Principle:	4-stroke Otto gas engine
No of cylinders :	6 in line
Engine cooling :	Engine cooling water pump, without radiator for engine cooling water. Pressure fan ⌀ 620 mm, drive via power band
Lubrication :	Pressure lubrication by gear-driven pump, exchangeable lube-oil filter in full flow and lube oil cooler integrated in engine coolant circuit.
Spark plugs:	Special spark plug for industrial gas engines.
Alternator:	28 V / 55 A drive via power band
Starter motor:	With or without pre-engaged-drive starter 24 V - 4.0 kW

ENGINE DATA

λ = 1.00	METRIC		ENGLISH	
Rated speed	rpm	1500	rpm	1500
ISO standard power (COP)	kW	68	bhp	91
Air ratio	λ	1.00	λ	1.00
Configuration		in-line engine		in-line engine
No of cylinders		6		6
Bore	mm	108	in	4,25
Stroke	mm	125	in	4,92
Swept volume	L	6,87	cu in	419
Direction of rotation looking on flywheel		counter clockwise		counter clockwise
Flywheel housing		SAE 2		SAE 2
Ring gear with number of teeth	Z	129	Z	129
Compression ratio	ε	13,5:1	ε	13,5:1
Mean effective pressure	bar	7,92	psi	114,8
Mean piston speed	m/s	6,25	in/s	246,1
Lube oil consumption up to	kg/h	0,10	lb/hr	0,026
Lube oil filling quantity min./max.	l	24/34	U.S. gal	6,34/8,98
Coolant filling quantity	l	16	U.S. gal	4,23
max. operating pressure	bar	2	psi	29,0
min. engine coolant circulation quantity	l/min	245	U.S. gal/min	64,7
Pressure reserve water pump	bar	0,3	psi	4,2
Coolant temperature min.	°C	80	°F	176
max. coolant temperature	°C	88	°F	190
Difference (inlet - outlet max.)	K	6	K	6
max. suction pressure	mbar	15	psi	0,22
max. exhaust back pressure	mbar	40	psi	0,58
Engine width	mm	740	in	29,13
Engine length	mm	1320	in	51,97
Engine height	mm	990	in	38,98
Engine weight, dry	kg	600	lb	1323

Lube oil to MAN works standard M 3271-2 and coolant to MAN works standard M 324 Type NF
Gas quality to MAN data sheet - minimum requirement for the gas quality for MAN gas engines
Air ratio measured by lambdameter ETAS LA 4_E

RATING DATA		**50 Hz**		
λ = 1.00		**METRIC**		
Load	%	100	75	50
Ignition timing	°BTDC	19	19	19
ISO standard rating	kW	68	51	34
Coolant heat	kW	62	55	48
Exhaust heat up to 120 °C	kW	51	39	28
Radiation heat max.	kW	8		
Energy input	kW	205	165	126
Fuel consumption	MJ/kWh	10,9	11,6	13,3
Efficiency				
mechanical	%	33,2	30,9	27,0
thermal	%	55,3	57,0	60,1
total	%	88,5	87,9	87,1
Mass flows				
Combustion air	kg/h	261	210	161
Fuel	kg/h	15,0	12,0	9,2
Exhaust gas mass flow rate, wet	kg/h	276	222	170
Temperatures				
Exhaust gas temperature	°C	635	605	575
Fan				
Power input for fan	kW	6,1	6,0	
Cooling air supplied for fan-cooled radiator	m³/h	14800	11200	
Max static pressure in front of radiator	mbar	5	6	
Max static pressure after radiator	mbar	2	2	

Emissions at 100 % load	**Correlation**		**5 % O_2**	**15 % O_2**
NO_X	mg/Nm³	<	3337	1252
	ppm	<	2200	2200
CO	mg/Nm³	<	1905	714
	ppm	<	2000	2000
THC	mg/Nm³	<	143	54
	ppm	<	300	300

Reference gas mixing unit: Woodward-Deltec 100/54 and ignition system MIC 508

The technical data are based on natural gas with a calorific value of 10 kWh/Nm³ and a methane no. > 80
The technical data indicated is based on standard conditions acc to DIN ISO 3046-1

Standard conditions:		
	Atmospheric pressure absolute:	100 kPa
	Air temperature	25 °C
	Relative air humidity	30 %

