

**UNITED NATIONS / DOT
PERFORMANCE CERTIFICATION**



6HH1 PERIODIC RETEST

**200 Liter Plastic Composite Twin Drum with
Non-Vented Plug with Dip Tube**

TEST REPORT #: 20-MN30003

Ⓢ 6HH1 / X1.9 / 320 / **
USA / +AA9938

**Insert the year packaging is manufactured

TESTING PERFORMED FOR:

RIKUTEC AMERICA INC.
371 Douglas Road
Whitinsville, MA 01588

ATTN: Mario Puzo

TESTING PERFORMED BY:

TEN-E PACKAGING SERVICES, INC.
1666 County Road 74
Newport, MN 55055
Phone: 651-459-0671
Fax: 651-459-1430

April 7, 2020

TABLE OF CONTENTS

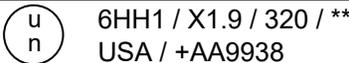
SECTION I: CERTIFICATION 3
SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS 4
 COMPONENT INFORMATION 5
SECTION III: TEST PROCEDURES AND RESULTS 10
 DROP TESTS 10
 LEAKPROOFNESS TEST 11
 HYDROSTATIC PRESSURE TEST 12
 DYNAMIC COMPRESSION TEST 13
 VIBRATION TEST 14
REGULATORY AND INDUSTRY STANDARD REFERENCES 15
SECTION IV: MATHEMATICAL CALCULATIONS 16
SECTION VI: INDIVIDUAL LOAD VS. DEFLECTION GRAPHS AND DATA 18
APPENDIX A: MANUFACTURER’S CLOSURE INSTRUCTIONS 20

SECTION I: CERTIFICATION

**Periodic Retest of the Rikutec America Inc.
 200 Liter Plastic Composite Twin Drum with Non-Vented Plug with Dip Tube**

TEN-E Packaging Services, Inc. is a current DOT UN Third-Party Certification Agency under §107.403 and certifies that the Rikutec America Inc. packaging referenced above has passed the standards of the DEPARTMENT OF TRANSPORTATION'S TITLE 49 CFR; Performance Oriented Packaging Standards, Section 178. This package is also certified under IMDG, ICAO/IATA Regulations and the UN Recommendations on the Transport of Dangerous Goods. It is the responsibility of the end user to determine authorization for use under these regulations. The use of other packaging methods or components other than those documented in this report may render this certification invalid.

SUMMARY OF PERFORMANCE TESTS

UN / DOT TEST	CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop	178.603	2.85 m	Methanol/Water	March 30, 2020	PASS
Leakproofness	178.604	30 kPa – 5 Minutes	Empty	April 7, 2020	PASS
Hydrostatic	178.605	320 kPa - 30 Minutes	Water	April 2, 2020	PASS
Dynamic Compression	178.606	1,195.0 Kg	Empty & without Closures	April 7, 2020	PASS
Vibration	178.608	4.0 Hz – 1 Hour	Water	April 6, 2020	PASS
TEST REPORT NUMBERS:			20-MN30003, 18-MN30284		
UN MARKING: (CFR 49 – 178.503)					
PACKAGING IDENTIFICATION CODE:			6HH1-Plastic Receptacle in Plastic Drum (178.522)		
PERFORMANCE STANDARD:			X (Packaging meets Packing Group I, II and III tests)		
MAXIMUM PRODUCT SPECIFIC GRAVITY:			1.9		
HYDROSTATIC TEST PRESSURE:			320 kPa		
YEAR OF MANUFACTURE:			** Insert year the packaging is manufactured		
STATE AUTHORIZING THE MARK			USA		
PACKAGING CERTIFICATION AGENCY:			(+AA) TEN-E Packaging Services, Inc. (Newport, MN CAA #2006030022)		
THIRD PARTY PACKAGING IDENTIFICATION:			+AA9938		
PERIODIC RETEST DATE:			April 7, 2021		

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE OR FIT FOR A PARTICULAR PURPOSE, ARE DISCLAIMED. In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by Rikutec America Inc. for services rendered. In the event of future changes to the above referenced test standards, it is the responsibility of Rikutec America Inc. to determine whether additional testing or updating of past testing is necessary to verify that the packaging we have tested remains in compliance with those standards.

