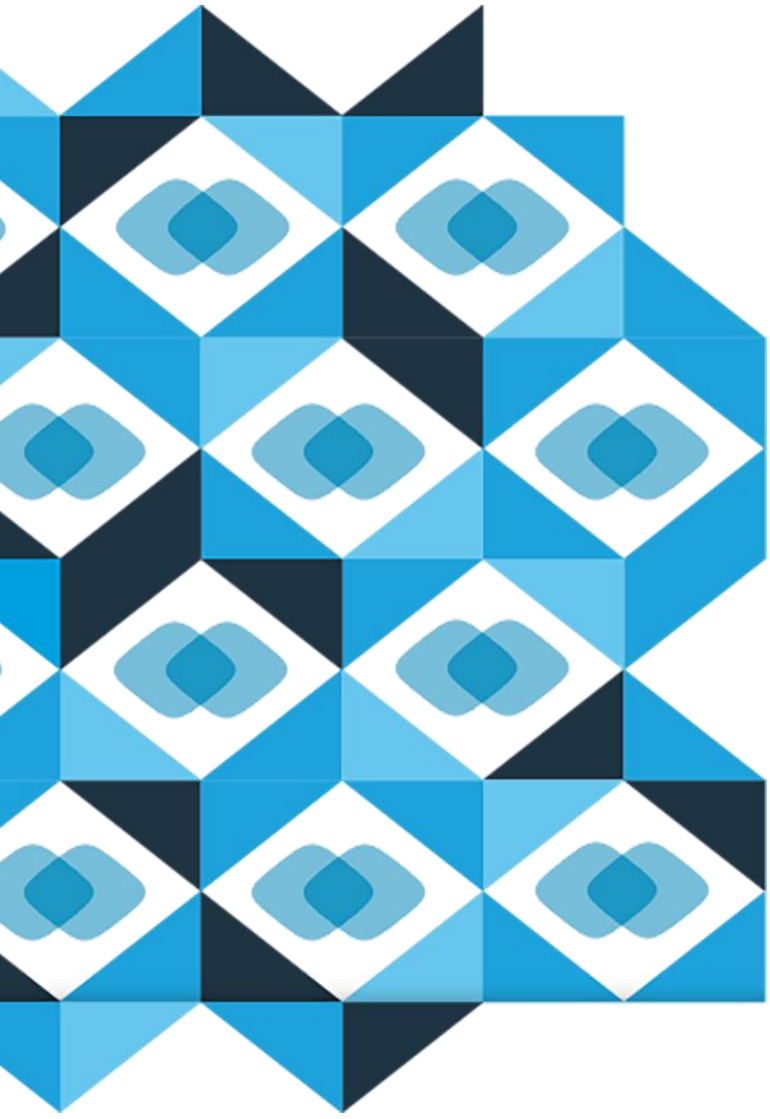
Material Testing Report

ISO 23907-2 Testing of Sharps Container



Client: Sharpak Healthcare

Revision Date: 8th April 2025

Report Number: IMP06690-LR rev2

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1. Introduction

Impact Solutions was approached by Sharpak Healthcare to carry out testing in accordance with ISO 23907-2:2019 on a sharps container. The containers were received on 5th March 2025 and on arrival logged into Impact Solutions' sample reception system and assigned a unique code as shown in Table 1.

Table 1 Material as supplied

Sample Supplied	Impact Solution Code
Sharpak 220	LIV-25-0355

The tests undertaken and their parameters are summarised in Table 2.

Table 2 Tests undertaken

Test undertaken	Section of ISO 23907-2:2019	Pass/Fail Criteria
Container stability	6.1	Does not slide on 15° incline
Handle strength	6.2	Handle shall not break
Resistance to penetration	6.3	Penetration force > 20 N
Resistance to damage after dropping	6.4	No damage compromising safe use, handles and closure remain functional
Resistance to spillage by toppling	6.5	No evidence of compromise of performance, temporary closure remains intact

Figure 1 Example of container and lid as received

The results in this report relate only to the materials supplied.

