StirLNG-4 Cryogenerator

Liquefier for micro scale LNG production

Stirling Technology

For over sixty years Stirling Cryogenics has been designing and manufacturing gas liquefaction systems, serving customers all over the world under all possible conditions. This experience is incorporated in our Methane liquefiers called StirLNG. They have three specific fields of application:

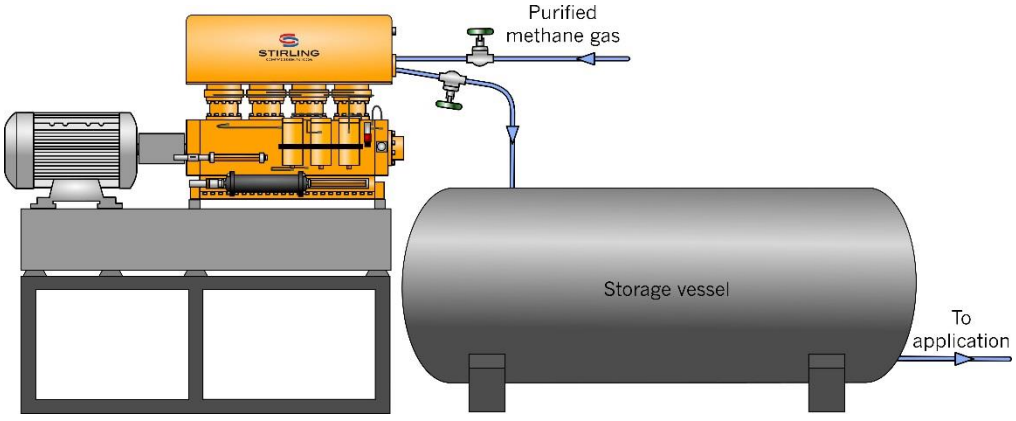
- Micro scale production of LNG from a purified gas source such as pipe line or biogas.
- Re-liquefaction of boil off gas to compensate for losses in a cryogenic (storage) system (fuel stations, storage tanks, etc.).
- Re-liquefaction of boil-off gas on vessels. The StirLNG-4 is available in an adapted version specifically for maritime use.

The cooling power of the StirLNG is created by the so called reversed Stirling cycle: compression and expansion of helium gas in a closed cycle by mechanical pistons. The gas to be liquefied is not used to create this cold: it will just flow through a cold heat exchanger where energy is extracted and the gas will liquefy. The gas will only encounter a phase change and there is no pressure difference between the gas and the liquid.

LNG Production with StirLNG-4

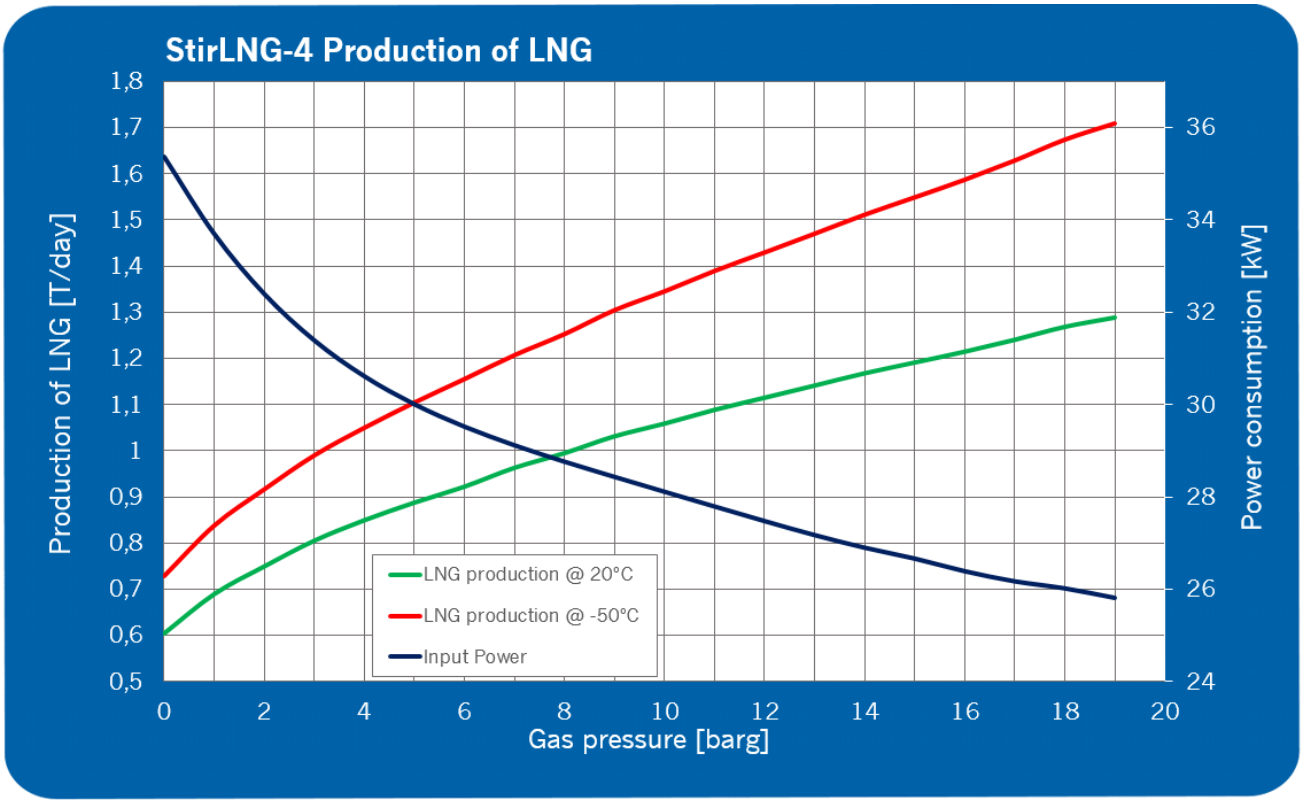
The StirLNG-4 is our SPC-4 Cryogenerator specifically modified for micro scale LNG production and re-liquefaction. Depending on the gas pressure, the StirLNG-4 produces around 1 T/day of LNG (720 gal/day).

