

Creard R-455A



REFRIGERANTS

## Creard R-455A

Information sur le produit

## Description du produit

Creard R-455A est un fluide frigorigène A2L à faible PRG destiné aux applications de réfrigération à basse et moyenne température. Il vient remplacer les fluides frigorigènes comme le R-404A ou le R-507 qui étaient utilisés jusqu'à présent.

- Fluide frigorigène zéotrope composé de CO<sub>2</sub> / R-32 / R-1234yf (3,0 / 21,5 / 75,5 % en termes de poids)
- Ce fluide frigorigène doit être chargé en phase liquide
- Propriétés thermo-physiques comparables aux fluides R-404A / R-507 et R-22
- Faible niveau d'inflammabilité, non toxique
- PRG100 inférieur à 150
- Les compresseurs doivent être chargés d'huiles POE

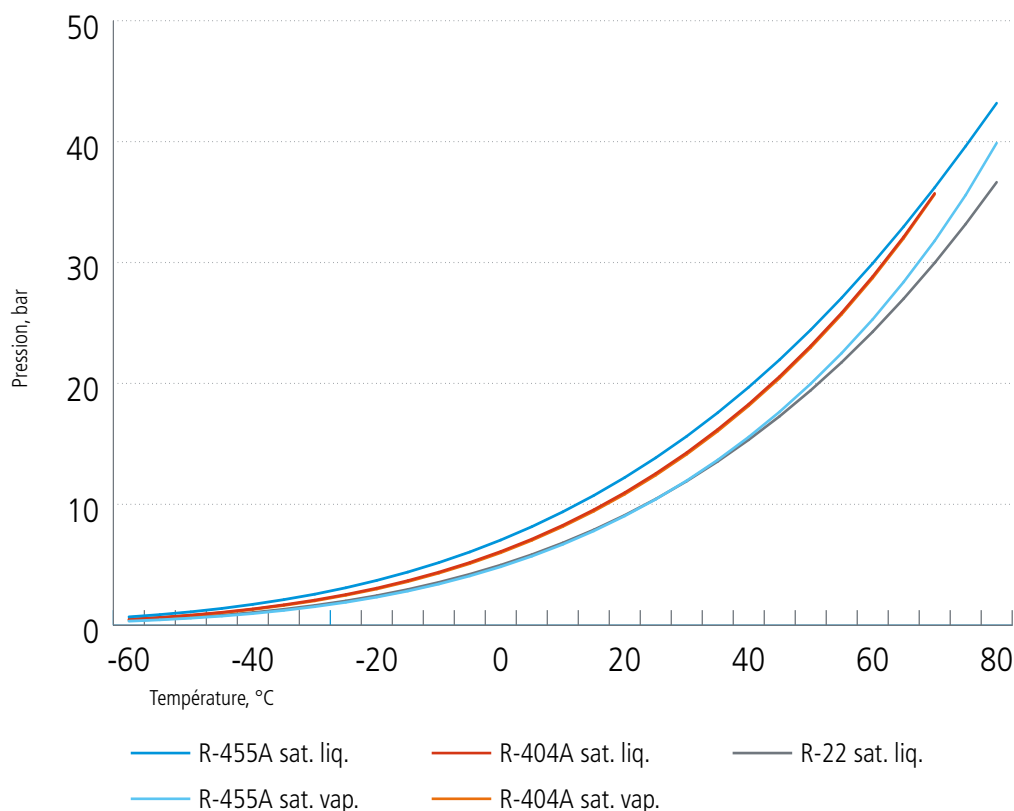
## Applications

- Remplacement à long-terme des fluides R-404A / R-507 et R-22
- Chambres froides de stockage
- Systèmes MultiPlex et vitrines réfrigérées de supermarchés
- Machines à glaçons
- Transport frigorifique
- Groupes de condensation, unités de refroidissement

