Wind Chill

Wind Chill is the term used to describe the rate of heat loss on the human body resulting from the combined effect of low temperature and wind. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually internal body temperature. While exposure to low wind chills can be life threatening to both humans and animals alike, the only effect that wind chill has on inanimate objects, such as vehicles, is that is shortens the time it takes the object to cool to the actual air temperature (it cannot cool the object below that temperature). For example, water freezes at 32 degrees F, regardless of what the wind chill temperature is.

The current wind chill temperature index (WCT) formula was developed during 2000 -2001 and implemented for the winter of 2001-2002. A Joint Action Group for temperature Indices (JAG/TI) consisting of the NWS, Meteorologic Services of Canada (MSC), the academic research community (Indiana University-Purdue University in Indianapolis (IUPUI), University of Delaware, and University of Missouri), and the International Society of Biometeorology, developed the formula. The JAG/TI formula made use of the advances in science, technology, and computer modeling to provide a more accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. In addition, clinical trials were conducted and the results of those trials have been used to verify and improve the accuracy of the new formula.

Standardization of the WCT Index among the meteorological community is important, so that an accurate and consistent measure is provided and public safety is ensured. Some of the items incorporated into the WCT include:

- Use wind speed calculated at the average height (5 feet) of the human body's face instead of 33 feet (the standard anemometer height);
- Be based on a human face model;
- Incorporate modern heat transfer theory (heat loss from the body to its surroundings, during cold and breezy/windy days);
- Lower the calm wind threshold to 3 mph;
- Use a consistent standard for skin tissue resistance; and
- Assume the worst case scenario for solar radiation (clear night sky).

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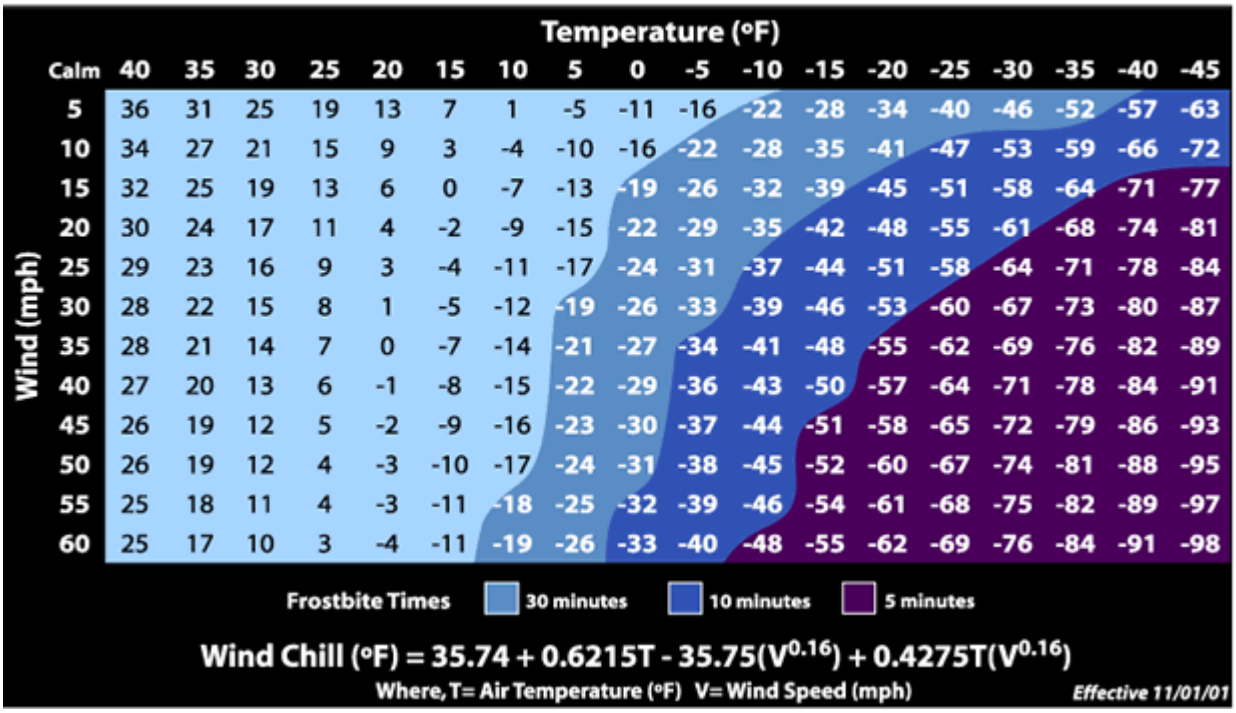
NWS Windchill Chart



Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times — 30 minutes — 10 minutes — 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01