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**Laboratory #:** 791962-18  
**Report Date:** October 30, 2018  
**Received Date:** October 9, 2018

**Attention:** Tom Cray  
**Specimen:** Portable Fuel Container with Child-Resistant Closure Collar

## TEST REPORT

A specimen of new, portable, fuel containers with a child-resistant closure collar was submitted for evaluation of its child-resistance and senior-adult use effectiveness in accordance with ASTM F2517-17, "Standard Specification for Determination of Child Resistance of Portable Fuel Containers for Consumer Use".

The testing program involved the sequential protocol evaluation of fifty (50) children, and a panel of one hundred (100) senior adults. The testing of the children and senior adults took place at various locations during the month of October 2018. Observations and times were recorded for every participant that took part in the testing.

Cambridge Materials Testing Ltd. (CMTL) is an independent testing laboratory and is not affiliated in any way to nor has any commercial interests in the manufacturer or supplier of the child resistant closure collar.

### IDENTIFICATION OF CLOSURE COLLAR ON PORTABLE FUEL CONTAINER

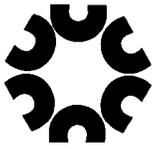


Photo #1 – Side View of Portable Fuel Container

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Test Report Template Revision January 2013

Per Steve Brown  
STEPHEN BROWN, QUALITY ASSURANCE

Per Derek Wild  
DEREK WILD, TECHNICIAN



Laboratory #791962-18  
No Spill Incorporated

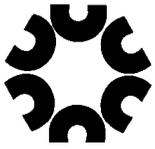
**IDENTIFICATION OF CLOSURE COLLAR ON PORTABLE FUEL CONTAINER (Cont'd)**



Photo #2 – Side View of Child Resistant Closure Collar



Photo #3 – View of Collar removed from the Portable Fuel Container



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**IDENTIFICATION OF CLOSURE COLLAR ON PORTABLE FUEL CONTAINER (Cont'd)**

Identification	Description
Product Name	No-Spill Portable Fuel Container
Product Manufacturer	No Spill Incorporated, 9808 Pflumm Road, Lenexa, Kansas 66215
Closure Model (Trade Name)	Collar Closure, with Safety Tab
Closure Size	Child Resistant Closure Collar (2¾-inch diameter, 1-inch height)
Closure Manufacturer	No Spill Incorporated, 9808 Pflumm Road, Lenexa, Kansas 66215
Closure Material & Color(s)	Collar (Polyethylene)
Closure Liner Material	-
TAC Seal Material	-
Opening Instructions	As directed on the affixed label (see Photograph #5)
Symbols, Numbers, and Letters Found Inside the Closure	None Inside the Closures
Container Model	Gasoline Can
Container Material and Color	Red, Blow-Molded High Density Polyethylene
Net Contents	10 L / 2½ US Gallons
Symbols, Numbers, and Letters on the Bottom of the Container	HDPE-2, 4 May 12, 2018 No Spill, Inc Lenexa, Kansas USA <a href="http://www.nospill.com">www.nospill.com</a> – 913-888-9200
Other Product Information, for example, EPA Registration Number	TSG Classified to ANSI/ASTM F852-08 EPA Code HNSRPPFCSBF1 CARB EO G-07-049



## TEST PROCEDURES

### CHILD TEST

No Spill Incorporated performed the following preparation of the test containers by subjecting them to:

- Low-temperature exposure at -5°F (-20.5°C) for 8 hours
- Elevated temperature exposure at 144°F (62°C) for 8 hours
- Opening and closing of each closure for 250 cycles

CMTL prepared the test containers prior to testing by filling them one-quarter full with water. The containers had been properly secured at least 72 hours before the beginning of the test and being provided to the children.

Upon completion of testing, the containers were inverted to determine presence of any leakage.

Evaluation of the children's performance to open the child-resistant closure collar was performed on three different age groups.

The age groups were identified as follows:

- Group #1 - Children Between 51 and 49 Months (Total # of children: 15; Male: 7; Female: 8)
- Group #2 - Children Between 48 and 45 Months (Total # of children: 20; Male: 10; Female: 10)
- Group #3 - Children Between 44 and 42 Months (Total # of children: 15; Male: 8; Female: 7)

The children required documented parental consent prior to participation in the evaluation of the child-resistant closure, and were selected from six (6) separate test sites. The children were tested in pairs, in the presence of one of their teachers, in a well-lit, unused classroom.

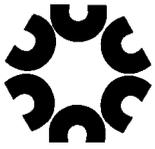
Four testers were used to test the child resistance of the collar closure, and the order in which they were tested was random and recorded.

The children received one portable fuel container with child-resistant closure collar for evaluation of their effectiveness. The children were instructed to try and open the collar and get the water to come out of the container using whatever method they liked. They were also told that their attempts would be observed during a timed, maximum 5 minute period.

