Experiments on Corrosion Intercept CD Inserts
1998-2002

Jonathan S Farley MA ACR MIPC

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Mr P Treves
Omega Intercept
4 Farm View Drive
Basingstoke
Hampshire
RG24 8EX

6th November 2002

Dear Mr Treves,

Please find enclosed a copy of my report based on some of the tests I have performed on the Jewel Case Inserts produced by you. This report does not include all of the tests I have performed on Corrosion Intercept, merely the ones which are most relevant to the Jewel Case Inserts. When I have completed writing up the other experiments, I will forward them to you as well.

The internal atmosphere pH tests were performed the only way I was able with the resources I had to hand since I have financed all these tests personally, and using my own equipment. The actual readings may be questionable, but I believe give a good indication of the levels of acidity present. Also, the methodology of accelerated ageing is also questioned. It is however, the only test mechanism we have to date, and until a better methodology is produced, we have to rely on its findings. The oven I used was a humidity regulated oven, which is regarded as being marginally more accurate to reality than a non-humidity controlled model.

Yours sincerely

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Items

1) CD Jewel Case type 1 (control); commercial replacement CD case (PC Line[1]), unplasticised Polystyrene (transparent) outer shell and ABS (Adenosine Butadyl Styrene mix) insert.
Acronym in test; ***C[x]***

2) CD case type 2; commercial replacement CD case (PC Line), unplasticised Polystyrene (transparent) outer shell. Original ABS insert replaced with Corrosion Intercept insert.
Acronym in test; ***O[x]***

Test 1

Objective: to test for the presence of plasticisers in Corrosion Intercept inserts. Plasticisers are generally compounds used to impart flexibility to the material. Lack of flexibility results in brittleness and consequent fracture of the plastic. The majority of plasticisers however are organic acids which sublime directly to a vapour.

The consequence of the presence of an uncontrolled plasticiser in a CD Jewel Case is that the acid content of a case's internal environment can increase, which may prove detrimental to its contents[2].

Theory: Plasticisers are generally oleaginous, and sublime directly to a vapour on exposure to air. Removal from air therefore should disallow the plasticiser to volatilise.

Method: Six inserts (three Omega Intercept and three control) were placed under de-ionised water at 20c. Without the ability to volatilise, the plasticiser should accumulate on the surface of the insert. At regular intervals, the inserts were felt by touch for an oleaginous deposit on its surface. The length of time from immersion to tactile sensing of plasticiser can be assumed to be relative to the quantity of plasticiser within the inserts[3].

Results

O1	18 hours	C1	18 hours
O2	18 hours	C2	24 hours
O3	18 hours	C3	18 hours

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[1] The experiment comparisons are against the most commonly available replacement Jewel Case. PC Line (PC World) Source their replacement Jewel Cases from the same manufactory as Dixons, W H Smith, Currys and Argos. As such, this material make up is the most commonly available on the market. Surveying commercially distributed CDs showed that 80% of those marketed were retailed in Jewel Cases of the same chemical composition, though not from the same manufactory.

[2] Acid migration from case inserts was the true cause of the so-called laser rot exhibited by Philips DuPont discs, not as was claimed at the time, sub standard paper in the case's environment.

[3] In each immersion test, oleaginous deposits were examined under a microscope and a Transmission Electron Microscope to ensure that deposits were not bacterial colonies.

Test 2

Objective: To assess if Corrosion Intercept regulates the acidity of the plasticiser by measuring the acidity of the oleaginous deposit over a given period of time.

Method: Six samples were immersed in de-ionised water for 30 days[4]. After each 24 hour period, the samples were removed from the bath and the pH of the plasticiser was measured using a Jenway pH meter.

The pH of the water bath was also measured daily, and replaced with fresh de-ionised water to ensure that variance in the bath was not affecting the plasticiser.

In each case, the results were entered into a spread sheet, and an average plot was taken:

Results of pH tests on oil residue over 30 days

Day	**C1**	**C2**	**C3**	**O1**	**O2**	**O3**
1	3.6	2.2	3.6	6.5	6.6	6.4
2	3.4	3.7	3.1	6.8	6.7	6.1
3	2.7	3	3.3	6.2	6.1	6.1
4	2.3	3	3.8	6.1	6.3	7
5	2.8	3.5	4	6.3	6.8	6.1
6	3.3	3.9	2.9	6.5	6.2	6.8
7	3.7	2.6	2.8	6.8	6.5	6.5
8	2.9	2.4	3.5	6.9	6.8	6.6
9	3.1	3.2	2.9	6	6.5	6.7
10	2.8	3.7	2.5	6.3	6.6	7
11	2.4	2.1	3.2	6.7	6.8	6.2
12	3.6	2.5	3.7	6.8	6.4	6.4
13	2.9	2.2	2.3	6.8	6	6.1
14	2.8	3.6	3.6	7	6.1	6.2
15	2.9	2.5	2.6	6.9	7	6.8
16	3.9	3.7	2.2	6.5	6.8	6.1
17	3.3	2.3	3.7	6.2	6.9	6.2
18	3.5	3.6	3.8	6.1	6.6	6.5
19	2.6	3.6	3.9	6.2	6.8	6.7
20	2.6	2.1	2.2	6.9	6.1	6.4
21	3.2	3.1	2.7	6.4	6.7	6.1
22	2.9	2.3	3.3	6.1	6.2	6.6
23	2.7	3.7	3.7	6.6	6	6.6
24	3.9	2.3	3.8	6.1	6	6.8
25	2.9	3.5	2.2	6.9	6.8	6.7
26	2.3	3.6	2.8	6.9	6.2	6.9
27	3.8	3	2.5	6	6.8	6.9
28	2.7	3.7	2.8	6.6	6.3	6.7
29	2.8	3.5	2	6.8	6.3	6.7
30	2	2.5	2.1	6.5	6.9	6.4

