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OEM Filter-Driers

LLD and BF Series

Catalog A-1c, October 2021



ENGINEERING YOUR SUCCESS.

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LLD Series Filter-Driers

Parker Sporlan's LLD Series filter-driers are ideal for protecting HVAC/R systems, compressors, and valves from the harmful effects of moisture, acid, and solid debris.

Multiple sizes are available to optimize contaminant control. This filter-drier is ideal for air-conditioning and refrigeration OEM applications as well as private label opportunities.



Features and Benefits

- Excellent moisture and acid protection in HVAC/R systems
- Best-in-class filtration capacity and efficiency for solid debris protection due to solid core design
- Solid copper fittings for easy brazing
- Exceptional UV protection from polyester powder paint
- Flexibility with 2 different core composition blends, 4 core sizes, and multiple fitting configurations

Specifications

- 650 psi (45 bar) Maximum Rated Pressure
- Core blends tailored to meet specific requirements:
 - 100% molecular sieve solid core to maximize water adsorption
 - 80% molecular sieve/20% activated alumina blended core for additional acid adsorption while maintaining high water adsorption
- 10-micron outlet filter
- 500-hour salt spray per ASTM B117
- UL Listed component File SA1756 – SMGT2/SMGT8, cURus
- RoHS and REACH Compliant
- CE compliance per Art. 4.3 PED 2014/68/EUU

Specifications - LLD Series

Refrigerant Holding Capacities

MODEL	OUNCES OF REFRIGERANT BY WEIGHT at 100°F (GRAMS (g) OF REFRIGERANT BY WEIGHT at 38°C)					
	R-290	R-448A R-449A	R-32	R-407A/C/F	R-410A	R-454B
030 Series	0.7 (20)	1.6 (45)	1.4 (40)	1.6 (45)	1.5 (43)	1.4 (40)
050 Series	1.7 (48)	3.6 (102)	3.2 (91)	3.8 (108)	3.5 (99)	3.3 (94)
080 Series	3.0 (84)	6.5 (186)	5.7 (162)	6.8 (193)	6.2 (176)	5.8 (166)
160 Series	4.4 (124)	9.6 (272)	8.4 (237)	10.0 (283)	9.2 (261)	8.6 (243)

Water and Filtration Capacity

MODEL	RATINGS AT AHRI STANDARD CONDITIONS												
	DROPS OF WATER CAPACITY												FILTRATION CAPACITY In Grams at 5 psi (0.34 bar) ΔP
	R-32		R-407A/C/F		R-410A		R-448A		R-449A		R-454B		
	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	
LLD-030 Series	49	10	65	51	51	29	76	53	78	54	56	23	5
LLD-050 Series	119	25	158	124	124	71	187	129	192	132	137	56	10
LLD-080 Series	190	41	252	198	198	114	298	206	306	211	220	89	15
LLD-160 Series	273	59	363	285	285	164	429	296	441	304	316	129	20
LLDB-030 Series	40	9	53	43	42	25	63	44	65	45	47	19	5
LLDB-050 Series	98	21	130	104	102	60	154	107	158	109	114	46	10
LLDB-080 Series	157	34	208	166	163	95	247	171	253	174	183	73	15
LLDB-160 Series	226	48	299	238	234	137	355	246	363	250	262	105	20

