



Laser Cutter Safety Materials

The tables below provides a list of common materials, the laser generated air contaminants (LGACs) whether they are acceptable or not to cut or engrave in a laser cutter.

Never cut a material if unsure about its composition!

Always review the SDS of a new material

Discuss with your supervisor or contact OHSE (ohs@uvic.ca) about cutting/engraving new materials

Unacceptable Materials

Material	Notes
Polycarbonate	- High risk fire hazard
Ceramic Stone Porous material	- Steam explosions cause projectiles
Halogen containing materials - Neoprene - Polyvinyl Chloride (PVC) - Vinyl - Teflon	- Releases toxic and/or corrosive gas - If material contains chloride, LGAC produced is hydrogen chloride (HCl) gas – corrosive - If material contains fluoride, LGAC produces is hydrogen fluoride (HF) gas – toxic & corrosive
Styrenes - Polystyrene - Styrofoam - Thermoset polyester - Acrylonitrile butadiene styrene (ABS)	- Releases toxic LGAC benzene gas - High risk fire hazard
CN bond materials - Acrylonitrile butadiene styrene (ABS) - Nylon - Polyurethane - Some acrylics	- Releases toxic & corrosive hydrogen cyanide (HCN) gas
Fiberglass composites Carbon fiber composites	- Consists of fiberglass or carbon fiber embedded in thermoset polyester or epoxy - Release of toxic & corrosive gases of HCN and/or benzene gas





Acceptable Materials

Material	Notes
Cardboard Card Stock Paper	<ul style="list-style-type: none"> - Cuts well - LGACs: carbon dioxide (CO₂) and water vapor - Potential for fires
Cork	<ul style="list-style-type: none"> - Not very combustible - Does not emit significant amount of smoke - Low fire risk
Natural Wood	<ul style="list-style-type: none"> - Cuts & engraves well - Type of wood affects laser power and speed settings - Increase of resin content will increase risk of fire
Plywood Medium density fiberboard (MDF)	<ul style="list-style-type: none"> - Adhesives in material makes them more resistant to laser cutting/engraving - LGACs: formaldehyde gas
Natural fibers <ul style="list-style-type: none"> - Cloth - Leather 	<ul style="list-style-type: none"> - Non toxic LGAC gas - Natural leather: bad smelling (burning animal flesh) LGAC gas but non-toxic
Metals only with oxide or coating surface	<ul style="list-style-type: none"> - Cannot cut due to high reflectivity - Engraving (etching) only - Laser annealing possible: surface oxidation to change colour of the surface - Fiber lasers are commonly used for metal engraving - Best engraving results with metal materials that have an oxide or coating surface (ablates surface by laser to expose metal underneath)
Glass	<ul style="list-style-type: none"> - Only engraving (etching) - Laser engraving produces frosted look
Ceramics only coated with glazes or paint	<ul style="list-style-type: none"> - Laser engraving of coating glaze or paint to expose ceramic underneath - Ceramic material must be dry <ul style="list-style-type: none"> • Absorbed water can cause material to break and projectiles
Stone	<ul style="list-style-type: none"> - Engraves well - Stone material must be dry before engraving <ul style="list-style-type: none"> • Absorbed water can cause material to break and projectiles
Most Acrylics (PMMA) Polypropylene	<ul style="list-style-type: none"> - Cuts and engraves (frosted look) well - Fire hazard
Delrin® (polyoxymethylene)	<ul style="list-style-type: none"> - Cuts and engraves well - LGAC: formaldehyde gas
Natura rubber (elastomer)	<ul style="list-style-type: none"> - Cuts & engraves well - Significant amount of smoke produced
Silicone (elastomer)	<ul style="list-style-type: none"> - Cuts & engraves well - Significant amount of residue and dust produced