[4] NB. The tests were performed sequentially due to restricted space

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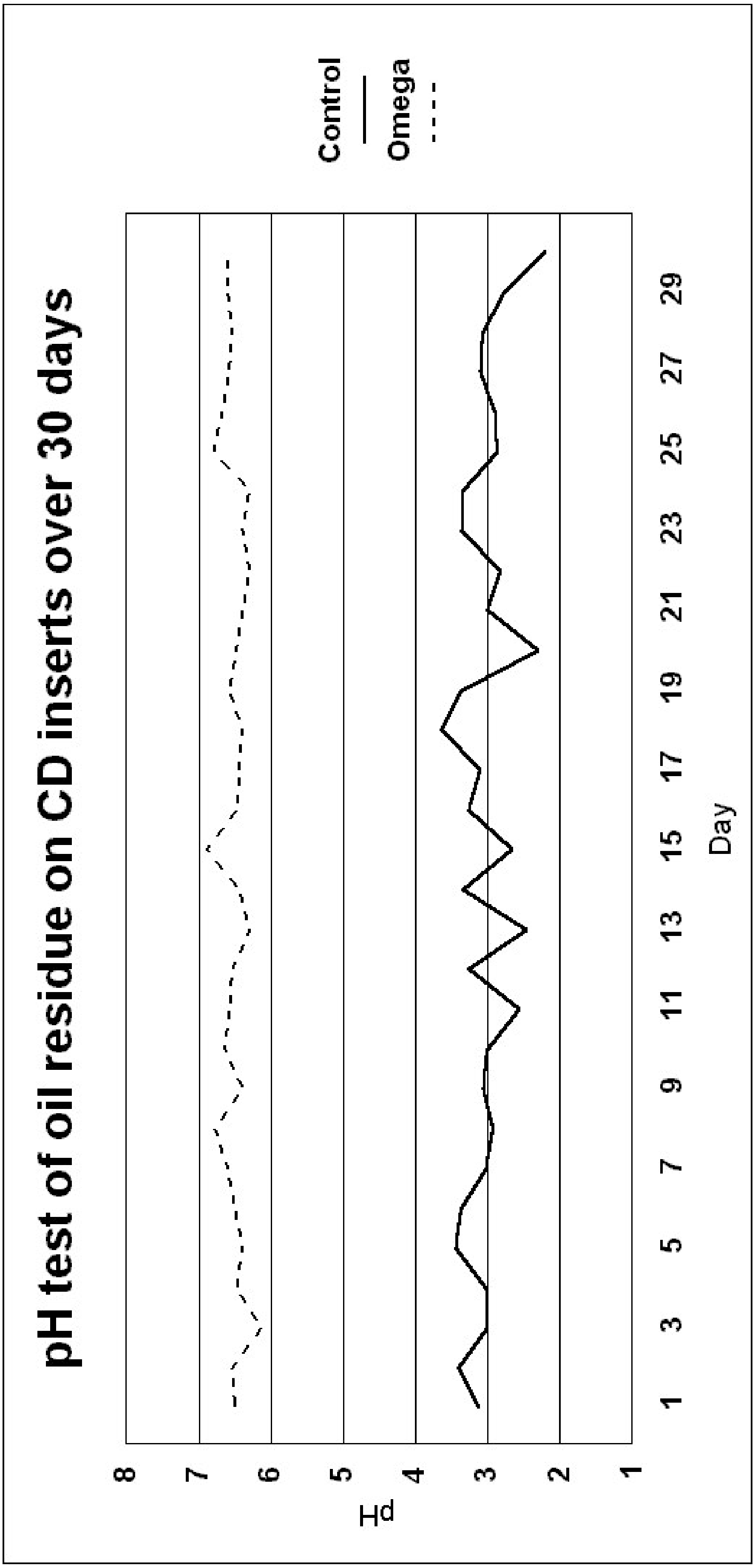
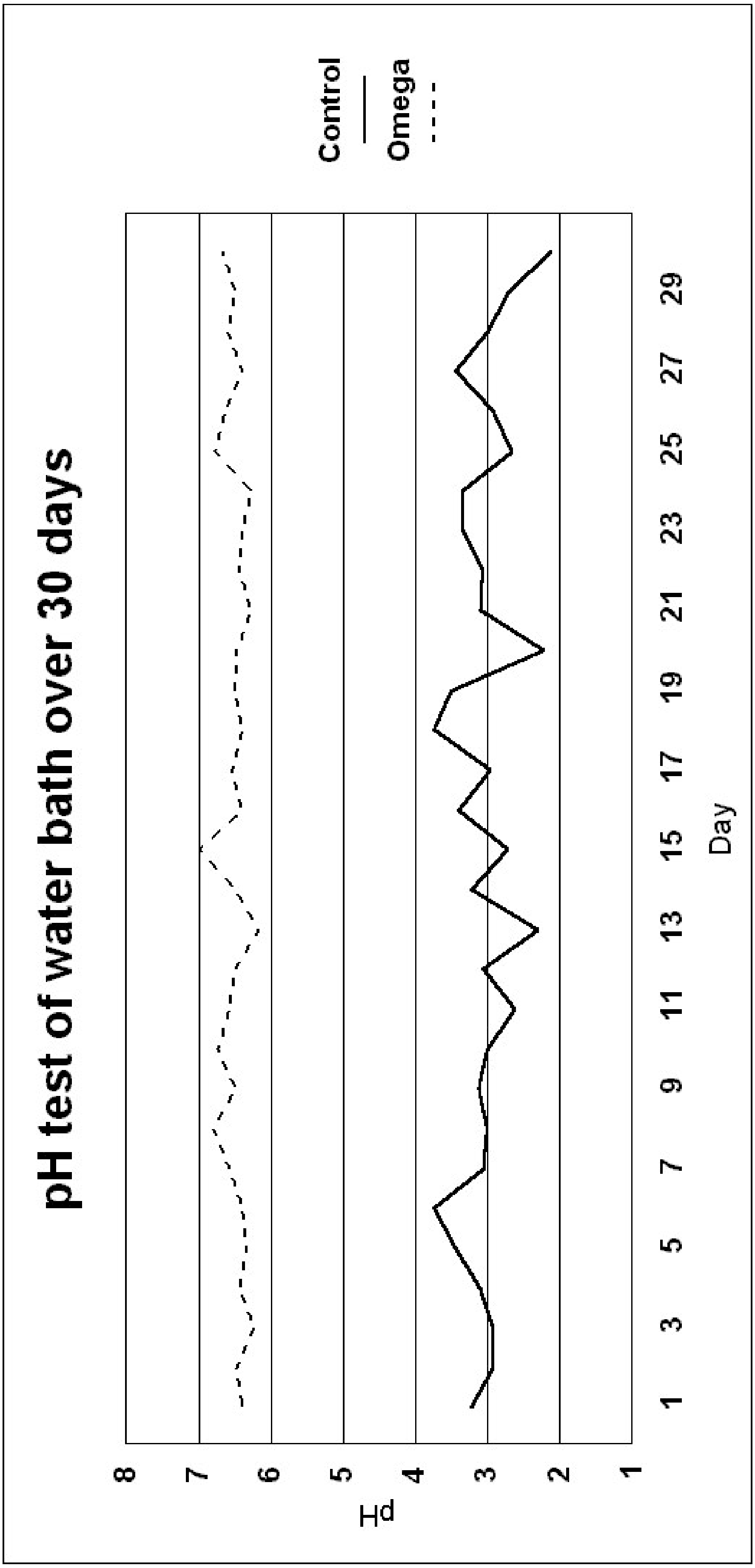
Results of pH tests on de-ionised water bath over 30 days

