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SGE-H series gas engines and gen-sets biogas

1,200/1,500/1,800 rpm

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SGE-24HM & SGE-42HM

Engine Parameters	English Units	Metric Units	SGE-24HM				SGE-42HM			
			1,500		1,800		1,500		1,800	
Speed	rpm		1,500		1,800		1,500		1,800	
Engine power	bhp	kWb	697	(520)	697	(520)	1,395	(1,040)	1,395	(1,040)
Cylinder arrangement			In Line 8				V12			
Mean effective pressure	psi	bar	252	(17.4)	210	(14.5)	286	(19.7)	238	(16.4)
Bore	inch	mm	5.98	(152)	5.98	(152)	6.30	(160)	6.30	(160)
Stroke	inch	mm	6.50	(165)	6.50	(165)	6.89	(175)	6.89	(175)
Displacement	cu.in	Litres	1,460	(24.0)	1,460	(24.0)	1,718	(42.2)	1,718	(42.2)
Mean piston speed	in/s	m/s	325	(8.3)	390	(9.9)	344	(8.8)	413	(10.5)
Compression ratio			11.8 : 1				11.9 : 1			
Combustion air mass flow	lbs/hr	kg/h	4,211	(1,910)	5,247	(2,380)	10,119	(4,590)	10,251	(4,650)
Packaged ventilation air flow ²⁾	scfm	m ³ /h	21,424	(36,400)	21,424	(36,400)	42,849	(72,800)	42,849	(72,800)
Engine coolant capacity (Main circuit) ³⁾	gal.	Litres	21	(80)	21	(80)	63	(240)	63	(240)
Engine coolant capacity (Aux. circuit) ³⁾	gal.	Litres	5	(20)	5	(20)	20	(75)	20	(75)
Lube oil capacity ³⁾	gal.	Litres	45	(169)	45	(169)	107	(403)	107	(403)
Lube oil consumption ⁴⁾	lbs/bhp.hr	g/kWh	0.00058	(0.35)	0.00058	(0.35)	0.00025	(0.15)	0.00025	(0.15)
Energy Balance										
Generator efficiency ^{5) 6)}	%	%	96.6		96.2		97.2		96.9	
Electrical power ^{5) 6)}	kWe	kW	502		500		1,011		1,008	
Jacket (HT) water heat	Btu x 1,000/hr	kW	788.7	(231)	679.5	(199)	1,864.3	(546)	1,959.9	(574)
Intercooler (LT) water heat	Btu x 1,000/hr	kW	273.2	(80)	327.8	(199)	198.0	(58)	194.6	(57)
Exhaust heat - cooled to 120°C	Btu x 1,000/hr	kW	874.1	(256)	1055.1	(309)	1,697.0	(497)	1,908.7	(559)
Engine radiation heat	Btu x 1,000/hr	kW	99.0	(29)	136.6	(40)	239.0	(70)	239.0	(70)
Generator radiation heat	Btu x 1,000/hr	kW	60.4	(18)	67.5	(20)	99.4	(29)	110.1	(32)
Fuel consumption ⁷⁾	Btu x 1,000/hr	kW	4,029.0	(1,180)	4,244.1	(1,243)	8,071.7	(2,364)	8,382.4	(2,455)
Mechanical efficiency	%		44.1		41.8		44.0		42.4	
Electrical efficiency	%		42.6		40.2		42.8		41.0	
Thermal efficiency	%		48.1		48.6		46.6		48.5	
Total efficiency	%		90.6		88.8		89.3		89.5	
System Parameters										
Jacket (HT) water temperature max.	°F	°C	194	(90)	194	(90)	194	(90)	194	(90)
Jacket (HT) water flow rate min.	gpm	L/hr	141	(32)	123	(28)	167	(38)	167	(38)
Jacket (HT) water flow rate max.	gpm	L/hr	264	(60)	264	(60)	308	(70)	308	(70)
Intercooler stages			Single				Double			
Intercooler (LT) coolant temperature	°F	°C	131	(55)	131	(55)	131	(55)	131	(55)
Intercooler (LT) coolant flow rate min./max.	gpm	L/hr	88	(20)	110	(25)	88	(20)	110	(25)
Intercooler (LT) coolant flow rate min./max.	gpm	L/hr	132	(30)	132	(30)	132	(30)	132	(30)
Exhaust manifold type			Dry				Dry			
Exhaust temperature	°F	°C	927	(497)	916	(491)	806	(430)	865	(463)
Exhaust mass flow wet	lbs/hr	kg/h	4,674	(2,120)	5,732	(2,600)	11,067	(5,020)	11,244	(5,100)
Exhaust backpressure max.	psi	mbar	0.65	(45)	0.65	(45)	0.65	(45)	0.65	(45)
Maximum pressure loss in front of air cleaner	psi	mbar	0.073	(5)	0.073	(5)	0.073	(5)	0.073	(5)
Fuel pressure range	psi	mbar	0.73 - 3.48 (50 - 240)				0.73 - 3.48 (50 - 240)			
Starter battery 2x12 V, capacity required	Ampere-hour		280				280			
Emissions ⁸⁾										
NOx	g/bhp.hr		< 1.1		< 1		< 1.1		< 1	
CO	g/bhp.hr		< 2.4		< 2.4		< 2.2		< 2.2	
THC (in C1 base)	g/bhp.hr		< 4.3		< 4.3		< 4.3		< 4.3	
NMHC (in C1 base)	g/bhp.hr		< 0.7		< 0.7		< 0.7		< 0.7	

