Conversions

Units	kPa	Pa	mB	cm H_2O
kPa	1	1000	10	10.2
Pa	0.001	1	0.01	0.0102
mB	0.1	100	1	1.02
cm H_2O	0.098	98	0.98	1

Converting dew point temperature to % relative humidity (RH):

The output from the LI-610 is always at saturation (100% RH) for the dew point temperature which is set, at constant temperature and pressure. To find the RH at a temperature other than that which is set in the LI-610, using the psychrometric table, follow this procedure:

Example: *At a set dew point temperature of 25 °C, what is the RH at 35 °C?*

- Locate the intersection of the 25 °C temperature line and the 100% RH curve.
- Follow this point horizontally to the right until the vertical line corresponding to 35 °C is reached. The intersection of these points is at approximately 56% RH.

Mathematically;

$$\frac{\text{Vapor Pressure at 25 }^{\circ}\text{C}}{\text{Vapor Pressure at 35 }^{\circ}\text{C}} \text{(from Saturation Vapor Pressure Table)}$$

$$\frac{3.181 \text{ kPa}}{5.649 \text{ kPa}}(100)$$

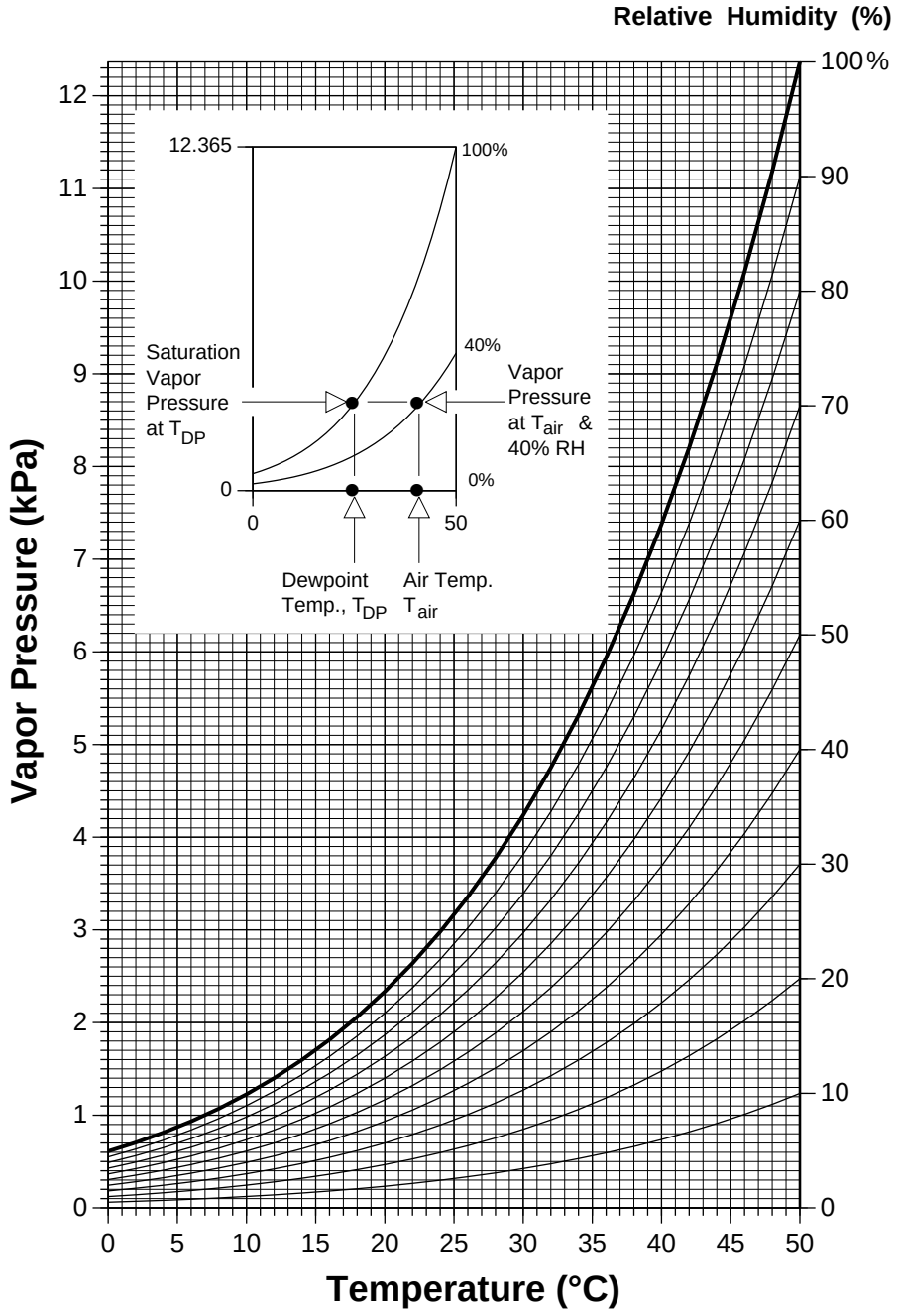
= **56.31%**

Conversely, to find the dew point temperature corresponding to a known RH and air temperature, follow this procedure:

Example: *With air at 50% RH and 25 °C air temperature, what is the dew point temperature?*

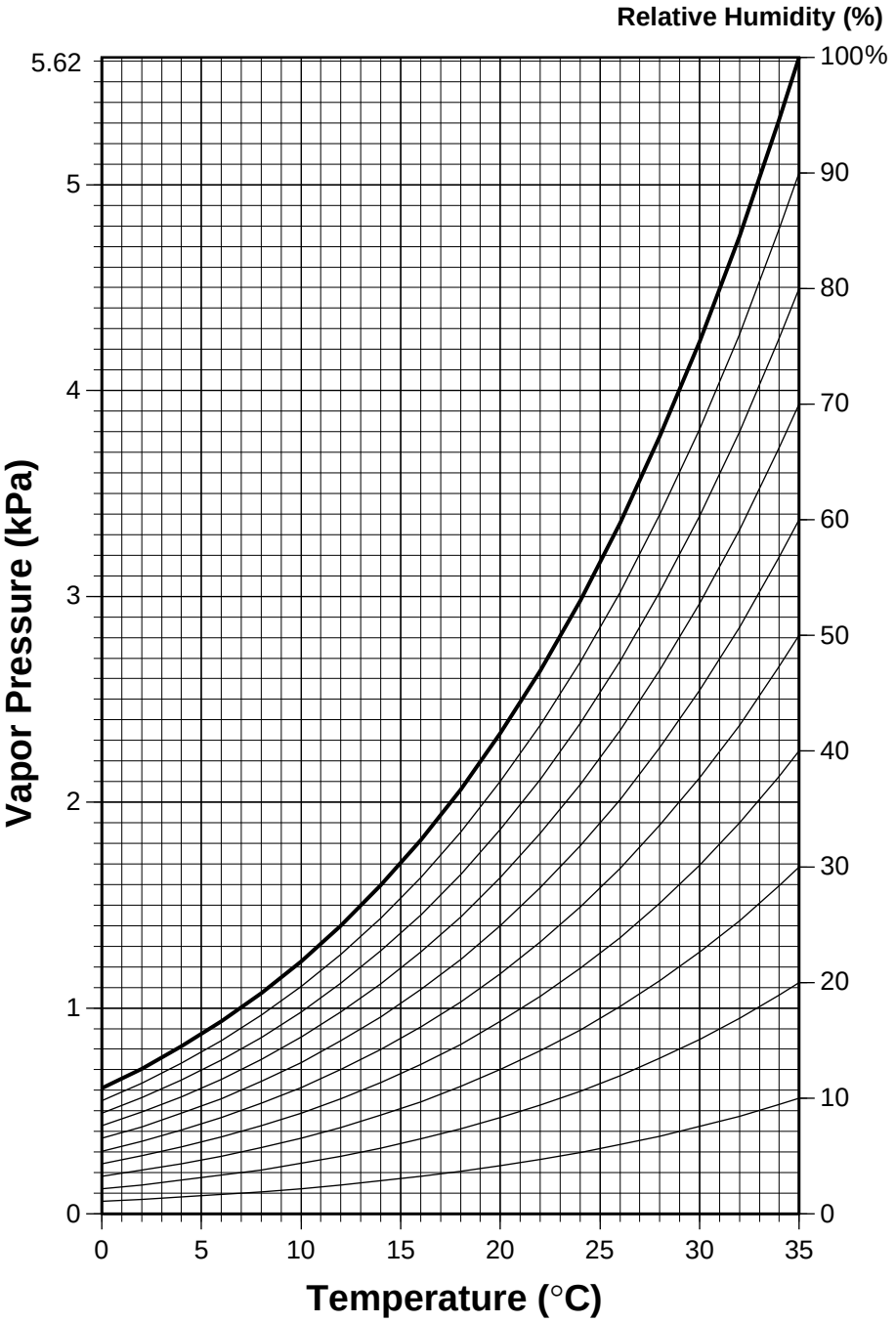
- Locate the intersection of the 50% RH line and the vertical line above 25 °C. The intersection is at approximately 1.6 kPa.
- Follow this line horizontally to the left until the 100% RH line is reached. The dew point temperature at this intersection corresponds with approximately 14 °C.

LI-610 Reference Card



Psychrometric Chart (0 to 50 °C)

Psychrometric Chart (0 to 35 °C)