Day	**C1**	**C2**	**C3**	**O1**	**O2**	**O3**
1	3.5	2.5	3.7	6.3	6.5	6.4
2	2.9	3.2	2.7	6.7	6.6	6.1
3	3	2.9	2.9	6.1	6.3	6.3
4	2.5	3.2	3.6	6	6.4	6.9
5	2.7	3.3	4.3	6.1	7	5.9
6	3.6	4.3	3.3	6.4	6.1	6.7
7	4.1	2.2	2.9	6.7	6.4	6.6
8	2.6	2.6	3.8	6.9	7	6.5
9	2.6	3.5	3.3	6.1	6.7	6.7
10	2.7	3.8	2.5	6.4	6.7	7.1
11	2.4	1.9	3.6	6.7	6.9	6.1
12	3.7	2.1	3.4	6.7	6.4	6.4
13	2.4	2.5	2	6.6	5.8	6.1
14	2.4	3.6	3.7	7	6.1	6.4
15	2.6	3	2.6	7	7	7
16	4.2	3.5	2.5	6.4	6.8	6
17	2.9	2.2	3.8	6.3	7.1	6.2
18	3.7	3.4	4.1	6	6.5	6.7
19	2.7	3.4	4.4	6.3	6.6	6.6
20	2.6	1.9	2.2	6.9	6	6.5
21	3.6	3.3	2.4	6.2	6.5	6.1
22	3.2	2.3	3.7	6.3	6.3	6.7
23	2.6	3.9	3.5	6.5	6	6.7
24	3.8	2	4.2	6.1	5.9	6.8
25	2.9	3.1	2	6.8	6.7	6.8
26	2.7	3.7	2.4	6.9	6.1	6.9
27	4.2	3.3	2.8	5.8	6.6	6.8
28	2.6	3.2	3.2	6.8	6.1	6.9
29	2.4	4	1.7	6.7	6.2	6.6
30	1.9	2.1	2.4	6.6	7	6.4


pH test of oil residue on CD inserts over 30 days
Control
Omega
pH
8
7
6
5
4
3
2
1
Day
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29


pH test of water bath over 30 days
Control
Omega
pH
8
7
6
5
4
3
2
1
Day
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29

Test 3

Objective: To assess whether the build up of acidic vapour within a Jewel Case is significant, and if so, if it is controllable through Corrosion Intercept.

Theory: The requirement of this test is to assess whether the rate of air exchange through the Jewel Case slots is sufficient enough not to allow a build up of acidity, and if not, whether the Corrosion Intercept product can regulate the acid content.

Method: Sixty samples were used, thirty control and thirty Omega Intercept, (each experimented on in batches of ten). Each sample set was shelved on a wire rack CD stand[5] in 'ambient[6]' conditions for a period of two months.

Following this, a Dräger tube (8101121) was used to measure the internal atmosphere of the Jewel case. The quantity of atmosphere required to generate a reaction in the tube is greater than that present in a closed jewel case. Therefore measurement was achieved through attaching a narrow diameter unplasticised polyethylene tube to the end of the Dräger tube inlet, inserting the free end through one of the paper retention slots in the Jewel case, then extracting the internal atmosphere sequentially from each of the ten Jewel Cases in the experiment[7].

This Dräger tube is capable of measuring the presence of acid gases, though it is not capable of differentiating between them, or measuring the pH range.

Results

O1	No Reaction	C1	Acidic
O2	No Reaction	C2	Acidic
O3	No Reaction	C3	Acidic

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[5] Allowing maximum exposure to the venting slots of the Jewel Cases.

[6] The principle of this tests is efficacy in home/office use rather than archive storage. Therefore conditions were set at those expected in a home or office environment: 19 - 26^{o}c with a variation no greater than 1^{o} per half hour and 45 - 70% RH with a variation no greater than 5% per hour.

[7] 10 pumps are required in order to generate a reaction in the tube, therefore in each experiment, 10 Corrosion Intercept and 10 Control Jewel Cases constitute one result.

Test 4 (For Guidance Only[8])
Objective: To assess the level of acid build up within a Jewel Case over a given period of time.

Method: Six samples were tested, three control and three Corrosion Intercept.

Each sample was shelved on a wire rack CD stand[9] in 'ambient[10]' conditions, over a period of 91 days. After each twenty four hour period, a BDH (Merck) strip was wetted and fed through one of the Jewel Case slots. After a period of five minutes, the strip was removed, and the colour change was compared to those given on the packet and the pH recorded. The pH readings were entered into a spreadsheet, and an average plot for each type was generated.