Flow Capacity

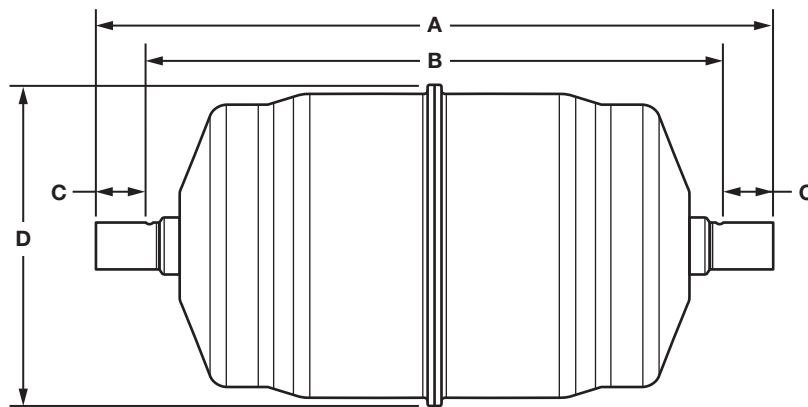
MODEL	RATINGS AT AHRI STANDARD CONDITIONS							
	FLOW CAPACITY Tons at 1 psi ΔP (kW at 0.07 bar ΔP)							
	R-32	R-407A	R-407C	R-407F	R-410A	R-448A	R-449A	R-454B
LLD-032S	2.0 (7.0)	1.3 (4.6)	1.4 (4.9)	1.4 (4.9)	1.4 (4.9)	1.3 (4.6)	1.3 (4.6)	1.6 (5.6)
LLD-033S	5.3 (18.6)	3.4 (11.9)	3.7 (13.0)	3.8 (13.3)	3.7 (13.0)	3.4 (11.9)	3.4 (11.9)	4.3 (15.1)
LLD-052S	2.9 (10.2)	1.9 (6.7)	2.0 (7.0)	2.0 (7.0)	2.0 (7.0)	1.9 (6.7)	1.9 (6.7)	2.4 (8.4)
LLD-053S	6.6 (23.1)	4.3 (15.1)	4.6 (16.1)	4.7 (16.5)	4.6 (16.1)	4.3 (15.1)	4.3 (15.1)	5.4 (18.9)
LLD-083S	8.5 (29.8)	5.5 (19.3)	5.9 (20.7)	6.0 (21.0)	6.0 (21.0)	5.5 (19.3)	5.4 (18.9)	7.0 (24.5)
LLD-084S	13.5 (47.3)	8.8 (30.8)	9.5 (33.3)	9.6 (33.6)	9.5 (33.3)	8.8 (30.8)	8.7 (30.5)	11.1 (38.9)
LLD-163S	8.5 (29.8)	5.5 (19.3)	5.9 (20.7)	6.0 (21.0)	6.0 (21.0)	5.5 (19.3)	5.4 (18.9)	7.0 (24.5)
LLD-164S	15.5 (54.3)	10.1 (35.4)	10.9 (38.2)	11.0 (38.5)	10.9 (38.2)	10.1 (35.4)	10.0 (35.0)	12.7 (44.5)
LLD-165S	18.7 (65.5)	12.1 (42.4)	13.1 (45.9)	13.2 (46.2)	13.1 (45.9)	12.1 (42.4)	12.0 (42.0)	15.3 (53.6)
LLDB-032S	2.0 (7.0)	1.3 (4.6)	1.4 (4.9)	1.4 (4.9)	1.4 (4.9)	1.3 (4.6)	1.3 (4.6)	1.6 (5.6)
LLDB-033S	5.3 (18.6)	3.4 (11.9)	3.7 (13.0)	3.8 (13.3)	3.7 (13.0)	3.4 (11.9)	3.4 (11.9)	4.3 (15.1)
LLDB-052S	2.9 (10.2)	1.9 (6.7)	2.0 (7.0)	2.0 (7.0)	2.0 (7.0)	1.9 (6.7)	1.9 (6.7)	2.4 (8.4)
LLDB-053S	6.6 (23.1)	4.3 (15.1)	4.6 (16.1)	4.7 (16.5)	4.6 (16.1)	4.3 (15.1)	4.3 (15.1)	5.4 (18.9)
LLDB-083S	8.5 (29.8)	5.5 (19.3)	5.9 (20.7)	6.0 (21.0)	6.0 (21.0)	5.5 (19.3)	5.4 (18.9)	7.0 (24.5)
LLDB-084S	13.5 (47.3)	8.8 (30.8)	9.5 (33.3)	9.6 (33.6)	9.5 (33.3)	8.8 (30.8)	8.7 (30.5)	11.1 (38.9)
LLDB-163S	8.5 (29.8)	5.5 (19.3)	5.9 (20.7)	6.0 (21.0)	6.0 (21.0)	5.5 (19.3)	5.4 (18.9)	7.0 (24.5)
LLDB-164S	15.5 (54.3)	10.1 (35.4)	10.9 (38.2)	11.0 (38.5)	10.9 (38.2)	10.1 (35.4)	10.0 (35.0)	12.7 (44.5)
LLDB-165S	18.7 (65.5)	12.1 (42.4)	13.1 (45.9)	13.2 (46.2)	13.1 (45.9)	12.1 (42.4)	12.0 (42.0)	15.3 (53.6)

*Contact your Parker Sporlan sales engineer for additional configurations.

