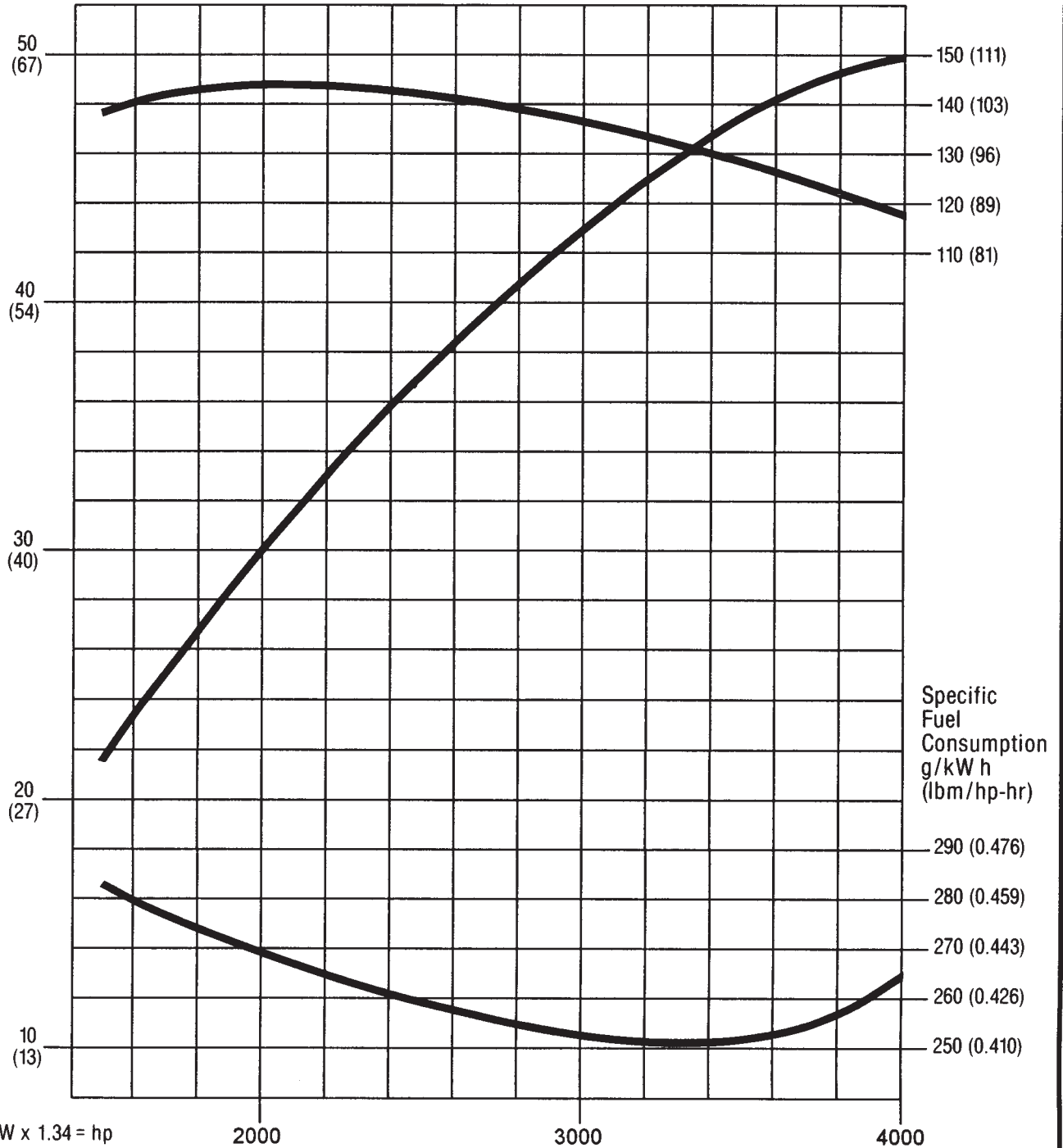
**Volkswagen AG,
Wolfsburg**



Carburetor Engine - JG1
(without radiator fan)

Power
kW (hp)

Torque
Nm (ft-lbf)



kW x 1.34 = hp

Nm x .74 = ft-lbf

g/kW-h x .00164 = lbm/hp-hr

2000

3000

4000

engine speed rpm



INTRODUCTION

The Volkswagen Industrial Engine with the engine code **ADF** is a 1.8 ltr. water-cooled, four cylinder, four-stroke, in-line, spark-ignition engine with a carburetor. With the multitude of possible applications of this engine it is essential to adhere to the recommendations on the following pages when developing new equipment. This will ensure proper operation and a long service life of the entire assembly under all operating conditions.

Design: Direct valve operation via an overhead cam (OHC) driven with a toothed belt. Maintenance-free valve timing gear with hydraulic tappets. Intermediate shaft for driving the ignition distributor and the fuel pump.