MANUFACTURER:
 Rikutec America Inc.
 371 Douglas Road
 Whitinsville, MA 01588



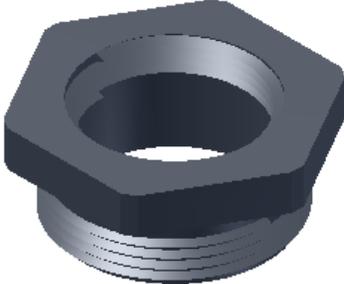
Tyler Kinderman
 Packaging Engineer
 TEN-E Packaging Services, Inc.
 1666 County Road 74
 Newport, MN 55055

SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

200 Liter Plastic Composite Twin Drum with Non-Vented Plug with Dip Tube

ASSEMBLY DRAWING	TEST LEVELS		
	Certification Type:	Periodic Retest	
	Packaging Code Designation:	6HH1	
	Packing Group:	I	
	Specific Gravity:	1.9	
	Internal Pressure:	320 kPa	
	TEST SAMPLE PREPARATION (Refer to Section IV)		
	Overall Packaging Tare Weight:	16.2 Kg	
	Fill Capacity (98% Maximum Capacity):		
	Methanol/Water Solution	184.3 Kg	
	Water	192.1 Kg	
	Package Test Weight:		
	Methanol/Water Solution	200.5 Kg	442.0 Lbs.
	Water	208.3 Kg	459.2 Lbs.
	Authorized Package Gross Mass:	381.1 Kg	840.2 Lbs.
	CLOSING METHODS		
2" Non-Vented Plug:			
Application Torque:	22 Ft-Lbs.		
Equipment:	Torque Wrench #740		
Dip Tube:			
Application Torque:	22 Ft-Lbs.		
Equipment:	Torque Wrench #740		
3/4" Plug on Dip Tube:			
Application Torque:	26 In-Lbs.		
Equipment:	Torque Wrench #740		
Safety Cap:			
Application Torque:	4 Ft-Lbs.		
Equipment:	Torque Wrench #740		
1" Black Plug & Fitting:	Installed by Manufacturer		
Refer to Appendix A for the Manufacturer's Closure Instructions			

COMPONENT INFORMATION

1" PLUG (9002571)		DRAWING	
Manufacturer: Rikutec, Altenkirchen, Germany			
Description:	1" NPS Threaded Plug		
Quantity:	1		
Material:	High Density Polyethylene, Black		
Tare Weight:	4.115 Grams		
Overall Dimensions:			
• Height	13.0 mm 0.51"		
• Diameter	30.0 mm 1.18"		
Thread Dimensions:			
• T	25.0 mm 0.98"		
• E	23.6 mm 0.92"		
Markings (QC Audit):	None		
FITTING (9002569)			
Manufacturer: Rikutec, Altenkirchen, Germany			
Description:	1-1/4" NPS Threaded Drum Fitting		
Quantity:	1		
Material:	High Density Polyethylene, Black		
Tare Weight:	6.642 Grams		
Overall Dimensions:			
• Height	16.0 mm 0.63"		
• Width	36.0 mm 1.42"		
Inside Thread Dimensions:			
• T	25.0 mm 0.98"		
• E	23.6 mm 0.93"		
Outside Thread Dimensions:			
• T	32.0 mm 1.26"		
• E	30.0 mm 1.18"		
Markings (QC Audit):	None		

NON – VENTED PLUG (9000662)		DRAWING
Manufacturer: AS Stromungstechnik, Ostfildern, Germany		
Description:	2" Buttress Threaded Plug	
Quantity:	1	
Material:	Polyethylene, Natural	
Tare Weight:	36.708 Grams	
Overall Dimensions:		
• Height	35.0 mm 1.38"	
• Diameter	80.0 mm 3.15"	
Thread Dimensions:		
• T	62.0 mm 2.44"	
• E	55.6 mm 2.19"	
Markings (QC Audit):	as	
Liner/Gasket:		
Description:	Plastic, POE Flange Gasket	
Tare Weight:	5.242 Grams	
Thickness:	7.9 mm 0.31"	
Diameter:	76.7 mm 3.02"	

DIPTUBE SAFETY CAP (S63X5 PE-0900-SF-STO)		DRAWING
Manufacturer: AS Stromungstechnik, Ostfildern, Germany		
Description:	Threaded Safety Cap	
Quantity:	1	
Material:	Polyethylene, Natural	
Tare Weight:	34.634 Grams	
Overall Dimensions:		
• Height	22.9 mm 0.90"	
• Diameter	79.0 mm 3.11"	
Thread Dimensions:		
• T	40.9 mm 1.61"	
• E	38.6 mm 1.52"	
Markings (QC Audit):	As 6-8 Nm	