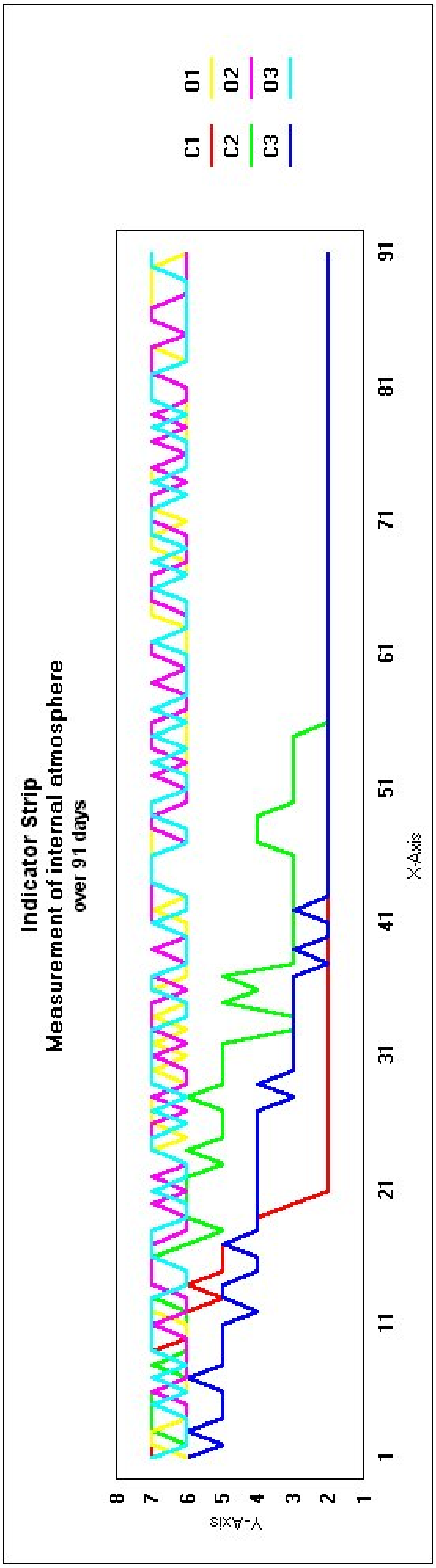
Results

Day	C1	C2	C3	O1	O2	O3	Control	Omega
1	7	7	6	6	7	7	6.7	6.7
2	7	6	5	7	6	6	6.0	6.3
3	7	7	6	7	6	6	6.7	6.3
4	7	7	5	6	6	6	6.3	6.0
5	7	7	5	7	6	7	6.3	6.7
6	7	7	5	6	7	6	6.3	6.3
7	6	6	6	6	6	7	6.0	6.3
8	6	7	5	6	6	6	6.0	6.0
9	7	6	5	6	6	7	6.0	6.3
10	6	6	5	6	6	7	5.7	6.3
11	6	6	5	6	7	7	5.7	6.7
12	6	6	4	7	6	7	5.3	6.7
13	5	7	5	7	6	7	5.7	6.7
14	6	6	5	6	7	6	5.7	6.3
15	5	6	4	6	7	6	5.0	6.3
16	5	7	4	7	7	7	5.3	7.0
17	5	6	5	7	7	7	5.3	7.0
18	4	5	4	7	6	7	4.3	6.7
19	4	6	4	6	6	6	4.7	6.0
20	3	6	4	6	7	6	4.3	6.3
21	2	6	4	7	6	7	4.0	6.7
22	2	6	4	6	7	6	4.0	6.3
23	2	5	4	6	6	6	3.7	6.0
24	2	6	4	7	7	7	4.0	7.0
25	2	5	4	6	7	7	3.7	6.7
26	2	5	4	7	7	6	3.7	6.7
27	2	5	4	7	6	7	3.7	6.7
28	2	6	3	7	7	6	3.7	6.7
29	2	5	4	6	6	7	3.7	6.3
30	2	5	3	7	6	7	3.3	6.7
31	2	5	3	6	7	7	3.3	6.7
32	2	5	3	7	6	7	3.3	6.7

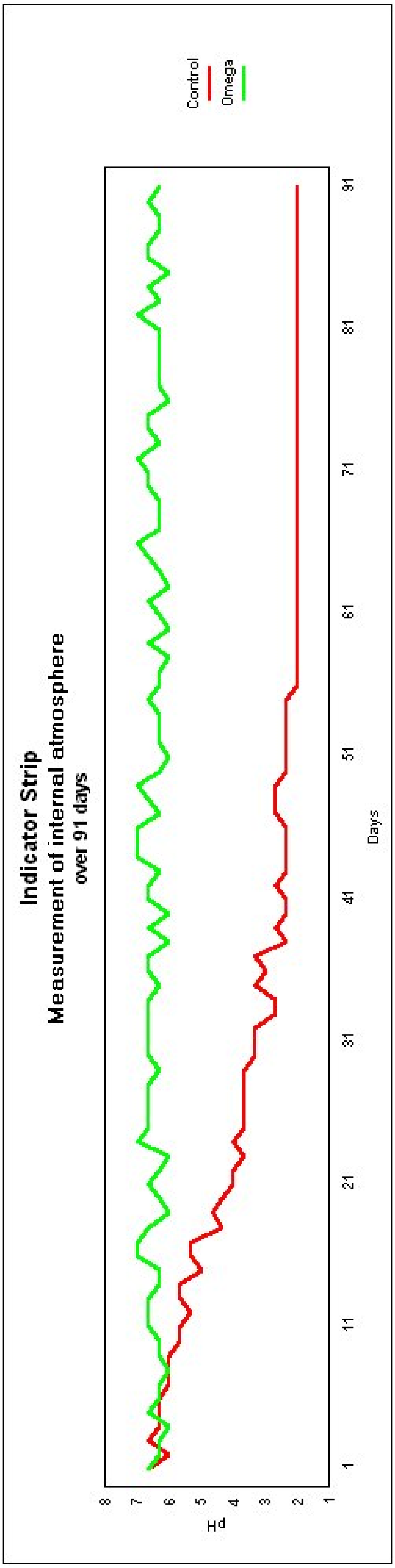
[8] This was the only way I could do the experiment with the resources that I had, and the results may not be exact. Consequently, the results here are guideline only.
[9] Allowing maximum exposure to the venting slots of the Jewel Cases.
[10]The principle of this tests is efficacy in home/office use rather than archive storage. Therefore conditions were set at those expected in a home or office environment: 19 - 26^{o}c with a variation no greater than 1^{o} per half hour and 45 - 70% RH with a variation no greater than 5% per hour.

