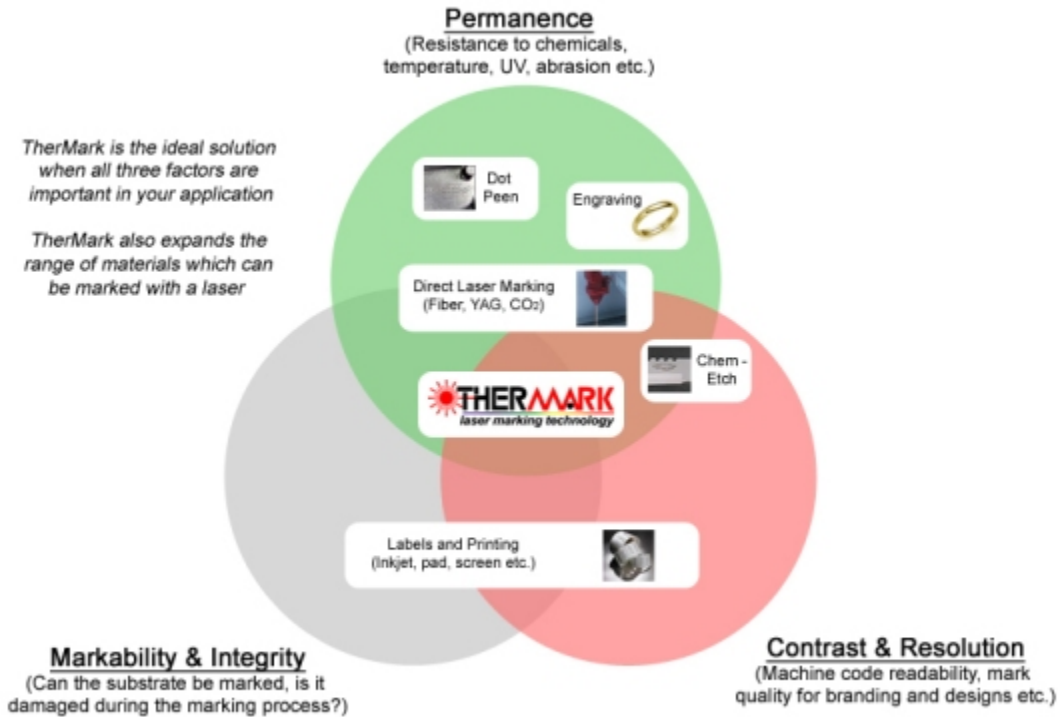


Value Proposition	Stamping / Engraving	Pad/Screen Printing	Dot Peen / Pin Stamping	Direct Laser marking	Engraving & Fill	Ink Jet Printing	Labels & Transfers	Chemical Etch	Laser Bonding
0=Low 9=High									
High Contrast	3	9	3	6	9	9	9	6	9
High Resolution	3	7	3	9	5	9	9	5	9
Permanence	9	5	9	8	7	3	2	8	9
Variable Data	0	0	9	9	2	9	9	2	9
Abrasion Resistance	9	3	9	5	7	2	2	6	9
Variety of Substrates	5	8	5	4	5	9	8	4	8
Chemical Resistance	9	3	9	6	4	3	2	7	9
Temperature resistance	9	3	9	6	4	3	2	7	9
Marking Speed	7	8	7	9	2	9	9	2	7
Available Colors	0	9	0	1	9	9	9	1	6
Equipment Cost	8	7	6	4	7	7	8	6	5
Overall Cost per Mark	7	5	7	7	2	9	8	7	5
Potential for Logo/Decoration	1	9	1	5	2	7	9	5	7
Overall Value "In-use"	70	76	77	79	65	88	86	66	101

TherMark vs. other Marking Solutions

There are many ways to mark today's variety of products such as labels, engraving and printing technologies. Each of these methods has advantages and disadvantages making them more or less appropriate for your application's unique requirements. We recommend evaluating your marking needs in at least three different dimensions: permanence, markability & substrate integrity, and contrast & resolution.

TherMark's patented laser bonding technology offers a unique solution at the convergence of these three dimensions: our laser marking materials can make permanent, high contrast, high resolution variable marks on difficult materials without damaging the substrate. If your application requires this combination of factors then TherMark will be your optimal solution.