Rating adaptation at ambient conditions acc to DIN ISO 3046-1
The tolerance for the specific fuel consumption is + 5 % at rated output
The tolerance for the usable heat is 7 % at rated output
The coolant data are based on a 40 % portion of antifreeze
Density of cooling air 1,05 kg/m³

RATING DATA	**50 Hz**			
λ = 1.00	**ENGLISH**			
Load	%	100	75	50
Ignition timing	°BTDC	19	19	19
ISO standard rating	Btu/min	3867	2900	1934
Coolant heat	Btu/min	3526	3128	2730
Exhaust heat up to 248 °F	Btu/min	2923	2218	1575
Radiation heat max.	Btu/min	455		
Energy input	Btu/min	11658	9383	7165
Fuel consumption	Btu/bhp-hr	7671	8232	9429
Efficiency				
mechanical	%	33,2	30,9	27,0
thermal	%	55,3	57,0	60,1
total	%	88,5	87,9	87,1
Mass flows				
Combustion air	lb/hr	576	463	354
Fuel	lb/hr	33	27	20
Exhaust gas mass flow rate, wet	lb/hr	609	490	374
Temperatures				
Exhaust gas temperature	°F	1175	1121	1067
Fan				
Power input for fan	bhp	8,2	8,0	
Cooling air supplied for fan-cooled radiator	cfm	8711	6592	
Max static pressure in front of radiator	psi	0,073	0,087	
Max static pressure after radiator	psi	0,029	0,029	

Emissions at 100 % load	**Correlation**		**15 % O_2**
NO_X	g/bhp-hr	<	8,4
	ppm	<	2200
CO	g/bhp-hr	<	4,7
	ppm	<	2000
THC	g/bhp-hr	<	0,4
	ppm	<	300

Reference gas mixing unit: Woodward-Deltec 100/54 and ignition system MIC 508

The technical data are based on natural gas with a calorific value of 970 Btu/cu ft and a methane no. > 80
The technical data indicated is based on standard conditions acc to DIN ISO 3046-1

Standard conditions:	Atmospheric pressure: 14,5 psi or 328 ft above sea level
	Air temperature 77 °F
	Relative air humidity 30 %

Rating adaptation at ambient conditions acc to DIN ISO 3046-1
The tolerance for the specific fuel consumption is + 5 % at rated output
The tolerance for the usable heat is 7 % at rated output
The coolant data are based on a 40 % portion of antifreeze
Density of cooling air 0.0655 pound/ft³

ENGINE DATA

λ = 1.00	METRIC		ENGLISH	
Rated speed	rpm	1800	rpm	1800
ISO standard power (COP)	kW	74	bhp	99
Air ratio	λ	1.00	λ	1.00
Configuration		in-line engine		in-line engine
No of cylinders		6		6
Bore	mm	108	in	4,25
Stroke	mm	125	in	4,92
Swept volume	L	6,87	cu in	419
Direction of rotation looking on flywheel		counter clockwise		counter clockwise
Flywheel housing		SAE 2		SAE 2
Ring gear with number of teeth	Z	129	Z	129
Compression ratio	ε	13,5:1	ε	13,5:1
Mean effective pressure	bar	7,18	psi	104,1
Mean piston speed	m/s	7,50	in/s	295,3
Lube oil consumption up to	kg/h	0,10	lb/hr	0,026
Lube oil filling quantity min./max.	l	24/34	U.S. gal	6,34/8,98
Coolant filling quantity	l	16	U.S. gal	4,23
max. operating pressure	bar	2	psi	29,0
min. engine coolant circulation quantity	l/min	300	U.S. gal/min	79,3
Pressure reserve water pump	bar	0,4	psi	5,4
Coolant temperature min.	°C	80	°F	176
max. coolant temperature	°C	88	°F	190
Difference (inlet - outlet max.)	K	6	K	6
max. suction pressure	mbar	15	psi	0,22
max. exhaust back pressure	mbar	40	psi	0,58
Engine width	mm	740	in	29,13
Engine length	mm	1320	in	51,97
Engine height	mm	990	in	38,98
Engine weight, dry	kg	600	lb	1323

