



Life Sciences Solutions

Secure sample storage, transportation and data management



Worthington Industries is a leading designer and manufacturer of cold chain equipment for the Life Science and Animal Husbandry markets. Products are manufactured and shipped with care to customers through our global distribution network from Theodore, AL, USA (the former manufacturing facility for CryoScience by Taylor-Wharton® products).

WorthingtonIndustries.com/LifeSciences

LABS Series



State-of-the-art LABS Freezers

High efficiency, very low LN₂ consumption

- LN₂ storage in either liquid or vapor phase
- Near LN₂ temperatures maintained at top of inventory storage system for overall sample viability

Single pivot point aluminum turntable design – smooth rotation and ergonomic use

- Eliminates any mechanical component maintenance
- Full height, segmented and labeled turntable provides easy inventory storage access and management
- Convenient access to measure LN₂ level

Hinged lid and stainless steel table top

- The lid includes locking capabilities and activates an automatic defog for quick viewing of inventory storage
- The table top provides a working surface and protection to electrical and plumbing components

Enhanced and intuitive controller technology

- Discrete thermistor level measurement and thermocouple temperature resolution within 0.1°C
- Capabilities for data collection, event scheduling and enhanced security settings
- Second access point for monitoring temperature

Ease of Use

- Integral folding step with slip-resistant surface, and mechanical lock for securing the step when stowed
- Flexible Fill Hose with 1.27 cm I.D. includes dual swivel connectors and a 3/8" male NPT adaptor included with purchase

MODELS		20K	38K	40K	80K	94K
External Operating Height (Top of Step to Lid opening)	in. mm.	42 1067	44 1118	42 1067	42 1067	40 1016
Step Height	in. mm.	11 275	11.5 287.5	11/16.3 275/407.5	11/17 275/425	11/22 275/550
Height (Floor to Opening)	in. mm.	53 1346	56 1422	53 1346	53 1346	62 1575
Usable Height, Internal	in. mm.	30 762	30 762	30 762	30 762	35.3 897
Outside Diameter	in. mm.	34 864	42 1067	45 1143	59.5 1511	59.5 1511
Internal Working Diameter	in. mm.	29.5 750	38 965	40.5 1029	55 1397	55 1397
Neck Opening	in. mm.	13 330	18 457	18 457	24.5 622	24.5 622
Capacity						
Total LN ₂ Capacity (Liquid Storage)	L.	371	623	698	1269	1595
Total LN ₂ Capacity (Vapor Storage)	L.	36	73	80	137	300
Weight, Empty	lb. kg.	650 295	930 422	920 417	1550 703	1700 771
Maximum Gross Weight	lb. kg.	1311 595	2040 925	2164 981	3811 1729	4542 2060
Inventory Control System Specifications						
No. 100/81 Cell Racks		14	26	30	58	60
No. Shelves/Rack		13	13	13	13	15
No. 25 Cell Racks		4	12	8	12	8
No. Shelves/Rack		13	13	13	13	15
Vial Capacity, 2 ml		19500	37700	41600	79300	93000
Bag 25 ml (7 Level Rack)		1624	2688	3108	5999	6856
Bag 50 ml (7 Level Rack)		924	1582	1876	3381	3864
Bag 250 ml (5 Level Rack)		500	900	990	1920	2304
Bag 500 ml (5 Level Rack)		420	690	830	1610	1932

CS Series Control System

Intuitive LN₂ Control Technology

Control, monitor and secure your system with the CS Series Control.

- Fully enclosed and protected battery back-up (optional) provides up to 72 hours of fully operational capability, including automatic LN₂ filling.
- Solidly constructed enclosure with recessed display mount provides increased protection of electronics. The adjustable mounting post allows for greater viewing and operation.
- Communication center 12 VDC power, optional 12-volt battery back-up, remote alarm and three (3) communication channels are easily identified and accessible.
- Secured protective battery cover

