



Physiological Systems Changes with Decreasing Core Temperatures¹

Stage	⁰ C	⁰ F	Characteristics
Mild	37.6	99.6	Normal rectal temperatures +/- 1 Degree
	37.0	98.6	Normal oral temperatures +/- 1 Degree
	36.0	96.8	Increase in metabolic rate, blood pressure and preshivering muscle tone.
	35.0	95.0	Urine temperature 34.8 ⁰ C; maximum shivering thermogenesis
	34.0	93.2	Amnesia, dysarthria, and poor judgment develop; maladaptive behavior, normal blood pressure; maximum respiratory stimulation, tachycardia then progressive bradycardia
	33.0	91.4	Ataxia and apathy develop; linear depression of cerebral metabolism; tachypnea, then progressive decrease in minute volume; cold diuresis
Moderate	32.0	89.6	Stupor; 25% decrease in oxygen consumption
	31.0	87.8	Extinguished shivering thermogenesis
	30.0	86.0	AFib and other arrhythmias develop; Cardiac output 67% of normal; insulin ineffective
	29.0	85.2	Progressive decrease in level of consciousness, pulse and respiration; pupils dilated; paradoxical undressing
	28.0	82.4	Decreased ventricular fibrillation threshold; 50% decrease in oxygen consumption and pulse; hypoventilation
	27.0	80.6	Loss of reflexes and voluntary motion

¹ Textbooks of Military Medicine – Medical Aspects of Harsh Environments Volume 1 – Office of the Surgeon General, Department of the Army

Stage	°C	°F	Characteristics
Severe	26.0	78.8	Major acid-base disturbances no reflexes or response to pain
	25.0	77.0	Cerebral blood flow 33% of normal; loss of cerebrovascular autoregulation; cardiac output 45% of normal; pulmonary edema may develop
	24.0	75.2	Significant hypotension and bradycardia
	23.0	73.4	No corneal reflexes
	22.0	71.6	Max risk of V-Fib; 75% decrease in oxygen consumption
	20.0	68.0	Lowest resumption of cardiac electromechanical activity; Pulse 20% of normal
	19.0	66.2	Electroencephalographic silencing
	18.0	64.4	Asystole
	16.0	60.8	Lowest adult survival from accidental hypothermia
	15.2	59.2	Lowest infant survival from accidental hypothermia
	10.0	50.0	92% decrease in oxygen consumption
	9.0	48.2	Lowest survival from therapeutic hypothermia