## Aspects environnementaux

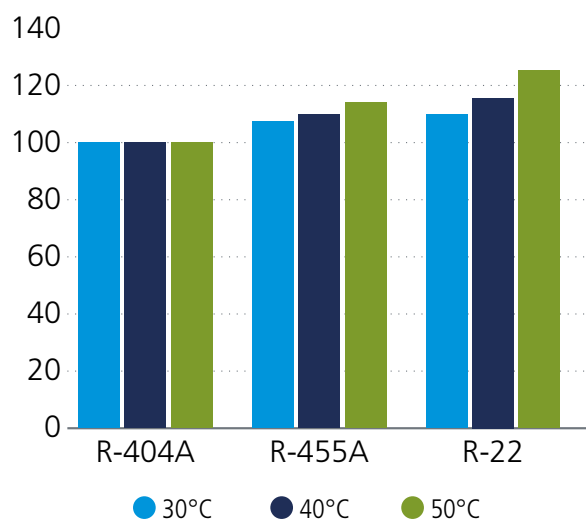
- Le R-455A est un mélange zéotrope consistant de CO<sub>2</sub> / R-32 / R-1234yf
- Il est conçu en tant que fluide frigorigène à faible PRG pour les applications de refroidissement à basse et moyenne température
- Grâce à son faible PRG, il satisfait aux exigences strictes des réglementations internationales en vigueur

## Gamme d'applications

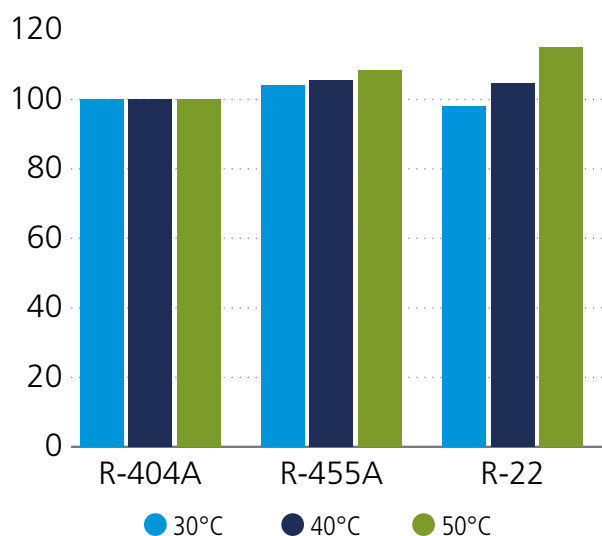


## Performances théoriques<sup>1</sup>

### COP



### Capacité



1

Conditions de simulation de cycle: Refprop 10.0  
 $t_o = -30^\circ\text{C}$ ,  $T_{\text{superheat}} = 10\text{K}$ ,  $T_{\text{subc.}} = 2\text{K}$ ,  $\text{isv} = f(p_o/p_o)$

## Propriétés physiques

Nom chimique	Carbon Dioxide / Difluoromethane / 2,3,3,3 Tetrafluoropropene	
Formule chimique	$\text{CO}_2 / \text{CH}_2\text{F}_2 / \text{CH}_2=\text{CF}_3$	
Masse molaire	kg/kmol	87.5
PRG <sub>100</sub>	IPCC 4 <sup>th</sup> AR / 5 <sup>th</sup> AR	148 / 146
Point d'ébullition à 1,013 bar	°C	-52.0 / -39.2
point de bulle / rosée		
Température critique	°C	85.6
Pression critique	bar	46.5
Densité critique	kg/m <sup>3</sup>	454.0
Volume critique	dm <sup>3</sup> /kg	2.198
Densité de liquide <sup>2</sup>	kg/m <sup>3</sup>	1033.4
Densité de vapeur <sup>2</sup>	kg/m <sup>3</sup>	45.6
Chaleur d'évaporation <sup>2</sup>	kJ/kg	167.9
$c_p$ liq.	kJ/(kg K)	1.567
$c_p$ vap.	kJ/(kg K)	1.136
Glissement de temp. au point d'ébullition normal	K	12.8
ASHRAE 34		A2L