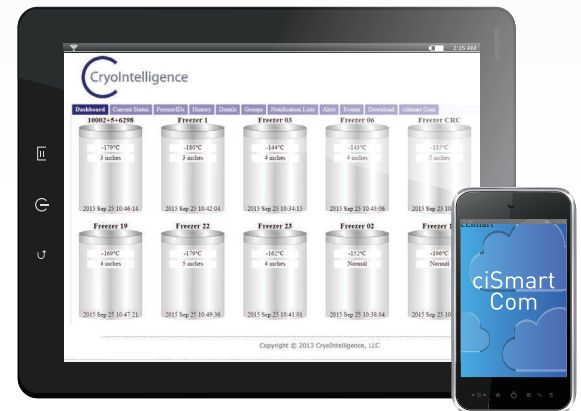
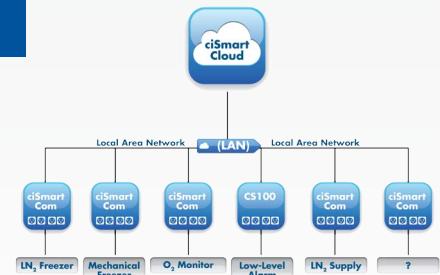


ciSmart™ COM Data Management



ciSmart Com is designed for freezer management and advanced reporting. It enhances the feature set of Worthington cryogenic controllers and seamlessly communicates with the ciSmart™ Cloud platform for powerful data features.

- Collects and analyzes multiple operational parameters
- Automatic data collection
- Data graphing
- Alarm notifications
- Advanced reporting
- Control log downloads
- Firmware update capability
- Local and global access
- Scalable
- Plug and play



K Series



K Series freezers offer reliable liquid nitrogen storage with controllable temperatures.

- Vapor* or liquid storage
- Intuitive touch controls
- Stainless Steel vacuum vessel
- Modular design
- Durable powder coated cabinet
- Caster mounted
- Superior vacuum performance



*When using a 10K for vapor phase storage, we recommend using aluminum storage racks.

MODEL		3K	10K	24K	38K
Static Holding Days		19	33	52	74
Working Time days		12	N/A	N/A	N/A
Evaporation Rate liters/days		2.5	5.0	7.0	8.0
Liquid Nitrogen Capacity - liters		48	165	365	590
Weight Empty	lbs. kg.	42.0 19.1	245 111	405 184	565 256
Weight Full	lbs. kg.	125 56.7	537 243	1046 474	1616 733
Neck Diameter	in. mm.	14.0 356	21.0 533	31.0 787	39.0 991
Overall Height	in. mm.	29.7 754	44.0 111.8	44.0 111.8	49.0 1245
Overall Dimensions	in. mm.	15.4 391	23.1x30.5 587x775	34.0x38.5 864x965	42.0 1067
Usable Height - Internal	in. mm.	19.2 488	29.0 737	29.0 737	29.0 737
Internal Diameter	in. mm.	14.0 356	21.0 533	31.0 787	39.0 991

CAPACITY		3K	10K	24K	38K
2 ml Plastic Vials		3024	10400	24050	38350
Number of 100/81 Cell Racks		N/A	7	17	28
Number of 25 Cell Racks		N/A	4	6	6
Number of Shelves		N/A	13	13	13
Box Size					
Shape		Triangle			
in.		6.75x6.87			
mm.		171x175			
Vials per box		56			
0.50cc straws, 10 per goblet, 2-13mm goblets per can, Two tier turn-table inventory control system		N/A	44000	59400	114000
Roller Base		366742	N/A	N/A	N/A

LS Series

Our laboratory systems refrigerators are designed to hold large vials in convenient box-type storage racks.

- Rugged construction – ribbed high strength aluminum body, magneformed necktube design, durable paint system
- Convenient storage systems – rack index location ring and internal location fixture, computer compatible box storage is ideal for simple inventory management
- Superior vacuum performance with super insulation provides maximum holding times
- Security – optional low-level alarm is available with remote connection capability
- Lockable lids
- Mobility - roller bases available



MODEL		LS750	LS3000	LS4800	LS6000
Static Holding Days		130	106	153	194
Working Time days		80	66	96	120
Evaporation Rate liters/days		0.27	0.76	0.85	0.84
Liquid Nitrogen Capacity - liters		35	81	130	165
Weight Empty	lbs. kg.	39 17.7	70 31.8	90 40.9	121 55.0
Weight Full	lbs. kg.	101.3 46.0	214.2 97.4	312.4 146.1	410.0 186.4
Neck Diameter	in. mm.	4.7 119	8.5 216	8.5 216	8.5 216
Overall Height	in. mm.	26.8 681	28.8 731	35.1 892	39.0 991
Overall Diameter	in. mm.	18.8 478	26.9 683	26.9 683	26.9 683
Number of Racks		6	6	6	6
Number of Shelves/Rack		5	5	8	10
2 ml Vial Capacity		750	3000	4800	6000
Box Size					
Shape		Square	Square	Square	Square
Size in.		3.0 x 3.0	5.0 x 5.0	5.0 x 5.0	5.0 x 5.0
Size mm.		76x76	127x127	127x127	127x127
Vials per box		25	100	100	100
Roller Base		366783	366864	366864	366864
Cryo-Sentry Level Alarm		366833	366644	366867	366658

XT Series



The extended time cryogenic refrigerators are designed for long-term storage in cryogenic temperatures.