Lube oil to MAN works standard M 3271-2 and coolant to MAN works standard M 324 Type NF
Gas quality to MAN data sheet - minimum requirement for the gas quality for MAN gas engines
Air ratio measured by lambdameter ETAS LA 4_E

RATING DATA		**60 Hz**		
λ = 1.00		**METRIC**		
Load	%	100	75	50
Ignition timing	°BTDC	19	19	19
ISO standard rating	kW	74	56	37
Coolant heat	kW	74	69	60
Exhaust heat up to 120 °C	kW	63	49	36
Radiation heat max.	kW	10		
Energy input	kW	228	190	143
Fuel consumption	MJ/kWh	11,1	12,3	13,9
Efficiency				
mechanical	%	32,5	29,2	26,0
thermal	%	60,1	62,2	67,1
total	%	92,5	91,4	93,0
Mass flows				
Combustion air	kg/h	290	242	182
Fuel	kg/h	16,6	13,9	10,4
Exhaust gas mass flow rate, wet	kg/h	307	256	193
Temperatures				
Exhaust gas temperature	°C	660	635	610
Fan				
Power input for fan	kW	10,2	10,5	
Cooling air supplied for fan-cooled radiator	m³/h	24250	18360	
Max static pressure in front of radiator	mbar	6	8	
Max static pressure after radiator	mbar	2	2	

Emissions at 100 % load	**Correlation**		**5 % O_2**	**15 % O_2**
NO_X	mg/Nm³	<	3034	1138
	ppm	<	2000	2000
CO	mg/Nm³	<	1762	661
	ppm	<	1850	1850
THC	mg/Nm³	<	95	36
	ppm	<	200	200

Reference gas mixing unit: Woodward-Deltec 100/54 and ignition system MIC 508

The technical data are based on natural gas with a calorific value of 10 kWh/Nm³ and a methane no. > 80
The technical data indicated is based on standard conditions acc to DIN ISO 3046-1

Standard conditions:		
	Atmospheric pressure absolute:	100 kPa
	Air temperature	25 °C
	Relative air humidity	30 %

Rating adaptation at ambient conditions acc to DIN ISO 3046-1
The tolerance for the specific fuel consumption is + 5 % at rated output
The tolerance for the usable heat is 7 % at rated output
The coolant data are based on a 40 % portion of antifreeze
Density of cooling air 1,05 kg/m³

RATING DATA		**60 Hz**		
λ = 1.00		**ENGLISH**		
Load	%	100	75	50
Ignition timing	°BTDC	19	19	19
ISO standard rating	Btu/min	4208	3156	2104
Coolant heat	Btu/min	4191	3941	3412
Exhaust heat up to 248 °F	Btu/min	3600	2775	2042
Radiation heat max.	Btu/min	563		
Energy input	Btu/min	12966	10805	8132
Fuel consumption	Btu/bhp-hr	7840	8711	9834
Efficiency				
mechanical	%	32,5	29,2	26,0
thermal	%	60,1	62,2	67,1
total	%	92,5	91,4	93,0
Mass flows				
Combustion air	lb/hr	640	534	402
Fuel	lb/hr	37	31	23
Exhaust gas mass flow rate, wet	lb/hr	677	564	425
Temperatures				
Exhaust gas temperature	°F	1220	1175	1130
Fan				
Power input for fan	bhp	13,7	6,8	
Cooling air supplied for fan-cooled radiator	cfm	14273	10806	
Max static pressure in front of radiator	psi	0,087	0,116	
Max static pressure after radiator	psi	0,029	0,029	

Emissions at 100 % load	**Correlation**		**15 % O_2**
NO_X	g/bhp-hr	<	11,5
	ppm	<	2000
CO	g/bhp-hr	<	4,4
	ppm	<	1850
THC	g/bhp-hr	<	0,2
	ppm	<	200

