



**Biogas Engine E 2842 LE 322**  
**Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**



Principle:	4-stroke Otto gas engine
No of cylinders :	12-cylinder in V-form
Supercharging:	Exhaust turbocharger with water-cooled turbine housing, pressure-lubricated bearings and water-cooled bearing pedestal.
Mixture cooling:	Two-stage mixture cooling Without mixture water pump, the coolant circulation must be designed with external coolant pumps with mixture temperature regulation at 50 °C .
Engine cooling :	Without engine water pump, coolant to be circulated by external water pump with temperature control.
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.
Starter motor:	Pre-engaged-drive starter 24 V - 6.5 kW Starter battery capacity: 143 Ah, 24 V

Since our products are in continuous development, we reserve the right to make technical modifications.



**Biogas Engine E 2842 LE 322**  
**Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 50 °C 122 °F

**ENGINE DATA**

$\lambda = 1.47$

	<b>50 Hz</b>		<b>50 Hz</b>	
	<b>METRIC</b>		<b>ENGLISH</b>	
Rated speed	rpm	1500	rpm	1500
ISO standard power (COP)	kW	380	bhp	510
Air ratio	$\lambda$	1,47	$\lambda$	1,47
Configuration		V - engine		V - engine
No of cylinders		12		12
Bore	mm	128	in	5,04
Stroke	mm	142	in	5,59
Swept volume	L	21,93	cu in	1338
Direction of rotation looking on flywheel		counter clockwise		counter clockwise
Flywheel housing		SAE 1		SAE 1
Ring gear with number of teeth	Z	160	Z	160
Compression ratio	$\epsilon$	12:1	$\epsilon$	12:1
Mean effective pressure	bar	13,87	psi	201,1
Mean piston speed	m/s	7,10	in/s	279,5
Lube oil consumption up to	kg/h	0,20	lb/hr	0,053
Lube oil filling quantity min./max.	l	60/90	U.S. gal	7.9/10.83
Coolant filling quantity	L	23	U.S. gal	6,08
Max. operating pressure	bar	3	psi	43,5
Min. engine coolant circulation quantity	l/min	554	U.S. gal/min	146,4
Coolant temperature min.	°C	80	°F	176
Max. coolant temperature	°C	88	°F	190
Difference (inlet - outlet max.)	K	6	K	6
Max. mixture inlet temperature after throttle valve	°C	50	°F	122
Max. mixture cooling water inlet temperature LT	°C	45	°F	113
Min. mixture cooling water circulation quantity LT	l/min	86	U.S. gal/min	22,72
Max. mixture cooling water inlet temperature HT	°C	85	°F	185
Min. mixture cooling water circulation quantity HT	l/min	216	U.S. gal/min	57,06
max. suction pressure	mbar	15	psi	0,22
max. exhaust back pressure	mbar	40	psi	0,58
Engine width	mm	1142	in	44,96
Engine length	mm	1570	in	61,81
Engine height	mm	1155	in	45,47
Engine weight, dry	kg	1420	lb	3131

Lube oil to MAN works standard M 3271-2 and coolant to MAN works standard M 324 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



**Biogas Engine E 2842 LE 322**  
**Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 50 °C

**RATING DATA**

**50 Hz**

<b>METRIC</b>		$\lambda = 1.47$	$\lambda = 1.40$	$\lambda = 1.34$
Load	%	100	75	50
Ignition timing	°BTDC	18	18	18
ISO standard rating	kW	380	285	190
Coolant heat	kW	205	180	147
Mixture heat HT	kW	40	17	1
Mixture heat LT	kW	16	8	6
Exhaust heat up to 120 °C	kW	228	181	126
Radiation heat max.	kW	30	20	14
Energy input	kW	946	732	512
<b>Fuel consumption</b>	MJ/kWh	9,0	9,3	9,7
<b>Efficiency</b>				
mechanical	%	40,2	38,9	37,1
thermal	%	50,0	51,6	53,5
total	%	90,2	90,6	90,6
<b>Mass flows</b>				
Combustion air	kg/h	1744	1297	861
Fuel	kg/h	196	153	106
Exhaust gas mass flow rate, wet	kg/h	1940	1450	967
<b>Temperatures</b>				
Exhaust gas temperature	°C	480	495	510
<b>Emissions at 100 % load (Correlation 5 % O<sub>2</sub>)</b>				
NO <sub>x</sub>	mg/Nm <sup>3</sup> <	500		
CO	mg/Nm <sup>3</sup> <	1000		
HCHO (Formaldehyde)	mg/Nm <sup>3</sup> <	60		
NMHC	mg/Nm <sup>3</sup> <	150		

Reference gas mixing unit: RMG 985-200/100 and ignition system Motortech MIC 511

The technical data are based on a gas mixture of 60% methane and 40% carbondioxid with a calorific value of 6.0 kWh/Nm<sup>3</sup> and a methane no. > 100