33	2	3	3	6	7	7	2.7	6.7
34	2	3	3	7	7	6	2.7	6.7
35	2	5	3	6	7	6	3.3	6.3
36	2	4	3	7	6	7	3.0	6.7
37	2	5	3	6	7	7	3.3	6.7
38	2	3	2	6	6	6	2.3	6.0
39	2	3	3	7	7	6	2.7	6.7
40	2	3	2	6	6	6	2.3	6.0
41	2	3	2	6	7	7	2.3	6.7
42	2	3	3	7	7	6	2.7	6.7
43	2	3	2	6	7	6	2.3	6.3
44	2	3	2	7	7	7	2.3	7.0
45	2	3	2	7	7	7	2.3	7.0
46	2	3	2	7	7	7	2.3	7.0
47	2	4	2	7	6	6	2.7	6.3
48	2	4	2	7	7	6	2.7	6.7
49	2	4	2	7	7	7	2.7	7.0
50	2	3	2	6	6	7	2.3	6.3
51	2	3	2	6	6	6	2.3	6.0
52	2	3	2	6	7	6	2.3	6.3
53	2	3	2	6	6	7	2.3	6.3
54	2	3	2	6	7	6	2.3	6.3
55	2	3	2	6	7	7	2.3	6.7
56	2	2	2	6	7	6	2.0	6.3
57	2	2	2	6	6	7	2.0	6.3
58	2	2	2	6	6	6	2.0	6.0
59	2	2	2	7	7	6	2.0	6.7
60	2	2	2	6	6	6	2.0	6.0
61	2	2	2	6	7	6	2.0	6.3
62	2	2	2	6	7	7	2.0	6.7
63	2	2	2	6	6	6	2.0	6.0
64	2	2	2	7	6	6	2.0	6.3
65	2	2	2	7	7	6	2.0	6.7
66	2	2	2	7	7	7	2.0	7.0
67	2	2	2	6	7	6	2.0	6.3
68	2	2	2	6	6	7	2.0	6.3
69	2	2	2	7	6	6	2.0	6.3
70	2	2	2	7	6	7	2.0	6.7
71	2	2	2	6	7	7	2.0	6.7
72	2	2	2	7	7	7	2.0	7.0
73	2	2	2	6	7	6	2.0	6.3
74	2	2	2	7	6	7	2.0	6.7
75	2	2	2	7	7	6	2.0	6.7
76	2	2	2	6	6	6	2.0	6.0
77	2	2	2	6	7	6	2.0	6.3
78	2	2	2	6	6	7	2.0	6.3
79	2	2	2	6	7	6	2.0	6.3
80	2	2	2	6	6	7	2.0	6.3
81	2	2	2	6	6	7	2.0	6.3
82	2	2	2	7	7	7	2.0	7.0
83	2	2	2	6	7	6	2.0	6.3
84	2	2	2	7	7	6	2.0	6.7
85	2	2	2	6	6	6	2.0	6.0
86	2	2	2	7	7	6	2.0	6.7
87	2	2	2	7	7	6	2.0	6.7

88	2	2	2	7	6	6	2.0	6.3
89	2	2	2	7	6	6	2.0	6.3
90	2	2	2	7	6	7	2.0	6.7
91	2	2	2	6	6	7	2.0	6.3



Indicator Strip
Measurement of internal atmosphere
over 91 days
C1
C2
C3
01
02
03
X-Axis
Y-Axis
1
11
21
31
41
51
61
71
81
91
1
2
3
4
5
6
7
8


Indicator Strip
Measurement of internal atmosphere
over 91 days
Control
Omega
pH
Days
1
11
21
31
41
51
61
71
81
91
8
7
6
5
4
3
2
1

Test 5 The Razor Blade Test (real-time)
Objective: This test determines the corrosion inhibiting properties of Corrosion Intercept, in direct, and indirect contact with metal samples. The sample metals tested were: Silver and Aluminium[11].