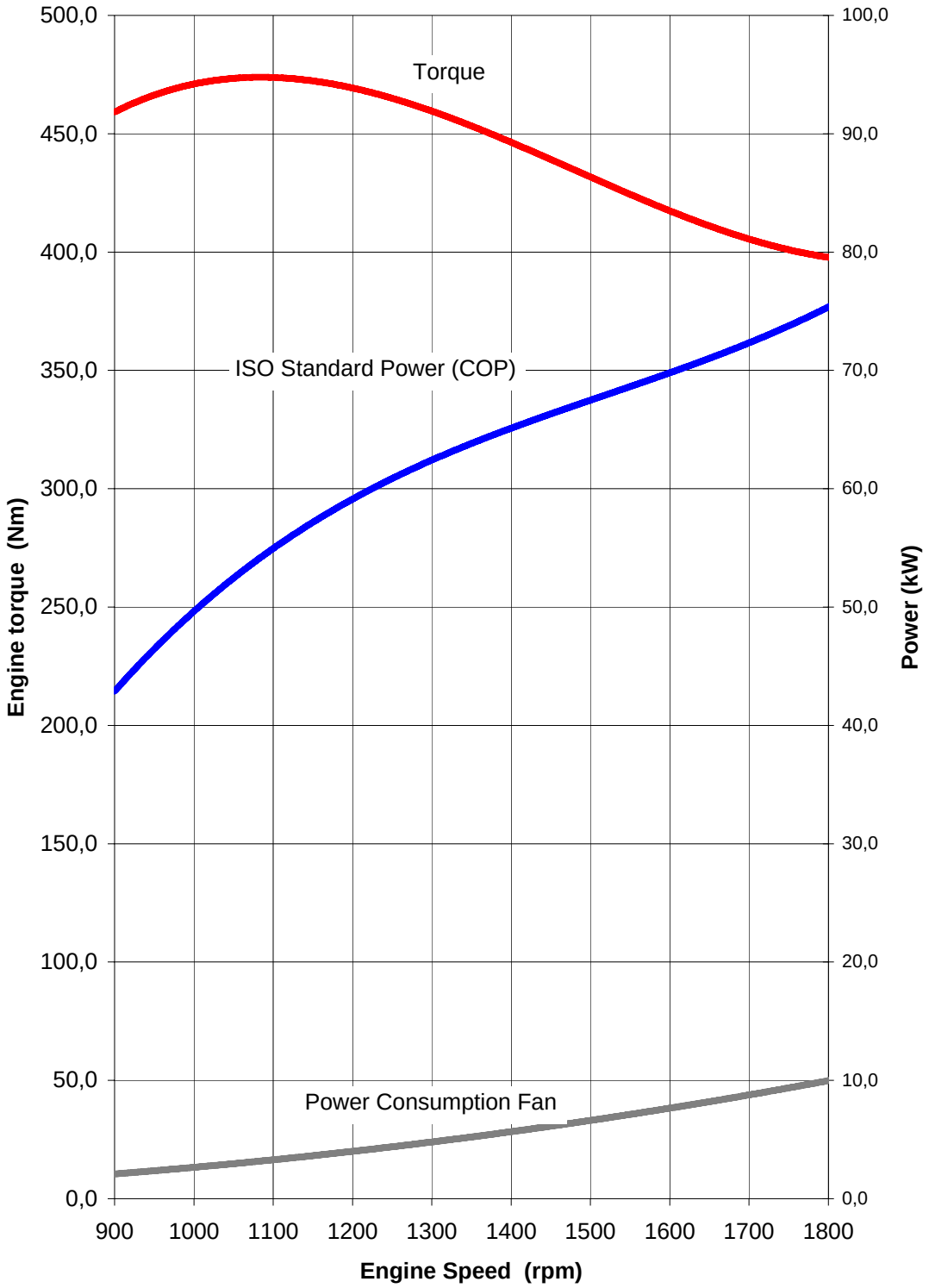
Reference gas mixing unit: Woodward-Deltec 100/54 and ignition system MIC 508

The technical data are based on natural gas with a calorific value of 970 Btu/cu ft and a methane no. > 80
The technical data indicated is based on standard conditions acc to DIN ISO 3046-1