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 45 % portion of antifreeze



**Biogas Engine E 2842 LE 322**  
**Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 122 °F

**RATING DATA**

**50 Hz**

**ENGLISH**

		$\lambda = 1.47$	$\lambda = 1.40$	$\lambda = 1.34$
Load	%	100	75	50
Ignition timing	°BTDC	18	18	18
ISO standard rating	Btu/min	21610	16208	10805
Coolant heat	Btu/min	11658	10236	8360
Mixture heat HT	Btu/min	2275	967	57
Mixture heat NT	Btu/min	910	455	341
Exhaust heat up to 248 °F	Btu/min	12966	10293	7165
Radiation heat max.	Btu/min	1706	1137	796
Energy input	Btu/min	53798	41628	29117

**Fuel consumption**

	Btu/bhp-hr	6361	6573	6856

**Efficiency**

mechanical	%	40,2	38,9	37,1
thermal	%	50,0	51,6	53,5
total	%	90,2	90,6	90,6

**Mass flows**

Combustion air	lb/hr	3845	2859	1898
Fuel	lb/hr	432	337	234
Exhaust gas mass flow rate, wet	lb/hr	4277	3197	2132

**Temperatures**

Exhaust gas temperature	°F	896	923	950
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**Emissions at 100 % load (Correlation 15 % O<sub>2</sub>)**

NO <sub>x</sub>	g/bhp-hr	< 1,0
CO	g/bhp-hr	< 2,5
HCHO (Formaldehyde)	g/bhp-hr	< 0,07
NMHC	g/bhp-hr	< 0,2

Reference gas mixing unit: RMG 985-200/100 and ignition system Motortech MIC 511

The technical data are based on a gas mixture of 60% methane and 40% carbondioxid with a calorific value of 580 Btu/cu ft and a methane no. > 100

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 45 % portion of antifreeze



**Biogas Engine E 2842 LE 322**  
**Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 80 °C 176 °F

**ENGINE DATA**

$\lambda = 1.47$

	<b>50 Hz</b>		<b>50 Hz</b>	
	<b>METRIC</b>		<b>ENGLISH</b>	
Rated speed	rpm	1500	rpm	1500
ISO standard power (COP)	kW	335	bhp	449
Air ratio	$\lambda$	1,47	$\lambda$	1,47
Configuration		V - engine		V - engine
No of cylinders		12		12
Bore	mm	128	in	5,04
Stroke	mm	142	in	5,59
Swept volume	L	21,93	cu in	1338
Direction of rotation looking on flywheel		counter clockwise		counter clockwise
Flywheel housing		SAE 1		SAE 1
Ring gear with number of teeth	Z	160	Z	160
Compression ratio	$\epsilon$	12:1	$\epsilon$	12:1
Mean effective pressure	bar	12,22	psi	177,3
Mean piston speed	m/s	7,10	in/s	279,5
Lube oil consumption up to	kg/h	0,20	lb/hr	0,053
Lube oil filling quantity min./max.	l	60/90	U.S. gal	7.9/10.83
Coolant filling quantity	L	23	U.S. gal	6,08
Max. operating pressure	bar	3	psi	43,5
Min. engine coolant circulation quantity	l/min	551	U.S. gal/min	145,7
Coolant temperature min.	°C	80	°F	176
Max. coolant temperature	°C	88	°F	190
Difference (inlet - outlet max.)	K	6	K	6
Max. mixture inlet temperature after throttle valve	°C	80	°F	176
Max. mixture cooling water inlet temperature LT	°C	75	°F	167
Min. mixture cooling water circulation quantity LT	l/min	132	U.S. gal/min	34,87
Max. mixture cooling water inlet temperature HT	°C	85	°F	185
Min. mixture cooling water circulation quantity HT	l/min	132	U.S. gal/min	34,87
max. suction pressure	mbar	15	psi	0,22
max. exhaust back pressure	mbar	40	psi	0,58
Engine width	mm	1142	in	44,96
Engine length	mm	1570	in	61,81
Engine height	mm	1155	in	45,47
Engine weight, dry	kg	1420	lb	3131

Lube oil to MAN works standard M 3271-2 and coolant to MAN works standard M 324 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



**Biogas Engine E 2842 LE 322**  
**Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 80 °C

**RATING DATA**

**50 Hz**

**METRIC**

		$\lambda = 1.47$	$\lambda = 1.40$	$\lambda = 1.34$
Load	%	100	75	50
Ignition timing	°BTDC	16	16	16
ISO standard rating	kW	335	252	168
Coolant heat	kW	204	194	161
Mixture heat HT	kW	34	11	2
Mixture heat LT	kW	0	0	0
Exhaust heat up to 120 °C	kW	218	160	112
Radiation heat max.	kW	28	19	12
Energy input	kW	882	686	495

