

# Volcanic Explosivity Index (VEI)

is a scale that describes the size of an explosive volcanic eruption

Key characteristics that define VEI include:

- Volume of ash produced
- Height of eruption cloud above the vent
- Duration of eruption

VEI is analogous to the Richter magnitude scale for earthquakes.

In the 0 to 8 scale of VEI, each interval represents an increase of a factor of ten.

An eruption of VEI 4 is 10 times larger than a 3 and one hundred times larger than a 2.

## Representative eruptions for each VEI and their rate of occurrence:

VEI	Description	Example	Rate on Earth	Bulk Volume of Erupted Products
8		Toba, Indonesia, 75,000 yr ago	Two per 100,000 years	>230 cubic miles
7		Crater Lake, Oregon, 7600 yr ago	Several per millennium	20 cubic miles
6	Very large	Krakatau, Indonesia, 1883	Several per century	4 cubic miles
5	Large	Mount St. Helens, May 18, 1980	One per decade	0.25 cubic mile
4	Moderate to large	Mont Pelée, Martinique, 1902	Tens per decade	100 million cubic yards
3	Moderate	Mount St. Helens, May 25 and June 12, 1980	Several per year	10 million cubic yards
2	Small	Mount St. Helens, December 7, 1989	Tens per year	1 million cubic yards
1	Non-explosive	Mount St. Helens, October 1, 2004	Frequent	<1 million cubic yards
0				

## Eruption column heights and typical thicknesses of ashfall at a given distance increase with increasing VEI:

VEI	Eruption column height above vent	Approximate ash thickness at 10 miles	At 100 miles	At 300 miles
7	>80,000 feet	Tens of feet	Several feet	Several inches
6	>80,000 feet	Ten feet	One foot	One inch
5	>80,000 feet	Two feet	Several inches	0.5 inch
4	30,000-80,000 feet	One foot	One inch	One-quarter inch
3	10,000-50,000 feet	Few inches	Less than 1 inch	Dusting
2	3000-15,000 feet	Fraction of inch	Dusting	Nil
1	500-3000 feet	Dusting	Nil	Nil
0	<500 feet	Nil	Nil	Nil

Ashfall thicknesses vary greatly within a single VEI category due to differences in eruption and wind conditions.