## Conditionnement

Type	Conteneur en acier ordinaire
Dimension	859 x 2230 (P x L)
Volume	930 l
Poids à vide	~ 500 kg
Poids net	750 kg
Raccordements	Vanne DIN4676, W 1-1/4
Autre conditionnement sur demande	

<sup>2</sup> Conditions de simulation de cycle:  
 $t_o = -30^\circ\text{C}$ ,  $t_c = \text{variable}$ ,  $T_{\text{superheat}} = 10\text{K}$ ,  $T_{\text{subc.}} = 2\text{K}$ ,  $\text{isent. eff.} = f(p_o/p_o)$

## Table de vapeur humide du Creard R-455A\*

t	p'	p''	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	bar	dm³/kg	dm³/kg	kg/m³	kg/m³	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
-60	0.686	0.336	0.762	591.76	1311.61	1.69	119.63	355.98	236.36	0.6707	1.8083
-59	0.721	0.356	0.764	560.15	1308.90	1.79	120.90	356.62	235.73	0.6767	1.8058
-58	0.758	0.378	0.766	530.55	1306.18	1.88	122.17	357.27	235.10	0.6826	1.8034
-57	0.797	0.400	0.767	502.80	1303.45	1.99	123.44	357.91	234.47	0.6885	1.8010
-56	0.837	0.423	0.769	476.78	1300.71	2.10	124.72	358.55	233.83	0.6943	1.7987
-55	0.879	0.448	0.770	452.36	1297.96	2.21	125.99	359.19	233.20	0.7002	1.7964
-54	0.923	0.473	0.772	429.43	1295.20	2.33	127.27	359.83	232.56	0.7060	1.7941
-53	0.968	0.500	0.774	407.88	1292.43	2.45	128.55	360.47	231.92	0.7118	1.7919
-52	1.014	0.528	0.775	387.62	1289.66	2.58	129.83	361.11	231.28	0.7176	1.7898
-51	1.063	0.558	0.777	368.56	1286.87	2.71	131.11	361.75	230.64	0.7234	1.7877
-50	1.113	0.588	0.779	350.62	1284.08	2.85	132.40	362.39	229.99	0.7291	1.7856
-49	1.166	0.620	0.780	333.72	1281.27	3.00	133.68	363.02	229.34	0.7348	1.7836
-48	1.220	0.653	0.782	317.79	1278.46	3.15	134.97	363.66	228.69	0.7406	1.7816
-47	1.276	0.688	0.784	302.77	1275.64	3.30	136.26	364.30	228.04	0.7463	1.7797