**Fuel consumption**

	MJ/kWh	9,5	9,8	10,6

**Efficiency**

mechanical	%	38,0	36,7	34,0
thermal	%	51,6	53,2	55,6
total	%	89,6	89,9	89,5

**Mass flows**

Combustion air	kg/h	1556	1152	795
Fuel	kg/h	176	137	99
Exhaust gas mass flow rate, wet	kg/h	1733	1290	894

**Temperatures**

Exhaust gas temperature	°C	500	505	508
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**Emissions at 100 % load (Correlation 5 % O<sub>2</sub>)**

NO <sub>x</sub>	mg/Nm <sup>3</sup>	< 500
CO	mg/Nm <sup>3</sup>	< 1000
HCHO (Formaldehyde)	mg/Nm <sup>3</sup>	< 60
NMHC	mg/Nm <sup>3</sup>	< 150

Reference gas mixing unit: RMG 985-200/100 and ignition system Motortech MIC 511

The technical data are based on a gas mixture of 60% methane and 40% carbondioxid with a calorific value of 6.0 kWh/Nm<sup>3</sup> and a methane no. > 100

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 45 % portion of antifreeze



**Biogas Engine E 2842 LE 322**  
**Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 176 °F

**RATING DATA**

**50 Hz**

**ENGLISH**

		$\lambda = 1.47$	$\lambda = 1.40$	$\lambda = 1.34$
Load	%	100	75	50
Ignition timing	°BTDC	16	16	16
ISO standard rating	Btu/min	19051	14331	9554
Coolant heat	Btu/min	11601	11033	9156
Mixture heat HT	Btu/min	1934	626	114
Mixture heat NT	Btu/min	0	0	0
Exhaust heat up to 248 °F	Btu/min	12376	9099	6359
Radiation heat max.	Btu/min	1592	1081	682
Energy input	Btu/min	50168	39012	28131

**Fuel consumption**

	Btu/bhp-hr	6700	6926	7492

**Efficiency**

mechanical	%	38,0	36,7	34,0
thermal	%	51,6	53,2	55,6
total	%	89,6	89,9	89,5

**Mass flows**

Combustion air	lb/hr	3431	2541	1754
Fuel	lb/hr	389	302	218
Exhaust gas mass flow rate, wet	lb/hr	3820	2843	1972

**Temperatures**

Exhaust gas temperature	°F	932	941	946,4
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**Emissions at 100 % load (Correlation 15 % O<sub>2</sub>)**

NO <sub>x</sub>	g/bhp-hr	< 1,0
CO	g/bhp-hr	< 2,5
HCHO (Formaldehyde)	g/bhp-hr	< 0,07
NMHC	g/bhp-hr	< 0,2

Reference gas mixing unit: RMG 985-200/100 and ignition system Motortech MIC 511

The technical data are based on a gas mixture of 60% methane and 40% carbondioxid with a calorific value of 580 Btu/cu ft and a methane no. > 100

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 45 % portion of antifreeze



**Biogas Engine E 2842 LE 322**  
**Preliminary Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to

50 °C

122 °F

**ENGINE DATA**

$\lambda = 1.47$

	<b>60 Hz</b>		<b>60 Hz</b>	
	<b>METRIC</b>		<b>ENGLISH</b>	
Rated speed	rpm	1800	rpm	1800
ISO standard power (COP)	kW	380	bhp	510
Air ratio	$\lambda$	1,47	$\lambda$	1,47
Configuration		V - engine		V - engine
No of cylinders		12		12
Bore	mm	128	in	5,04
Stroke	mm	142	in	5,59
Swept volume	L	21,93	cu in	1338
Direction of rotation looking on flywheel		counter clockwise		counter clockwise
Flywheel housing		SAE 1		SAE 1
Ring gear with number of teeth	Z	160	Z	160
Compression ratio	$\epsilon$	12:1	$\epsilon$	12:1
Mean effective pressure	bar	11,55	psi	167,6
Mean piston speed	m/s	8,52	in/s	335,4
Lube oil consumption up to	kg/h	0,20	lb/hr	0,053
Lube oil filling quantity min./max.	l	60/90	U.S. gal	7.9/10.83
Coolant filling quantity	L	23	U.S. gal	6,08
Max. operating pressure	bar	3	psi	43,5
Min. engine coolant circulation quantity	l/min	627	U.S. gal/min	165,6
Coolant temperature min.	°C	80	°F	176
Max. coolant temperature	°C	88	°F	190
Difference (inlet - outlet max.)	K	6	K	6
Max. mixture inlet temperature after throttle valve	°C	50	°F	122
Max. mixture cooling water inlet temperature LT	°C	45	°F	113
Min. mixture cooling water circulation quantity LT	l/min	102	U.S. gal/min	26,99
Max. mixture cooling water inlet temperature HT	°C	85	°F	185
Min. mixture cooling water circulation quantity HT	l/min	205	U.S. gal/min	54,26
max. suction pressure	mbar	15	psi	0,22
max. exhaust back pressure	mbar	40	psi	0,58
Engine width	mm	1142	in	44,96
Engine length	mm	1570	in	61,81
Engine height	mm	1155	in	45,47
Engine weight, dry	kg	1420	lb	3131