- Rugged construction – ribbed high strength aluminum body, magneformed necktube design, durable paint
- Versatile storage system – convenient canister numbered index location ring and tapered internal canister locator
- Superior vacuum performance with super insulation provides maximum holding times
- Security – optional low-level alarm is available with remote connection capability on larger models
- Lockable lids (except for XT10)
- Mobility – roller bases available for some models

MODEL		XTL3	XTL8	XT10	XT20	XT34
Static Holding Days		27	80	100	230	340
Working Time days		17	50	62	140	212
Evaporation Rate liters/days		0.11	0.10	0.10	0.09	0.10
Liquid Nitrogen Capacity - liters		3	8	10	20.7	34
Weight Empty	lbs. kg.	7.2 3.3	19.6 8.9	16.5 7.5	26 11.8	34.75 15.8
Weight Full	lbs. kg.	12.5 5.7	33.8 15.4	34.3 15.6	62.8 28.6	95.3 43.3
Neck Diameter	in. mm.	2.0 51	2.0 51	2.0 51	2.0 51	2.0 51
Overall Height	in. mm.	17.2 437	19 483	23.8 597	25.8 655	26.3 668
Overall Diameter	in. mm.	7.6 193	15.6 396	11.4 290	15.6 396	18.8 478
Number of Canisters		6	6	6	6	6
Canister Dimensions	in. mm.	1.5x5 38x127	1.5x5 38x127	1.5x11 38x279	1.5x11 38x279	1.5x11 38x279
Number of 1.2 ml & 2.0 ml vials (5/cane)		N/A	N/A	150	150	150
Number of 1.2 ml & 2.0 ml vials (6/cane)		N/A	N/A	180	180	180
Number of 1/2 cc straws - (10 per cane)		N/A	N/A	540	540	540
Number of 1/2 cc straws - Bulk (1 level)		750	750	N/A	750	750
Number of 1/2 cc straws - Bulk (2 levels)		N/A	N/A	1500	1500	1500
Roller Base		N/A	366742	N/A	366742	366783
Low Level Alarm		N/A	N/A	N/A	366786	366786

HC Series

Our high capacity refrigerators are designed for storing large quantities.

- Large storage capacity
- Rugged construction – ribbed high strength aluminum body, magneformed necktube design, durable paint
- Numbered index ring and tapered internal canister locator
- Superior vacuum performance with super insulation provides maximum holding times
- Security – lockable lid and optional low-level alarm with remote connection available
- Mobility – roller bases available for all models



MODEL		HCL12	HC20	HC34	HC35	VHC35	VHC38
Static Holding Days		60	87	200	130	130	120
Working Time days		37	54	125	81	81	75
Evaporation Rate liters/days		0.20	0.23	0.17	0.27	0.27	0.31
Liquid Nitrogen Capacity - liters		12	20	34	35	35	38
Weight Empty	lbs. kg.	21.6 9.8	26.4 12.0	35.38 16.1	39 17.7	37.9 17.2	38.2 17.3
Weight Full	lbs. kg.	43.0 19.5	62.0 28.2	95.9 43.6	101.3 46.0	100.2 45.5	104.7 47.5
Neck Diameter	in. mm.	3.6 91	3.6 91	3.6 91	4.7 119	4.7 119	5.0 127
Overall Height	in. mm.	19.0 482	24.25 615	26.31 668	26.8 681	26.8 681	26.8 681
Overall Diameter	in. mm.	15.6 396	15.6 396	18.8 478	18.8 478	18.8 478	18.8 478
Number of Canisters		6	6	6	10	6	6
Canister Dimensions		2.75x5 70x127	2.75x11 70x279	2.75x11 70x279	2.64x11 67x279	3.7x11 94x279	4.13x11 105x279
Number of 1.2 ml & 2.0 ml vials (5/cane)		N/A	570	570	850	1050	1260
Number of 1.2 ml & 2.0 ml vials (6/cane)		N/A	684	684	1020	1260	1512
Number of 1/2 cc straws - (10 per cane)		N/A	1850	1850	2800	3000	3528
Number of 1/2 cc straws - Bulk (1 level)		2940	N/A	N/A	N/A	N/A	N/A
Number of 1/2 cc straws - Bulk (2 levels)		N/A	5880	5880	9800	9900	11520
7th Canister		N/A	N/A	N/A	N/A	R036-9C27	R038-9C28
Roller Base		366742	366742	366783	366783	366783	366783
Cryo-Sentry Level Alarm		N/A	366815	366815	366845	366833	369628

