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Evaluating BRANOrst Superchips

Background: Gerhard Stottmeister/Corpac GmbH, submitted a cardboard like material referred to as Superchips to Cortec Corporation. One Superchip will protect 25 liters of volume.

Purpose: Evaluate the corrosion inhibition performance of submitted corrosion inhibiting product.

Method: ASTM D 1748-83
 GC Mass Spectrometry

Materials: Cortec Corporation Environmental chamber
 Hewlett Packard 5890A Gas Chromatograph
 Carbon steel panels (Q-Panel SAE 1010 Carbon Steel, ground both sides)
 BRANOrst Superchips (25 liters of protection/chip)
 Cortec VpCI-131 foam emitter (up to 42 liters of protection/emitter)

Procedure: (1) A carbon steel panel was inserted into a one gallon jar, along with Cortec VpCI-131 emitter and 30 ml of an aqueous solution, containing 1% Sodium sulfate/1% Ammonium Chloride.
 (2) A carbon steel panel was inserted into a one gallon jar, along with Two BRANOrst Superchips, and 30 ml of an aqueous solution containing 1% Sodium sulfate/1% Ammonium Chloride.

Results:

ASTM D 1748-83 (150 deg F, ~ 100% R.H.)

Material	Amount of corrosion after 7 days
Two BRANOrst-Superchips, one carbon steel panel and aqueous sodium sulfate/Ammonium chloride solution within a one gallon jar	Five 1-3 mm diameter areas of rust observed
Cortec VpCI-131 foam emitter, one carbon steel panel and aqueous sodium sulfate/Ammonium chloride solution within a one gallon jar	No corrosion observed

Photos attached

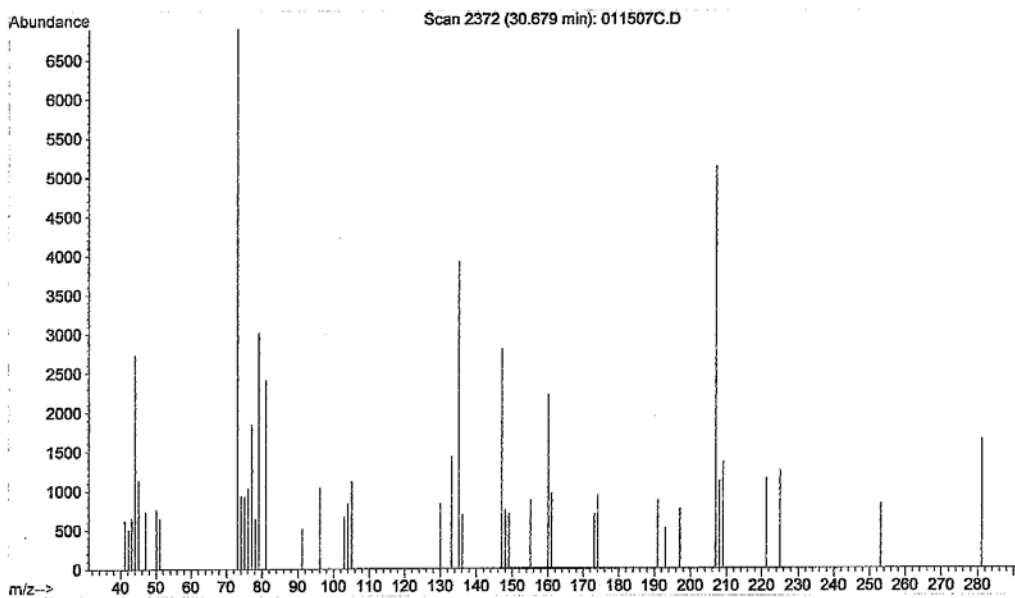
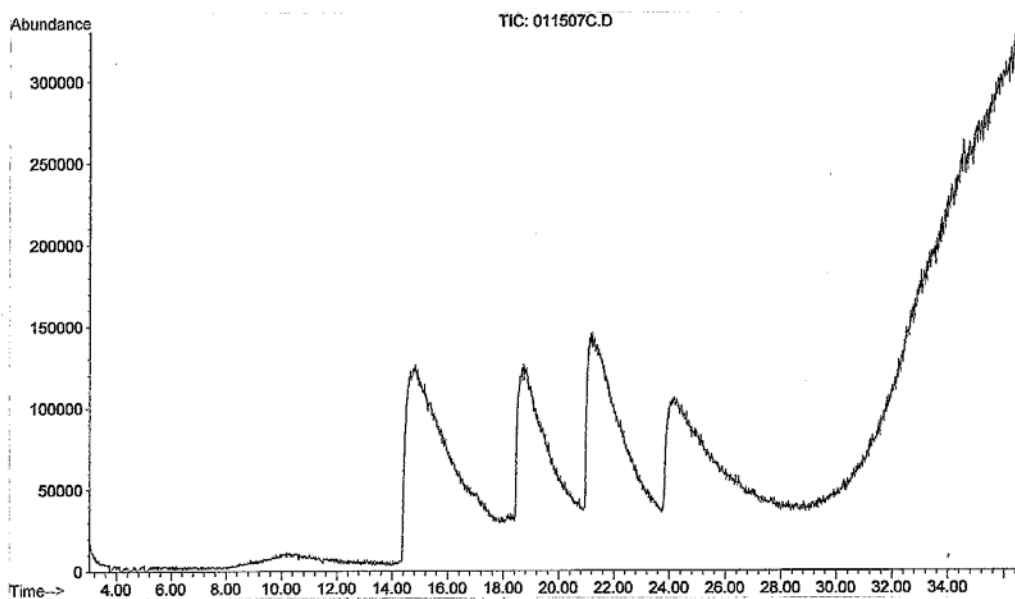
GC/Mass Spectrometry: See attached