Lube oil to MAN works standard M 3271-2 and coolant to MAN works standard M 324 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





**Biogas Engine E 2842 LE 322**  
**Preliminary Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 50 °C

**RATING DATA**

**60 Hz**

<b>METRIC</b>		$\lambda = 1.47$	$\lambda = 1.40$	$\lambda = 1.34$
Load	%	100	75	50
Ignition timing	°BTDC	18	18	18
ISO standard rating	kW	380	285	190
Coolant heat	kW	232	200	170
Mixture heat HT	kW	38	16	0
Mixture heat LT	kW	18	7	6
Exhaust heat up to 120 °C	kW	243	187	133
Radiation heat max.	kW	30	20	14
Energy input	kW	985	760	536
<b>Fuel consumption</b>	MJ/kWh	9,3	9,6	10,2
<b>Efficiency</b>				
mechanical	%	38,6	37,5	35,4
thermal	%	52,1	53,0	56,5
total	%	90,7	90,5	91,9
<b>Mass flows</b>				
Combustion air	kg/h	1789	1315	888
Fuel	kg/h	201	155	109
Exhaust gas mass flow rate, wet	kg/h	1990	1470	997
<b>Temperatures</b>				
Exhaust gas temperature	°C	490	500	515
<b>Emissions at 100 % load (Correlation 5 % O<sub>2</sub>)</b>				
NO <sub>x</sub>	mg/Nm <sup>3</sup> <	500		
CO	mg/Nm <sup>3</sup> <	1000		
HCHO (Formaldehyde)	mg/Nm <sup>3</sup> <	60		
NMHC	mg/Nm <sup>3</sup> <	150		

Reference gas mixing unit: RMG 985-200/100 and ignition system Motortech MIC 511

The technical data are based on a gas mixture of 60% methane and 40% carbondioxid with a calorific value of 6.0 kWh/Nm<sup>3</sup> and a methane no. > 100

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 45 % portion of antifreeze



**Biogas Engine E 2842 LE 322**  
**Preliminary Technical Data**  
**for 60%-CH<sub>4</sub> , 40%-CO<sub>2</sub>**

Mixture cooling up to 122 °F

**RATING DATA**

**60 Hz**

**ENGLISH**

		$\lambda = 1.47$	$\lambda = 1.40$	$\lambda = 1.34$
Load	%	100	75	50
Ignition timing	°BTDC	18	18	18
ISO standard rating	Btu/min	21610	16208	10805
Coolant heat	Btu/min	13194	11374	9668
Mixture heat HT	Btu/min	2161	910	0
Mixture heat LT	Btu/min	1024	398	341
Exhaust heat up to 248 °F	Btu/min	13846	10620	7540
Radiation heat max.	Btu/min	1706	1137	796
Energy input	Btu/min	56016	43220	30482

**Fuel consumption**

	Btu/bhp-hr	6573	6785	7209

**Efficiency**

mechanical	%	38,6	37,5	35,4
thermal	%	52,1	53,0	56,5
total	%	90,7	90,5	91,9

**Mass flows**

Combustion air	lb/hr	3945	2899	1957
Fuel	lb/hr	443	342	241
Exhaust gas mass flow rate, wet	lb/hr	4388	3240	2198

**Temperatures**

Exhaust gas temperature	°F	914	932	959
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**Emissions at 100 % load (Correlation 15 % O<sub>2</sub>)**

NO <sub>x</sub>	g/bhp-hr	< 1,0
CO	g/bhp-hr	< 2,5
HCHO (Formaldehyde)	g/bhp-hr	< 0,07
NMHC	g/bhp-hr	< 0,2

Reference gas mixing unit: RMG 985-200/100 and ignition system Motortech MIC 511

The technical data are based on a gas mixture of 60% methane and 40% carbondioxid with a calorific value of 580 Btu/cu ft and a methane no. > 100

