



TECHNICAL REPORT

NUMBER

625-82

TITLE

ADHESION AND DIRECT IMPACT OF THE NUTEC 11S/1201 SYSTEM ON
STEEL SUBSTRATES
FOR
GENERAL USE
CUSTOMER

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SCOPE:

The objective of this test is to evaluate the adhesive properties and the impact resistance of the NUTEC 11S/1201 system on steel substrates. Various methods of surface preparation will be used: hand tool cleaning, power tool cleaning, and abrasive blasting.

SUMMARY:

The NUTEC 11S/1201 system shows excellent adhesion and impact resistance when applied to steel substrates regardless of surface preparation.

PROCEDURE:

One 12 x 12 x $\frac{1}{4}$ " steel plate covered with milscale and slight signs of rusting was prepared in the following manner. One-third of the panel was blasted to SSPC-SP-10 using G-40 steel grit with a resulting surface profile of $1\frac{1}{4}$ -2 mils, one-third of the panel was power tool cleaned using a drill powered wire brush and the remaining third was wire brushed by hand. The entire panel was then solvent wiped to remove any loose rust or surface contamination. The panel was coated with the NUTEC 11S/1201 system as per the attached panel preparation sheet and allowed to cure a minimum of seven days at ambient conditions. On June 15, 1982, five Elcometer adhesion dollies were attached to each section using NUTEC 8 as an adhesive. The dollies were pulled and impact testing was performed on June 18, 1982, to complete the testing.

RESULTS:Adhesion

Hand tool cleaned

Dolly #	PSI to Remove	Mode of Failure
1	1100	20% 11S Cohesion Failure 80% 1201 Cohesion Failure
2	1000	30% 11S Cohesion Failure 30% 11S Adhesion Failure 40% 1201 Cohesion Failure
3	700	100% 11S Cohesion Failure
4	700	100% 11S Cohesion Failure
5	600	100% 11S Cohesion Failure
Average	820	70% 11S Cohesion Failure 24% 1201 Cohesion Failure 6% 11S Adhesion

RESULTS (Con't)Power tool cleaned

Dolly #	PSI to Remove	Mode of Failure
1	1100	80% 1201 Cohesion Failure 20% 11S Adhesion Failure
2	1000	80% 1201 Cohesion Failure 20% 11S Adhesion Failure
3	1300	100% 1201 Cohesion Failure
4	900	90% 1201 Cohesion Failure 10% 11S Adhesion Failure
5	800	100% 1201 Cohesion Failure
Average	1020	90% 1201 Cohesion Failure 10% 11S Adhesion Failure

Blasted

Dolly #	PSI to Remove	Mode of Failure
1	1200	100% 1201 Cohesion Failure
2	1200	10% 1201 Cohesion Failure 90% 11S Cohesion Failure
3	800	50% 1201 Cohesion Failure 50% 11S Cohesion Failure
4	700	80% 1201 Cohesion 20% 11S Cohesion
Average	920	58% 1201 Cohesion Failure 42% 11S Cohesion Failure

Impact resistance:

Blasted 3/16-5/16" delamination

Hand Tooled 5/16-3/8" delamination

Power Tooled 5/16-3/8" delamination

CONCLUSION:

The NUTEC 11S/1201 system shows excellent adhesion and impact resistance when applied to steel substrates.

All areas met the 200 PSI criteria of ANSI N5.12 Section 6.4 and far exceeded that figure. The manner of preparation was of little significance in determining the most beneficial method.

CONCLUSIONS (Con't)

The impact resistance of all areas met the 3/4" maximum established in ANSI N5.12 Section 6.5. The only defects observed was slight delamination at the point of impact; no delamination, cracking or other detrimental effects radiated from this point.

REFERENCE:

Action Request 1463.

PHYSICAL PROPERTIES

A.N.S.I. N-5.12

Test No: 1463

1. PRODUCT TESTED: NUTEC 11S/1201
2. TYPE OF SUBSTRATE: Steel with milscale SIZE: 12 x 12 x 1/4"
3. SURFACE PREPARATION: 1/3 blasted to SP-10, 1/3 hand tooled to SP-2, 1/3 power tooled to SP-3.
Entire panel solvent wiped to remove surface contamination.
4. PRODUCT DATA: N/A SAMPLE #'s: A788

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) %R.H.	THICKNESS (inches)	DATE APPLIED
1	NUTEC	11S	3396/3363/3411	Squeegee	84/87	.015-.025	5/26/82
2	NUTEC	1201	3301/2968	Spray	82/74	.005-.006	5/27/82

SP-3	SP-2	SP-10
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Total .020-.031
coated on front side only

5. CURING DATA: N/A
AMBIENT TEMP. 65-95 °F REL. HUMIDITY: 60-100 % MIN. CURE TIME: 7 DAYS
6. TEST PROCEDURE: A.N.S.I. N-5.12
7. TEST RESULTS:

7.1 ABRASION: Federal Test Method Standard 141 Test Method 6192, 1000 cycles with a CS-17 wheel and a 1000 gram

LOW N/A HIGH N/A AVERAGE N/A

7.2 ADHESION: Determined by use of the Elcometer Adhesion Tester SEE TECHNICAL REPORT #625-82 RESULTS

AVERAGE OF TESTS PSI

7.3 DIRECT IMPACT RESISTANCE:

TEST REPORT # 625-82 SUBMITTED BY Tom Kessel DATE SUBMITTED 6/23/82 APPROVED BY *David E. Arnold*