3/4" PLUG (S63X5 PE-0900-SF-STO)		DRAWING
Manufacturer: AS Stromungstechnik, Ostfildern, Germany		
Description:	3/4" Threaded Center Plug	
Quantity:	1	
Material:	Polyethylene, Natural	
Tare Weight:	4.384 Grams	
Overall Dimensions:		
• Height	13.2 mm 0.52"	
• Diameter	30.0 mm 1.18"	
Thread Dimensions:		
• T	25.9 mm 1.02"	
• E	23.4 mm 0.92"	
Markings (QC Audit):	8	
Liner/Gasket:		
Description:	3/4" Polyethylene, Natural O-Ring	
Tare Weight:	0.396 Grams	
Thickness:	2.8 mm 0.11"	
Diameter:	28.7 mm 1.13"	
2" DIPTUBE (S63X5 PE-0900-SF-STO)		
Description:	2" Threaded Drum Insert and Dip Tube Assembly	
Quantity:	1	
Material:	Polyethylene, Natural	
Tare Weight:	169 Grams	
Overall Dimensions:		
• Top Diameter	73.0 mm 2.87"	
• Bottom Diameter	35.0 mm 1.37"	
• Shoulder Height	43.4 mm 1.71"	
• Tube Diameter	26.9 mm 1.06"	
• Overall Height	900.0 mm 35.43"	
3/4" Thread Dimensions:		
• T	26.9 mm 1.06"	
• E	24.4 mm 0.96"	
Safety Cap Thread Dimensions:		
• T	42.2 mm 1.66"	
• E	39.9 mm 1.57"	
2" Diptube Thread Dimensions:		
• T	63.0 mm 2.48"	
• E	56.1 mm 2.21"	
Markings (QC Audit):	1912M807	
Liner/Gasket:		
Description:	Plastic, POE Flange Gasket	
Tare Weight:	5.232 Grams	
Thickness:	7.9 mm 0.31"	
Diameter:	76.7 mm 3.02"	

BULKHEAD FITTING (9002568)		DRAWING
Manufacturer: Rikutec, Altenkirchen, Germany		
Description:	Plastic Threaded Clamping Nut	
Quantity:	2	
Material:	Black, Polyethylene	
Tare Weight:	0.5 Kg	
Overall Dimensions:		
• Height	13.5 mm 0.53"	
• Diameter	120.0 mm 4.72"	
Thread Dimensions:		
• T	88.0 mm 3.46"	
• E	85.1 mm 3.35"	
Markings (QC Audit):	None	
Foam Pads:		
Description:	(2) Black Polyethylene Foam Pads Placed Over Drum Liner Openings	
Tare Weight:	59.309 Grams	
Thickness:	6.1 mm 0.24"	
Diameter:	132.1 mm 5.159"	

TIGHT HEAD PLASTIC INNER DRUM (12200000)		DRAWING
Manufacturer: Rikutec, Altenkirchen, Germany		
Description:	200 Liter Tight Head Plastic Inner Drum	
Material/Pigment:	Polyethylene, Natural	
Method of Manufacture:	Blow Molded	
Tare Weight:	4.5 Kg	
Capacity:		
• Rated	200 Liter	
• Overflow	196.0 Kg (51.78 Gallons)	
Overall Dimensions:		
• Height	920.0 mm 36.22"	
• Overall Diameter	560.0 mm 22.04"	
• Bottom Diameter	492.5 mm 19.39"	
70 mm Opening Thread Dimensions:		
• T	65.0 mm 2.55"	
• E	56.9 mm 2.24"	
• Height	0.779"	
Clamping Ring Thread Dimensions (9002563)		
• T	86.1 mm 3.39"	
• E	82.8 mm 3.26"	
Wall Thickness:		
• Minimum	2.0 mm 0.08"	
Markings (QC Audit):	09/19-00002828	

TIGHT HEAD PLASTIC DRUM (12200003)		DRAWING
Manufacturer: Rikutec, Altenkirchen, Germany		
Description:	200 Liter Plastic Outer Drum to Contain Inner Drum	
Lifting Ring:	Fully Integrated	
Material/Pigment:	Polyethylene, Blue	
Method of Manufacture:	Blow Molded	
Tare Weight:	11.2 Kg	
Overall Dimensions:		
• Height	967.0 mm 38.07"	
• Diameter	578.0 mm 22.76"	
Opening Dimensions:		
Inside Diameter	102.6 mm 4.04"	
1" Fitting Thread Dimensions:		
• T	31.8 mm 1.25"	
• E	30.7 mm 1.21"	
Wall Thickness:		
• Minimum	4.0 mm 0.16"	
Markings (QC Audit):	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;"> u n </div> <div> 6HH1 / Y1.9 / 320 / 0519 / D BAM14926 – RIKUTEC RIKUTEC Dispense 05/19-00001570 Recirculation SPI "2" PE-HD Recycling Symbol </div> </div>	

SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Methanol/Water Solution (0.968 SG)	<ul style="list-style-type: none"> For packaging containing liquid, each packaging does not leak when equilibrium has been reached between the internal and external pressures. Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	-18°C (0°F) Chamber #202	
TEST CONTENTS TEMP.:	-19.6°C (-3.3°F)	
DROP HEIGHT:	2.85 Meters (113.0") (Refer to Section IV)	
TEST EQUIPMENT:	Quick Release Hook Mechanism	

DIAGONAL TOP CHIME (ON DIP TUBE CLOSURE) DROP TEST SET-UP AND RESULTS

	Sample #	Results	Comments/Observations
	1	PASS	No leakage. Slight deformation at point of impact.
	2	PASS	No leakage. Slight deformation at point of impact.
	3	PASS	No leakage. Slight deformation at point of impact.