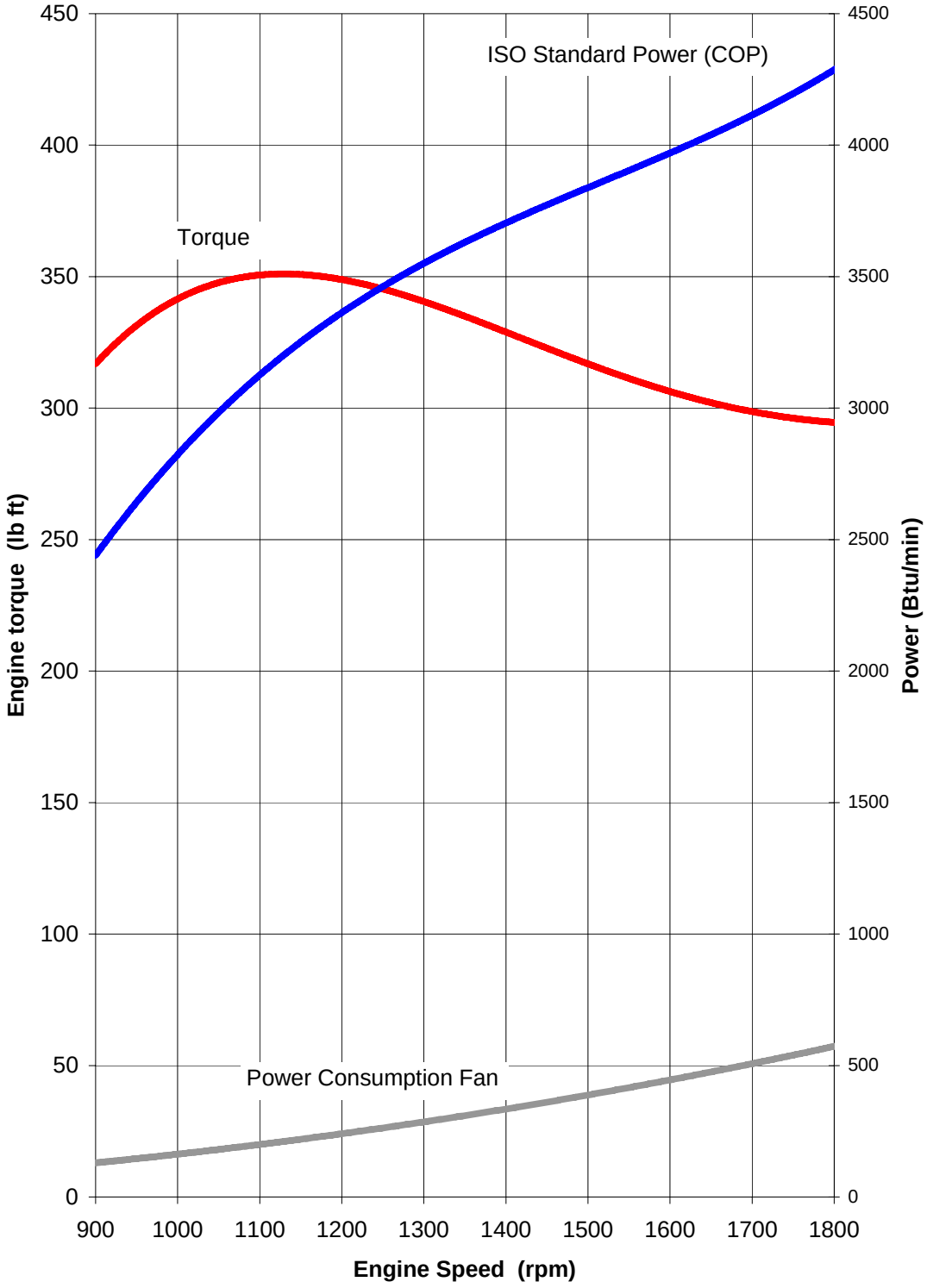
Standard conditions:		
	Atmospheric pressure: 14,5 psi	or 328 ft above sea level
	Air temperature	77 °F
	Relative air humidity	30 %

Rating adaptation at ambient conditions acc to DIN ISO 3046-1
The tolerance for the specific fuel consumption is + 5 % at rated output
The tolerance for the usable heat is 7 % at rated output
The coolant data are based on a 40 % portion of antifreeze
Density of cooling air 0.0655 pound/ft³