-46	1.334	0.724	0.786	288.60	1272.80	3.47	137.55	364.93	227.38	0.7520	1.7778
-45	1.394	0.762	0.787	275.22	1269.96	3.63	138.85	365.57	226.72	0.7576	1.7759
-44	1.456	0.801	0.789	262.59	1267.10	3.81	140.15	366.20	226.06	0.7633	1.7741
-43	1.520	0.842	0.791	250.65	1264.24	3.99	141.45	366.84	225.39	0.7689	1.7723
-42	1.587	0.884	0.793	239.36	1261.36	4.18	142.75	367.47	224.73	0.7745	1.7705
-41	1.656	0.928	0.795	228.68	1258.48	4.37	144.05	368.10	224.05	0.7801	1.7688
-40	1.727	0.974	0.796	218.57	1255.58	4.58	145.36	368.74	223.38	0.7857	1.7671
-39	1.800	1.022	0.798	208.99	1252.67	4.78	146.67	369.37	222.70	0.7913	1.7654
-38	1.876	1.071	0.800	199.92	1249.76	5.00	147.98	370.00	222.02	0.7969	1.7638
-37	1.954	1.122	0.802	191.32	1246.83	5.23	149.29	370.63	221.34	0.8024	1.7622
-36	2.035	1.176	0.804	183.17	1243.89	5.46	150.61	371.25	220.65	0.8079	1.7607
-35	2.118	1.231	0.806	175.43	1240.94	5.70	151.92	371.88	219.95	0.8135	1.7591
-34	2.204	1.288	0.808	168.09	1237.97	5.95	153.25	372.50	219.26	0.8190	1.7576
-33	2.292	1.347	0.810	161.11	1235.00	6.21	154.57	373.13	218.56	0.8245	1.7562
-32	2.383	1.409	0.812	154.48	1232.01	6.47	155.90	373.75	217.86	0.8299	1.7547
-31	2.477	1.472	0.814	148.18	1229.01	6.75	157.23	374.37	217.15	0.8354	1.7533
-30	2.574	1.538	0.816	142.19	1226.00	7.03	158.56	374.99	216.44	0.8409	1.7519
-29	2.673	1.606	0.818	136.49	1222.97	7.33	159.89	375.61	215.72	0.8463	1.7506
-28	2.776	1.677	0.820	131.06	1219.94	7.63	161.23	376.23	215.00	0.8517	1.7493
-27	2.881	1.750	0.822	125.90	1216.89	7.94	162.57	376.85	214.28	0.8572	1.7480
-26	2.989	1.825	0.824	120.97	1213.82	8.27	163.91	377.46	213.55	0.8626	1.7467