1) Reference gas (CH₄: 67%, CO₂: 33%). For other biogas qualities consult.

2) Assumes intake air flow at delta T = 5°C including combustion air

3) Not including pipes and heat exchangers

4) Mean lube oil consumption between maintenance steps

5) At 50 Hz, U = 0.4 kV, power factor = 1

6) At 60 Hz, U = 0.48 kV, power factor = 1

7) With a tolerance of + 5 %

8) Lower emission engines are available; consult a sales representative for performance data

SGE-56HM

Engine Parameters	English Units	Metric Units	SGE-56HM					
			1,200		1,500		1,800	
Speed	rpm		1,200		1,500		1,800	
Engine power	bhp	kWb	1,395	(1,040)	1,663	(1,240)	1,810	(1,350)
Cylinder arrangement			V16					
Mean effective pressure	psi	bar	268	(18.5)	256	(17.6)	232	(16.0)
Bore	inch	mm	6.30	(160)	6.30	(160)	6.30	(160)
Stroke	inch	mm	6.89	(175)	6.89	(175)	6.89	(175)
Displacement	cu.in	Litres	3,436	(56.3)	3,436	(56.3)	3,436	(56.3)
Mean piston speed	in/s	m/s	276	(7.0)	344	(8.8)	413	(10.5)
Compression ratio			11.9 : 1					
Combustion air mass flow	lbs/hr	kg/h	10,406	(4,720)	12,346	(5,600)	13,338	(6,050)
Packaged ventilation air flow ²⁾	scfm	m ³ /h	42,849	(72,800)	51,089	(86,800)	51,621	(94,500)
Engine coolant capacity (Main circuit) ³⁾	gal.	Litres	69	(260)	69	(260)	69	(260)
Engine coolant capacity (Aux. circuit) ³⁾	gal.	Litres	20	(75)	20	(75)	20	(75)
Lube oil capacity ³⁾	gal.	Litres	111	(419)	111	(419)	111	(419)
Lube oil consumption ⁴⁾	lbs/bhp.hr	g/kWh	0.00025	(0.15)	0.00025	(0.15)	0.00025	(0.15)
Energy Balance								
Generator efficiency ^{5) 6)}	%	%	96.8		97.1		96.9	
Electrical power ^{5) 6)}	kWe	kW	1,007		1,204		1,308	
Jacket (HT) water heat	Btu x 1,000/hr	kW	2,000.9	(586)	2,390.1	(700)	2,475.5	(725)
Intercooler (LT) water heat	Btu x 1,000/hr	kW	204.9	(60)	266.3	(78)	290.2	(85)
Exhaust heat - cooled to 120°C	Btu x 1,000/hr	kW	1,659.4	(486)	2,000.9	(586)	2,516.4	(737)
Engine radiation heat	Btu x 1,000/hr	kW	225.4	(66)	221.9	(65)	286.8	(84)
Generator radiation heat	Btu x 1,000/hr	kW	113.6	(33)	122.8	(36)	142.9	(42)
Fuel consumption ⁷⁾	Btu x 1,000/hr	kW	8,174.1	(2,394)	9,748.2	(2,855)	10,868.1	(3,183)
Mechanical efficiency	%		43.4		43.4		42.4	
Electrical efficiency	%		42.1		42.2		41.1	
Thermal efficiency	%		47.3		47.8		48.6	
Total efficiency	%		89.3		89.9		89.7	
System Parameters								
Jacket (HT) water temperature max.	°F	°C	194	(90)	194	(90)	194	(90)
Jacket (HT) water flow rate min.	gpm	L/hr	181	(41)	216	(49)	220	(50)
Jacket (HT) water flow rate max.	gpm	L/hr	308	(70)	308	(70)	308	(70)
Intercooler stages			Double					
Intercooler (LT) coolant temperature	°F	°C	131	(55)	131	(55)	131	(55)
Intercooler (LT) coolant flow rate min.	gpm	L/hr	66	(15)	88	(20)	110	(25)
Intercooler (LT) coolant flow rate max.	gpm	L/hr	132	(30)	132	(30)	132	(30)
Exhaust manifold type			Dry					
Exhaust temperature	°F	°C	779	(415)	788	(420)	874	(468)
Exhaust mass flow wet	lbs/hr	kg/h	11,354	(5,150)	13,470	(6,110)	14,595	(6,620)
Exhaust backpressure max.	psi	mbar	0.65	(45)	0.65	(45)	0.65	(45)
Maximum pressure loss in front of air cleaner	psi	mbar	0.073	(5)	0.073	(5)	0.073	(5)
Fuel pressure range	psi	mbar	0.73 - 3.48 (50 - 240)					
Starter battery 2x12 V, capacity required	Ampere-hour		280					
Emissions ⁸⁾								
NOx	g/bhp.hr		< 1		< 1.1		< 1	
CO	g/bhp.hr		< 2.2		< 2.2		< 2.2	
THC (in C1base)	g/bhp.hr		< 4.3		< 4.3		< 4.3	
NMHC (in C1 base)	g/bhp.hr		< 0.7		< 0.7		< 0.7	