2. Experimental Work

Samples were supplied to Impact Solutions after having undergone the lifespan simulation detailed in Section 5 of ISO 23907-2:2019, based on an expected lifespan of 100 reuses. The processed covered in Sections 4.5.1 and 4.5.2 (cleaning and decontamination, and microbiological validation) were not validated by Impact Solutions, but are covered by Sharpak Healthcare procedures and have been independently validated.

2.1. Container Stability

A container with its lid attached was filled to the nominal fill volume line with 1 ml syringes and placed bottom-down on a plywood surface inclined at an angle of 15°. Any movement or toppling of the container was then observed.

2.2. Handle Strength

A container with its lid attached was filled to 150% of its maximum allowable gross mass with polyethylene (PE) pellets. The permanent closure was then sealed and the container suspended from its handle for one hour in an environment of 23 ± 2°C. The handles were then inspected for any damage.

2.3. Resistance to Penetration

One container was cut into 24 equally sized pieces with the thickness of each measured at the thinnest point.

Testing was carried out on an Instron 3382 universal test machine fitted with a 5 kN load cell. A 21 gauge needle (nominal diameter of 0.8 mm) was used for each test and was installed in a holder mounted to the crosshead of the machine. Each specimen was positioned on a support with a 6 mm through hole for the needle to pass into. The needle was then driven through the specimen at a rate of 100 mm/min, with the load being recorded throughout.

2.4. Resistance to Damage after Dropping

Five containers were filled with 1% of their maximum fill volume with water and 100% of their maximum allowed gross mass of PE pellets. Each container was mounted to an IPT drop table and dropped from a height of 1 m onto a 1” thick steel plate.

Five orientations were tested, with the containers being dropped on to the following parts:

1. Base
2. Side wall
3. Adjacent side wall
4. Top of lid
5. Lower corner

After each drop, the containers were inspected for damage.

2.5. Resistance to Spillage by Toppling

Four containers were filled with 1 ml syringes to the nominal fill volume line and the temporary closure secured. A load was then manually applied to a point above the pivot point such that it rotated and balanced on edge, when it was then allowed to overbalance and

topple. The container was then inspected for evidence of any damage or loss of containment. This was repeated for each orientation of the container, i.e. tipping along each lower edge.

3. Results

The results are summarised in Table 3, with detailed results presented in the Appendix.

Table 3 Average Test Results

Test	Result	Pass/Fail
Container stability	No toppling at 15°	Pass
Handle strength	No failure	Pass
Resistance to penetration	24.5 ± 2.2 N	Pass
Resistance to damage after dropping	No failures	Pass
Resistance to spillage by toppling	Closure intact, no compromise of function	Pass

4. Appendix I – Test Data

Table 4 Puncture test results

Specimen No.	Thickness (mm)	Load (N)		Specimen No.	Thickness (mm)	Load (N)
1	1.66	22.2		13	1.88	26.3
2	1.73	22.2		14	2.21	28.5
3	1.66	21.8		15	1.73	24.6
4	2.03	27.7		16	1.77	22.7
5	2.02	25.9		17	1.71	22.4
6	2.20	29.1		18	2.00	25.4
7	2.07	26.8		19	2.07	25.9
8	2.06	25.1		20	1.85	23.8
9	1.96	24.2		21	1.71	22.8
10	2.06	25.7		22	1.62	21.5
11	1.77	23.9		23	1.73	23.4
12	1.70	23.8		24	1.68	22.5

Table 5 Drop test results

Point of impact	Drop height (m)	Result	Observations
Base	1	Pass	No physical damage
Sidewall	1	Pass	No physical damage
Adjacent Sidewall	1	Pass	No physical damage
Top	1	Pass	No physical damage
Lower Corner	1	Pass	Slight indentation at point of impact

Table 6 Topple test results

Orientation	Result	Observations
0°	Pass	No spillage, closure intact
90°	Pass	No spillage, closure intact
180°	Pass	No spillage, closure intact
270°	Pass	No spillage, closure intact

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