Conclusion:

- (1) Cortec VpCI-131 foam emitter protected panel showed no corrosion, whereas, corrosion was observed on the carbon steel panel protected by two BRANOrst Superchips.
- (2) From GC/Mass Spec, BRANOrst Superchips are composed of paper fibers, benzotriazole and derivatives of benzoic acid (benzoates). See attached.

File : C:\HPCHEM\1\DATA\011507C.D
Operator :
Acquired : 15 Jan 2007 15:34 using AcqMethod AMINE
Instrument : GC/MS Ins
Sample Name: SuperChips
Misc Info :
Vial Number: 2



Scan 964 (14.804 min): 011507C.D
SuperChips

PBM Search of library C:\DATABASE\NBS75K.L

Name	MolWt	Formula	Qual
1. Benzoic Acid	122	C7H6O2	96
2. Benzoic Acid	122	C7H6O2	96
3. Benzoic Acid	122	C7H6O2	96
4. Benzoic Acid	122	C7H6O2	94
5. Benzoic Acid	122	C7H6O2	91
6. Benzoic acid, silver(1+) salt	229	C7H6AgO2	90
7. Pyrido[1,2-a]azepine-6,7,8,9-tetracarbox	497	C25H23NO10	90
8. Benzoic acid, anhydride	226	C14H10O3	90
9. Benzoic Acid	122	C7H6O2	87
10. Benzoic acid, ammonium salt	139	C7H9NO2	83
11. [1,1'-Biphenyl]-3,4-diol, 4'-chloro-	220	C12H9ClO2	78
12. Histamine, N-benzoyl-2-cyano-	240	C13H12N4O	64
13. Butanedioic acid, (phenylmethylene)-	206	C11H10O4	52
14. Benzenecarbothioic acid	138	C7H6OS	52
15. Benzoyl isothiocyanate	163	C8H5NOS	50
16. Benzeneacetic acid, .alpha.-oxo-, methyl	164	C9H8O3	50
17. Ethanone, 2-bromo-1-phenyl-	198	C8H7BrO	50
18. 1,2-Propanedione, 1-phenyl-	148	C9H8O2	47
19. Benzoylformic acid	150	C8H6O3	47
20. Benzoyl chloride	140	C7H5ClO	47