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

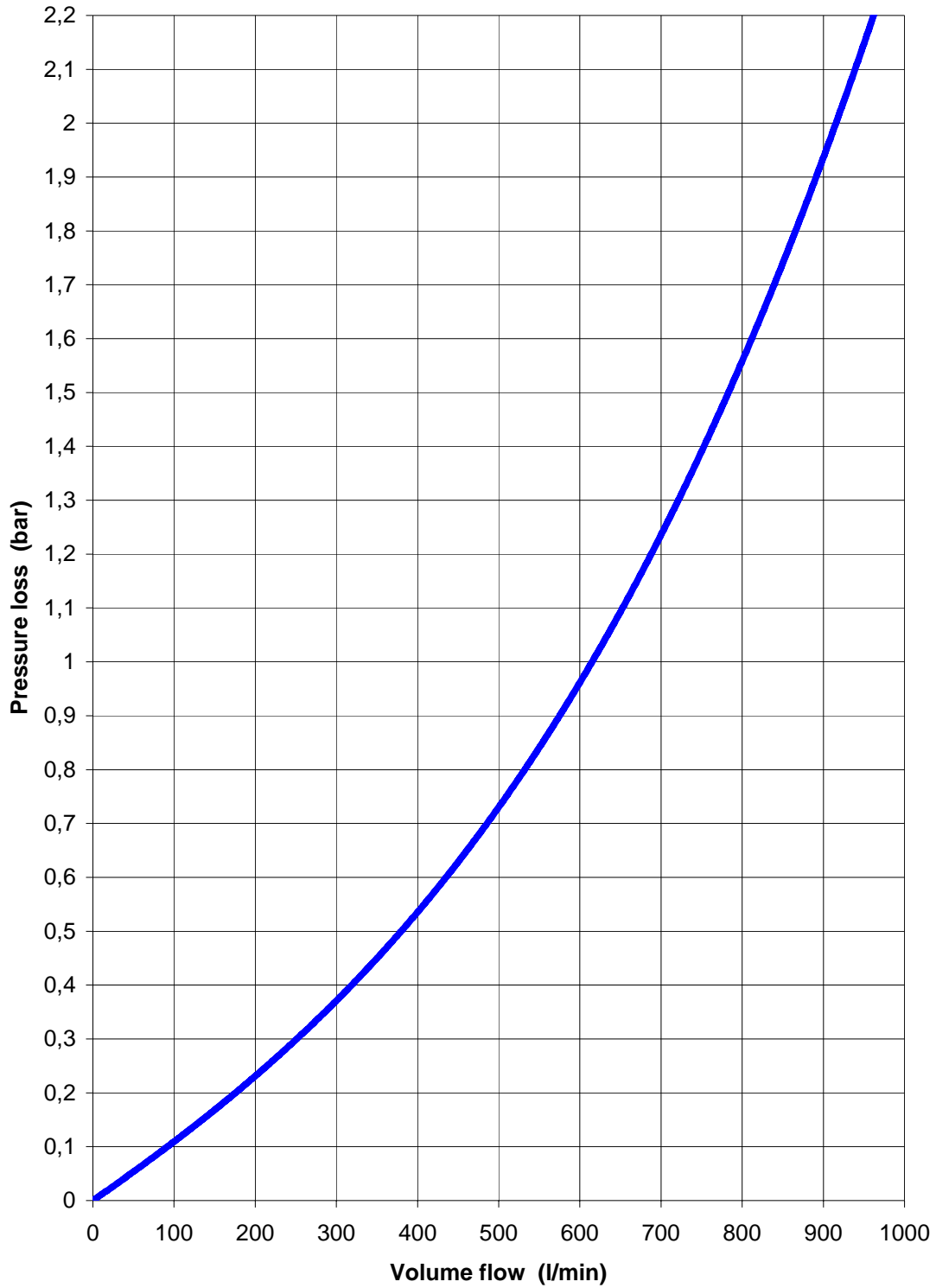
The tolerance for the specific fuel consumption is + 5 % at rated output

