

Kryon® 290 (R-290)

The refrigerant used in “Plug-In” systems for Commercial Refrigeration

Kryon® 290 (propane) is an hydrocarbon HC belonging to the linear saturated alkanes. Hydrocarbons are refrigerants which are exclusively composed of carbon and hydrogen atoms; these compounds occur naturally in the earth's atmosphere, therefore it does not represent an environmental risk (greenhouse gas emission and ozonedepleting).

Kryon® 290, as all other hydrocarbons, is a highly flammable gas (ASHRAE safety rating A3). For this reason the safety implications must be appropriately considered during operations of storage, handling and transport. In refrigeration “plug-in” systems (e.g. refrigerated showcases and cabinets) propane charge does not exceed 150 grams.

Kryon® 290 requires the use of mineral oil in cooling systems' compressors, thus avoiding humidity problems relating to use of synthetic lubricants.



Physical Properties	UM	Kryon® 290
Chemical Formula	-	C ₃ H ₈
Environmental Classification	-	HC
Molecular Weight	gr/grmole	44,1
Saturated Vapour Temperature @ 1,013 bar	°C	-42,11
Temperature Glide @ 1,013 bar	K	0,00
Density of Liquid @ 25°C	kg/m³	580,88
Density of Saturated Vapour @ 1,013 bar	kg/m³	2,44
Pressure of Saturation (Saturated Liquid) @ 25°C	bar_rel	2,49
Pressure of Saturation (Saturated Liquid) @ 50°C	bar_rel	5,83
Critical Temperature	°C	96,74
Critical Pressure	bar_rel	42,51
Critical Density	kg/m³	220,48
Heat of Evaporation @ 1,013 bar	kJ/Kg	425,59
Specific Entropy of Liquid @ 25°C	kJ/Kg*°C	1,225
Specific Entropy of Vapour @ 25°C	kJ/Kg*°C	2,351
CP/CV Ratio @ 25°C - 1,013 bar_ass		1,1364
ODP	(R11 = 1)	0,00
Atmosferic Life Time	Years	Not established
GWP - IPCC rev. 4 (IPCC rev. 5)	(CO ₂ = 1)	3 (3)
ASHRAE Standard 34 Safety Rating		A3
Lower Flammability Limit	%	2,1
Classification according to Directive 97/23/CE PED	Group	1

Applications

Kryon® 290 is mainly used in commercial refrigeration systems, (positive temperature): supermarket refrigerated display case, ice maker machines, vending machines.

Kryon® 290 is also used in some low temperature industrial system.

Performance

- ✓ The absence of ozone layer depleting substances and its extremely low greenhouse gas emission allowed Kryon® 600a to be used increasingly as refrigerant in low charge systems.
- ✓ Refrigerating systems with high gas charge can be only achieved when a confined cooling system and a transfer fluid are provided.

Recommended Lubricants

Kryon® 290 requires the use of mineral oil in cooling systems' compressors, thus avoiding humidity problems relating to the use of synthetic lubricants.



Packaging

Item Code	Gas Q.ty Kg	Container	Capacity Lt	Pressure	Valve	Sales Unit	N° Pieces per Pack	N° Cylinders per Pallets	GWP per Pack (TonCO ₂ eq.)
F-GF-R290-13	5	Cylinder	13	42 bar	W 20 x 1/14" LH	KG	1	30	0,015
F-GF-MI-R290-1LT	0,43	KryoSmart	1	48 bar	7/16" 28 UNEF	Pkg.	12	360 (30 Pkg.)	0,015