Displacement	cm ³ (in. ³)	1781 (109)
Bore/stroke	mm (in.)	81.0/86.4 (3.19/3.40)
Compression ratio		9.0:1
Firing order		1-3-4-2
Output		
N _{max} at 4000 rpm	kW (hp)	50 (67) [DIN 70020]
Engine Speed		
Max. permissible at full load	rpm	4000
Idling speed	rpm	750±50
Installation angle	∠°	20
Mixture Preparation		Downdraught carburetor with electric and coolant-temperature controlled choke
JG1 with 1B3 carburetor		
Fuel		Regular
Octane requirement	RON	91
as per	DIN	51600 (leaded)
as per	DIN	51607 (unleaded)
Fuel consumption	g/kW h (lbm/hp-hr)	see Page 1
Alternator 12 V	A	65
Starter 12 V	kW (hp)	0.95 (1.3)
Battery 12 V	A (Ah)	220 (45) minimum capacity
Spark plugs		
Manufacturer	Bosch	W 8 DTC
	Beru	14-8 DTU
	Champion	N 9 BYC 4
	NGK	BP 5 ET-10
Electrode gap	mm (in.)	0.9 - 1.1 (.035 - .043)



Lubrication		Pressure-feed lubrication with gear pump, full-flow filter
Oil pressure at 2000 rpm and 80°C (176°F)	bar (psi)	2.0 - 8.0 (29 - 116)
Oil consumption at 4000 rpm	ltr/hr (qt/hr)	0.05 - 0.1
Engine oil quality		Brand-name oils as per oil specifications of operating instructions.
Cooling		closed cooling system (pressurized system with separate expansion tank and pressure valve).
Pressure valve opens at	bar (psi)	1.2 - 1.5 (17 - 22)
Coolant		use 60% water and 40% coolant additive G11 V8B as frost and corrosion protection (sufficient up to cold start limit).
Cold Start limit temperature	°C (°F)	-25 (-13)
Moment of inertia		
total crankshaft drive	kgm ² (lbm-in ²)	0.143 (489)
flywheel	kgm ² (lbm-in ²)	0.079 (270)
clutch	kgm ² (lbm-in ²)	0.023 (79)
Permissible power take off	Nm (ft.-lbf)	17 (12.5) radially via belt pulley
	Nm (ft.-lbf)	48 (35.4) radially or axially via crankshaft.
Permissible operating angle in all directions	∠° (%)	18 (33)
Weight engine dry	kg (lbm)	approx. 111 (245)



FILLING CAPACITIES

Cooling system	ltr. (qt.)	approx. 5-8 (depending on cooling system)
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For first filling, pour in coolant slowly up to Max. - marking while continuously bleeding cooling system of air. Allow engine to warm up until thermostat is fully open. Switch off engine and allow to cool down before checking and correcting cooling level.

IMPORTANT!

Do not open radiator cap while engine is hot, as coolant system is pressurized.
- DANGER OF SCALDING -

Oil circuit		
without filter change	ltr. (qt.)	2.5 (2.6)
with filter change	ltr. (qt.)	3.0 (3.2)
Difference between Min. - and Max. - marking on dipstick	ltr. (qt.)	approx. 1.0

TEMPERATURES

Coolant		
permissible temperature	°C (°F)	95 (203) continuous operation
	°C (°F)	105 (221) 5-minutes' operation
	°C (°F)	118 (244) absolute limit
Thermostat		
fully open	°C (°F)	85 (185)
starts opening at	°C (°F)	70 (158)
Temperature switch		
closes at	°C (°F)	110 ± 3 (230 ± 5)
Engine oil		
permissible max. temperature	°C (°F)	130 (266) in oil sump