The children were not given the impression that they were taking part in a game or test and no rewards were offered. The tester only encouraged the children to continue trying if they lost interest or gave up trying.

If the children were unable to open the collar and get the water to come out of the container after the maximum 5 minute period, the tester demonstrated how to gain access to the contents without verbal instruction and using their own, demonstration container. The children were then allowed another 5 minute period in which to attempt to open the collar and gain access to the contents.

The children were allowed to talk to each other, watch each other, but not open/gain access to each other's container.



CHILD TEST (Cont'd)

If the child was able to gain access to the contents of the container, the tester said, "Thank you" and took the container away from the child.

The container's child-resistant closure collar was considered a failure if the child was able to open it causing water to be accessible.

At the conclusion of testing, the tester thanked the children for helping and told them that they should never try to open containers like this in the absence of an adult and that this type of container will have something dangerous in it that will make them sick. The children's teacher then escorted the children back to their regular classroom.

SENIOR ADULT TEST

CMTL prepared the test containers prior to testing by filling them one-quarter full with water. Upon completion of testing the containers were inverted to determine presence of any leakage.

Two test stations were set up in order to evaluate the child-resistant closure collar.

The senior adults were presented with two identical, portable, fuel containers with child-resistant closure collar for evaluation of their use effectiveness. They were tested individually, and instructed to open the child-resistant closure.

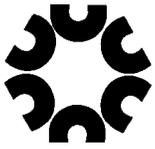
Participants were asked to follow the instruction shown on the child-resistant closure collar and to remove it to gain access to the containers contents.

The evaluation of the senior adult's performance to open the child-resistant closures was performed on three different age groups. The age groups were identified as follows:

- Group #1 - Senior Adults between 50 and 54 years (Total # of seniors: 25; Male: 8; Female: 17)
- Group #2 - Senior Adults between 55 and 59 years (Total # of seniors: 25; Male: 8; Female: 17)
- Group #3 - Senior Adults between 60 and 70 years (Total # of seniors: 50; Male: 15; Female: 35)

All the senior adult testing was conducted in a central location setting, and each adult was required to read and sign a consent form prior to participation.

Four testers were involved, and no more than 20% of the adults were drawn from a single Postal Code to assure geographical diversity.



SENIOR ADULT TEST (Cont'd)

The senior adults were timed with a stopwatch to record the opening times of the child-resistant closure collar.

The adults were instructed to try to open the child-resistant closure collar, while the tester observed and timed their attempts during a maximum 5 minute period. If successful, they were asked to repeat the tasks within a one minute period on the separate identical, portable, fuel container with child resistant closure.

If they were unable to open the collar during the 5 minute trial, they were asked to participate in a screening test with a non-child resistant (CR) or "special" cap closure. The customer provided an identical fuel container that had the child-resistant feature disabled. The adults were allotted 61 seconds for this task and eliminated from the study if they failed.

The adult-use effectiveness of the container was considered a failure if the seniors failed to open the collar during the trial period, but were able to open a non-child resistant closure collar on the screening container.

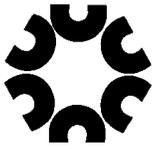


Photo #4 – View of Portable Fuel Container with Non-Child Resistant Collar for Screening Test



