



LMM 6000 is one of TherMark's general purpose laser marking products and is recommended for creating black marks on a variety of metals. LMM 6000 has been specially designed to dry in a hard coat which can be handled prior to laser marking without rubbing off. This allows parts coated with LMM 6000 to be stored, moved or stacked prior to laser marking. If you are interested specifically in marking stainless steel, you should choose LMM 6000, as it makes the darkest marks on this substrate. However, the process window for LMM 6000 is somewhat narrow, so if ease of use is a concern, LMM 14 may be a better option and its marks on stainless steel are not significantly different from LMM 6000.

LMM 6000 - BLACK



Recommended substrates:

LMM 6000 is a fairly flexible product which is recommended for many metals. The following list is made up of substrates on which LMM 6000 works well.

Stainless Steel
Stainless Steel - Bright Annealed
Galvanized Steel
Brass
Aluminium
Copper

Chrome Plating
Nickel Plating
Gold Plating
Silver Plating
Titanium
Pewter

This list is not exhaustive, however, so if your substrate does not appear on the list, this does not mean LMM 6000 will not mark it.

Lasers that work:

LMM 6000 works equally well with CO2 and solid state lasers.



Dilution:

LMM 6000 will need to be diluted differently depending on how you plan to apply it.

- ☀ **Air brush application:**
Ratio of 1:1 (1 part in volume of LMM 6000, 1 parts in volume of denatured alcohol (ethanol)) is recommended. Please refer to your air brush manual for information about material thickness for your model type.
- ☀ **Foam brush (hand) application:**
Ratio of 1:1 (1 part in volume of LMM 6000, 1 parts in volume of denatured alcohol) is recommended.

Application methods:

Please make sure that the surface to be marked is free and clear of oils, cleaning agent films, dust and lacquer coating.

- ☀ **Aerosol or air brush application:**
Shake the aerosol can thoroughly before use to achieve a homogenous suspension of marking material inside the can. When applying LMM 6000 from an aerosol can, the resulting coating of LMM 6000 should be approx. 25 µm thick. Spray uniformly at a ~30 cm distance from the surface and move the nozzle from one side to the other covering the whole substrate area. Start spraying away from the area to be marked and move towards the opposite side and past the target area. Over-spraying before and after the target area allows constant velocity of movement and will help provide an even coating on the substrate. Make sure the bare metal is not visible underneath. If necessary spray one or two more times. In general 1-2 strokes are enough to generate the desired coating.
- ☀ **Foam or camel hair brush (hand) application:**
When hand applying, the resulting coating of LMM 6000 should be approx. 25µm thick. Soak less max. 5 mm of the brush with LMM 6000. There is no need to soak more than that, otherwise the ink may splash and result in an uneven coat thickness. Apply with smooth, even strokes.

Note: Aerosol and air brush application are both preferred over foam / camel hair brush application. It can be challenging to achieve the smooth, even coating of laser marking material necessary for optimal marks when using a foam brush. We only recommend foam brush application if you are coating a small surface area.

Drying time & methods:

If left to air dry, LMM 6000 is normally fully dry within 3 to 5 minutes. If air drying takes too long, however, a hair drier or forced air heater may be used to speed up the process. LMM 6000 can be fully dried with an average household hair dryer in less than 15 sec. Do not enforce accelerated drying by too much heat, because this could cause tiny cracks in the dried coating visible later on the mark.



Product appearance:

LMM 6000 is yellowish/tan in colour and has the consistency of thick pancake batter. It should not separate upon standing, but it is still advisable to stir LMM 6000 prior to use. Once applied to the substrate and dry, LMM 6000 will be a yellowish/tan paint-like coating.

Product storage:

All LMM 6000 products should be stored between 5°C and 35°C in a dark, dry place. Avoid contact of liquid products with metals (don't decant in a metal bottle or use a metal cap). Aerosol cans should be stored on their side rather than their bottom, as the LMM 6000 material can settle and clump together inside the can. Side storage makes it easier to achieve even dispersion when the cans are shaken.

Additional information:

Refer to the Material Safety Data Sheet (MSDS) for further information about storage, shipping, safe handling and operation or disposal.



Laser Settings:

The following table details recommended laser settings on a range of common substrates. These settings are designed to help guide the user to the optimum parameters as quickly as possible. **Please note that there will be variations in substrate finish and between different brands of laser. It may still be necessary to perform further refinement of settings to achieve the desired mark.**

Power and speed are the two most important variables to control when using TherMark laser marking materials with any laser, but there are other relevant variables depending on which laser you are using, such as the focal length of the focusing lens, resolution (DPI), rep rate (PPI, Hz), or hatch spacing (for vectoring mode operation).

Please take an additional look at the general explanation sheet "Laser Adjustment". It explains how to find the range of process window for the laser parameter settings. For outdoor applications or if the marked parts are placed in aggressive mechanical or chemical environments we recommend to use a parameter setting for higher energy.

Suggested Laser Settings Used for CO ₂ X-Y Laser						CO ₂
Substrate Material	45W laser		30W laser		Lens (")	DPI / PPI
	Power (W)	Speed (mm/sec)	Power (W)	Speed (mm/sec)		
Stainless Steel	41	2500	30	1800	2	1000 / 1000
Stainless Steel - Bright Annealed	45	1800	30	1600	1.5	1000 / 1000
Galvanized Steel	45	1600	30	1200	1.5	1000 / 1000
Brass	45	500	30	400	1.5	1000 / 1000
Aluminium	45	700	30	500	1.5	1000 / 1000
Copper	45	400	30	80	1.5	1000 / 1000
Chrome Plating	30	500	30	500	2	1000 / 1000
Nickel Plating	45	700	30	500	1.5	1000 / 1000
Gold Plating	45	500	30	400	1.5	1000 / 1000
Silver Plating	45	200	30	100	1.5	1000 / 1000
Titanium	29	3200	29	3200	1.5	1000 / 1000
Pewter	41	1800	30	1300	2	1000 / 1000

Suggested Laser Settings Beam Steered ND:YAG or Fibre Laser (f=100 mm)				YAG
Material	Power (W)	Speed (mm/sec)	Hatch Spacing (μm)	Mode * Frequency / Continuous Wave
Stainless Steel	9	180	50	CW
Stainless Steel - Bright Annealed	9	180	50	CW
Galvanized Steel	9	200	50	CW
Brass	9	100	50	CW
Aluminium	10	100	50	CW
Chrome Plating	10	60	50	CW
Nickel Plating	10	250	50	CW
Gold Plating	10	150	50	CW
Silver Plating	10	30	50	CW
Titanium	7	300	50	CW
Pewter	10	300	50	CW

*** Your laser doesn't support CW Mode:**

Some lasers support QS-Mode only and are not able to operate in Continuous Wave Mode (CW). If your laser cannot be switched to CW mode or to frequency = 0 HZ then try following:

- Select highest possible frequency
 - Select pulse duration as long as possible
 - Start marking with several different speed and power laser settings
 - If marking is not successful shorten the focus distance for a few "mm".
 - Repeat marking tests with several different speed and power settings.
- Read the TherMark Laser Adjustment Help Manual for better understanding the test results.

Please note: this instruction switches the properties of your laser spot as similar as possible to a CW laser. In a final step it depends on many details and properties of your laser if those changes can make possible perfect marking results.