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Industrial Engines
ADF

12 V WIRING DIAGRAM

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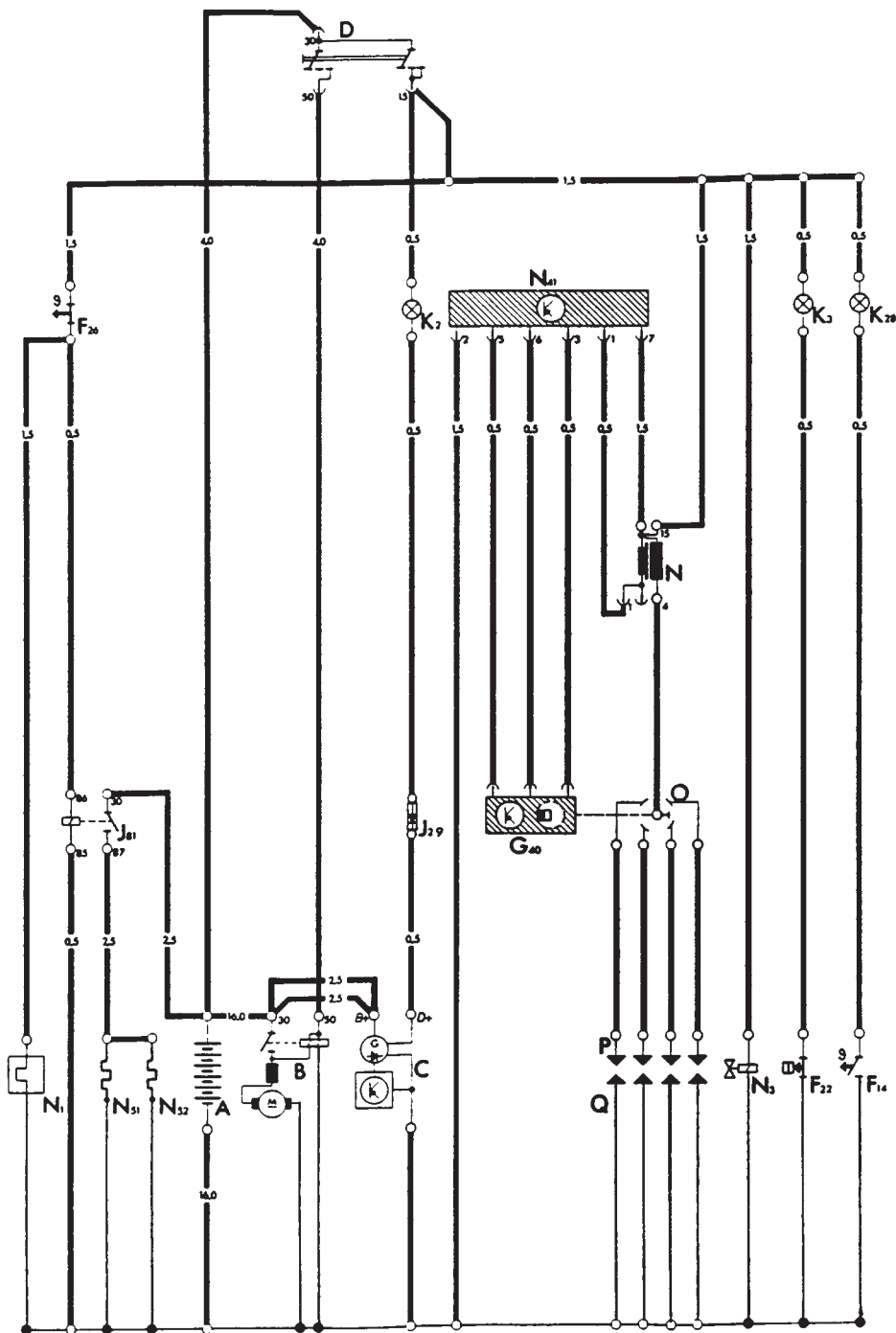
Series-Production Model

DESIGNATION

- A - Battery
- B - Starter
- C - Alternator
- D - Starter switch
- F14 - Coolant Temperature switch [110°C] (230°F)
- F22 - Oil pressure switch [0.3 bar] (4 psi)
- F26 - Thermo switch for automatic choke
- G40 - Electronic ignition
- J29 - Blocking diode
- J81 - Relay for intake manifold preheating
- K2 - Alternator warning lamp - 2 Watt
- K3 - Oil pressure warning lamp
- K28 - Coolant temperature warning lamp
- N - Ignition coil
- N1 - Carburetor automatic choke
- N3 - By-pass air cut-off valve
- N41 - Electronic ignition control unit
- N51 - Intake manifold preheater
- N52 - Bypass air heater
- O - Distributor
- P - Spark plug connector
- Q - Spark plug

