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VIZZY BRITE AEROSOL

Stability Trials and Physical Evaluation Report

Reference Number: **CH-181105-01**

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Position: **Production Chemist**

Company: **David Gray & Co Pty Ltd**

ABSTRACT SUMMARY

The aim of this report is to provide the results of the spray characteristic and physical stability trials, conducted on Vizzy Brite's Silver Aerosol Reflector Paint. Trials were adapted and based on scientific methods (ref CIPAC methods). Stability trials were conducted for pre and post accelerated storage conditions for 14 days @ 54 deg C and 28 days @ 54 deg C and pre and post cold storage @ 0 deg C for 7 days. Spraying trials were also conducted on various surfaces and a quality control evaluation was conducted.

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TRIALS AND STABILITY EVALUATION

PROCEDURE

1. A blend for each can, as the proposed formulation was prepared in the laboratory. The product was packed in the packaging in which it will be marketed, i.e. 350g in a plain, tin plate, non-lacquered aerosol can with the chosen actuator.

2 . Two sample cans were placed in the ambient storage cupboard (representing pre-storage)

3. Two sample cans were placed in the oven @ 54 deg C, one for 14 days and the other one for 28 days (this represents approximately 2 years and 4 years at ambient temperature respectively).

4. One sample can was placed in the fridge @ 0 deg C for 7 days (representing cold temperature storage)

5. One sample can was placed in the oven @ 30 deg C (representing real time storage at ambient temperatures)

6. At the end of 7 days the fridge sample was removed (post storage) and returned to ambient temperature before trialing.

7. At the end of 14 days the oven sample @ 54 deg C was removed (post storage accelerated conditions) and returned to ambient temperature before trialing.

8. At the end of 28 days the oven sample @ 54 deg C was removed (post storage) and returned to ambient temperature before trialing.

9. Physical stability and quality control testing was then conducted to evaluate the product and performance of the aerosol cans.

Physical Stability Evaluation

Can from fridge @ 0 deg C

After 7 days in the fridge, the can was removed and allowed to return to ambient temperature.
The can was reweighed to check for leaks and there was no evident difference. On inspection of the exterior of can and valve, everything was normal. Spraying trials were then commenced.
The can was then sprayed out onto a metal surface and checked for performance.
There proved to be no apparent physical change on the can, spraying mechanism or the product there in. The contents of the can sprayed out as normal until all the product was depleted. When the product dried, the result was evident. No adverse effect on the product or coverage. The mirror shine was still the same as previous trials with ambient cans.
Overall, the can and the product showed no adverse effect at 0 deg C proving to be very physically stable.

Can from oven @ 54 deg C for 7 days / Can from oven @ 54 deg C for 28 days

After 14 and 28 days respectively the cans were removed from the oven and allowed to return to ambient temperature. The cans were reweighed to check for leaks. There was only a very slight difference, which was negligible.

On inspection of the cans exterior and valves, everything was normal. The cans were then shaken up and the spraying trials commenced. The cans were then sprayed onto a metal surface and checked for performance. There proved to be no physical change on either the can, or spraying mechanism or the product there in. The contents of the can sprayed out as normal, until all the product was depleted. When the product dried, the result was evident.

No adverse effect on the product and the coverage was detected and the mirror shine was equivalent to the previous trials with ambient cans.

Furthermore, both cans were cut open to display a full view of the inside of the cans and upon inspection, very little of the beads remained. The cans were still in good condition internally as was the valve and dip tube.

Overall both cans displayed no adverse effect at 54 deg C for the period of time designated, proving to be very physically stable.

Quality Control

The quality control is conducted and adapted along industry guidelines for aerosol products. The quality control ensures the manufacturer delivers a quality product during and at the end of its production. The product has to pass the tests that have been specified, before being shipped out to the customer. The Quality Control Analysis Report records the results of testing. Further or other tests could be adapted to suit the product as required.

The attached QC sheet (see Appendix 1) shows the results obtained. The product has passed the test for this analysis. Several ambient cans were used for this testing. Results display the overall average.

Discussion

It can be seen that from before and after storage there was no notable changes or differences, after low storage temperature @ 0 deg C for 7 days and accelerated storage @ 54 deg C for 14 days and 28 days respectively.
Physical attributes, (packaging, valve, dip tube actuator and concentrate colour and appearance) all proved to withstand the extremes of elevated and cold temperature storage. This was proven in the trials and quality control testing.

The two cans cut open (oven @ 54 deg C for 14 and 28 days) were photographed to show that all the bead concentrate was dispelled and the internal surface and components of the can suffered no adverse reaction to the concentrate. These photos have been included in Appendix 2.

Conclusion

In conclusion, the proposed formulation of Vizzy Brite Aerosol Reflector Paint displayed adequate physical stability. The trials and tests proved that the product was viable and should remain so for at least four years, under normal storage conditions (at or above 25 deg C).

Colin Hanson
DAVID GRAY & CO PTY LTD

Technical Officer

APPENDIX 1

DAVID GRAY & CO PTY LIMITED
QUALITY CONTROL ANALYSIS REPORT
AEROSOLS

PRODUCT: VISY BRITE AEROSOL (Silver) BATCH N^{O}: Can # 3C (Silver)

