

# UID Generic Marking Guide (GenMark)

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# GenMark Usage

- First Determine Material Type Needed or Desired to be Used
- Review Table to Find the Known Reasonable Marking Methods for that Material Type
  - These Are the 80% Common Methods for That Material Type
- Next, Review Environmental Criteria Tables
  - Same 80% Common Approach Applies

# GenMark Usage (cont.)

- Consider Cost of Marking Process, When More Than One Option is Feasible
- Combination Data From the Tables is a Reasonable Approach to Feasible UID Marking Method(s) for the Part/Application
- For Detailed Qual Test Data Related to the Material Type & Environmental Criteria, Consult the JMQWG Matrix and Test Data Summary Sheets

# Material Type Table

Std Metallics (with primer)	Label, Direct Ink*, Direct Invasive**
Std Metallics (no primer)	Directive Invasive, Direct Ink w/clear coat
Exotic Metallics	Eng Analysis Req'd Case-by-Case
Composites	Label, Direct Ink (white) – Do Not Etch
Fiberglass	Label, Direct Ink – Do Not Etch
Plastics	Label, Direct Ink – Do Not Etch
Ceramics	Label, Direct Ink – Do Not Etch
Special Coatings	Eng Analysis Req'd Case-by-Case
Cloth	Cloth Stencil Label, Direct Ink
Rubber	Special Etch Only
Glass	Chem, Laser or Abrasive Etch
Leather	Direct Ink Jet or Stencil
Wood	Direct Ink, Label – Do Not Etch

\* Inks work best with clear overcoat, \*\*Direct Invasive = Dot Peen, Chem Etch, Laser Etch, etc. require surface prep after marking

# Environmental Criteria Table 1

Ambient Temp (70° F ± 20° F)	Label, Direct Ink, Direct Invasive
Moderate Temp (-20° to +160° F)	Label, Direct Ink, Direct Invasive
Extreme High Temp (> +160° F)	Direct Invasive Only (labels and inks may melt at extreme high temp)
Extreme Low Temp (< -20°F)	Direct Invasive, Direct Ink + clear coat
Extreme High & Low Temp (< -20°F thru > +160° F)	Direct Invasive Only

# Environmental Criteria Table 2

Extended Exposure to Sand, Dust, Salt Spray, Humidity, etc.	Direct Invasive Only (labels & inks not durable enough)
Exposure to Chemicals (fuel, oil, cleaners, hyd fluid, etc.)	Direct Invasive, Label or Ink must have clear coat for durability
Exposure to High Speed Air or Water	Direct Invasive Only (labels & inks not durable enough, labels possible FOD)
Exposure to Chem/Bio/Rad	Eng Analysis Req'd Case-by-Case
Extended Exposure to Sunlight	Direct Invasive Only (labels & inks tend to fade, lose readability)

# NASA Matrices

MATERIAL TO BE MARKED / MARKING PROCESS	METALLIC S								NON-METALLIC S								
	Aluminum	Anodized	Beryllium	Carbon Steel	Copper	Brass	Magnesium	Titanium	Ceramics	Glass	Cloth	Painted	Plastics	Rubber	Teflon	Wood	Others
Abrasive Blast	*	*		*	*	*	*	*	*		*	*		*		*	*
Adhesive Dispensing	*	*	*	*	*	*	*	*	*		1	*	*	*	*	*	*
Cast, Forge or Mold	*	*	*	*	*	*	*	*	*					*			
Dot Peen	*			1	*	1						1	*				
Electro-Chem Coloring	*	*	*	*	*	*	*	*	*								
Electro-Chem Etching	*	*	*	*	*	*	*	*	*								
Embroidery											*						
Engraving/Milling	*	*		*	*	*	*	*	*			1	*			*	*
Laser Bonding	*		*	*	*	*	*	*	*								
Laser - Short Wave Lengths	*	1	*	*	*	*	*	*	*			1	*	*	*	*	*
Laser - Visible Wave Lengths	1	1	*	1	*	*	*	*	*			1	*				*
Laser - Long Wave Lengths		1								*		1					*
Laser Shot Peening	*	1	2	2	*	2	2	*	*			1	*				
LENS	*	1	*	*	*	*	*	*	*								
LISI	*	2	*	*	*	*	2	2	*								
Ink Jet	*	*	*	*	*	*	*	*	*		1	*	*	*			*
Silk Screen	*	*	*	*	*	*	*	*	*			*	*	*		*	*
Stencil	*	*	*	*	*	*	*	*	*			*	*	*		*	*
Thin Film Deposition	*	*	*	*	*	*	*	*	*			*	*	*		*	*

- \* = Acceptable marking process for noted material
- 1 = Contact Engineering before proceeding
- 2 = Marking method still under development

Marking Process	Part Environments															
	Ground and Sub-Orbital Operations (DoD Supplied)										Low Earth Orbit Operations (NASA Supplied - MISSE)					
	Abrasion	Chemicals - Deter	Chemicals - Fuels	Chemicals - Grease	Chemicals - Hydraulic Fluid	Chemicals - Lubricating Oil	Foreign Object Damage (FOD)	High Heat (Engines) +2000° F	Temperature: -30° F to 140° F	Ultra-Violet	Salt Spray	Atomic oxygen	High Energy Particles	Ultra-Violet (UV)	Debris & Meteoroid Impact	Temperature Extremes
Laser-Etch (Direct)	X	X	X	X	X	X	X	X	X	X						
Laser-Etch (Gas Assisted)				X												
Laser-Induced Surface Improvement		X	X	X	X	X	X	X	X	X						
Laser-Induced Vapor Deposition																
Laser-Shot Peen		X	X	X	X	X		X	X	X						
Mechanical Engraving	X	X	X	X	X	X	X	X	X	X	X			X		X
Silk Screen*								U								
Stencil-Chemical Coating								U								
Stencil-Ink*								U								
Stencil-Thermal Spray		X	X	X	X	X		X								
Paper Labels	U	U	U	U	U	U		U	X							U
Polymeric Labels				X	X	X		U	X	X	X					U
Metallic Tags, Bands and Remaplets								U	X	X	X					

Legend: X = Marking remains readable, R = Marking can be restored to readable status, U = Marking rendered unusable, Blank = Testing Not Completed  
 \*Clear coat required, \*\* Incorporated for comparison purposes

# Test Data Summary Sheet

**EXAMPLE ONLY**

## Example Test Data Summary Sheet

Material Type:

Material Strength or Hardness:

Coatings/Finishes:

Material Substrate:

Thickness:

Surface Roughness:

Surface Color:

Environmental Criteria & Test Points:

UID Mark Verifier Reading, Before & After:

Pedigree of Equipment Used to Mark & Verify:

ID Specs Used:

Special Processes Used:

Metallurgical or Material Effects (if any):

Add'l Info, Restrictions/Limitations & Notes:

Org/Company Report Number:

Recommended: Yes or No

Point of Contact (Tester):

Phone Number:

E-Mail:

**EXAMPLE ONLY**

# Summary

- The UID GenMark Will Get Designers Pointed to a UID Marking Solution Set that Should be Appropriate 80% of the Time
- Special Materials and/or Environments, Will Require an Engineering Analysis for Each Case
- Consult the JMQWG Matrix and Test Data Summary Sheets for Details