**RESULTS**  
**CHILD TEST**

51 - 49 Months Female									51 - 49 Months Male								
Name	Month	Day	Year	Months	Day	Months	5 Minute Test - Before Demonstration	5 Minute Test - After Demonstration	Name	Month	Day	Year	Months	Day	Months	5 Minute Test - Before Demonstration	5 Minute Test - After Demonstration
Brooklyn	8	8	2014	50	9	50	300	300	Oliver	8	24	2014	50	-7	50	300	300
Violet	7	28	2014	51	-11	51	300	300	Oscar	8	24	2014	50	-7	50	300	300
Meya	8	8	2014	50	9	50	300	300	Cody	8	12	2014	50	5	50	300	300
Aarohi	9	8	2014	49	8	49	300	10	Nico	9	24	2014	49	-8	49	300	213
Juliette	8	29	2014	50	-13	50	300	300	Talvin	9	4	2014	49	12	49	300	300
Janlayah	9	14	2014	49	4	49	300	300	Sai	8	20	2014	50	-4	50	300	300
Kiana	8	12	2014	50	18	51	300	300	Zakaria	8	30	2014	50	0	50	300	300
Audrina	7	26	2014	51	-9	51	300	300									
Mean							300.0	263.8	Mean							300.0	287.6
Standard Deviation							0.0	102.5	Standard Deviation							0.0	32.9
48 - 45 Months Female									48 - 45 Months Male								
Name	Month	Day	Year	Months	Day	Months	5 Minute Test - Before Demonstration	5 Minute Test - After Demonstration	Name	Month	Day	Year	Months	Day	Months	5 Minute Test - Before Demonstration	5 Minute Test - After Demonstration
Cora	1	23	2015	45	-6	45	300	300	Roarke	11	23	2014	47	-6	47	300	300
Joyce	12	28	2014	46	-11	46	300	300	Bequette	10	31	2014	48	-15	48	300	300
Joy	1	25	2015	45	-8	45	300	300	Reid	1	10	2015	45	6	45	300	300
Lumar	12	18	2014	46	0	46	300	300	Kenan	12	18	2014	46	0	46	300	300
Vy	11	19	2014	47	-1	47	300	300	Kaeyle	1	17	2015	45	1	45	300	300
Mayar	12	18	2014	46	0	46	300	300	Aiden	1	24	2015	45	-6	45	300	300
Zeina	12	2	2014	46	16	46	300	300	Kaeyre	1	17	2015	45	1	45	300	300
Vedaha	12	2	2014	46	28	47	300	300	Julius	1	29	2015	45	1	45	300	300
Angel	1	12	2015	45	18	46	300	300	Joseph	1	2	2015	45	28	46	300	300
Cecilia	1	16	2015	45	14	45	300	300	Emerson	2	6	2015	44	24	45	300	300
Mean							300.0	300.0	Mean							300.0	300.0
Standard Deviation							0.0	0.0	Standard Deviation							0.0	0.0
44-42 Months Female									44-42 Months Male								
Name	Month	Day	Year	Months	Day	Months	5 Minute Test - Before Demonstration	5 Minute Test - After Demonstration	Name	Month	Day	Year	Months	Day	Months	5 Minute Test - Before Demonstration	5 Minute Test - After Demonstration
Olivia	3	30	2015	43	-13	43	300	300	Zachary	3	4	2015	43	13	43	300	300
Brienne	3	22	2015	43	-5	43	300	300	Alexander	2	12	2015	44	4	44	300	300
Clare	3	4	2015	43	12	43	120	-	Harris	3	7	2015	43	9	43	300	300
Maggie	2	16	2015	44	0	44	180	-	Max	2	22	2015	44	-6	44	300	300
Kaylynn	2	2	2015	44	14	44	300	300	Tarek	2	27	2015	44	-9	44	300	300
Emmalia	3	3	2015	43	15	43	300	300	Izaiah	3	15	2015	43	3	43	300	300
Genevieve	4	21	2015	42	-3	42	300	300	Ire	2	18	2015	44	0	44	300	300
									Liam	3	10	2015	43	20	44	300	300
Mean							257.1	300.0	Mean							300.0	300.0
Standard Deviation							75.2	0.0	Standard Deviation							0.0	0.0
Mean-Total, all Girls & Boys							294.0	292.1									
St Dev-Total, all Girls & Boys							30.3	43.4									



### CHILD TEST

There were four openings of the child-resistant closure collar that would cause water to dispense. Two openings were during the 5-minute test period before demonstration and two releases were during the 5-minute test period after demonstration.

There was no leakage of water from the container with closed child-resistant closure collar before or after testing by the children.

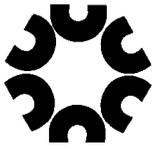
The mean opening times and standard deviation for each 5-minute test period are detailed within the Table above.

The percentage of containers tested at each site as a percentage of total containers was 20%.

The percentage of containers tested by each tester as a percentage of the total containers was 24 to 26%.

The child-resistant closure collar on the portable, fuel container was 96% effective for the children tested between the ages of 42 to 51 months before the demonstration, and 96% effective after the demonstration.

The child-resistant closure collar on the portable, fuel container ***passed*** the acceptance criteria for the children's protocol testing as per ASTM F2517-17, Standard Specification for Determination of Child Resistance of Portable Fuel Containers for Consumer Use.



SENIOR TEST

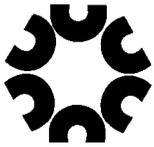
Women 50 - 54 Years		COLLAR CLOSURE			
		5 Min. Test (sec.)		1 Min. Test (sec.)	
No.	Order	Open	Close	Open	Close
1	13	7	4	8	3
2	38	11	5	6	4
3	39	24	6	7	2
4	53	7	4	7	3
5	68	11	5	8	4
6	80	33	11	16	11
7	82	10	7	12	5
8	86	24	9	9	7
9	87	4	2	4	10
10	88	11	35	13	7
11	90	8	6	18	4
12	91	3	3	6	2
13	92	6	2	6	4
14	93	13	6	19	4
15	94	14	14	8	7
16	95	10	5	6	3
17	96	36	5	43	7
Women 55-59 Years		COLLAR CLOSURE			
		5 Min. Test (sec.)		1 Min. Test (sec.)	
No.	Order	Open	Close	Open	Close
1	23	20	10	10	5
2	28	19	10	20	10
3	35	15	4	8	4
4	36	19	14	8	3
5	41	5	3	4	2
6	48	3	6	9	3
7	49	2	4	3	2
8	50	7	2	8	5
9	54	10	5	6	5
10	58	8	5	7	4
11	59	14	6	10	5
12	60	9	3	7	3
13	67	15	5	9	5
14	70	7	5	12	3
15	79	8	4	8	12
16	81	60	5	9	4
17	97	6	3	10	3