The tolerance for the usable heat is 7 % at rated output

The coolant data are based on a 45 % portion of antifreeze

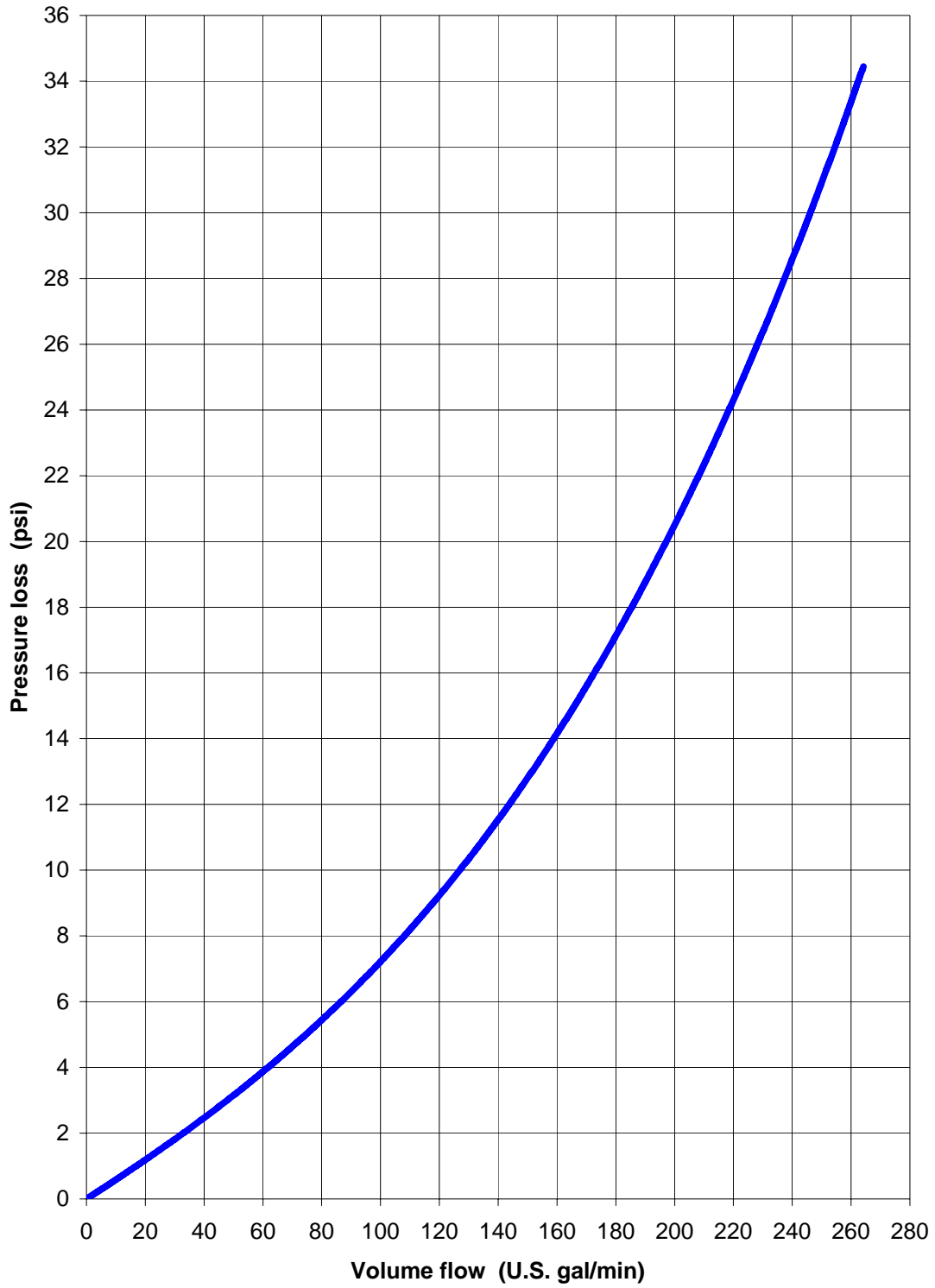


**METRIC**



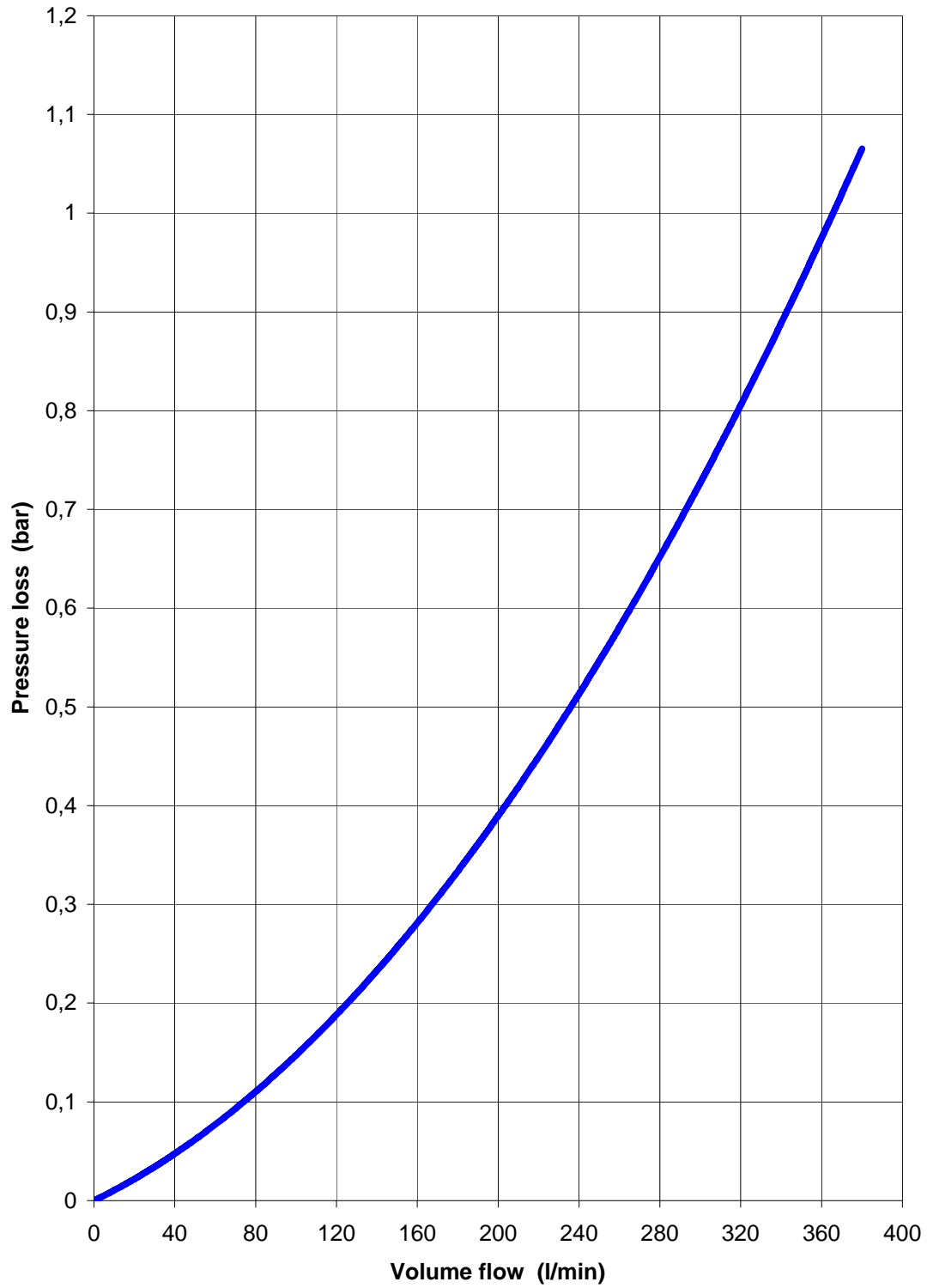


ENGLISH



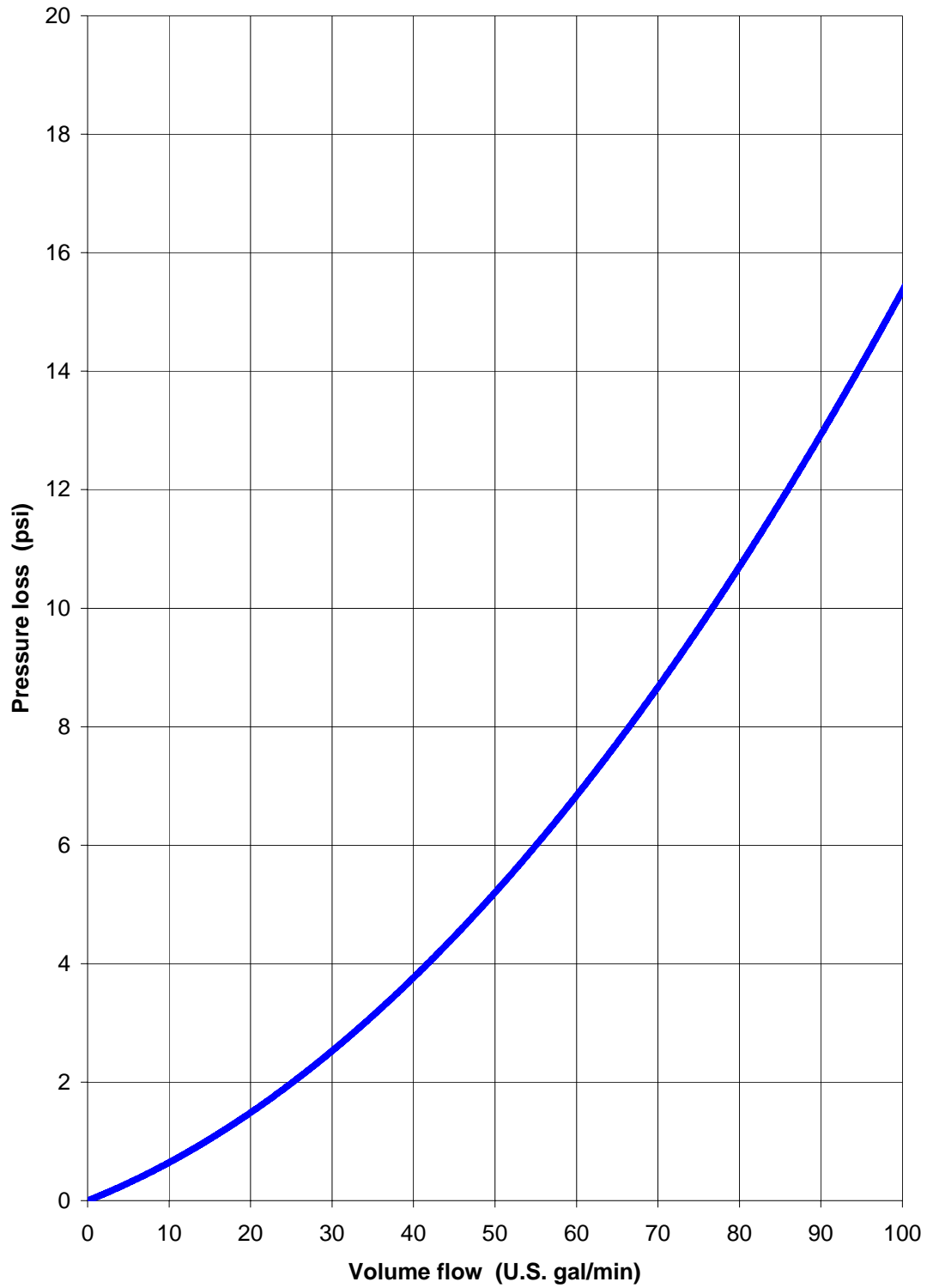