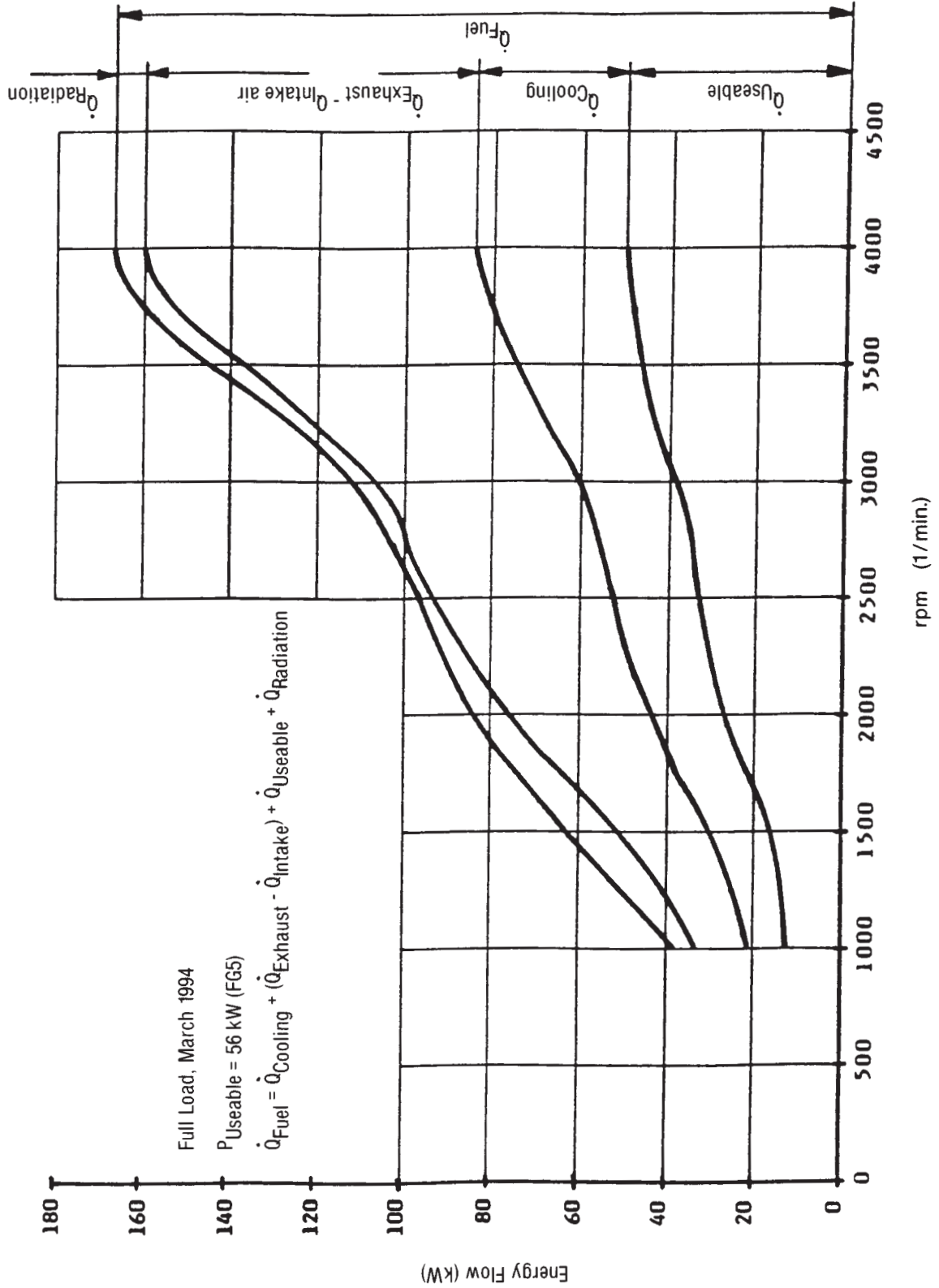
WIRE SIZES

0.5 mm ²	Use	
1.5		16 ga.
2.5		14 ga.
4.0		10 ga.
6.0		10 ga. or 2X12 ga.
16.0		4 ga.



NOTE:

Indicated wiring cross-sections are minimum sizes. Some units have larger cross sections and these should be taken into account when carrying out repairs.





Water Pump Volume

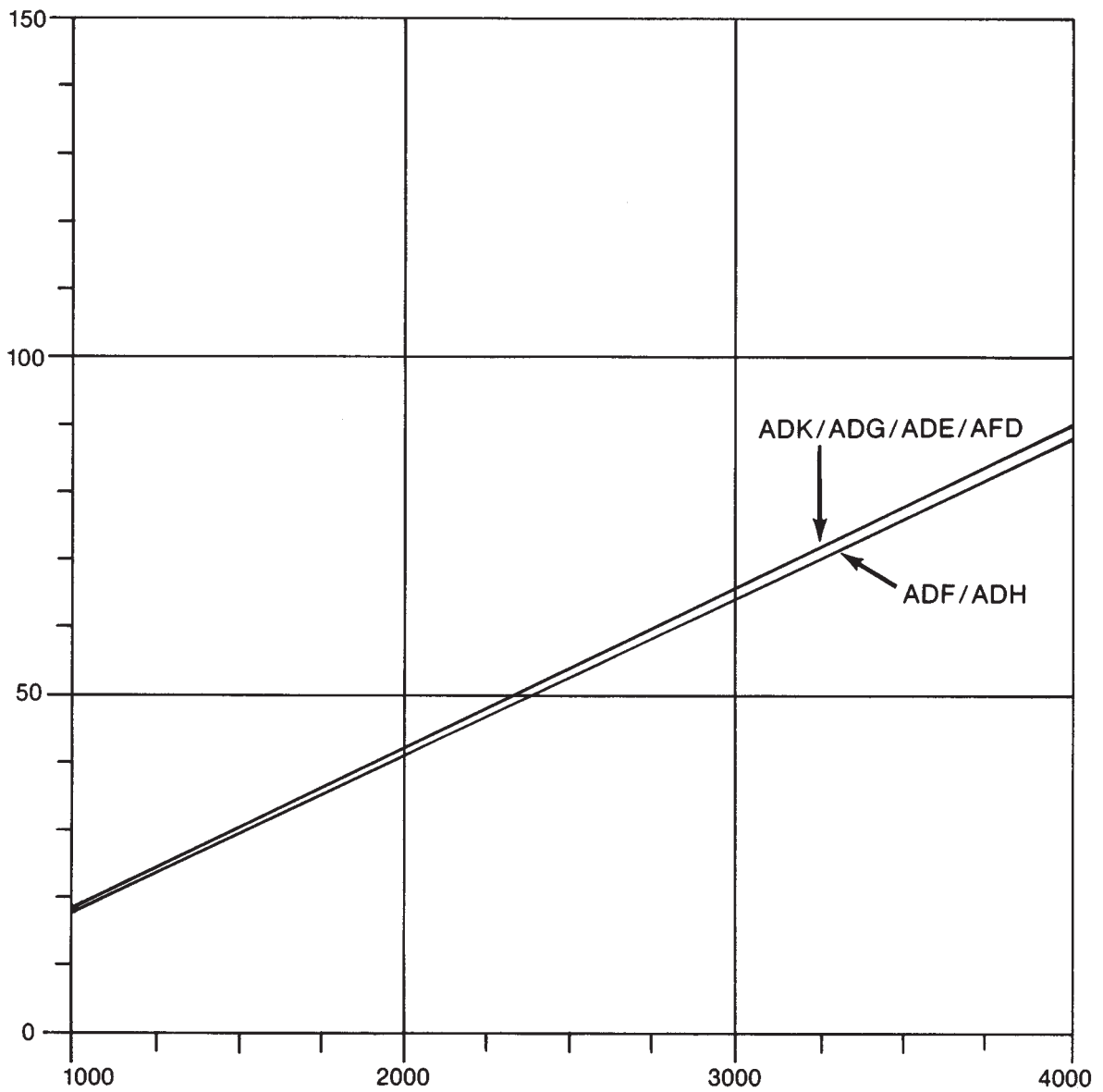
Volume is measured cold with automotive cooling system