t	p'	p''	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	bar	dm³/kg	dm³/kg	kg/m³	kg/m³	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
-25	3.101	1.903	0.826	116.28	1210.75	8.60	165.26	378.07	212.81	0.8680	1.7454
-24	3.216	1.983	0.828	111.81	1207.66	8.94	166.61	378.68	212.07	0.8734	1.7442
-23	3.333	2.066	0.830	107.54	1204.55	9.30	167.96	379.29	211.33	0.8787	1.7430
-22	3.454	2.152	0.832	103.47	1201.44	9.66	169.32	379.90	210.58	0.8841	1.7418
-21	3.579	2.241	0.835	99.59	1198.31	10.04	170.68	380.51	209.83	0.8895	1.7407
-20	3.706	2.332	0.837	95.88	1195.16	10.43	172.04	381.11	209.07	0.8948	1.7395
-19	3.837	2.426	0.839	92.33	1192.00	10.83	173.40	381.72	208.31	0.9002	1.7384
-18	3.972	2.523	0.841	88.94	1188.82	11.24	174.77	382.32	207.54	0.9055	1.7373
-17	4.110	2.623	0.843	85.70	1185.63	11.67	176.14	382.91	206.77	0.9108	1.7362
-16	4.251	2.726	0.846	82.61	1182.43	12.11	177.52	383.51	205.99	0.9161	1.7352
-15	4.397	2.832	0.848	79.64	1179.21	12.56	178.90	384.10	205.21	0.9214	1.7341
-14	4.545	2.942	0.850	76.81	1175.97	13.02	180.28	384.70	204.42	0.9267	1.7331
-13	4.698	3.054	0.853	74.09	1172.72	13.50	181.66	385.29	203.62	0.9320	1.7321
-12	4.855	3.170	0.855	71.49	1169.44	13.99	183.05	385.87	202.82	0.9373	1.7311
-11	5.015	3.290	0.858	69.00	1166.16	14.49	184.44	386.46	202.02	0.9425	1.7302
-10	5.179	3.412	0.860	66.61	1162.85	15.01	185.84	387.04	201.20	0.9478	1.7292
-9	5.347	3.538	0.862	64.32	1159.53	15.55	187.24	387.62	200.38	0.9530	1.7283
-8	5.519	3.668	0.865	62.12	1156.19	16.10	188.64	388.20	199.56	0.9583	1.7274
-7	5.696	3.802	0.867	60.02	1152.84	16.66	190.05	388.77	198.73	0.9635	1.7265
-6	5.876	3.939	0.870	57.99	1149.46	17.24	191.46	389.35	197.89	0.9688	1.7256
-5	6.061	4.079	0.873	56.05	1146.07	17.84	192.87	389.92	197.04	0.9740	1.7247
-4	6.250	4.224	0.875	54.19	1142.65	18.45	194.29	390.48	196.19	0.9792	1.7239
-3	6.443	4.373	0.878	52.40	1139.22	19.08	195.71	391.05	195.33	0.9844	1.7230
-2	6.641	4.525	0.880	50.68	1135.77	19.73	197.14	391.61	194.47	0.9896	1.7222
-1	6.843	4.682	0.883	49.02	1132.30	20.40	198.57	392.16	193.60	0.9948	1.7214
0	7.049	4.842	0.886	47.43	1128.80	21.08	200.00	392.72	192.72	1.0000	1.7205
1	7.260	5.007	0.889	45.90	1125.29	21.78	201.44	393.27	191.83	1.0052	1.7197
2	7.476	5.176	0.891	44.43	1121.75	22.51	202.88	393.81	190.94	1.0104	1.7190
3	7.696	5.350	0.894	43.02	1118.20	23.25	204.33	394.36	190.03	1.0155	1.7182
4	7.922	5.528	0.897	41.65	1114.62	24.01	205.78	394.90	189.12	1.0207	1.7174
5	8.151	5.710	0.900	40.34	1111.02	24.79	207.23	395.44	188.21	1.0259	1.7166
6	8.386	5.897	0.903	39.08	1107.39	25.59	208.69	395.97	187.28	1.0310	1.7159
7	8.626	6.089	0.906	37.86	1103.74	26.41	210.15	396.50	186.34	1.0362	1.7152
8	8.871	6.285	0.909	36.68	1100.07	27.26	211.62	397.02	185.40	1.0413	1.7144
9	9.120	6.486	0.912	35.55	1096.37	28.13	213.09	397.54	184.45	1.0465	1.7137