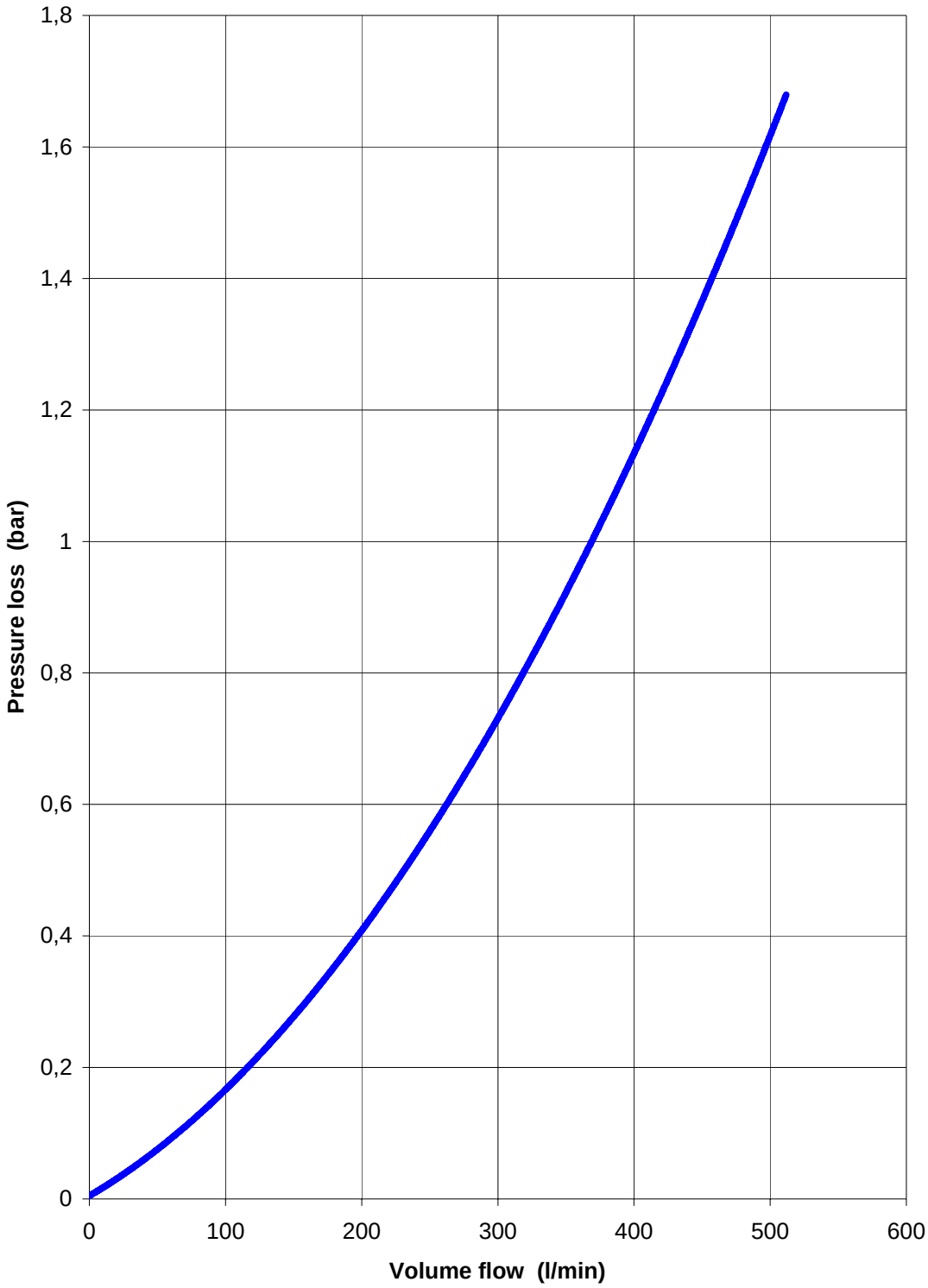
METRIC


500,0
450,0
400,0
350,0
300,0
250,0
200,0
150,0
100,0
50,0
0,0
100,0
90,0
80,0
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,0
Torque
ISO Standard Power (COP)
Power Consumption Fan
Engine torque (Nm)
Power (kW)
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
Engine Speed (rpm)