FLAT ON SIDE (ON DIP TUBE CLOSURE) DROP TEST SET-UP AND RESULTS

	Sample #	Results	Comments/Observations
	4	PASS	No leakage. Slight deformation at point of impact.
	5	PASS	No leakage. Slight deformation at point of impact.
	6	PASS	No leakage. Slight deformation at point of impact.

LEAKPROOFNESS TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	<ul style="list-style-type: none"> A packaging passes the test if there is no leakage of air from the packaging. (§178.604)
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	30 kPa	
TEST DURATION:	5 Minutes	
AREA OF PRESSURIZATION:	Through the Top Head into the Inner Container	
TEST EQUIPMENT:	Regulated Air Source #: 1 Digital Pressure Gauge #: 613	

LEAKPROOFNESS PRESSURE TEST SET-UP AND RESULTS

	Sample #	Results	Comments/Observations
	13	PASS	All three samples maintained the 30 kPa test pressure for 5 minutes without leakage.
	14	PASS	
	15	PASS	

HYDROSTATIC PRESSURE TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> For each test sample, there is no leakage of liquid from the package. (§178.605)
FILL CAPACITY:	Maximum Capacity	
CLOSURE APPLICATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST PRESSURE:	320 kPa	
TEST DURATION:	30 Minutes	
AREA OF PRESSURIZATION:	Through the Closure	
TEST EQUIPMENT:	Regulated Water Source #: 2 Digital Pressure Gauge #: 615	

HYDROSTATIC PRESSURE TEST SET-UP AND RESULTS

	Sample #	Results	Comments/Observations
	7	PASS	All three samples maintained the 320 kPa test pressure for 30 minutes without leakage.
	8	PASS	
	9	PASS	

DYNAMIC COMPRESSION TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty & without Closures	<ul style="list-style-type: none"> • After application of the required load, there can be no buckling of the sidewalls sufficient to cause damage to its expected contents. • In no case may the maximum deflection exceed one inch. (§178.606)
CONDITIONING:	Ambient	
PRE-LOAD APPLIED:	50 Lbs.	
MINIMUM TEST LOAD REQUIRED:	1,195.0 Kg (2,634.5 Lbs.) (Refer to Section IV)	
PLATEN TRAVEL RATE:	1/2" per Minute	
TEST EQUIPMENT:	L.A.B. 6630 Compression System	

DYNAMIC COMPRESSION TEST SET-UP AND RESULTS

	Sample #	Load	Deflection	Results
	13	2,638 Lbs.	0.17"	PASS
	14	2,658 Lbs.	0.14"	PASS
	15	2,666 Lbs.	0.10"	PASS

Note: Refer to Section VI for the Load vs. Deflection Graphs of each test sample.

VIBRATION TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Water	<ul style="list-style-type: none"> • Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. • A packaging passes the vibration test if there is no rupture or leakage from any of the packages. • No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength. (§178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. 6000 Transportation Simulator	

VIBRATION TEST SET-UP AND RESULTS

	Sample #	Results	Comments/Observations
	10	PASS	No leakage or damage.
	11	PASS	
	12	PASS	

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②	IMDG ^③	ICAO ^④	IATA ^⑤
	October 2019 Edition	20 th Edition	2018 Edition	2019-2020 Edition	61st Edition
Drop:	178.603	6.1.5.3	6.1.5.3	6; 4.3	6.3.3
Leakproofness:	178.604 & 178; Appendix B (2) & (3)	6.1.5.4	6.1.5.4	6; 4.4	6.3.4
Hydrostatic Pressure:	178.605	6.1.5.5	6.1.5.5	6; 4.5	6.3.5
Stacking:	178.606	6.1.5.6	6.1.5.6	6; 4.6	6.3.6
Vibration:	178.608	---	---	4; 1.1.1 & 4;1.1.4	5.0.2.7

① United States Department of Transportation Code of Federal Regulations (CFR) Title 49, Transportation, Parts 100-185

② The United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations (UN – Orange Book)

③ International Maritime Dangerous Goods Code (IMDG)

④ Technical Instructions for the Safe Transport of Dangerous Good by Air (ICAO)