LD Series



Our cryogenic liquid dewars are designed to store and dispense small amounts of liquid nitrogen.

- High performance modern construction and advanced insulation materials assure high thermal efficiency
- New rugged construction, ribbed high strength aluminum body, magneformed necktube design, and more durable paint system

MODEL		LD4	5LD	LD10	LD25	CLASSIC-25	LD35	LD50
Static Holding Days		10	6	45	109	119	152	122
Evaporation Rate - liters/days		0.40	0.77	0.22	0.23	0.21	0.23	0.41
Liquid Nitrogen Capacity - liters		4	5	10	25	25	35	50
Weight Empty	lbs. kg.	6.6 3.0	6.9 3.1	14.5 6.6	23.2 10.5	19 8.6	35.1 16.0	38.7 17.6
Weight Full	lbs. kg.	13.7 6.2	15.8 7.2	32.3 14.7	67.7 30.8	63.5 28.9	97.4 44.3	127.7 58.0
Neck Diameter	in. mm.	1.2 30	5.6 142	2.0 51	2.5 64	2.0 51	2.5 64	2.5 64
Overall Height	in. mm.	17.0 432	17.5 445	23.5 597	25.8 655	22.9 582	26.3 668	32.4 823
Overall Diameter	in. mm.	7.6 193	7.6 193	11.4 290	15.6 396	15.5 394	18.8 475	18.8 475
Liquid Withdrawal Device P/N		N/A	N/A	N/A	366597	N/A	366597	366597
Roller Base P/N		N/A	N/A	N/A	366742	366577	366783	366783
Tipping Stand P/N		N/A	N/A	N/A	D025-8C00	N/A	N/A	N/A
Dipper P/N		N/A	366744	366744	366744	366744	366744	366744

- Easy operation lightweight snap-on cap and necktube assures tight closure and easy access, convenient larger handles
- Superior vacuum performance with super insulation provides maximum holding times
- Optional equipment includes liquid withdrawal device, tipping stand, dippers and roller base (for larger models)

CX Series

Cryo Exchange dry shippers are designed to safely transport materials at cryogenic temperatures.

- Advanced Concept Adsorbent enables faster charging
- Complies with IATA regulations
- Rugged construction - dependable, stronger necktube design, ribbed high strength aluminum body, durable paint system
- Superior vacuum performance with super insulation provides maximum holding times
- Optional storage accessories include a five shelf rack box system and blood bag rack for the CXR500
- Temperature loggers are available for all models
- Lockable lids



MODEL		CX100	CXR100	CXR500
Static Holding Days		22	16	11
Working Time days		17	11	7
Evaporation Rate - liters/days		0.19	0.23	0.64
Liquid Nitrogen Absorbed - liters		4.1	3.7	7
Weight Empty	lbs. kg.	11.7 5.3	11.7 5.3	30 13.6
Weight Full	lbs. kg.	19 8.6	18.3 8.3	42.5 19.3
Neck Diameter	in. mm.	2.78 71	3.58 91	8.5 216
Overall Height	in. mm.	18.4 467	19.4 493	26.9 693
Overall Diameter	in. mm.	9.2 234	9.2 234	15.5 391
Number of Canisters		1	1	N/A
Canister Dimensions	in. mm.	2.64x11.0 67x279	2.64x11.0 67x279	N/A N/A
Number of 1.2 ml & 2.0 ml vials (5/cane)		85	85	500
Number of 1.2 ml & 2.0 ml vials (6/cane)		102	102	500
Number of 1/2 straws (10/cane)		280	280	N/A
Number of 1/2 cc straws - Bulk (2 levels)		800	800	N/A