Prob	CAS#	Ref#	K	dK	Flag	%	Con	C_1	Tilt	R_IV	XCORR
1.*96	000065-85-0	64651	100	0	0	72	1	76	0	96	9959
2.*96	000065-85-0	64647	95	0	0	99	0	76	0	96	9991
3.*96	000065-85-0	3903	94	5	0	85	0	76	0	96	9969
4.*94	000065-85-0	64650	78	17	0	99	3	70	0	93	9961
5.*91	000065-85-0	64649	71	28	1	89	5	60	13	52	9951
6. 90	000532-31-0	29712	83	31	0	99	0	57	0	47	9964
7. 90	071127-22-5	58859	81	0	0	69	1	57	0	47	9984
8. 90	000093-97-0	70764	103	13	0	99	0	57	6	45	9729
9.*87	000065-85-0	64648	87	16	0	71	15	54	42	80	9982
10. 83	001863-63-4	7152	91	5	0	82	0	50	3	38	9867
11. 78	055097-84-2	27546	64	64	1	73	9	46	2	40	9931
12. 64	000000-00-0	31918	45	83	2	98	16	37	16	41	9748
13. 52	005653-88-3	24275	76	34	1	77	31	27	0	45	8649
14. 52	000098-91-9	6861	67	26	0	85	35	27	0	43	8281
15. 50	000532-55-8	13116	68	16	0	92	35	25	16	41	8363
16. 50	015206-55-0	67796	57	30	0	93	35	25	1	40	8443
17. 50	000070-11-1	22211	54	49	0	86	35	25	6	43	8321
18. 47	000579-07-7	9265	45	40	1	99	39	20	0	39	8452
19. 47	000611-73-4	9649	47	41	1	92	38	20	6	41	8518
20. 47	000098-88-4	65992	71	22	0	71	39	20	17	39	8446

Scan 1540 (21.298 min): 011507C.D
SuperChips

PBM Search of library C:\DATABASE\NBS75K.L

Name	MolWt	Formula	Qual
1. 1H-Isoindole-1,3(2H)-dione, 2-(2-hydroxy	191	C10H9NO3	91
2. 1H-Isoindole-1,3(2H)-dione, 2-(oxiranylm	203	C11H9NO3	45
3. 1H-Isoindole-1,3(2H)-dione, 2-(4-bromobu	281	C12H12BrNO2	38
4. N-Phenylpiperidine	161	C11H15N	38
5. Phosmet	317	C11H12NO4PS2	38
6. 1,2-Benzenedicarbonitrile, 3,6-dihydroxy	160	C8H4N2O2	37
7. N-(Bromomethyl)phthalimide	239	C9H6BrNO2	32
8. 4(1H)-Quinazolinone, 1-methyl-	160	C9H8N2O	25
9. 1H-Isoindole-1,3(2H)-dione, 2-(4-hydroxy	219	C12H13NO3	25
10. Phosmet	317	C11H12NO4PS2	25
11. 5-Methoxytryptamine	190	C11H14N2O	17
12. Thiophene, 2-phenyl-	160	C10H8S	14
13. 3,4-Methylenedioxyphenylacetonitrile	161	C9H7NO2	12
14. 4(3H)-Quinazolinone, 3-methyl-	160	C9H8N2O	12
15. 2,7-Naphthalenediol	160	C10H8O2	10
16. Thiophene, 3-phenyl-	160	C10H8S	9
17. Benzene, 1,2,4-trimethyl-5-(1-methylethe	160	C12H16	9
18. Benzene, 1,4-diisocyanato-	160	C8H4N2O2	9
19. Benzonitrile, 4-isothiocyanto-	160	C8H4N2S	9
20. 1(2H)-Phthalazinone, hydrazone	160	C8H8N4	9

Prob	CAS#	Ref#	K	dK	Flag	%	Con	C_1	Tilt	R_IV	XCORR
1.	91 003891-07-4	20455	115	8	0	86	3	60	0	56	9862
2.	45 005455-98-1	23539	64	66	1	82	21	19	5	37	9351
3.	38 005394-18-3	72267	65	58	1	70	40	14	16	37	8698
4.*	38 004096-20-2	12729	47	50	1	72	38	14	1	36	8884
5.	38 000732-11-6	45198	50	88	1	76	38	14	5	33	8792
6.*	37 004733-50-0	12332	34	83	3	82	42	13	0	30	8789
7.	32 005332-26-3	31691	55	69	2	99	50	9	6	37	8684
8.*	25 003476-68-4	12428	40	63	2	89	51	7	1	30	8458
9.	25 024697-70-9	27362	37	101	2	99	42	7	3	23	9155
10.	25 000732-11-6	73191	35	108	1	99	44	7	0	22	8860
11.	17 000608-07-1	20297	35	92	1	67	55	3	0	22	8195
12.*	14 000825-55-8	67561	36	58	0	84	66	2	0	41	7793
13.*	12 004439-02-5	12671	31	73	1	52	64	2	0	33	8781
14.*	12 002436-66-0	12413	30	96	3	77	57	2	0	29	8396
15.*	10 000582-17-2	67554	29	58	1	99	63	1	0	29	7989
16.*	9 002404-87-7	67558	27	79	2	94	67	1	0	9	7722
17.*	9 054340-84-0	12576	24	87	2	84	58	1	0	9	7926
18.*	9 000104-49-4	12331	25	92	2	72	55	1	0	9	8339
19.*	9 002719-32-6	12333	26	68	1	67	66	1	0	9	7959
20.*	9 000086-54-4	12339	25	102	3	97	60	1	0	9	7975

