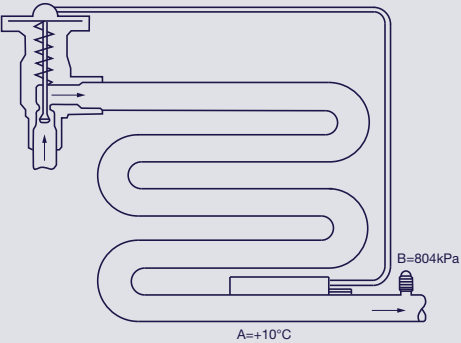


Measuring Superheat

What is Superheat? Superheat is the difference between the boiling point of the refrigerant in the evaporator and the temperature of the refrigerant leaving the evaporator. A positive superheat reading is required to ensure no liquid refrigerant enters the compressor. Every application is unique therefore setting and fine tuning of the superheat is required.



Measuring Superheat During stable operation with the refrigerated space at or near design temperature the superheat can be determined by taking the following readings.

Where, A = Temperature at the Bulb of the TX Valve. B = Evaporating temperature correlating to the pressure taken at the Schrader valve using an Actrol Temperature/Pressure Chart.

A - B = Superheat

Example: For a system using R410A, the dew pressure gauge reading of 804kPa equals +4°C on an Actrol Temperature/Pressure Chart, this is the evaporating temperature. The temperature read of +10°C is the temperature at the bulb of the TX valve. A - B = Superheat 10 (°C) – 4 (°C) = 6 (K)



Temperature Pressure Data For Common Refrigerants

DEW Use Dew pressure for superheat calculations. and Bubble pressure for sub-cooling calculations

RED Red figures under kPa are negative kilopascals and red figures under psi are inches of mercury

R404A			R449A (XP40)			R452A (XP44)			R455A			R507		
°C	BUBBLE		BUBBLE	DEW		BUBBLE	DEW		BUBBLE	DEW		BUBBLE	DEW	
	kPa	psi		kPa	psi		kPa	psi		kPa	psi		kPa	psi
-40	34	5	30	4	30	4	10	1	10	1	37	5	37	5
-38	47	7	42	6	4	32	5	10	1	1	50	7	50	7
-36	60	9	55	8	14	44	8	12	3	1	64	9	64	9
-34	75	11	70	10	26	58	8	32	5	6	89	11	89	11
-32	90	13	85	12	38	72	10	45	8	13	104	14	104	14
-30	106	15	101	15	51	87	13	58	10	17	120	16	120	16
-28	124	18	118	17	65	104	15	73	11	22	136	19	136	19
-26	143	21	137	20	80	121	18	88	13	26	152	22	152	22
-24	162	24	156	23	96	140	20	105	15	29	169	24	169	24
-22	183	27	177	26	113	160	23	122	18	32	188	27	188	27
-20	206	30	199	29	131	182	26	141	20	35	208	30	208	30
-18	229	33	222	32	150	205	29	161	23	39	231	33	231	33
-16	254	37	247	36	171	228	33	182	26	43	257	37	257	37
-14	281	41	273	40	193	253	37	206	30	47	284	41	284	41
-12	308	45	300	44	216	280	41	228	33	51	312	45	312	45
-10	338	49	329	48	241	308	45	253	36	55	340	49	340	49
-8	369	53	360	52	267	337	49	279	40	59	369	53	369	53
-6	401	58	392	57	294	368	53	306	44	63	398	58	398	58
-4	435	63	426	62	324	401	58	331	48	67	426	63	426	63
-2	471	68	462	67	354	435	63	359	52	71	455	67	455	67
0	509	74	499	72	387	471	68	372	54	75	484	72	484	72
2	548	80	538	78	421	509	74	405	59	79	513	78	513	78
4	590	86	579	84	457	540	80	440	64	83	542	84	542	84
6	633	92	622	90	495	590	86	477	69	87	571	90	571	90
8	678	98	667	97	534	634	92	516	75	91	600	96	600	96
10	726	105	714	104	574	678	98	556	81	95	629	101	629	101
12	775	112	764	111	614	727	105	599	87	99	658	107	658	107
14	827	120	815	118	655	777	113	643	93	103	687	113	687	113
16	881	128	869	126	696	829	120	690	100	107	716	120	716	120
18	937	136	925	134	741	883	128	739	107	111	745	128	745	128
20	996	144	983	143	784	940	136	790	114	115	774	136	774	136
22	1057	153	1044	151	833	1000	144	844	122	119	803	144	803	144
24	1121	163	1107	161	886	1060	154	900	131	123	832	154	832	154
26	1187	172	1173	170	941	1124	163	958	139	127	861	163	861	163
28	1256	182	1242	180	1000	1190	173	1019	148	131	890	173	890	173
30	1327	192	1313	190	1061	1259	183	1083	157	135	919	183	919	183
32	1401	203	1387	201	1124	1331	193	1149	167	139	948	193	948	193
34	1479	214	1464	212	1191	1405	204	1218	177	143	977	204	977	204
36	1559	226	1544	224	1261	1482	215	1290	187	147	1006	215	1006	215
38	1642	238	1627	236	1334	1563	227	1366	198	151	1035	227	1035	227
40	1728	251	1713	249	1411	1646	239	1444	209	155	1064	239	1064	239
42	1818	264	1803	261	1492	1732	251	1525	221	159	1093	251	1093	251
44	1910	277	1895	275	1577	1824	264	1609	233	163	1122	264	1122	264
46	2007	291	1992	289	1666	1913	277	1697	246	167	1151	277	1151	277
48	2106	305	2091	303	1759	2009	291	1788	259	171	1180	291	1180	291
50	2209	320	2194	318	1856	2107	306	1883	273	175	1209	306	1209	306
52	2316	336	2301	334	1957	2209	320	1982	287	179	1238	320	1238	320
54	2427	352	2412	350	2062	2315	336	2084	302	183	1267	336	1267	336
56	2542	369	2527	367	2171	2424	352	2190	318	187	1296	352	1296	352
58	2661	386	2646	384	2284	2537	368	2301	334	191	1325	368	1325	368
60	2784	404	2770	402	2401	2653	385	2415	350	195	1354	385	1354	385
62	2911	422	2898	420	2521	2773	402	2534	368	199	1383	402	1383	402
64	3043	441	3031	440	2645	2897	420	2658	385	203	1412	420	1412	420
66	3181	461	3169	460	2774	3024	439	2786	404	207	1441	439	1441	439
68	3323	482	3313	480	2907	3156	458	2919	423	211	1470	458	1470	458
70	3471	503	3463	502	3044	3292	477	3058	443	215	1500	477	1500	477