Pulley Ratio

ADF/ADH : KW da 0 139 (i = 1,08)
WP 129

ADK/ADG : KW da 0 115 (i = 1,11)
ADE/AFD WP 104

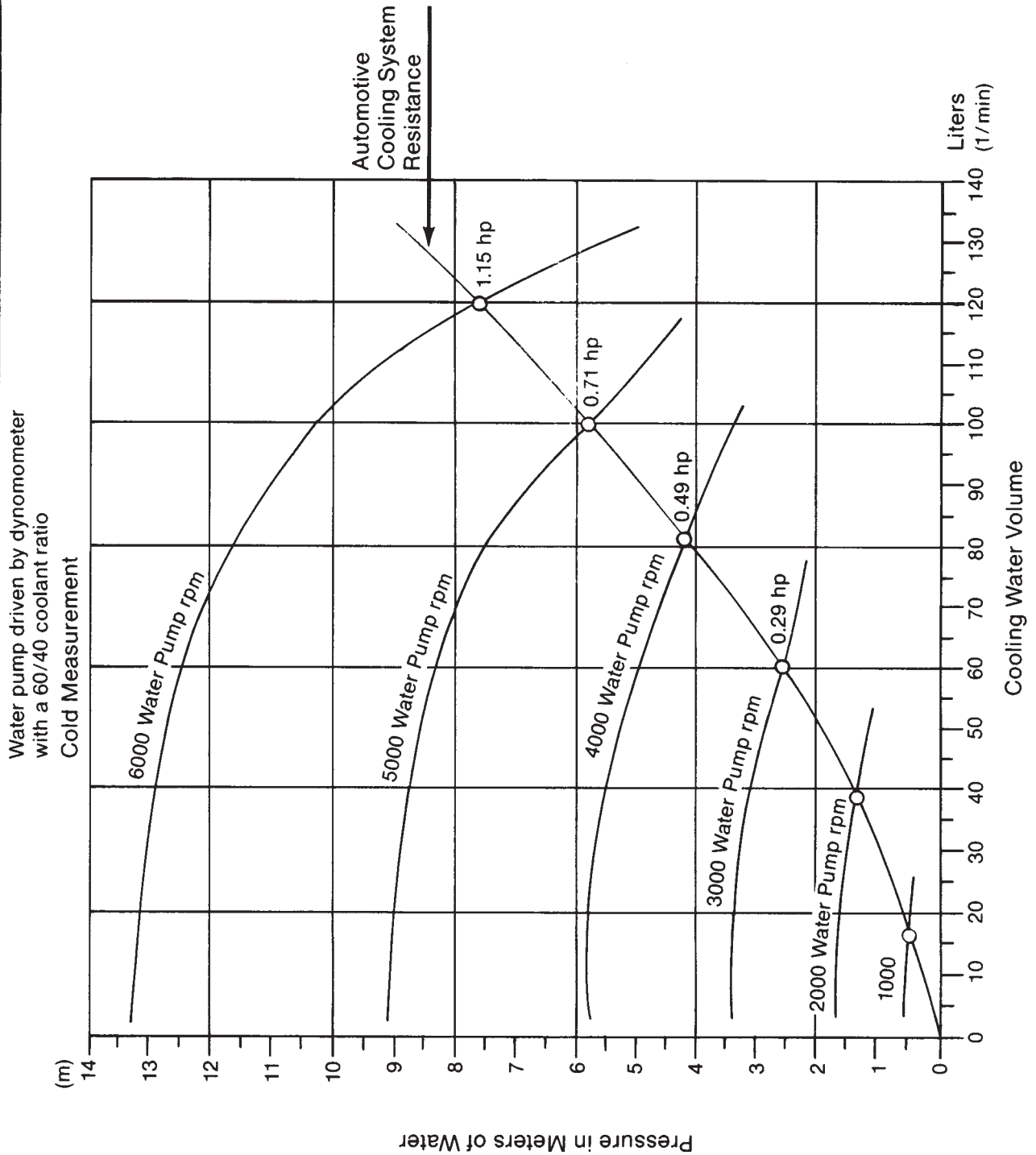
Liters (1/min)



Engine rpm (1/min)