ACCESSORIES

Shelf Stainless Steel Rack (100 cell plastic box)	N/A	N/A	366650
Stainless Steel Blood Bag Rack	N/A	N/A	366543
Replaceable Adsorbent Kit	N/A	367556	367556
Spare Canister	366695	367541	N/A
Spare Necktube Core	366694	367565	366540
Poly Carb 100 Cell Box (case of 24)	N/A	N/A	366995
Round Black Shipping Case	367817	367817	367818
Square Grey Shipping Case	366548	366548	N/A

AI Series

Our TORO and AI21 cryogenic refrigerators, designed specifically for animal insemination, offer greater capacity, maximum hold times and durability for rugged conditions.

- Built to last—lightweight ribbed aluminum exterior construction and magneformed joints for maximum structural integrity
- Reliable—designed and constructed to stringent specifications and the highest quality requirements
- Ready—samples can be easily retrieved and stored for an extended period of time

The new AI Shield™ provides a solution for protecting frozen bull semen from adverse temperature fluctuations common in removing the canister from cryogenic refrigerators.

- Improved sample viability
- Higher conception rates
- Increased productivity



MODELS	AI21	TORO
Static Holding Time Days	221	253
Working Time Days	138	158
Evaporation Rate	liters/days 0.095	0.095
Liquid Nitrogen Capacity	liters 21	24
Weight Empty	lbs.(kg.) 26 (11.8)	26.2 (11.9)
Weight Full	lbs.(kg.) 63.4 (28.8)	69 (31.3)
Neck Diameter	in.(mm.) 2.18 (55.4)	2.18 (55.4)
Overall Height	in.(mm.) 25.8 (655)	25.8 (655)
Overall Diameter	in.(mm.) 15.6 (396)	15.6 (396)
Number of Canisters	6	6
Canister Dimensions	in.(mm.) 1.65x11 (41.9x279)	1.65x11 (41.9x279)
Number of 1.2 ml & 2.0 ml vials (5/cane)	210	210
Number of 1/2 cc straws - (10 per cane)	720	720
Number of 1/2 cc straws - Bulk (1 level)	1122	1122

ACCESSORIES		
Roller Base	366742	366742
Low-Level Alarm	367676	367676

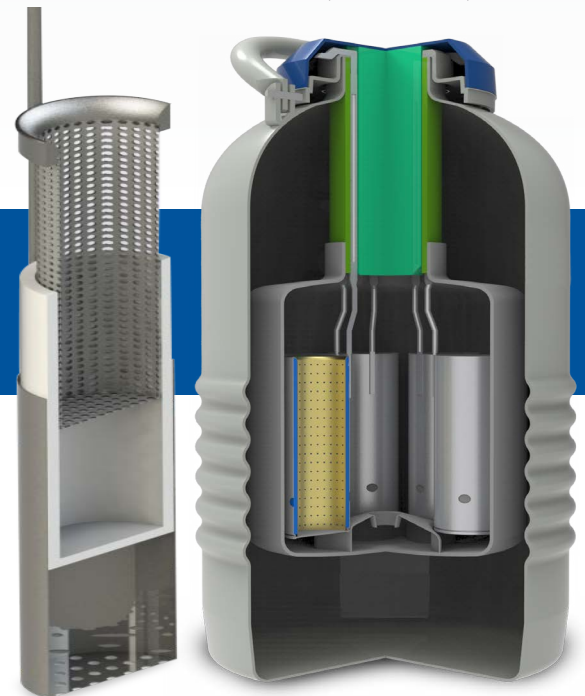
MODELS	AIS3	AIS1.5
Capacity (Ltrs.)	3.5	1.5
Empty Weight (Kgs.)	3	1.8
Full Weight (Kgs.)	6	3
Neck Diameter (mm)	51	32
Outer Diameter (mm)	220	175
Total Height (mm)	460	375
Static Evaporation Loss Rate (Ltrs/day)	0.14	0.12
Static Holding Time (Days)	25	13
Canister O.D. (mm)	39	22
Canister Height (mm)	125	127
No. of Canisters (No.)	6	3
Straw Holding Capacity Single Level (0.5ml/0.25ml)	94/212	12/27
Straw Holding Capacity Double Level (0.5ml/0.25ml)	NA	NA

AI SHIELD™
Innovative Thermal Protection



**Protect Your Investment.
Reduce AI Failure.**

WorthingtonIndustries.com/AIShield



Accessories

Roller Base & Tipping Stand

The sturdy aluminum, 5-caster roller base enables movement of refrigerators and dewars easily and safely. Choose from three sizes to fit either the 15.6 in. (396 mm) dia., 18.8 in (478 mm) dia., or the 26.7 in (678 mm) dia. units. The tipping stand for the 25LD provides mobility and assists in transferring liquid nitrogen. Both include lockable casters.