Method: Six Jewel Cases were tested, three Control samples and three with Corrosion Intercept inserts.

Twelve samples each of silver and aluminium were acquired. The sample plates were approximately 1" long by 1/8" wide, were pre-polished by the manufacturers for shipment.

1) The samples were Rouge polished to give a fresh, smooth surface.
2) The prepared metal samples were pre-cleaned and washed with iso-propanol.
3) After the samples were cleaned, they were only handled using nitrile laboratory gloves[12].
4) The samples were air dried in a filtered air flow system, then instantly put into the test sequence.

Two samples of each metal were attached to each Jewel Case insert. The first were attached directly to the insert (direct contact sample), while the second were attached to a film of Polyethylene Terephthalate which was in turn attached to the insert (indirect contact sample).

The Jewel Cases were closed and left in 'ambient' conditions for 168 hours, after which the metal strips were examined and assessed as a pass or fail. I further assigned a scale based on the visible signs of corrosion and discolouration. Any discolouration was considered to be a fail:

Pass	1	Clear
Fail	2	Discolouration
Fail	3	Corrosion and Discolouration

Results

Samples	Al (indirect)	Al (direct)	Au (indirect)	Au (direct)
C1	Fail 2	Fail 2	Fail 2	Fail 2
C2	Fail 2	Fail 2	Fail 2	Fail 2
C3	Fail 2	Fail 2	Fail 2	Fail 2
O1	Pass 1	Pass 1	Pass 1	Pass 1
O2	Pass 1	Pass 1	Pass 1	Pass 1
O3	Pass 1	Pass 1	Pass 1	Pass 1

[11] Two metals used as reflective layers in compact discs. Silver being the most reactive metal and aluminium the least.
[12]Latex laboratory gloves were not used due to their ability to deposit, pick up and transfer residues.

Test 6 The Razor Blade Test (accelerated ageing)
Objective: This test determines the corrosion inhibiting properties of Corrosion Intercept, in direct, and indirect contact with metal samples. The sample metals tested were: Silver and Aluminium[13].

Method: Six Jewel Cases were tested, three Control samples and three with Corrosion Intercept inserts.

Twelve samples each of silver and aluminium were acquired. The sample plates were approximately 1" long by 1/8" wide, were pre-polished by the manufacturers for shipment.

1) The samples were Rouge polished to give a fresh, smooth surface.
2) The prepared metal samples were pre-cleaned and washed with iso-propanol.
3) After the samples were cleaned, they were only handled using nitrile laboratory gloves[14].
4) The samples were air dried in a filtered air flow system, then instantly put into the test sequence.

Two samples of each metal were attached to each Jewel Case insert. The first were attached directly to the insert (direct contact sample), while the second were attached to a film of Polyethylene Terephthalate which was in turn attached to the insert (indirect contact sample).

The Jewel Cases were closed and transferred to the accelerated ageing oven, where they were subjected to conditions of 55ºc and 85%RH for 168 hours, after which the metal strips were examined and assessed as a pass or fail. I further assigned a scale based on the visible signs of corrosion and discolouration. Any discolouration was considered to be a fail:

Pass	1	Clear
Fail	2	Discolouration
Fail	3	Corrosion and Discolouration

Results

Samples	Al (indirect)	Al (direct)	Au (indirect)	Au (direct)
C1	Fail 2	Fail 2	Fail 2	Fail 3
C2	Fail 2	Fail 2	Fail 2	Fail 3
C3	Fail 2	Fail 2	Fail 2	Fail 3
O1	Pass 1	Pass 1	Pass 1	Pass 1
O2	Pass 1	Pass 1	Pass 1	Pass 1
O3	Pass 1	Pass 1	Pass 1	Pass 1

[13] Two metals used as reflective layers in compact discs. Silver being the most reactive metal and aluminium the least.
[14]Latex laboratory gloves were not used due to their ability to deposit, pick up and transfer residues.

Test 7
Objective: To assess, in real time, the failure of CDs housed in Corrosion Intercept.

Method: Nine CD-R[15] discs were used, six the control Jewel Cases and three in Corrosion Intercept Cases.

A disc image was constructed consisting of ten audio tracks. This disc image was burned to each of the CD-Rs. Three were housed in control Jewel Cases, three were housed in Corrosion Intercept Jewel Cases. Three discs were put aside as a real-time copies, being kept in 'ambient' conditions, (19 - 26ºc with a variation no greater than 1º per half hour and 45 - 70% RH with a variation no greater than 5% per hour).

Each disc was placed in the accelerated ageing oven, where they were subjected to conditions of 55ºc and 85%RH. After each 24 hour period the discs were removed from the oven and compared against the master CD image, (kept on Windows NT server and compared against multiple backup tapes prior to each test). When the master CD image and the CD-R no longer matched, the CD was considered to have failed, and the number of days to failure noted.