TherMark vs. Stamping & Engraving

Stamping and engraving processes offer great permanence because they involve the physical engraving or indentation of the substrate. However, stamped and engraved marks lack contrast and resolution, leaving them difficult to view from a distance and making them inappropriate for bar codes or data matrices which need to be machine-read. Variable data such as serialization can be a challenge, as well. Stamping and engraving are also not appropriate for any sensitive application in which substrate damage is prohibited (common with medical devices, chrome plated bathroom fittings, cutlery, aerospace, automotive, etc).

TherMark laser bonded marks are an improvement over stamping and engraving in permanence, contrast/resolution, ease of creating variable data, and substrate protection.

TherMark vs. Pad/Screen Printing

Inexpensive and quick, pad and screen printing are both very common. Although many colors and substrates can be marked, both processes require a custom stencil that contains the image being marked making it impossible to run sequential data such as serial numbers. Additionally, pad and screen printed marks are not very permanent, often being susceptible to removal by solvents and abrasive cleaners.

TherMark laser bonded marks are an improvement over pad and screen printing in permanence and ease of creating variable data. If you already have a pad or screen printing process and wish to upgrade to TherMark marks you can simply substitute our formulas for pad and screen printing into your existing process and add a laser bonding step.

Dot Peen / Pin Stamping

The dot peening or pin stamping process offers a cost effective way of creating a permanent mark, even creating variable data such as 2D codes and serial numbers. The process however, lacks contrast and resolution and damages the substrate. These techniques are also ineffective on glass and ceramics.

TherMark laser bonded marks are an improvement over dot peen and pin stamping in contrast/resolution and substrate protection.

Direct Laser Marking

Direct laser marking is a common technique for marking metals and plastics, especially in industrial applications. It is fast, accurate and can facilitate variable data. The spot size of these lasers is quite small, allowing high resolution. However, direct marking has significant limitations on which metals can be marked: many raw metals, plated metals, and anodized aluminum are not appropriate. Additionally, direct marks on metal have poor viewing angles and only medium quality contrast, fade with extended UV exposure, and rely on carbon migration or annealing to create a mark. This alters the substrate, frequently creating corrosion sites that render direct marking inappropriate for sensitive applications. Finally, solid state lasers used in direct marking are substantially more expensive than lower cost CO₂ lasers.

TherMark laser bonded marks are an improvement over direct laser marks in permanence (no fading with UV exposure), contrast (improved human and machine readability), the number of metals appropriate for marking, and substrate protection. If you are already using direct laser marking and wish to upgrade to TherMark laser bonded marks, your existing laser will work; all you need to do is add the laser marking material. Otherwise, you can achieve all the benefits of TherMark laser bonded marks with a lower cost CO₂ laser rather than a more expensive direct marking laser.

Engrave and fill

Filling an engraved mark solves the problems of contrast associated with a normal engraved mark. On the downside, it is a lengthy process and the inks can still be removed using solvents and other cleaners.

TherMark laser bonded marks are an improvement over engrave and fill processes in permanence, speed, ease of creating variable data, and substrate protection.

Ink Jet Printing

Ink jet printing has many uses for serialization in high speed processes such as marking bottles and cans during production. The level of resolution and contrast achievable with ink jet printing is quite high and the ink does not normally affect the integrity of the substrate. The marks made will not be permanent, however, being easily destroyed using solvents. Ink jet marks are some of the least durable marks.

TherMark laser bonded marks are an improvement over ink jet marks in permanence.

Labels & Transfers

Labels have long been the staple method for identifying and serializing products. The labeling process is not truly a direct part marking solution and most labels are not viable in harsh environments where there is exposure to temperature changes, moisture or chemicals. The risk is that the label can be damage or removed, leaving no trace of the data. While some labels are designed to survive more extreme conditions, these labels tend to be rather expensive.

TherMark laser bonded marks are an improvement over labels in permanence and cost.

Chemical Etching

Chemical etching is used to mark glass and some metals. While offering a permanent solution, the marks lack contrast. It is also challenging to mark variable data and the chemicals used create environmental headaches for manufacturers.

TherMark laser bonded marks are an improvement over chemical etching in contrast/resolution, ease of creating variable data, substrate protection, speed, and environmental friendliness.

More comparisons

For a more detailed chart comparing TherMark laser marking materials vs. other marking technologies across thirteen specific dimensions, please [click here](#).