\*D'après Refprop 10.0

Les informations contenues dans le présent document constituent des exemples de mesures réelles, et les exemples d'utilisation présentés ici ne garantissent pas que les produits puissent s'appliquer en pratique à l'exemple d'utilisation donné.

t	p'	p''	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	bar	dm <sup>3</sup> /kg	dm <sup>3</sup> /kg	kg/m <sup>3</sup>	kg/m <sup>3</sup>	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
10	9.375	6.692	0.915	34.46	1092.65	29.02	214.57	398.06	183.49	1.0516	1.7130
11	9.635	6.903	0.918	33.41	1088.90	29.93	216.05	398.57	182.52	1.0568	1.7122
12	9.900	7.119	0.922	32.39	1085.12	30.87	217.54	399.08	181.54	1.0619	1.7115
13	10.171	7.340	0.925	31.41	1081.32	31.83	219.03	399.58	180.55	1.0670	1.7108
14	10.446	7.566	0.928	30.47	1077.49	32.82	220.52	400.08	179.56	1.0722	1.7101
15	10.728	7.798	0.931	29.55	1073.63	33.84	222.02	400.57	178.55	1.0773	1.7094
16	11.014	8.035	0.935	28.67	1069.75	34.88	223.53	401.06	177.53	1.0824	1.7087
17	11.306	8.277	0.938	27.82	1065.83	35.94	225.04	401.54	176.50	1.0875	1.7080
18	11.604	8.525	0.942	27.00	1061.89	37.04	226.55	402.02	175.46	1.0926	1.7073
19	11.907	8.778	0.945	26.20	1057.91	38.16	228.08	402.49	174.42	1.0978	1.7066
20	12.216	9.037	0.949	25.43	1053.90	39.32	229.60	402.96	173.36	1.1029	1.7059
21	12.531	9.302	0.953	24.69	1049.86	40.50	231.13	403.42	172.28	1.1080	1.7053
22	12.852	9.573	0.956	23.97	1045.79	41.72	232.67	403.87	171.20	1.1131	1.7046
23	13.178	9.850	0.960	23.27	1041.68	42.97	234.21	404.32	170.11	1.1182	1.7039
24	13.511	10.133	0.964	22.60	1037.54	44.25	235.76	404.77	169.00	1.1233	1.7032
25	13.849	10.422	0.968	21.95	1033.36	45.56	237.32	405.20	167.88	1.1284	1.7025
26	14.194	10.718	0.972	21.32	1029.15	46.91	238.88	405.63	166.75	1.1336	1.7018
27	14.544	11.019	0.976	20.71	1024.90	48.30	240.45	406.06	165.61	1.1387	1.7011
28	14.901	11.328	0.980	20.11	1020.61	49.72	242.02	406.47	164.45	1.1438	1.7004
29	15.264	11.642	0.984	19.54	1016.27	51.18	243.60	406.88	163.28	1.1489	1.6996
30	15.633	11.964	0.988	18.98	1011.90	52.68	245.18	407.28	162.10	1.1540	1.6989
31	16.009	12.292	0.993	18.44	1007.49	54.22	246.78	407.68	160.90	1.1592	1.6982
32	16.391	12.627	0.997	17.92	1003.03	55.80	248.38	408.06	159.69	1.1643	1.6975
33	16.780	12.969	1.001	17.42	998.52	57.42	249.98	408.44	158.46	1.1694	1.6967
34	17.175	13.318	1.006	16.92	993.97	59.09	251.60	408.81	157.21	1.1745	1.6960
35	17.577	13.675	1.011	16.45	989.37	60.80	253.22	409.17	155.95	1.1797	1.6952
36	17.985	14.038	1.016	15.98	984.72	62.56	254.85	409.52	154.67	1.1848	1.6944
37	18.400	14.409	1.020	15.54	980.02	64.37	256.48	409.86	153.38	1.1900	1.6937
38	18.822	14.788	1.025	15.10	975.26	66.23	258.13	410.20	152.07	1.1951	1.6929
39	19.251	15.174	1.030	14.68	970.45	68.14	259.78	410.52	150.74	1.2003	1.6921
40	19.686	15.568	1.036	14.26	965.57	70.11	261.44	410.83	149.39	1.2055	1.6912
41	20.129	15.970	1.041	13.86	960.64	72.13	263.12	411.13	148.02	1.2106	1.6904
42	20.578	16.380	1.046	13.48	955.64	74.21	264.80	411.43	146.63	1.2158	1.6895
43	21.035	16.799	1.052	13.10	950.58	76.35	266.49	411.71	145.22	1.2210	1.6887
44	21.499	17.225	1.058	12.73	945.44	78.55	268.19	411.97	143.79	1.2263	1.6878

