

LASER MARKING DATA SHEET

Job No.: 05- 001

Engineer: A. Thomas

Report No.: SRC- L- 329A

Date: February 3, 2005

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Part 1. PART DESCRIPTION			
Manufacturer:	XXXXX	Part Type:	XXXXXXXX
Model Number:	N/A	Part Number(s):	
Basic Shape:	Ring (circular)	Overall Dimensions (mm):	32.40 dia X 17.50 wide X 2 Thick
Surface Coatings/Texture: Anodized milled steel			
Part 2. MATERIAL DESCRIPTION			
Material Family:	Steel	Lot:	Not specified
Material Type:	4140 Steel	Hardness:	Not specified
UNS Number:	Not Specified	Machinability:	Not specified
Cross Reference Specification: Not specified			
Mill:	Not specified		
Part 3. LASER DESCRIPTION			
Manufacturer:	Rofin-Sinar	Laser Type:	Powerline
Model Number:	RSY 90Q	Serial Number:	970306
Software Revision:	Version 3.9	Lamp Hours:	139.96
Part 4. SURFACE PREPARATION			
Surface Preparation:	None		
Other:			
Image File Name:	N/A	Marking Time (Seconds):	N/A
Aperture (mm):	N/A	Lens Size (mm):	N/A
Current (amps):	N/A	Power (watts):	N/A
Frequency:	N/A	Beam Width (mm):	N/A
Speed (mm/s):	N/A	Beam Expansion:	5X
Height:	N/A	Width:	N/A
Scale:	Line Orientation:	Overlap:	N/A
First Pulse Suppression:	N/A		
Frequency Limit:	Step:		
Backfill Material:	N/A		
Coloring Agent:	N/A		
Coating Material:	N/A		
Part 5. MARKING PARAMETERS			
Image File Name:	STE5001	Marking Time (Seconds):	≈ 3.0sec
Aperture (mm):	2.4	Lens Size (mm):	160
Speed (mm/s):	250	Power (watts):	20
Current (amps):	20	Beam Width (mm):	0.1
Frequency (QS):	10000	Beam Expansion:	5X
Line Orientation:	Horizontal	First Pulse Suppression:	Default
Scale:	0.7	Frequency:	5,000 Limit: 130 Step: 5
Backfill Material:	N/A		
Coloring Agent:	N/A		
Coating Material:	N/A		
Additives:	None		

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Part 6. SYMBOL PARAMETERS			
Parameter File:	N/A	No. of Characters Encoded:	35
Symbol Type:	Data Matrix	Data Encoded:	12345678904321_987654321_1A2B3C4D5E
Symbol Size (mm):	14.5 x4.833		
Rows x Columns:	12 x 36	Laser Width (mm):	0.130
Cell Size (mm):	0.403	Beam Overlap (%):	
ECC Level:	200	Lines per Cell:	
Color of Mark:	on Reflective	Depth of Mark (mm):	-----
Part 7. READER PARAMETERS			
Processor:	AutoID+	Camera:	RVSI CM4000
Camera Gain:	unknown	Gamma:	1.0, MGC, FLD
Lens Type:	Tamron 25mm	Lens Size:	1:1.8
Aperture Setting:	12	Focus Setting:	infinity
Extension Tube:	5mm	Camera to Target Distance (mm):	190
Software Version no.:	1.5.0.20	Trigger Method:	Manual
Field Mode (Low Density):	NO	Frame Mode (High Density):	YES
Symbol Size (mm):	105 x 107	Average Element Size:	5
Part 8. LIGHTING PARAMETERS			
Light manufacturer:	Nerlite	Light type:	Dark Field Illuminator
Light P/N:	Df-150-3	Light Color:	Red LED
Lighting Angle:	Parallel	Lighting Distance (mm):	20
Filter Type:	N/A	Contrast:	86%
Part 9. DECODING RESULTS			
Decoding 10 of 10:		Multiple Attempts:	No
Unused Error Correction:	0.89	Average Read (msec):	
Misread:	None	No Read:	None.

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Part 10. COMMENTS

The customer requested a laser-etched Data Matrix symbol to be placed on the machined surface of an automotive part. The image below captured by the DMx Auto ID camera system depicts that the Data Matrix symbol was successfully applied with the 90W Rofin-Sinar ND:YAG laser.

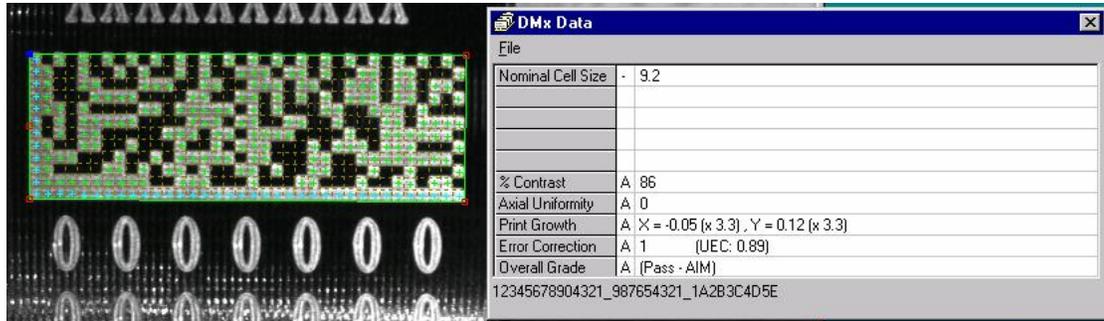


Figure 1. Data Matrix Symbol on Black Anodized XXXXXX.

The above image is a screen shot of the RVSI Data Matrix Verifier using the AIM verification standard developed for printed labels.

Due to the curved surface light reflects into the camera at odd angles. However, if illuminated correctly, fixed station readers have little difficulty reading this data matrix symbol. MXi handheld readers have only a minimal difficulty reading these marks.