Water Pump Performance Map





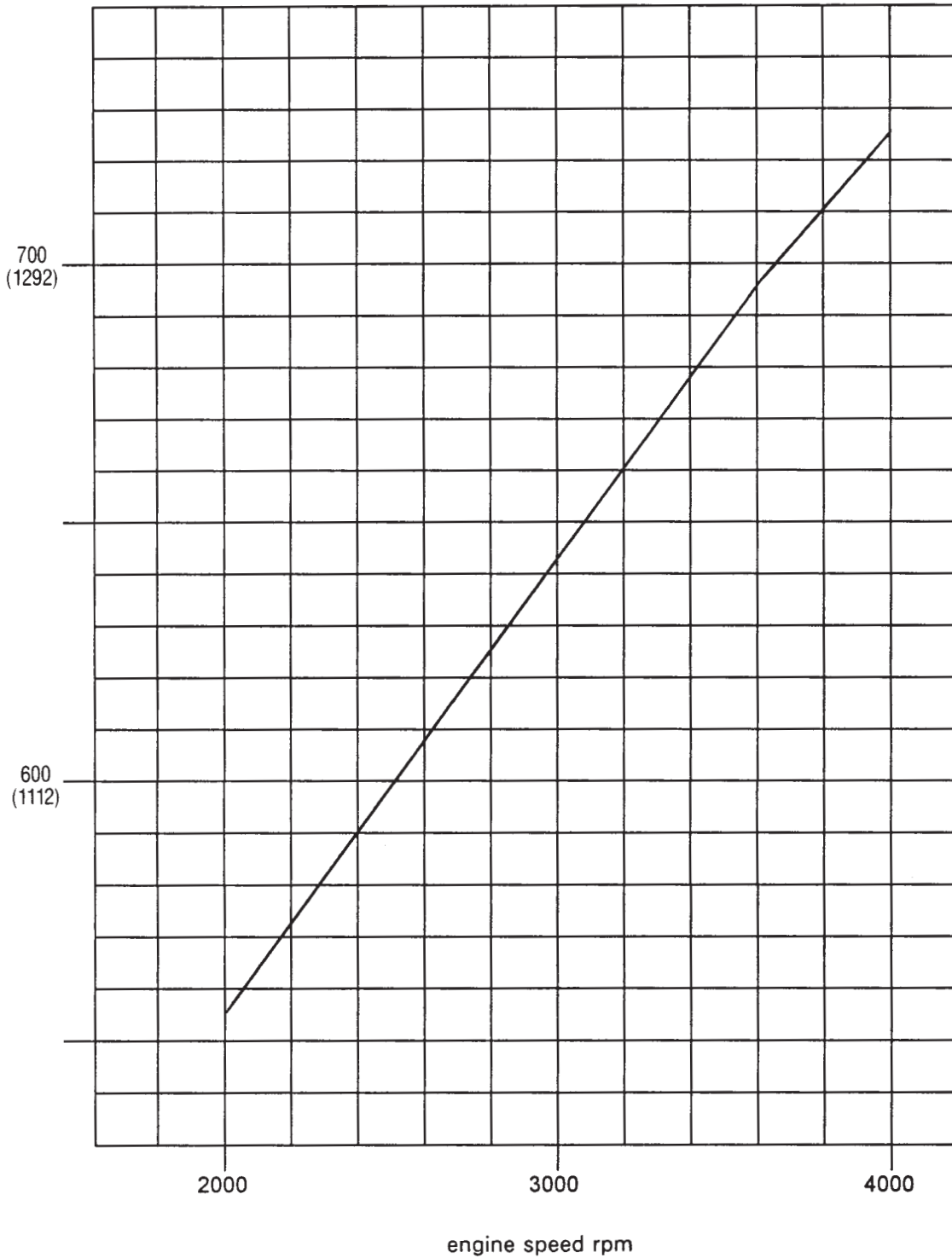
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**MAX. PERMISSIBLE EXHAUST
GAS TEMPERATURE**