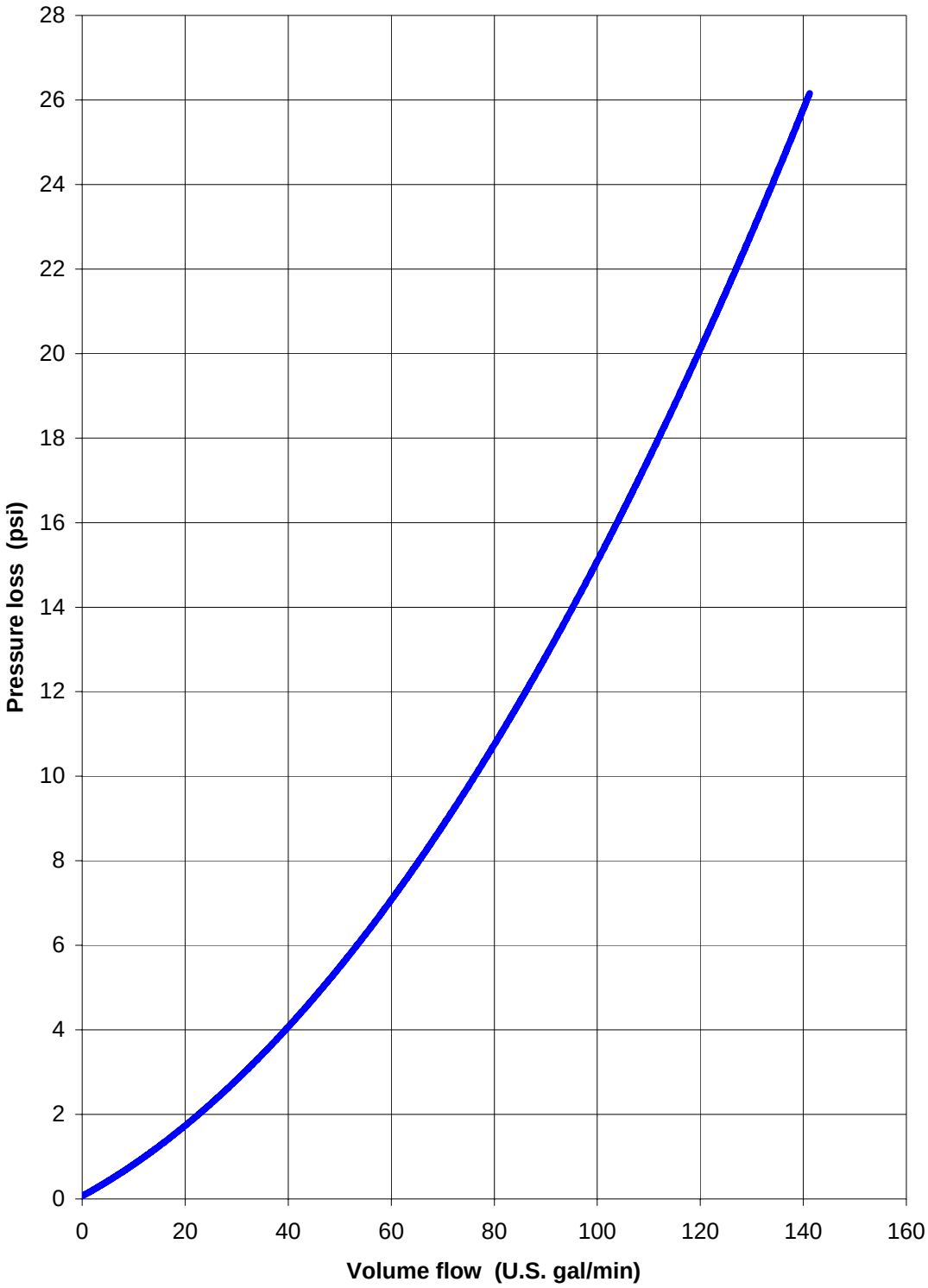
ENGLISH


ISO Standard Power (COP)
Torque
Power Consumption Fan
Engine torque (lb ft)
Power (Btu/min)
Engine Speed (rpm)
450
400
350
300
250
200
150
100
50
0
4500
4000
3500
3000
2500
2000
1500
1000
500
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800

METRIC


1,8
1,6
1,4
1,2
1
0,8
0,6
0,4
0,2
0
Pressure loss (bar)
0
100
200
300
400
500
600
Volume flow (l/min)

ENGLISH


Pressure loss (psi)
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0
20
40
60
80
100
120
140
160
Volume flow (U.S. gal/min)