DATE: 24 November 2005

ANALYST: C Hanson TIME: FORMULATOR: C Hanson

ANALYSIS	TEST METHOD	SPECIFICATION	RESULTS (4 CANS ASSESSED)
VISUAL INSPECTION OF CONCENTRATE	SWP - QC007 COLOUR/APPEARANCE	COLOUR - GREY/SILVER APPEARANCE - OPAQUE LIQUID	PASS (all cans)
GRAVITATION STABILITY OF CONCENTRATE	SWP - QC007 SHAKE/STAND 30 MIN	EMULSION SHOULD NOT SEPARATE < 5 MIN	PASS
VISUAL INSPECTION OF PACKAGING	SWP - QC001 CHECK STANDARD	CAN/CAP/VALVE/LABEL PASS/FAIL	PASS (all cans)
NETT WEIGHT DETERMINATION	SWP - QC003 MEAN WEIGHT - 4 CANS	NETT WEIGHT > 350g RECORD MEAN WT	351g (mean) PASS
VALVE CRIMP MEASUREMENTS	SWP - QC004 GAUGE 4 CANS - MEAN	VISUAL CHECK HOT WATER BATH LEAK TEST	No leaks (all cans) PASS
GAUGE PRESSURE	SWP - QC005 GAUGE 4 CANS - MEAN	35 - 55 psi-g @ 25^{O}C ± 1^{O}C = ± 1psi-g	40 psi g @ 30C (mean) PASS
DISCHARGE RATE	SWP - QC006 WT LOSS/SECSx60	100 g/min - 140 g/min @ 25^{O}C	120g/min (mean) PASS
TOTAL EXPULSION OF CONCENTRATE	SWP - QC006 PHYSICAL EXPULSION	ALL CONCENTRATE MUST BE EXPELLED	PASS (all cans)

ADJUSTMENTS 1.

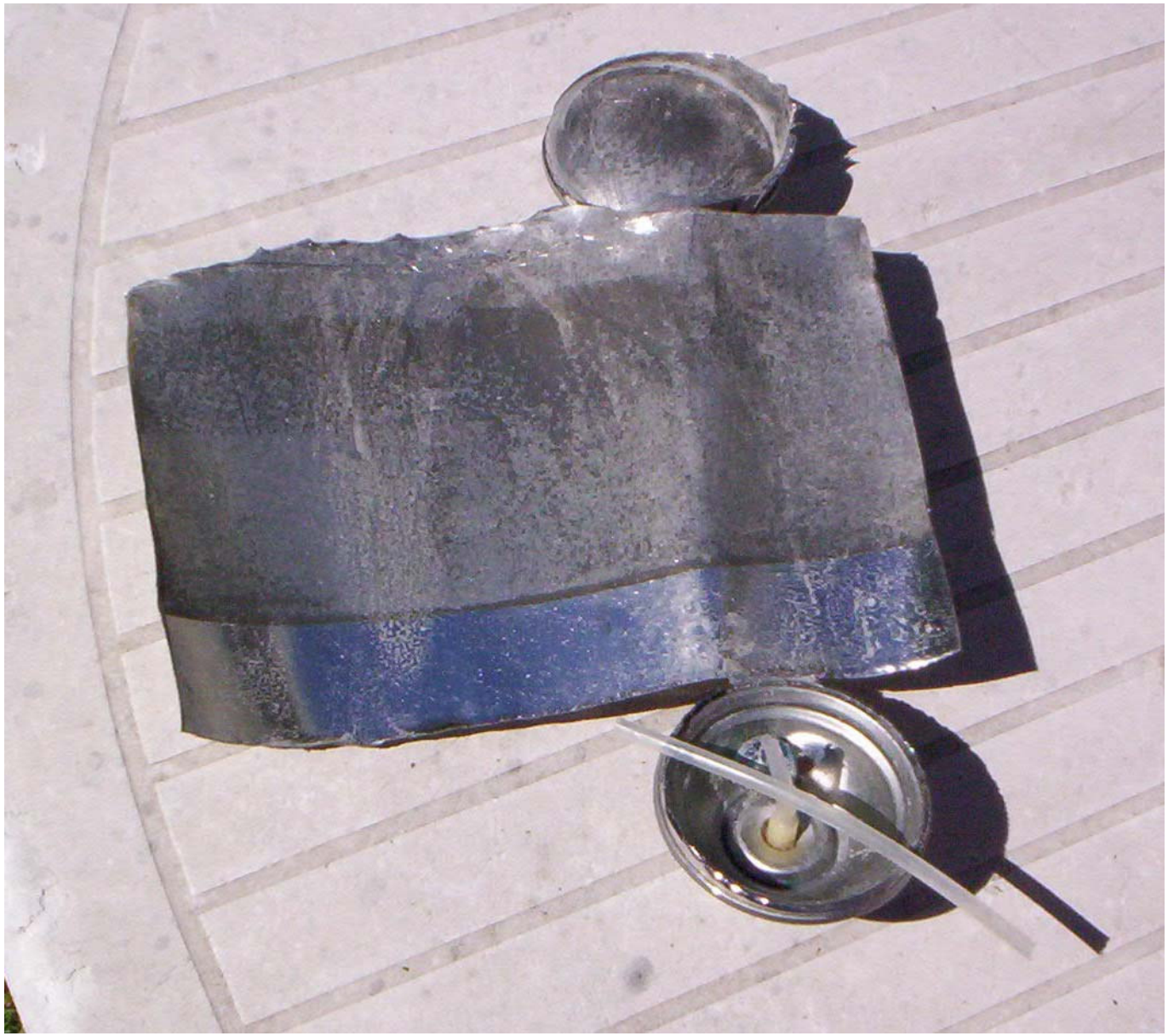
COMMENTS *These results are based on the routine quality control assessment conducted on aerosol products prior to approval for packing is issued.*

In this case the assessment was conducted on 4 cans that had been stored at ambient temperature.

QC RELEASE: C Hanson (Technical Officer) TIME/DATE: 24-Nov-05

APPENDIX 2

PHOTOGRAPHS OF INTERNALS OF VIZZY BRITE CAN FOLLOWING 2 WEEKS @ 54C



PHOTOGRAPHS ON INTERNALS OF VIZZY BRITE CAN FOLLOWING 4 WEEKS @ 54C