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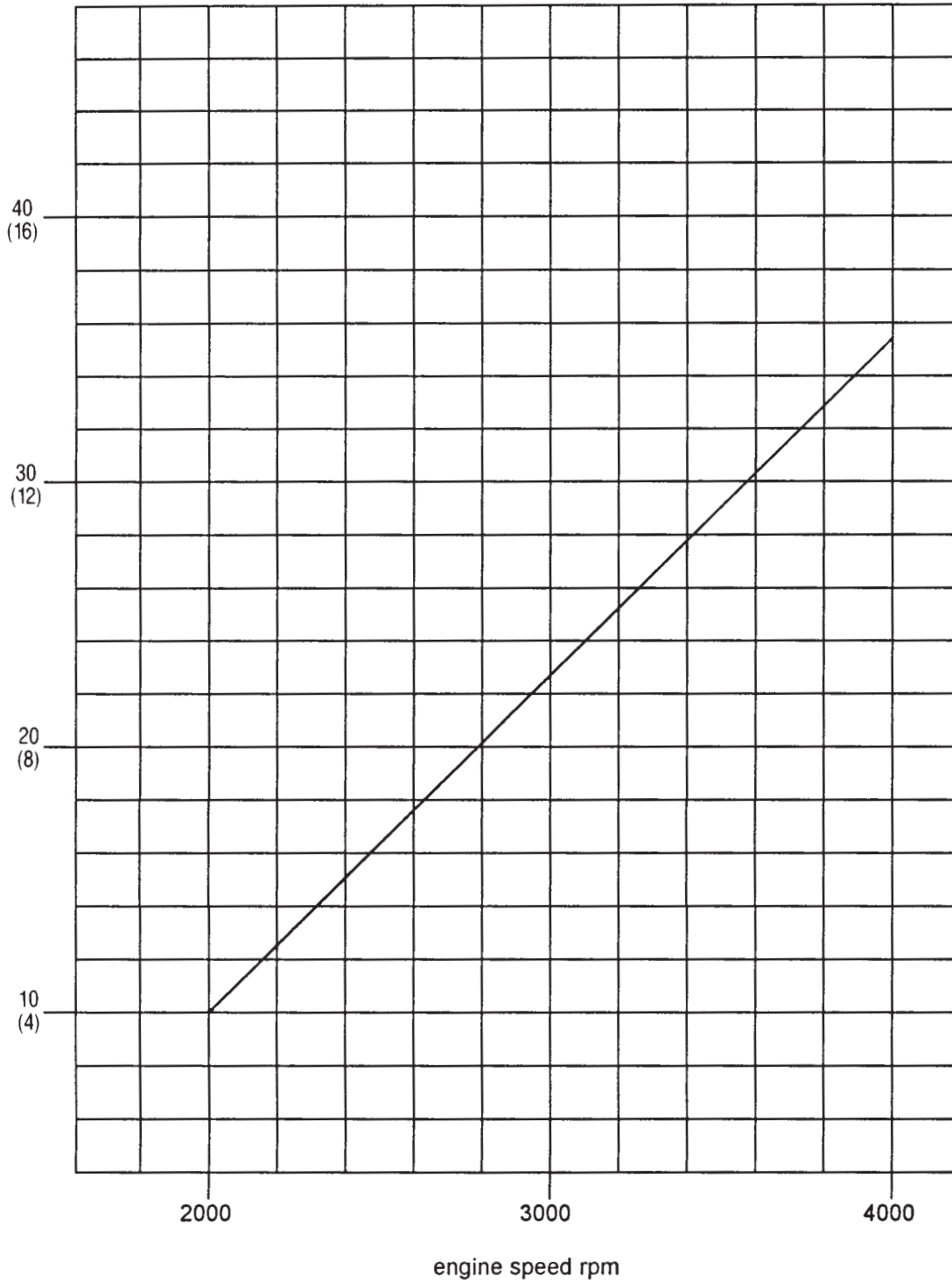
Measuring point: 150 mm behind exhaust gas flange

°C (°F)





mbar (in. H₂O)



