

# What Is CNC Laser Cutting Machine

## Introduction to CNC Laser Cutting

### Definition

CNC laser cutting is a thermal processing technology that integrates optical, mechanical, electrical, and computer technologies for high-precision and high-efficiency cutting of metal and non-metal materials.

### Key Components

Laser source, CNC system, cutting head, optics system, workpiece holding system, exhaust system, cutting bed, and assist gas system.



Laser source



CNC system



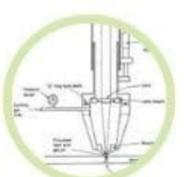
Cutting head



Workpiece holding system



Cutting bed



Optics system



Assist gas system

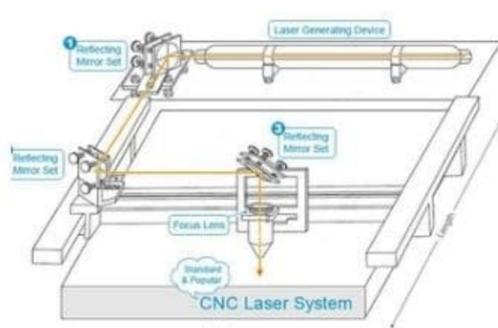


Exhaust system

## How It Works

### Process Overview

A high energy density laser beam is focused on the material, causing it to melt, vaporize, or undergo a chemical reaction. The CNC system controls the movement of the cutting head along predetermined paths to form intricate patterns.



## Types of CNC Laser Cutting Machines

### CO2 Laser Cutting Machine

Ideal for non-metal materials and some metal materials, with a large processing format.



### Fiber Laser Cutting Machine

Known for its high precision and suitability for cutting metal materials.



### Plane-Cutting and Pipe Cutting Machines

Known for its high precision and suitability for cutting metal materials.



## Advantages Over Traditional Methods

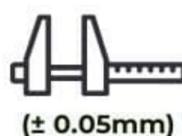
### Quality and Efficiency

Produces high-quality cuts with minimal heat affected zones and high processing speed.



### Precision and Flexibility

Achieves high positioning accuracy ( $\pm 0.05\text{mm}$ ) and can process complex patterns on a wide range of materials.



### Automation

CNC programming reduces manual intervention, enhancing production efficiency.



## Operating CNC Laser Cutting Machines

### Setup and Safety

Emphasizes the importance of material stability, correct parameter settings, and adherence to safety regulations.



## Key Advantages Highlighted

### Material Versatility

Cuts through a variety of materials including metals, plastics, and composites.



metals



plastics



composites

### Cost-Effectiveness

Despite high initial investment, long-term benefits include low operating costs and high efficiency.

## Limitations and Solutions

### Material Thickness and Compatibility

Challenges with cutting thick or highly reflective materials, mitigated by adjusting laser parameters or using specialized assisting gases.



### Maintenance Requirements

Regular maintenance and part replacement are necessary to ensure longevity and performance.



## Conclusion

CNC laser cutting machines are pivotal in advancing manufacturing efficiency, quality, and innovation.

