

## V-2 FACT SHEET

### Specifications:

Length: 46'1"

Diameter: 5'6"

Weight: missile - 6,278 lbs.  
warhead - 2,150 lbs.  
fuel - 18,948 lbs.

Range: 150-225 miles

Altitude: 55 miles maximum

27,376 lbs.

Velocity: 1,850 miles per hour

Time of Flight: 5 minutes

The V-2 was a self-steering liquid fuel rocket whose trajectory became pure ballistic after propulsion cutoff. The maximum speed in 45° flight after a vertical start was 1500 meters per second (3,355.39 mph), or five times the speed of sound.

The German Army Ordnance Department commenced rocket development in 1932 in Kummersdorf under the direction of General (then Captain) Walter Dornberger and Dr. Wernher von Braun. This was the first time in history that an organization had been set up to develop, test and produce guided missiles intended for use against point targets.

Prior to 1936, Dr. von Braun and Gen. Dornberger launched two liquid fueled rockets called by the popular names "Max" and "Merits." With the results of these launchings they realized that a systematic study of drag, stability, control and aerodynamic heating of a supersonic body had to be initiated before long range rockets could be successfully launched.

Aerodynamic studies were first conducted at the Technische Hochschule at Aachen in a 10 x 10 cm. (4 x 4 inch) supersonic wind tunnel, and later at Peenemuende in a 40 x 40 cm. (16 x 16 inch) tunnel.

The first V-2 prototype was damaged when, during tanking of liquid oxygen, it slipped out of a friction controlled holding device on the static stand. The next three fell back to the ground far short of their expected range.

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Missile four, launched on October 3, 1942, marked the first highly successful flight, traveling a distance of 170 miles and reaching a height of 90,000 meters (55.9 miles), higher than any previous projectile had ever reached.

V-2 was the pioneer in the use of inertial guidance. It was guided into the desired ballistic trajectory by vanes in the rocket exhaust and on the fins. The eight vanes were controlled individually by the guidance and control of the missile to control movement in three directions: roll, pitch and yaw. The range of the missile was determined by burn out or cutoff of the engine at a certain velocity after it entered the ballistic path.

The V-2 power plant was the first successful large liquid rocket engine and was the most powerful of its time. It used liquid oxygen and 75 per cent alcohol. The addition of 25 percent water did not materially effect motor efficiency, but added greatly to alleviate the temperature problem. The V-2 used regenerative cooling, passing fuel through a jacket around the combustion chamber before allowing it to enter the chamber.

The present Redstone missile power plant is a direct outgrowth and very similar to the V-2.

The V-2 program was estimated to have cost two billion dollars, with individual cost of a V-2 estimated at \$50,000. About 4,300 V-2's were fired in all.

Military use of the V-2 commenced on September 8, 1944. The V-2 could be launched in any direction from a mobile platform and required only minor preparations at the firing site. It was supersonic and no detection devices or defenses were available.