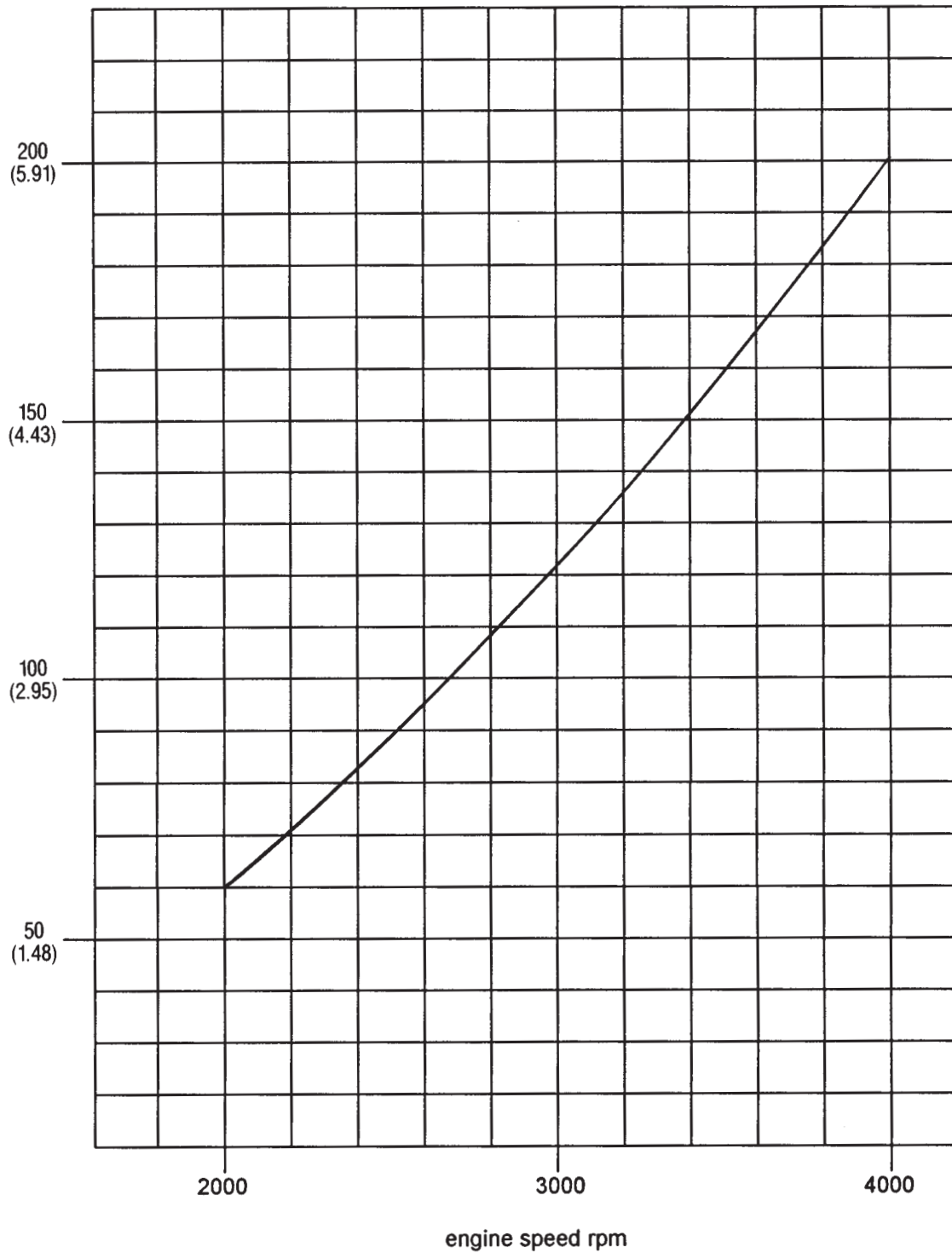


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**MAX. PERMISSIBLE
EXHAUST GAS BACK PRESSURE**

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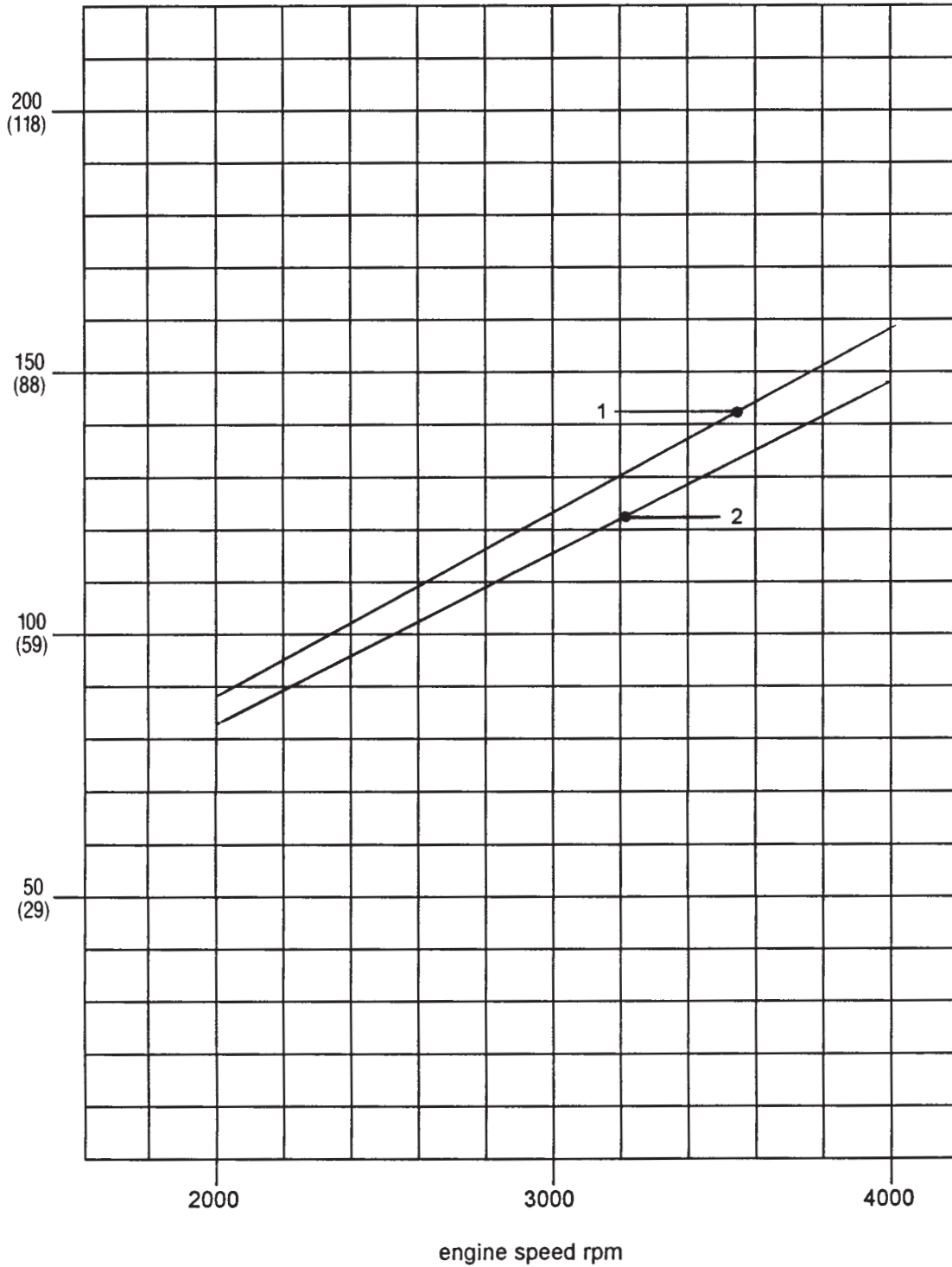
mbar (in. Hg)





at full load

m³/h (cfm)





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