⑤ International Air Transport Association (IATA) Dangerous Goods Regulations

INDUSTRY STANDARD REFERENCES

Drop:	ASTM ^⑥ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ASTM ^⑥ D7790:	Standard Test Method for the Preparation of Plastic Packagings Containing Liquids for United Nations (UN) Drop Testing
	ISO ^⑦ 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping
Hydrostatic Pressure:	ASTM ^⑥ D7660:	Standard Guide for Conducting Internal Pressure Tests on United Nations (UN) Packagings
Dynamic Compression:	ASTM ^⑥ D642:	Standard Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads
	ISO ^⑦ 12048:	Packaging – Complete, Filled Transport Packages – Compression and Stacking Tests Using a Compression Tester
Vibration:	ASTM ^⑥ D999:	Standard Test Method for Vibration Testing of Shipping Containers
	ISO ^⑦ 2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency

⑥ American Society for Testing and Materials (ASTM)

⑦ International Organization for Standardization (ISO)

EQUIPMENT

All inspection, measuring and test equipment that can affect product quality is calibrated and adjusted at prescribed intervals, or prior to use, and is traceable to NIST, using ANSI Z540 as an overall guide for calibration certification.

SECTION IV: MATHEMATICAL CALCULATIONS

INFORMATION USED FOR CALCULATIONS

Overall Packaging Tare Weight (PTW):	16.2 Kg	
Overflow Capacity (OFC):		
Methanol/Water	188.0 Kg	
Water	196.0 Kg	51.8 Gallons (GAL)
Packing Group:	I	
Product Specific Gravity (PSG):	1.9	
Packing Group Multiplication Factor (MF):	1.50	
Nesting Height of one Package (NH):	37.75 Inches	
Stack Test-# of Samples Tested Simultaneously:	0	

98% OF OVERFLOW

Overflow Capacity (OFC) x 98%

<u>OFC</u>	x	<u>98%</u>		
188.0	x	98% =	184.3 Kg	Methanol/Water
196.0	x	98% =	192.1 Kg	Water

PACKAGE TEST WEIGHT

Overall Pkg Tare Weight (PTW) + 98% Overflow Capacity (OFC)

<u>PTW</u>	+	<u>98% OFC =</u>		
16.2	+	184.3	200.5 Kg	442.0 Lbs. Methanol/Water
16.2	+	192.1	208.3 Kg	459.2 Lbs. Water

CALCULATED PACKAGE GROSS MASS (CPGM)

Overall Pkg Tare Weight (PTW) + (Product SG (PSG) x 98% Overflow (OFC))

<u>PTW</u>	+	<u>(PSG</u>	x	<u>98% OFC)</u>	
16.2	+	1.9	x	192.1	
		381.1	Kg	840.2	Lbs.

DROP HEIGHT

Calculation For Product Specific Gravities Exceeding 1.2

Product Specific Gravity (PSG) x Packing Group Multiplication Factor (MF)

<u>PSG</u>	x	<u>MF</u>		<u>Packing Group:</u>	<u>I</u>
1.9	x	1.50			
		2.85	Meter	<u>Required Drop Height</u>	<u>Actual Drop Height</u>
				112.2 Inches	113 Inches

DYNAMIC COMPRESSION TEST LOAD CALCULATIONS

Dynamic Compression Test Load Calculation

Where

- A=** Applied Load in Lbs.
- n=** Minimum number of containers that, when stacked reach a height of 3m (118 inches)-(See Calculation below)
- s=** Product Specific Gravity-(PSG)
- w=** Overall package tare weight (Lbs.)
- v=** Maximum Container Capacity (Gal.)
- 8.3** Weight in pounds of 1 gallon of water
- 1.5** Compensation factor that converts the static load of the stacking test into a load suitable for Dynamic Compression Testing

$$\frac{A}{2,634.5} = \frac{n \times ((w + (s \times v \times 8.3 \times 0.98)) \times 1.5)}{2.1 \times 35.8 \times 1.9 \times 51.8 \times 0.98 \times 1.5}$$

1,195.0 Kg 2,634.5 Lbs.

n = Number of Packages in a 3m High Stack (118 / Nesting Height (NH) -1)