Once per month, the real-time copies were also compared against the master disc image and the number of months noted until failure.

Results

C1	16 days
C2	25 days
C3	22 days
O1	612 days
O2	680 days
O3	691 days
Real-time 1	28 Months
Real-time 2	28 Months
Real-time 3	29 Months

[15]Kodak CD-R Ultima (manufactured 1999)

Conclusion

The most deleterious factor in the CD's environment which will contribute to its decay is the Jewel Case in which it is supplied. Acid off gassing as a result of poorly chosen materials in the product's packaging can reduce the longevity of a CD to decades rather than the centuries predicted by most manufacturers[16]. It was in fact acid migration from Jewel Case inserts affecting a nitro-cellulose lacquer that was the true cause of the so-called 'laser rot' exhibited by Philips DuPont discs, not as was claimed at the time, sub standard paper in the case's environment. The evidence of this is the concentration of bronzing around the edges of the disc's label side, rather than across the whole surface. Had paper been the true cause, bronzing would have occurred evenly across the whole of the disc as the paper rested in the same plane as the label side when the Jewel Case was closed.

It is clear however that in order for the Jewel Case 'crown' to remain flexible, the case inserts must be plasticised. Ageing CD inserts become brittle as more and more plasticiser sublimes off. This is seen primarily in the fracturing of the CD crown, which is the main symptom of age decay in Jewel Cases.

As a consequence, unless Jewel Cases undergo a radical redesign[17], the presence of deleterious plasticisers will be a continued requirement, and a continued threat to the longevity of CDs. Not one commercial CD manufacturer will admit publicly that their CDs are manufactured from decayable materials which can be affected from deleterious factors in their immediate environment. As a consequence of this, many packaging manufacturers pay little, or no attention to their choice of materials. Many CD, and even DVD packages over the years have been manufactured from materials which at best can be described as criminal. Only Corrosion Intercept has attempted to address these problems, and have achieved their objective with a great deal of success.

Test 1 shows that Corrosion Intercept is no different to other Jewel Case inserts in respect to plasticisers, however test 2 indicates that their acidity is adequately controlled.

Test 3 indicates that there is insufficient air exchange through the Jewel Case slots to reduce the build up of deleterious vapours in the Jewel Case's internal environment. Test 3 also indicated that there is no deleterious vapour build up within Jewel Cases containing the Corrosion Intercept insert.

Test 4 indicated that the of-gassing of acidic vapour reduced the internal atmosphere of the control Jewel Cases to pH 2 within 55 days, whereas the Corrosion Intercept inserts were still regulating their environment between pH 6 and 7 after 91 days.

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[16]Most accelerated ageing tests performed on CDs have been in ideal conditions. Specifically, the tests have been performed on CDs in sealed environments unaccompanied by the packaging in which they are marketed. Tests, reported by Kodak, Sony and TDK, regularly give lifespans of 200 years for compact discs.

Similar accelerated ageing tests that I have performed (not documented in this paper) have given approximately the same results, (100-200 year lifespans), when tested on CDs alone. CDs which have been tested using the same procedures except housed in their marketed packaging have all exhibited a drastically reduced lifespan, (10-50 years).

[17]Several have been tried to date, most of which have been failures.

Test 5 indicated that in real time, appreciable discolouration occurred within one week on all metals not contained in a Corrosion Intercept Jewel Case, while none had occurred on those that did.

Test 6 indicated that over the same period in an accelerated ageing oven, not only was discolouration present, but corrosion and pitting had occurred on the direct contact silver samples[18].

Test 7 attempted to estimate the longevity of a CD-R in real-time if housed in a Corrosion Intercept Jewel Case. With accelerated ageing, the CD-Rs used averaged a failure rate of 21 days in the control Jewel Cases, while those in the Corrosion Intercept Jewel Cases averaged 661 days. The same CD-Rs in control Jewel Cases failed on average in month 28. Using the formula:

{Real-time decay} / {Accelerated Control} * {Accelerated Intercept} = Real Time Intercept

A thumbnail estimate of 75 years is achieved for a CD-R in real time[19] if the CD-R is stored in a Corrosion Intercept Jewel Case, While 28 months (just over two years) is all the longevity that can be expected of a CD-R otherwise[20].

As a consequence of the above tests, I have to conclude that Corrosion Intercept addresses the problem of Jewel Cases causing the decay of CDs satisfactorily, and have no hesitation in recommending this product as a CD saving technology and a marked improvement over other products on the market.

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[18] Silver is used as the reflective layer on Traxdata CDs
[19] I am at present attempting to affect the same form of test on commercially produced CD media, however, tests will take considerably longer..
[20] Accelerated ageing is a doubtful methodology, and all accelerated ageing results (including my own) should be treated with caution.