**METRIC**



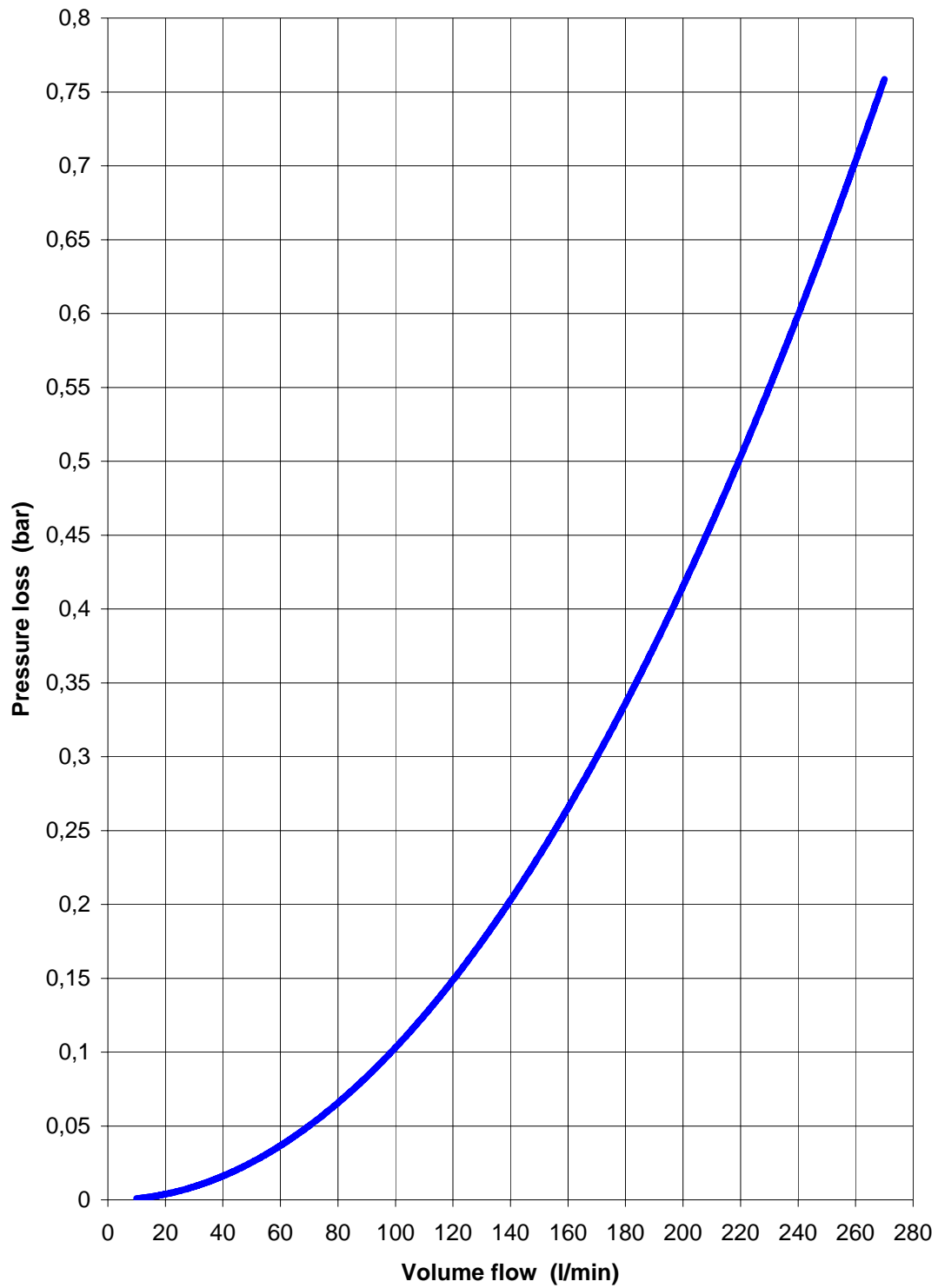


**ENGLISH**





**METRIC**





**ENGLISH**