Laboratory #791962-18  
No Spill Incorporated

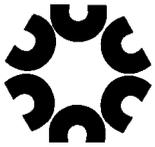
SENIOR TEST (Cont'd)

Women 60-70 Years		COLLAR CLOSURE			
		5 Min. Test (sec.)		1 Min. Test (sec.)	
No.	Order	Open	Close	Open	Close
1	62	10	4	11	7
2	63	14	2	9	2
3	64	11	4	9	5
4	7	2	2	2	2
5	10	18	10	15	8
6	12	7	2	5	1
7	16	24	20	7	4
8	17	6	6	3	2
9	22	8	4	8	7
10	26	11	4	9	4
11	37	16	7	7	4
12	42	23	14	5	1
13	43	3	1	2	1
14	46	12	7	8	5
15	51	6	3	4	3
16	52	20	2	13	3
17	55	14	7	10	4
18	56	28	12	14	7
19	57	3	3	14	3
20	65	18	5	13	3
21	66	31	8	11	5
22	69	6	13	19	24
23	71	25	5	3	8
24	72	13	4	8	2
25	73	33	6	11	5
26	74	21	3	4	4
27	75	13	6	7	2
28	76	11	5	8	3
29	77	13	6	11	7
30	78	4	2	7	18
31	83	22	7	15	6
32	84	8	3	10	5
33	85	10	7	11	6
34	99	12	4	6	6
35	100	8	6	8	11
<b>Total Women - Mean</b>		14	6	9	5
<b>Total Women - Standard Deviation</b>		10	5	6	4



SENIOR TEST (Cont'd)

Men 50-54 Years		COLLAR CLOSURE			
		5 Min. Test (sec.)		1 Min. Test (sec.)	
No.	Order	Open	Close	Open	Close
1	20	8	3	6	3
2	29	8	5	8	4
3	30	43	15	17	5
4	33	14	6	11	5
5	47	3	2	2	1
6	61	7	3	5	1
7	89	7	2	5	4
8	45	4	1	3	1
Men 55-59 Years		COLLAR CLOSURE			
		5 Min. Test (sec.)		1 Min. Test (sec.)	
No.	Order	Open	Close	Open	Close
1	8	4	2	3	2
2	9	11	5	10	3
3	18	4	2	2	2
4	24	24	7	17	4
5	25	6	7	4	5
6	34	9	7	5	3
7	40	7	2	4	3
8	44	1	1	1	1
Men 60-70 Years		COLLAR CLOSURE			
		5 Min. Test (sec.)		1 Min. Test (sec.)	
No.	Order	Open	Close	Open	Close
1	1	16	11	14	6
2	2	10	8	8	7
3	3	31	19	23	10
4	4	5	1	4	1
5	5	5	3	9	2
6	6	10	7	7	4
7	11	17	6	11	2
8	14	6	4	7	3
9	15	18	11	11	7
10	19	10	5	4	1
11	21	15	8	11	6
12	27	6	3	4	3
13	31	13	5	7	3
14	32	17	10	10	4
15	98	6	7	4	4
<b>Total Men - Mean</b>		11	6	8	4
<b>Total Men - Standard Deviation</b>		9	4	5	2
<b>Total Women &amp; Men - Mean</b>		13	6	9	5
<b>Total Women &amp; Men - Standard Deviation</b>		10	5	6	3



SENIOR TEST (Cont'd)

There was no leakage of water from the container with closed child-resistant closure collar before or after testing by the seniors.

The number of adult opening and re-securing failures for the collar closure in the first (5-minute) and second (1-minute) test periods was zero (0), resulting in a 100% senior adult-use effectiveness (SAUE).

The opening method for the closure collar was by pressing the teeth passed the stop releasing the child-resistant lock to open the collar from the portable fuel container. The instructions were imprinted on the collar itself, to open it and gain access to the containers contents.

The mean opening times and standard deviation for each test period are detailed within the Tables above.

The percentage of containers tested at each site as a percentage of total containers was 100%.

The percentage of containers tested by each tester as a percentage of the total containers was 25%.

The child-resistant closure collar **passed** the acceptance criteria for the senior adult-use effectiveness for the adults tested aged 50–70 years old for both test periods as per ASTM F2517-17, Standard Specification for Determination of Child Resistance of Portable Fuel Containers for Consumer Use.