Scan 1315 (18.761 min): 011507C.D
 SuperChips

PBM Search of library C:\DATABASE\NBS75K.L

Name	MolWt	Formula	Qual
1. 1H-Benzotriazole	119	C6H5N3	98
2. 1H-Benzotriazole	119	C6H5N3	93
3. 1H-Benzotriazole	119	C6H5N3	91
4. 1H-Benzotriazole	119	C6H5N3	91
5. Benzoxazole	119	C7H5NO	91
6. Benzene, isocyanato-	119	C7H5NO	86
7. 2,1-Benzisoxazole	119	C7H5NO	81
8. 2,1-Benzisoxazole	119	C7H5NO	81
9. Benzenediazonium, 4-hydroxy-, hydroxide,	120	C6H4N2O	68
10. Benzene, isocyanato-	119	C7H5NO	64
11. Benzoxazole	119	C7H5NO	64
12. Benzene, isocyanato-	119	C7H5NO	64
13. Benzoxazole	119	C7H5NO	64
14. Benzotrile, 3-hydroxy-	119	C7H5NO	62
15. 1,2-Benzisoxazole	119	C7H5NO	58
16. Benzotrile, 2-hydroxy-	119	C7H5NO	50
17. Benzene, azido-	119	C6H5N3	47
18. Propanoic acid, 2-chloro-	108	C3H5ClO2	38
19. Benzoxazole	119	C7H5NO	37
20. Benzotrile, 4-hydroxy-	119	C7H5NO	30

Prob	CAS#	Ref#	K	dK	Flag	%	Con	C_1	Tilt	R_IV	XCORR
1.*98	000095-14-7	3639	112	12	0	94	3	79	0	98	9870
2.*93	000095-14-7	64496	95	27	0	74	20	68	61	93	9274
3.*91	000095-14-7	64498	70	17	0	98	4	62	0	76	9671
4.*91	000095-14-7	64497	85	42	0	77	3	62	41	80	9685
5.*91	000273-53-0	64503	63	24	1	84	4	60	17	56	9246
6.*86	000103-71-9	64501	83	38	2	84	28	53	27	83	9527
7.*81	000271-58-9	3649	78	51	3	99	18	49	53	80	9003
8.*81	000271-58-9	64507	71	56	3	99	18	49	33	66	9022
9.*68	006925-01-5	3724	64	54	1	58	24	40	17	53	6184
10.*64	000103-71-9	64502	80	32	0	81	32	37	35	74	8383
11.*64	000273-53-0	64504	66	43	1	85	24	37	13	47	8946
12.*64	000103-71-9	3642	68	50	0	71	32	37	33	70	8759
13.*64	000273-53-0	3645	77	42	1	70	31	37	27	76	9467
14.*62	000873-62-1	3647	59	62	2	99	29	36	0	51	9498
15.*58	000271-95-4	3644	61	48	1	84	35	32	0	56	9509
16.*50	000611-20-1	64506	70	55	1	81	47	25	0	76	9601
17. 47	000622-37-7	64495	70	43	0	78	39	20	0	42	8994
18. 38	000598-78-7	63744	44	63	2	81	38	14	0	37	5941
19.*37	000273-53-0	64505	35	82	3	99	45	13	8	37	9077
20.*30	000767-00-0	64499	66	56	2	96	57	9	12	45	8535



BRANOrst protected panel, #1



BRANOrst protected panel, #2



BRANOrost protected panel, #3



Cortec VpCI-131 protected panel, #1



Cortec VpCI-131 protected panel, #2