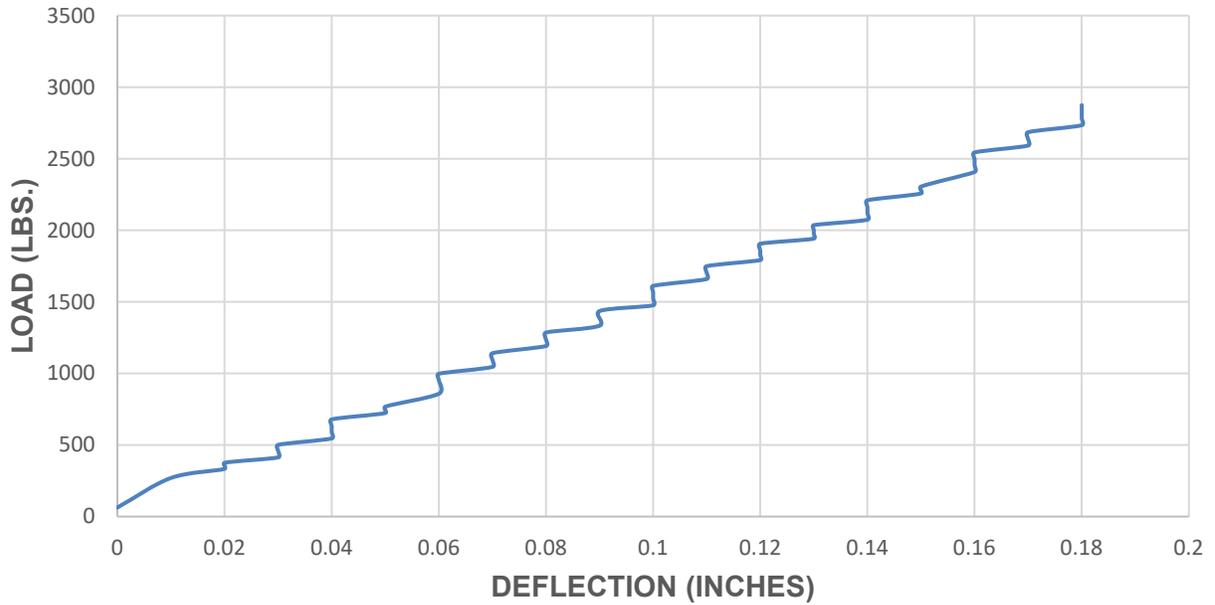
$$\frac{118}{NH} - 1 = n$$

118 / Nesting Height of one Pkg (NH) - 1

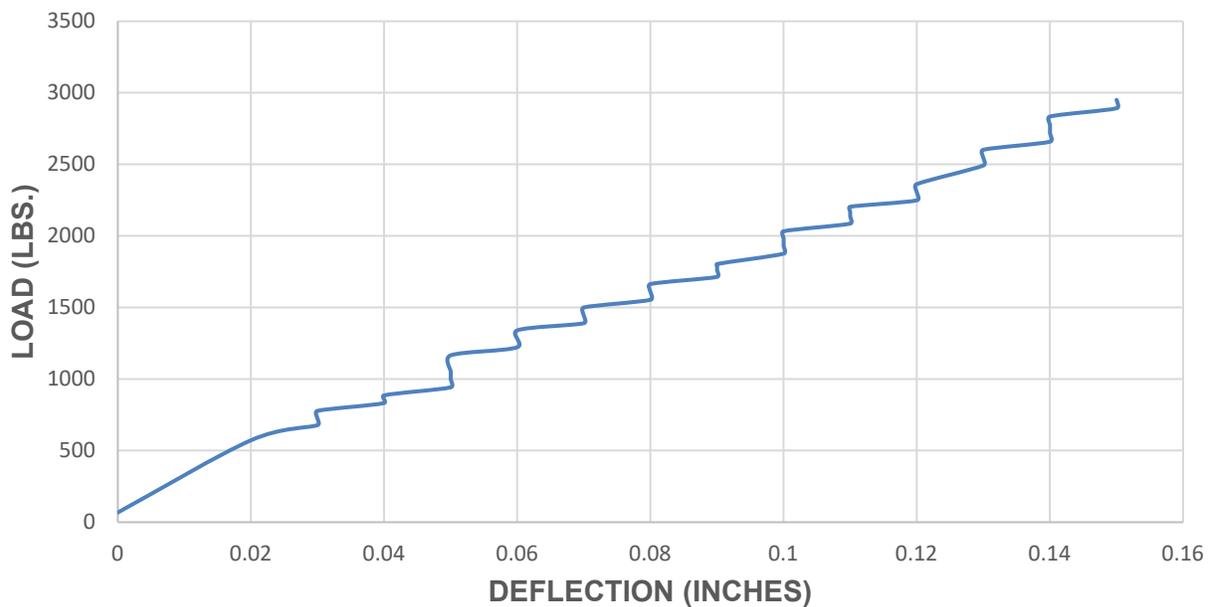
$$\frac{118}{37.75} - 1 = 2.1$$

SECTION VI: INDIVIDUAL LOAD VS. DEFLECTION GRAPHS AND DATA

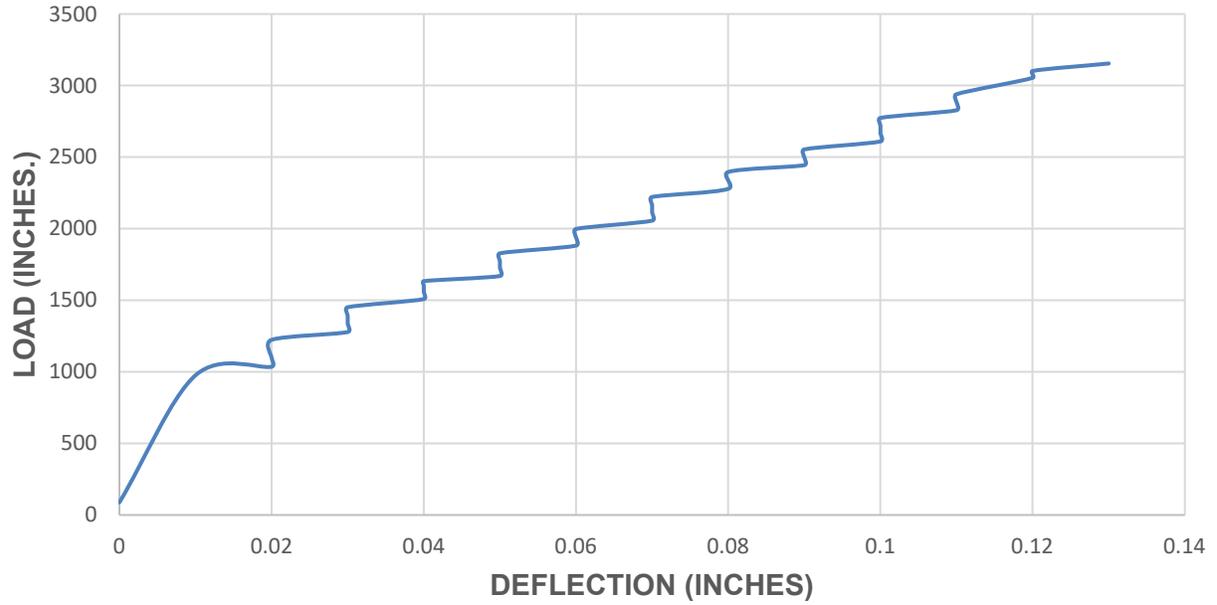
LOAD VS. DEFLECTION GRAPH – SAMPLE #13



LOAD VS. DEFLECTION GRAPH – SAMPLE #14



LOAD VS. DEFLECTION GRAPH – SAMPLE #15



APPENDIX A: MANUFACTURER'S CLOSURE INSTRUCTIONS

Operating Instructions / Handling

Before using, read carefully and store in a safe location



QC-System Container Closure Standard and Conductive Series "DT1 * DT2 * DT3"

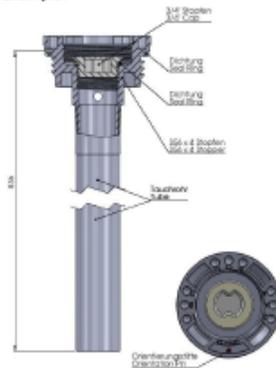


DT standard

DT conductive

The DT1, DT2 and DT3 Quick Connect container closures of the DK/RK/JK/AK/DRK/AA/PK/S series are used together with the QC-System dispense connection element to ensure the error-free filling and dispensing of liquid chemicals from containers, for example drum-shaped transport containers. The container closure is used to prevent contamination from external influences that negatively impact the purity of liquid special chemicals, such as high-purity chemicals for electronic component production. In its standard design, it is intended for the clean and safe dispensing / filling of inorganic chemicals; in its conductive version, it is intended for the clean and safe dispensing / filling of organic chemicals. The conductive version is electrostatically safe in accordance with Cenelec Technical Report TR 50404:2003 and can thus be used in zones 1 and 2 for liquids of the entire IIA explosion group.

Example:



Scope of delivery:

Container closures are welded in PE bag "free of contaminants" and delivered in an outer package made of carton.

Designations:

Label on PE bag: "article number, order number, date and number of pieces"

Document pocket in carton: Product-relevant specification document

Conditioning:

Free of contaminants.

Installation/commissioning

The container closure is inserted in a container opening that can accept a plug head in such a way that it can be replaced. Connected to the plug head is a riser tube (also referred to as a dip tube), which is mounted in the container opening and generally extends to the bottom of the container. After removing the conventional container closure, the dip tube removed from the PE bag is inserted in the open plug head of the container. The plug head of the container is equipped with an internal thread with which the external thread of the plug head can engage. With the help of an optionally available drum wrench and a torque wrench, the Quick Connect container closure is tightened with the correct torque so that it can be reliably connected to the container in a leak-proof manner. Before inserting the dip tube in the container, perform any necessary chemical or customer-specific special cleaning of the container closure. Using the coding recesses arranged around the perimeter of the plug head, a congruent dispensing connection element (dispense / filling head) shaped in the mirror image of the plug head can now be attached.



Safety precautions for dip tubes:

The maximum period of use of Quick Connect dip tubes should not exceed two years. Particularly when using with hydrogen peroxide, one year is not to be exceeded; for nitric acid and nitric acid mixtures, it is six months.