Liquid Withdrawal Device

The Liquid Withdrawal Device enables the LD25, LD35 and the LD50 to conveniently pressure-transfer liquid nitrogen at rates up to 8 liters per minute. The low pressure (10 psig / 0.7 bar) assures safe dispensing through a phase separator or an accessory transfer hose. Model 80 phase separator comes standard with this device.

P/N 366597



Inventory Control Systems

Complete offering of inventory control systems for all cryogenic vessels:

- Stainless Steel and Aluminum Racks, including new "Light" Vertical Racks
- Polycarb Boxes - 25, 81 and 100 cell
- Cardboard Boxes - 25 and 81 cell



Dippers & Measuring Rods

Safe and convenient LN2 dipper available. Dipper capacity of 0.7 cubic inches (12 cc). The low conducting measuring rod will clearly show the LN2 level of a dewar in inches and centimeters.

Dipper: 366744

Measuring Rod (36")

P/N 366784

Measuring Rod (48")

P/N 367656



Safety Gloves and Aprons

Complete offering of cryogenic safety supplies to ensure user protection

- Cryogenic Gloves – available in wrist, elbow and arm lengths in multiple sizes
- Cryogenic Aprons – available in multiple sizes



Also Available:

- Replacement Canisters and Neck Tube Cores
- Vial Retrieval Tool for safe removal of misplaced items within freezers



Large Nitrogen Supply Containers

Liquid Cylinders

Low pressure cylinders are used to supply and store liquefied gases with capacities of 180-265 liters.

MicroBulk Cylinders

Secure, on-site storage of cold liquid product. Available in sizes: 1000, 1500, 2000, 3000 liters.



Cryo-Sentry Low Level Alarm

Providing security for valuable biological samples, the low level alarm will provide a visual alarm, an audible alarm and a relay output when the liquid nitrogen in the vessel needs to be replenished. The alarm offers an optional remote alarm plug, which can be attached to a dialer or monitoring system to advise of an alarm when the lab is unattended. Recommended for stored product protection. Operates using global 9VDC Wall Transformer or AA batteries. For use with XT20, XT34, HC20, HC34, HC35, VHC35, VHC38, LS750, LS3000, LS4800, LS6000, AI21 and TORO vessels.



Cryogenic Phase Separators

Designed to minimize hazardous splashing, phase separators are available in three different sizes to accommodate transferring liquids into various open containers. The two larger phase separators are designed to fit the 3/8" MNPT end of Worthington transfer hoses.

- 2 3/4" (69.9 mm) x 1 3/8" (34.9 mm) OD, 3/8" FNPT P/N 367076
- 1 1/4" (31.8 mm) x 1" (25.4 mm) OD, 3/8" FNPT P/N 367077
- 1 1/2" (38.1 mm) x 1/2" (12.5 mm) OD, 1/8" FNPT P/N 367078



Transfer Hoses

Standard transfer hoses are constructed of flexible stainless steel suitable for the transfer of cryogenic fluids and are available in 4 ft. (1.2 m) or 6 ft. (1.8 m) lengths. Hoses are fitted with a 3/8 in. NPT male fitting and a CGA295 female fitting, or a CGA295/CGA295 female fitting. Vacuum-Jacketed hoses are also available.

- 4' (1.2m) - CGA295 x 3/8" MNPT P/N 367112
- 6' (1.8m) - CGA295 x 3/8" MNPT P/N 367111
- 6' (1.8m) - CGA295 x CGA295 P/N 367720
- 4' (1.2m) - VJ Super Flex, 1/2" Swivel both ends, P/N 367882
- 6' (1.8m) - VJ Super Flex, 1/2" Swivel both ends, P/N 367883
- 6' (3.0m) - VJ Super Flex, 1/2" Swivel both ends, P/N 367884



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