t	p'	p''	v'	v''	rho'	rho''	h'	h''	r	s'	s''
°C	bar	bar	dm <sup>3</sup> /kg	dm <sup>3</sup> /kg	kg/m <sup>3</sup>	kg/m <sup>3</sup>	kJ/kg	kJ/kg	kJ/kg	kJ/kg K	kJ/kg K
45	21.970	17.660	1.064	12.37	940.24	80.82	269.89	412.23	142.33	1.2315	1.6869
46	22.448	18.104	1.070	12.03	934.96	83.16	271.61	412.47	140.86	1.2367	1.6859
47	22.933	18.556	1.076	11.69	929.59	85.56	273.35	412.70	139.36	1.2420	1.6850
48	23.426	19.017	1.082	11.36	924.15	88.05	275.09	412.92	137.83	1.2472	1.6840
49	23.926	19.487	1.089	11.04	918.62	90.60	276.84	413.12	136.28	1.2525	1.6830
50	24.433	19.966	1.095	10.72	913.00	93.24	278.61	413.31	134.70	1.2578	1.6819
51	24.949	20.455	1.102	10.42	907.28	95.96	280.39	413.48	133.09	1.2631	1.6809
52	25.471	20.953	1.109	10.12	901.47	98.77	282.18	413.63	131.45	1.2685	1.6798
53	26.001	21.461	1.117	9.84	895.55	101.67	283.99	413.77	129.78	1.2739	1.6786
54	26.539	21.979	1.124	9.55	889.52	104.67	285.81	413.89	128.08	1.2792	1.6775
55	27.085	22.506	1.132	9.28	883.37	107.77	287.64	413.99	126.34	1.2847	1.6763
56	27.638	23.044	1.140	9.01	877.10	110.98	289.49	414.07	124.57	1.2901	1.6750
57	28.199	23.593	1.148	8.75	870.71	114.30	291.36	414.13	122.76	1.2956	1.6737
58	28.767	24.152	1.157	8.49	864.17	117.74	293.25	414.16	120.92	1.3011	1.6724
59	29.344	24.722	1.166	8.24	857.49	121.31	295.15	414.18	119.03	1.3066	1.6710
60	29.928	25.303	1.176	8.00	850.66	125.01	297.07	414.17	117.09	1.3122	1.6695
61	30.520	25.896	1.185	7.76	843.67	128.86	299.02	414.13	115.11	1.3178	1.6680
62	31.121	26.500	1.195	7.53	836.51	132.86	300.98	414.07	113.08	1.3235	1.6664
63	31.728	27.116	1.206	7.30	829.16	137.02	302.97	413.97	111.00	1.3292	1.6648
64	32.344	27.745	1.217	7.07	821.61	141.35	304.98	413.85	108.86	1.3349	1.6631
65	32.968	28.386	1.229	6.86	813.86	145.88	307.02	413.69	106.66	1.3407	1.6613
66	33.600	29.040	1.241	6.64	805.87	150.60	309.09	413.49	104.40	1.3466	1.6594
67	34.239	29.707	1.254	6.43	797.64	155.55	311.19	413.25	102.06	1.3526	1.6574
68	34.886	30.388	1.267	6.22	789.14	160.74	313.33	412.98	99.65	1.3586	1.6553
69	35.541	31.083	1.281	6.02	780.35	166.18	315.50	412.65	97.16	1.3647	1.6531
70	36.204	31.793	1.297	5.82	771.24	171.92	317.71	412.28	94.57	1.3709	1.6508
71	36.874	32.518	1.313	5.62	761.78	177.97	319.96	411.85	91.88	1.3772	1.6484
72	37.551	33.259	1.330	5.42	751.92	184.38	322.27	411.36	89.09	1.3836	1.6458
73	38.235	34.016	1.348	5.23	741.62	191.18	324.63	410.80	86.17	1.3902	1.6430
74	38.926	34.791	1.368	5.04	730.82	198.42	327.05	410.16	83.10	1.3969	1.6400
75	39.624	35.585	1.390	4.85	719.45	206.18	329.55	409.43	79.88	1.4038	1.6368
76	40.327	36.398	1.414	4.66	707.43	214.53	332.13	408.61	76.48	1.4110	1.6333
77	41.035	37.232	1.440	4.47	694.63	223.57	334.81	407.67	72.86	1.4183	1.6295
78	41.747	38.089	1.469	4.28	680.90	233.43	337.61	406.59	68.98	1.4260	1.6254
79	42.462	38.971	1.501	4.09	666.05	244.29	340.55	405.34	64.79	1.4341	1.6208
80	43.178	39.881	1.539	3.90	649.78	256.41	343.67	403.89	60.22	1.4426	1.6156

# Creard R-455A

Information sur le produit

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