Temperature Pressure Data For Common Refrigerants



Temperature Pressure Data For Common Refrigerants

DEW
Use Dew pressure for superheat calculations
and Bubble pressure for sub-cooling calculations

RED
Red figures under kPa are negative kilopascals
and red figures under psi are inches of mercury

R410A				R32				R454B				R22				R427A				R407F				R438A (MO99)				
BUBBLE		DEW		BUBBLE		DEW		BUBBLE		DEW		BUBBLE		DEW		BUBBLE		DEW		BUBBLE		DEW		BUBBLE		DEW		
kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	
-40	74	11	74	11	76	11	66	10	58	8	4	1	15	2	-17	5	34	5	-2	0	12	2	-18	3	-9	1	0	0
-38	91	13	90	13	93	13	81	12	73	11	14	2	26	4	-9	3	47	7	9	1	23	3	-9	1	0	0	0	
-36	108	16	108	16	111	16	98	14	89	13	25	4	38	6	1	0	60	9	20	3	34	5	1	0	0	0	0	
-34	127	18	126	18	130	19	116	17	106	15	37	5	51	7	11	2	75	11	32	5	47	7	11	2	3	2	3	
-32	147	21	147	21	150	22	135	20	124	18	49	7	65	9	22	3	91	13	45	7	60	9	22	3	3	2	3	
-30	169	25	168	24	172	25	156	23	144	21	63	9	79	12	34	5	108	16	59	9	75	11	34	5	5	2	3	
-28	192	28	191	28	195	28	178	26	165	24	77	11	95	14	47	7	126	18	74	11	90	13	47	7	7	2	3	
-26	216	31	215	31	220	32	201	29	187	27	92	13	112	16	61	9	145	21	90	13	106	15	60	9	9	2	3	
-24	242	35	241	35	247	36	225	33	211	31	108	16	130	19	76	11	166	24	107	16	124	18	75	11	11	2	3	
-22	270	39	269	39	275	40	252	36	236	34	126	18	149	22	92	13	188	27	125	18	142	21	91	13	13	2	3	
-20	299	43	298	43	304	44	279	41	263	38	144	21	169	24	109	16	211	31	145	21	162	23	107	16	16	2	3	
-18	330	48	329	48	336	49	309	45	291	42	163	24	190	28	127	18	235	34	166	24	183	26	125	18	18	2	3	
-16	363	53	362	52	369	54	340	49	321	47	184	27	213	31	146	21	261	38	188	27	205	30	144	21	21	2	3	
-14	398	58	396	57	405	59	373	54	353	51	206	30	237	34	166	24	289	42	217	31	228	33	164	24	24	2	3	
-12	435	63	433	63	442	64	408	59	386	56	229	33	262	38	188	27	318	46	237	34	253	37	186	27	24	2	3	
-10	473	69	471	68	481	70	444	64	421	61	253	37	289	42	211	31	348	51	263	38	279	40	209	30	30	2	3	
-8	514	75	512	74	523	76	483	70	459	67	279	40	317	46	235	34	381	55	291	42	307	44	233	34	34	2	3	
-6	557	81	555	80	567	82	524	76	498	72	306	44	346	50	261	38	415	60	321	47	336	49	258	37	37	2	3	
-4	602	87	600	87	613	89	566	82	539	78	335	49	378	55	289	42	450	65	353	51	366	53	285	41	40	2	3	
-2	650	94	647	94	661	96	611	89	583	84	365	53	411	60	317	46	488	71	386	56	398	58	314	46	46	2	3	
0	699	101	697	101	712	103	659	96	628	91	397	58	445	65	348	50	528	77	421	61	432	63	344	50	50	2	3	
2	752	109	749	109	765	111	708	103	676	98	430	62	481	70	380	55	569	83	458	66	468	68	376	55	55	2	3	
4	806	117	804	117	821	119	760	110	726	105	465	67	520	75	414	60	613	89	497	72	505	73	409	59	59	2	3	
6	864	125	861	125	880	128	815	118	779	113	501	73	559	81	450	65	659	96	538	78	544	79	445	64	64	2	3	
8	924	134	921	134	941	137	872	126	834	121	540	78	601	87	487	71	706	102	581	84	585	85	482	70	70	2	3	