For flammable liquids, only container closures of the "CDP" version may be used. Grounding of the dip tube is to be ensured with suitable means. With respect to design type approval of packagings and IBCs for the transport of dangerous goods, please inquire with the respective manufacturer.

The filler or shipper of chemicals is responsible for safe transport. For the proper closing of containers with QC container closures, plug heads or connection elements, we recommend the tightening torques listed below. For binding torque values, contact the container manufacturer.

1.) Tightening torques for steel/plastic:

Packaging type	Steel-plastic combination
Package code UN	1A1 / 8HA1
Thread (BCG)	56x4
Tightening torques (Nm)	25 +5

2.) Tightening torques for PE tight-head drums

Packaging type	PE tight-head drums		
Package code UN	1H1		
Thread (BCG)	56x4	62x5	70x5
Tightening torques (Nm)	20 +5	30 +5	35 +5

3.) Tightening torques for composite IBCs

Packaging type	Composite IBCs		
Package code UN	31HA1 / 31HR1		
Thread (BCG)	56x4	62x5	70x5
Tightening torques (Nm)	20 +5	30 +5	35 +5



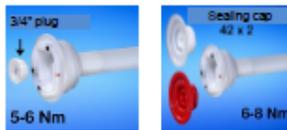
Operating Instructions / Handling

Before using, read carefully and store in a safe location



QC-System Container Closure Standard and Conductive Series "DT1 * DT2 * DT3"

4.) Tightening torques for dip tube closures



Maintenance:

The container closure is to be visually inspected at regular intervals - at least 1x per month - for damages and discolourations.



To check the container closure for secure seating and tightness in the container, it should be readjusted after no more than one year with a lower torque than is specified in the "Tightening torques" table. (not applicable for hydrogen peroxide and nitric acid). For this purpose, set the torque of your tool to "20 Nm" and perform the test. Under no circumstances may the container closure be unscrewed prior to the test if it will be used further, as the O-ring seated in the external thread of the plug head will no longer ensure reliable sealing. When unscrewing the plug head from the container, it is mandatory that the O-ring seal be replaced.

Coding:

The container closure can optionally be operated with a pin/hole coding system. To use, please refer to the list of chemical codes. For chemicals not listed here, please contact the chemical manufacturer.

Technical details:

Riser tube material: PE, PP, CDP conductive

Connection thread on container: 56PP, 70PP, 70x5PE, 62PE, S64 (2" buttress), G2", KS80PE, FL150

Options:
Other threads on request.

Serial number:
Engraving on the upper edge of the plug head

Example:



Immersion depths:
Any desired length, increments in millimetres, container-specific according to example list.

Seals:
Standard PE-LD.
Deviating from standard: FPM, POE

Security and closure systems:

For the seal on the open container closure, "sealing plugs" can be fitted in the internal thread section that reliably seal the plug head. Containers can either be provided with a conventional closure or may already be equipped with such a plug head that includes the "sealing plugs" for sealing on delivery.

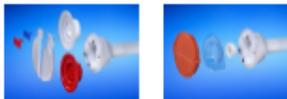
Sealing plug:



S = 3/4" / T = 42x2 closed

V = 3/4" / W = 42x2 vented

Tamper-evident closures:



O-S-S reusable

S62 disposable Sealing cap

The O-S-S reusable tamper-evident closure includes two seals of different colours that provide information on the condition of the container with respect to contents.

Blue = container full, closed
Red = container empty, open

The S62 disposable sealing cap can only be used with the plug head of size S62.

After pulling out the plug head, the cap can no longer be used and must be replaced if necessary.

Flexible bellows:

The riser tube that is connected to the plug head and which extends into the interior of the container is provided with a "flexible bellows section" on account of its construction. The flexible bellows ensure the required length adjustment of the distance between the container bottom and the screwed-in plug head and thereby guarantees reliable, almost complete emptying of the liquid from the container.

Flexible bellows versions:



B = flexible bellows, top

F = flexible bellows, bottom

Liability:

AS Strömungstechnik GmbH can accept no liability for errors or damages that result from improper handling of the QC container closures. Improper handling includes, in particular, failure to observe the operating instructions. Testing the chemical resistance of the dip tubes and their operational life is the responsibility of the customer. In the interest of the further development of AS products, we reserve the right to make design changes.

Accessories:

Drum wrench

For opening / closing the container closures and sealing plugs.

Order no. RDH 79003 PE (QC-2)
Order no. RDH 79005 PVDF (QC-2)
Order no. RDH 79007 PE (QC-3)

Coding control gauge

For checking the corresponding coding on the plug head

Order no. RDH 89701-02 (QC-2)
Order no. RDH 89701-03 (QC-3)