Saturation Vapor Pressure Table

Temp.°C	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.614	0.618	0.623	0.627	0.632	0.636	0.641	0.646	0.650	0.655
1	0.660	0.664	0.669	0.674	0.679	0.684	0.689	0.694	0.699	0.704
2	0.709	0.714	0.719	0.724	0.729	0.734	0.740	0.745	0.750	0.756
3	0.761	0.766	0.772	0.777	0.783	0.788	0.794	0.800	0.805	0.811
4	0.817	0.822	0.828	0.834	0.840	0.846	0.852	0.858	0.864	0.870
5	0.876	0.882	0.888	0.894	0.901	0.907	0.913	0.920	0.926	0.932
6	0.939	0.945	0.952	0.958	0.965	0.972	0.979	0.985	0.992	0.999
7	1.006	1.013	1.020	1.027	1.034	1.041	1.048	1.055	1.062	1.070
8	1.077	1.084	1.092	1.099	1.107	1.114	1.122	1.129	1.137	1.145
9	1.152	1.160	1.168	1.176	1.184	1.192	1.200	1.208	1.216	1.224
10	1.233	1.241	1.249	1.258	1.266	1.275	1.283	1.292	1.300	1.309
11	1.318	1.326	1.335	1.344	1.353	1.362	1.371	1.380	1.389	1.399
12	1.408	1.417	1.427	1.436	1.445	1.455	1.465	1.474	1.484	1.494
13	1.503	1.513	1.523	1.533	1.543	1.553	1.563	1.574	1.584	1.594
14	1.605	1.615	1.626	1.636	1.647	1.657	1.668	1.679	1.690	1.701
15	1.712	1.723	1.734	1.745	1.756	1.768	1.779	1.790	1.802	1.814
16	1.825	1.837	1.849	1.860	1.872	1.884	1.896	1.908	1.921	1.933
17	1.945	1.957	1.970	1.982	1.995	2.008	2.020	2.033	2.046	2.059
18	2.072	2.085	2.098	2.111	2.125	2.138	2.151	2.165	2.179	2.192
19	2.206	2.220	2.234	2.248	2.262	2.276	2.290	2.304	2.318	2.333
20	2.347	2.362	2.377	2.391	2.406	2.421	2.436	2.451	2.466	2.482
21	2.497	2.512	2.528	2.543	2.559	2.575	2.590	2.606	2.622	2.638
22	2.654	2.671	2.687	2.703	2.720	2.737	2.753	2.770	2.787	2.804
23	2.821	2.838	2.855	2.872	2.890	2.907	2.925	2.943	2.960	2.978
24	2.996	3.014	3.032	3.051	3.069	3.087	3.106	3.124	3.143	3.162
25	3.181	3.200	3.219	3.238	3.258	3.277	3.296	3.316	3.336	3.356
26	3.376	3.396	3.416	3.436	3.456	3.477	3.497	3.518	3.539	3.559
27	3.580	3.602	3.623	3.644	3.665	3.687	3.709	3.730	3.752	3.774
28	3.796	3.818	3.841	3.863	3.886	3.908	3.931	3.954	3.977	4.000
29	4.023	4.046	4.070	4.093	4.117	4.141	4.165	4.189	4.213	4.237
30	4.262	4.286	4.311	4.336	4.361	4.386	4.411	4.436	4.461	4.487
31	4.513	4.538	4.564	4.590	4.617	4.643	4.669	4.696	4.722	4.749
32	4.776	4.803	4.831	4.858	4.885	4.913	4.941	4.969	4.997	5.025
33	5.053	5.082	5.110	5.139	5.168	5.197	5.226	5.255	5.285	5.314
34	5.344	5.374	5.404	5.434	5.464	5.495	5.525	5.556	5.587	5.618
35	5.649	5.680	5.712	5.743	5.775	5.807	5.839	5.871	5.904	5.936
36	5.969	6.002	6.035	6.068	6.101	6.135	6.168	6.202	6.236	6.270
37	6.305	6.339	6.374	6.409	6.443	6.479	6.514	6.549	6.585	6.621
38	6.657	6.693	6.729	6.765	6.802	6.839	6.876	6.913	6.950	6.988
39	7.025	7.063	7.101	7.139	7.178	7.216	7.255	7.294	7.333	7.372
40	7.412	7.451	7.491	7.531	7.571	7.612	7.652	7.693	7.734	7.775
41	7.816	7.858	7.899	7.941	7.983	8.025	8.068	8.110	8.153	8.196
42	8.239	8.283	8.327	8.370	8.414	8.459	8.503	8.548	8.592	8.637
43	8.683	8.728	8.774	8.819	8.865	8.912	8.958	9.005	9.052	9.099
44	9.146	9.193	9.241	9.289	9.337	9.386	9.434	9.483	9.532	9.581
45	9.631	9.680	9.730	9.780	9.830	9.881	9.932	9.983	10.034	10.085
46	10.137	10.189	10.241	10.293	10.346	10.399	10.452	10.505	10.559	10.612
47	10.666	10.720	10.775	10.830	10.885	10.940	10.995	11.051	11.107	11.163
48	11.219	11.276	11.333	11.390	11.447	11.505	11.562	11.621	11.679	11.737
49	11.796	11.855	11.915	11.974	12.034	12.094	12.155	12.215	12.276	12.337
50	12.399	12.461	12.523	12.585	12.647	12.710	12.773	12.836	12.900	12.964

This table gives the saturation vapor pressure of moist air in kPa. This table was derived using the following equation from Buck (1981):

$$e(T) = 0.61121\left[1.00072 + 3.2\times10^{-5}(P) + 5.9\times10^{-9}(PT)\right] e^{\frac{\left(18.729-\frac{T}{227.3}\right)T}{T+257.87}}$$