- Engine performance data acc. to ISO 3046/1
 - Fuel blending system available on request
 - The values given in this data sheet are for information purposes only and not binding

Speed	1,200/1,500/1,800 rpm
Generator frequency	50/60 Hz
Applicable gas types ¹⁾	Biogas

Dimensions and other data

Engine Dimensions	English Units	Metric Units	SGE-24HM		SGE-42HM		SGE-56HM	
Width	in.	mm	81.8	(2,079)	84.8	(2,155)	84.2	(2,141)
Length	in.	mm	126.9	(3,223)	140.6	(3,571)	159.1	(4,041)
Height	in.	mm	62.6	(1,590)	85.8	(2,181)	87.3	(2,217)
Dry weight	lb	kg	9,259	(4,200)	13,779	(6,250)	16,535	(7,500)

Genset Dimensions	English Units	Metric Units	SGE-24HM		SGE-42HM		SGE-56HM	
Width	in.	mm	81.8	(2,079)	84.8	(2,155)	84.2	(2,141)
Length	in.	mm	155.5	(3,952)	191.5	(4,865)	218.3	(5,545)
Height	in.	mm	68.4	(1,738)	93.4	(2,373)	91.3	(2,319)
Dry weight	lb	kg	13,735	(6,230)	23,667	(10,735)	26,896	(12,200)

Noise emissions*								
Engine Noise dB(A)	HZ (Frec. Band)	SGE-24HM		SGE-42HM		SGE-56HM		
		1,500	1,800	1,500	1,800	1,200	1,500	1,800
	125	73	67	71	-	71	73	70
	250	83	77	81	74	77	83	84
	500	85	80	84	88	79	85	82
	1,000	88	88	87	83	81	88	86
	2,000	92	91	90	90	88	92	92
	4,000	89	87	89	87	83	89	88
	LpA, \dot{a} dB(A)	96	94	94	94	90	96	95

Exhaust Noise dB(A)	HZ	SGE-24HM		SGE-42HM		SGE-56HM		
	63	100	102	105	106	99	102	103
	125	121	131	119	129	109	122	125
	250	129	133	129	133	115	128	136
	500	116	122	116	123	116	122	127
	1,000	116	119	115	117	114	119	121
	2,000	115	117	113	114	114	117	117
	4,000	112	110	111	111	116	112	113
	LpA, \dot{a} dB(A)	130	136	130	135	122	130	137

Notes: Data obtained according to ISO 9614-2 • Data obtained @ 1 m from engine according to UNE-EN ISO-11203:1996
Maximum data standard deviations = ± 4 dB(A)

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