The Stirling Cryogenerator operates stand-alone, driven by an electrical motor and has its own control unit. Clean Methane gas, with a maximum pressure of 20 barg (290 psi), either from a well, biogas production plant or pipeline is fed to the StirLNG-4 liquefier. In the cold head, energy is extracted from the gas until it liquefies. By gravity, the formed liquid drains into an (intermediate) storage tank for further use.



Stirling Cryogenics B.V. | Science Park Eindhoven 5003 | 5692 EB Son | The Netherlands
Tel. +31 40 2677 300 | info@stirlingcryogenics.eu | www.stirlingcryogenics.eu | Commercial Register Eindhoven 73238783 | VAT NL859415934B01

StirLNG-4 Specifications



Gas Pressure	Temp. Liquid	CO_2(1)	Cooling Power	Electrical Input	Capacity Inlet gas temperature 20°C based on pure methane					Capacity Inlet gas temperature -50°C based on pure methane				
Barg	K	PPM	W	kW	Nm^3/hr	kg/hr	l/hr	T/day	Gal/day	Nm^3/hr	kg/hr	l/hr	T/day	Gal/day
0	111	66	6250	35,4	34,9	25,1	59,3	0,60	376	42,0	30,1	71,3	0,72	452
2	126	230	7350	32,3	43,8	31,5	78,8	0,75	499	53,5	38,4	96,1	0,92	609
4	135	486	7950	30,7	49,4	35,5	92,1	0,85	584	61,0	43,8	113,7	1,05	721
6	141	800	8400	29,6	53,9	38,7	103,5	0,93	656	67,2	48,2	129,0	1,16	818
8	146	1213	8750	28,8	57,8	41,4	113,8	0,99	722	72,7	52,2	143,3	1,25	909
10	151	1837	9050	28,0	61,3	44,0	123,7	1,05	784	77,9	55,9	157,2	1,34	997
12	155	2562	9300	27,5	64,5	46,3	133,3	1,11	845	82,8	59,4	171,0	1,43	1084
14	158	3287	9500	26,9	67,7	48,5	142,9	1,16	906	87,6	62,9	185,0	1,51	1173
16	161	4217	9700	26,5	70,7	50,7	152,5	1,22	967	92,4	66,3	199,4	1,59	1264
18	164	5412	9900	26,1	73,6	52,8	162,3	1,27	1029	97,2	69,7	214,3	1,67	1359
20	167	6944	10050	25,7	76,5	54,9	172,4	1,32	1093	102,1	73,2	230,0	1,76	1458

Specifications	
Explosion proof classification	ATEX Zone 2 or 1 Nec 500, Class 1 Div 2 or 1, gas group D Other, upon request
Max. gas pressure	20 barg 290 psig
Water consumption (incl. 20% EG)	4.000 l/hr @ 15°C
System size (l x w x h)	1,75 m 0,75 m 1,22 m

Feed gas composition limits	
Deviations from pure methane will affect capacity above. Please contact us with your gas composition for a specific calculation	Main stream: CH_4 CxHy (C2 to C4) 10% CxHy (C5+) < 1 ppm H_2O < -70°C dew point H_2S < 3,3 ppm Oil content < 0,01 mg/m³ Particles < 0,1 micron N_2/O_2 < 10%,(²)

1: Solubility of CO2 as function of liquid TEMPERATURE.
Pressure for indication only, relative to pure methane. Other components such as N2 will lower the liquid temperature relative to the saturated pressure, decreasing the allowable CO_2 level.

2: The actual re-liquefaction capacity might be lower, based on the composition of the boil off gas. Especially N_2 and O_2 will lower the re-liquefaction temperature and therefor will reduce the available cooling power and liquefaction

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