GWP



ODP



MT BT

Temperature

Thermodynamic Properties of Kryon® 290

LEGEND



Temperature	Vapour Pressure	Density		Enthalpy		Entropy	
		Saturated Liquid	Saturated Vapour	Saturated Liquid	Saturated Vapour	Saturated Liquid	Saturated Vapour
°C	bar_rel	kg/m³	kg/m³	KJ/kg	KJ/kg	KJ/kg*K	KJ/kg*K
-50	-0,31	589,90	1,73	82,75	516,48	0,530	2,473
-48	-0,24	587,63	1,89	87,19	518,88	0,550	2,467
-46	-0,16	585,35	2,05	91,65	521,29	0,569	2,461
-44	-0,08	583,06	2,23	96,12	523,69	0,589	2,455
-42	0,01	580,75	2,43	100,61	526,08	0,608	2,449
-40	0,10	578,43	2,63	105,12	528,48	0,628	2,443
-38	0,20	576,10	2,85	109,65	530,87	0,647	2,438
-36	0,30	573,76	3,08	114,20	533,26	0,666	2,433
-34	0,42	571,40	3,33	118,77	535,64	0,685	2,428
-32	0,54	569,03	3,59	123,36	538,01	0,704	2,424
-30	0,67	566,64	3,87	127,97	540,38	0,723	2,419
-28	0,80	564,23	4,16	132,61	542,75	0,742	2,415
-26	0,95	561,81	4,47	137,26	545,11	0,761	2,411
-24	1,10	559,38	4,80	141,94	547,46	0,779	2,407
-22	1,26	556,92	5,14	146,64	549,80	0,798	2,403
-20	1,43	554,45	5,50	151,36	552,13	0,817	2,400
-18	1,61	551,96	5,89	156,11	554,46	0,835	2,397
-16	1,80	549,45	6,29	160,88	556,77	0,854	2,393
-14	2,00	546,92	6,72	165,68	559,08	0,872	2,390
-12	2,22	544,37	7,16	170,50	561,37	0,891	2,387
-10	2,44	541,80	7,63	175,35	563,65	0,909	2,385
-8	2,67	539,20	8,12	180,22	565,92	0,927	2,382
-6	2,92	536,59	8,64	185,12	568,18	0,946	2,379
-4	3,18	533,95	9,18	190,05	570,42	0,964	2,377
-2	3,45	531,28	9,75	195,01	572,65	0,982	2,375
0	3,73	528,59	10,35	200,00	574,87	1,000	2,372
2	4,03	525,88	10,98	205,02	577,06	1,018	2,370
4	4,34	523,13	11,63	210,06	579,24	1,036	2,368
6	4,66	520,36	12,32	215,14	581,41	1,054	2,366
8	5,00	517,56	13,03	220,25	583,55	1,072	2,364
10	5,35	514,73	13,78	225,40	585,67	1,090	2,363
12	5,72	511,86	14,57	230,57	587,77	1,108	2,361
14	6,10	508,97	15,39	235,79	589,85	1,126	2,359
16	6,50	506,03	16,25	241,03	591,91	1,144	2,358
18	6,92	503,06	17,14	246,32	593,94	1,162	2,356
20	7,35	500,06	18,08	251,64	595,95	1,180	2,354
22	7,80	497,01	19,06	256,99	597,93	1,198	2,353
24	8,27	493,92	20,09	262,39	599,88	1,216	2,351
26	8,75	490,79	21,16	267,83	601,80	1,234	2,350
28	9,26	487,62	22,28	273,31	603,68	1,252	2,349
30	9,78	484,39	23,45	278,83	605,54	1,270	2,347
32	10,32	481,12	24,68	284,40	607,35	1,287	2,346
34	10,88	477,79	25,96	290,01	609,13	1,305	2,344
36	11,46	474,41	27,30	295,68	610,87	1,323	2,343
38	12,06	470,96	28,70	301,39	612,57	1,341	2,341
40	12,68	467,46	30,17	307,15	614,21	1,359	2,340
42	13,32	463,89	31,70	312,96	615,81	1,377	2,338
44	13,99	460,25	33,31	318,83	617,36	1,396	2,337
46	14,68	456,54	35,00	324,76	618,86	1,414	2,335
48	15,39	452,75	36,77	330,75	620,29	1,432	2,334
50	16,12	448,87	38,63	336,80	621,66	1,450	2,332
52	16,88	444,90	40,58	342,92	622,96	1,469	2,330
54	17,66	440,83	42,64	349,11	624,19	1,487	2,328
56	18,47	436,66	44,80	355,37	625,34	1,506	2,326
58	19,30	432,38	47,08	361,71	626,40	1,524	2,323
60	20,15	427,97	49,49	368,14	627,36	1,543	2,321

