



MILITEX COATINGS INC.

Qualification Test for

**Nano-Clear SuperCARC applied over
Military Vehicle painted surfaces to mitigate the
effect of chemical contamination, environmental
exposure including oxidation, weather damage,
corrosion and mechanical damages such as
scratches, chipping and marring.**

GENERAL DYNAMICS
Land Systems

Summary of Testing

Testing conducted by the Q.A. department of Militex Coatings Inc.

Procedure:

- Each variable under test will have 1 panel as control sample- A control sample being the CARC painted surface without the Nano-Clear
- Product will be applied to a minimum mil thickness of 2.0 mils and at 27%

Test Plan - Application of Nano-Clear Coating SuperCARC onto Paint (Black).
Nine panels as control panels and 23 panels with Nano-Clear for the various testing.

Test	No. of panels/ samples	Method	Comments
General appearance	All	Visual	Pass
Dry Film Thickness	All	ASTM B499	Good > 2mils
Gloss	All	ASTM D523	Few above maximum allowed 6
Adhesion	All	ASTM D3359	Pass
Solvent Wipes (MEK)	4	ASTM D4752	Better than CARC
Impact Resistance	4	TBD(ASTM D2794)	Pass
Chip Resistance	4*	ASTM D3170)	N/A
3.5% Salt Water soak	4	TBD (Soak for 24hrs on dry panels)	Pass
Mar Resistance	4*	ASTM D5178	Better than CARC
Pencil Hardness	4*	ASTM D3363	Better than CARC
Self-cleaning Properties	4	TBD	
De-Icing Properties	4	TBD	
Touchup/Repair Properties	4*	Visual	
Recoatibility Properties	3	Visual	
Flexibility	3	ASTM D4145	Pass
Force Drying	4	Visual	Pass
Abrasion test(Sand Blasting)	3	TBD	Pass
Coverage	4	Visual	

Note * means panel test will be done using an existing sample

Results table1:

Panel #	General appearance	Dry film thickness	Gloss Reading	Adhesion Test
1	Pass	2.3	1.5	Pass
2	Pass	2.2	1.4	Pass
3	Pass	2.4	1.9	Pass
4	Pass	2.6	2	Pass
5	Pass	2.1	1.8	Pass
6-Control	Pass	6.7	0.3	Pass
7-Control	Pass	6.3	.3	Pass
8-Control	Pass	5.5	.3	Pass
9-Control	Pass	5.3	.3	Pass
10-Control	Pass	6.0	.3	Pass
11	Pass	3.0	5.4	
12	Pass	3.0	5.8	
13	Pass	3.8	5.6	
14	Pass	3.0	6.0	
15	Pass	3.2	5.1	
17	Pass	3.0	6.2	
18	Pass	3.5	5.6	
19	Pass	2.8	7.7	
20	Pass	2.9	7.6	
21	Pass	3.3	4.9	
22	Pass	3.1	5.5	
23	Pass	3.1	4.6	
24	Pass	2.6	5.1	
25	Pass	2.2	4.4	
26	Pass	3.0	6.2	
27	Pass	2.6	6.7	
28	Pass	3.0	6.2	
29	Pass	2.8	6.3	
30	Pass	2.9	7.9	

Results table 2:

Panel #	Solvent Wipe	3.5% Salt water soak
1	Pass	
6-Control	Pass	
11	Pass	
16	Pass	
10-Control		Salt stained
28		Salt deposit wipes off easily
29		Salt deposit wipes off easily
30		Salt deposit wipes off easily

Results table 3:

Panel #	Mar Resistance	Impact test/Drop
6-Control	Easily mars, white chalk marks residue	
23	Does not easily mar, faint visual black lines	
24	Does not easily mar, faint visual black lines	
25	Does not easily mar, faint visual black lines	
7-Control		Paint chipped >5mm
21		Less paint chip <3mm
22		Less paint chip <1mm

Results table 4:

Panel #	Touchup, repair properties	Flexibility	Force drying
10-Control		Pass (90° bend)	Pass-1.5hour
14		Pass (90° bend)	Pass-1.5hour
16	Paint does not adhere well		
17	Paint does not adhere well		
8-Control	Easy to touch up		

Results table 5:

Panel #	Abrasion Test (blast to remove paint)	Abrasive Test- 10sec sand grit 320 paper
9-Control	48 sec blast	
26	52 sec blast	
27	55 sec blast	
4		Coating intact
5		Coating intact
6-Control		Topcoat taken off, primer exposed

Observations: Overall have had good results with the NANO testing done so far.

- The mixing ratio of 27% of NCIM Matting Additive may have to be changed to 28% to ensure that all gloss readings are within the gloss specification of maximum 6 for the CARC flat gloss.
- The two trained Militex painters now have a good knowledge on mixing and application of the Nano-Clear NCI/NCIM to achieve required coverage.
- The plan now is to ensure we have product in to paint the add on units when they come in as scheduled in May.