10	987	143	983	143	1006	146	931	135	892	129	580	84	645	94	527	76	757	110	626	91	628	91	521	76	76	2	3	
12	1053	153	1049	152	1073	156	993	144	952	138	622	90	691	100	568	82	809	117	674	98	673	98	562	8	8	2	3	
14	1122	163	1118	162	1143	166	1059	154	1015	147	665	97	739	107	612	89	864	125	723	105	719	104	604	88	94	2	3	
16	1193	173	1189	172	1217	176	1126	163	1081	157	711	103	789	114	657	95	921	134	776	113	768	111	649	94	94	2	3	
18	1268	184	1264	183	1293	188	1197	174	1150	167	759	110	841	122	705	102	980	142	830	120	819	119	696	101	101	2	3	
20	1346	195	1342	195	1373	199	1271	184	1222	177	809	117	895	130	755	110	1043	151	888	129	873	127	746	108	108	2	3	
22	1428	207	1423	206	1457	211	1348	196	1296	188	861	125	952	138	807	117	1107	161	947	137	928	135	797	116	116	2	3	
24	1512	219	1507	219	1544	224	1428	207	1374	199	915	133	1011	147	862	125	1175	170	1010	146	986	143	851	123	123	2	3	
26	1601	232	1595	231	1634	237	1512	219	1456	211	971	141	1073	156	919	133	1245	181	1075	156	1046	152	907	132	132	2	3	
28	1692	245	1687	245	1728	251	1598	232	1540	223	1030	149	1137	165	979	142	1318	191	1143	166	1109	161	966	140	140	2	3	
30	1788	259	1782	258	1826	265	1689	245	1628	236	1091	158	1203	175	1041	151	1394	202	1215	176	1174	170	1027	149	149	2	3	
32	1887	274	1881	273	1928	280	1782	259	1720	249	1154	167	1273	185	1106	160	1473	214	1289	187	1242	180	1091	158	158	2	3	
34	1990	289	1984	288	2034	295	1880	273	1815	263	1220	177	1344	195	1174	170	1555	226	1366	198	1312	190	1168	168	168	2	3	
36	2098	304	2091	303	2144	311	1981	287	1914	278	1288	187	1419	206	1244	180	1640	238	1447	210	1385	201	1227	178	178	2	3	
38	2209	320	2202	319	2258	328	2086	302	2017	293	1359	197	1496	217	1318	191	1729	251	1531	222	1461	212	1299	188	188	2	3	
40	2324	337	2317	336	2377	345	2194	318	2124	308	1432	208	1577	229	1394	202	1820	264	1618	235	1539	223	1374	199	199	2	3	
42	2444	354	2437	353	2500	363	2307	335	2235	324	1508	219	1660	241	1474	214	1915	278	1709	248	1621	235	1453	211	211	2	3	
44	2569	373	2561	371	2628	381	2424	352	2350	341	1587	230	1746	253	1557	226	2015	292	1803	262	1705	247	1534	222	222	2	3	
46	2698	391	2690	390	2760	400	2545	369	2469	358	1669	242	1836	266	1643	238	2115	302	1902	276	1792	260	1619	235	235	2	3	
48	2831	411	2823	409	2898	420	2671	383	2593	376	1754	254	1928	280	1732	251	2221	322	2004	291	1883	273	1706	247	247	2	3	
50	2970	431	2962	430	3040	441	2801	406	2722	395	1841	267	2024	294	1825	265	2230	338	2110	306	1976	287	1798	261	261	2	3	
52	3113	451	3105	450	3187	462	2935	426	2855	414	1932	280	2123	308	1922	279	2443	354	2220	322	2073	301	1893	274	274	2	3	
54	3262	473	3254	472	3340	484	3074	446	2993	434	2026	294	2226	323	2022	293	2559	371	2335	339	2174	315	1991	289	289	2	3	
56	3416	495	3408	494	3498	507	3218	467	3137	455	2123	308	2332	338	2126	308	2680	389	2454	356	2277	330	2093	304	304	2	3	
58	3576	519	3568	517	3662	531	3367	488	3285	476	2223	327	2441	354	2234	324	2805	407	25									