Specifications - LLD Series

Dimensions - Inches (mm)

MODEL	CONNECTION SIZE Inches	A Overall Length	B Lay-In Length	C Socket Depth	D Body Diameter
032S	1/4	3.86 (98.0)	3.12 (79.2)	0.37 (9.4)	1.78 (45.2)
052S		4.34 (110.2)	3.60 (91.4)	0.37 (9.4)	2.47 (62.7)
033S	3/8	4.00 (101.6)	3.12 (79.2)	0.44 (11.2)	1.78 (45.2)
053S		4.48 (113.8)	3.60 (91.4)	0.44 (11.2)	2.47 (62.7)
083S		5.38 (136.7)	4.50 (114.3)	0.44 (11.2)	2.66 (67.6)
163S		6.04 (153.4)	5.16 (131.1)	0.44 (11.2)	2.99 (75.9)
084S	1/2	5.51 (140.0)	4.51 (114.6)	0.50 (12.7)	2.66 (67.6)
164S		6.17 (156.7)	5.17 (131.3)	0.50 (12.7)	2.99 (75.9)
165S	5/8	6.42 (163.1)	5.18 (131.6)	0.62 (15.7)	2.99 (75.9)



Nomenclature

Example: LLDB-083S

LLD	B	-	08	3	S
Filter-Drier Type	Core Composition		Shell Size	Connection Size	Connection Type
LLD = Liquid Line Drier	(Blank) = 100% MS* B = 4:1, MS:AA* M = Muffler		03 05 08 16	2 = 1/4" 3 = 3/8" 4 = 1/2" 5 = 5/8"	(Blank) = Flare S = ODF Solder EXT = Extended

*MS = Molecular Sieve, AA = Activated Alumina

BF Series Filter-Driers

Parker Sporlan's BF Series filter-driers are ideal for protecting air-conditioning and heat pump systems, compressors, and valves from the harmful effects of moisture, acid, and solid debris.

Multiple sizes are available to optimize contaminant control. This filter-drier is ideal for OEM heat pumps and other reverse flow applications as well as private label opportunities.

Features and Benefits

- External check valves are not needed due to integrated check valves in this filter drier
- Excellent moisture and acid protection in air-conditioning and heat pump systems
- Best-in-class filtration capacity and efficiency for solid debris protection due to solid core design
- Solid copper fittings for easy brazing
- Exceptional UV protection from polyester powder paint
- Flexibility with 2 different core composition blends, 3 core sizes, and multiple fitting configurations
- External check valves are not needed due to integrated check valve designs

Specifications

- 650 psi (45 bar) Maximum Rated Pressure
- Core blends tailored to meet specific requirements:
 - 100% molecular sieve solid core to maximize water adsorption
 - 80% molecular sieve / 20% activated alumina blended core for additional acid adsorption while maintaining high water adsorption
- Conforming filter-seal
- 500-hour salt spray per ASTM B117
- UL Listed component File SA1756 – SMGT2/SMGT8, cURus
- RoHS and REACH Compliant
- CE compliance per Art. 4.3 PED 2014/68/EU



Specifications - BF Series

Refrigerant Holding Capacities

MODEL	OUNCES OF REFRIGERANT BY WEIGHT at 100°F (GRAMS (g) OF REFRIGERANT BY WEIGHT at 38°C)			
	R-32	R-407A/C/F	R-410A	R-454B
050 Series	3.3 (94)	3.9 (111)	3.6 (102)	3.4 (96)
080 Series	5.7 (163)	6.9 (196)	6.3 (179)	5.9 (167)
160 Series	8.3 (234)	9.8 (278)	9.0 (255)	8.5 (240)

Water and Filtration Capacity

MODEL	RATINGS AT AHRI STANDARD CONDITIONS												
	DROPS OF WATER CAPACITY												FILTRATION CAPACITY In Grams at 5 psi (0.34 bar) ΔP
	R-32		R-407A/C/F		R-410A		R-448A		R-449A		R-454B		
	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	75°F 25°C	125°F 52°C	
BF-050 Series	90	19	120	94	94	54	142	98	145	100	104	42	8
BF-080 Series	162	35	216	169	169	97	255	176	262	181	188	77	12
BF-160 Series	257	55	341	268	268	154	403	279	414	286	297	121	15
BFB-050 Series	75	16	100	79	78	46	118	82	121	83	87	35	8
BFB-080 Series	134	29	177	142	139	82	211	146	216	149	156	62	12
BFB-160 Series	213	46	281	224	221	129	335	232	342	236	247	99	15

Flow Capacity

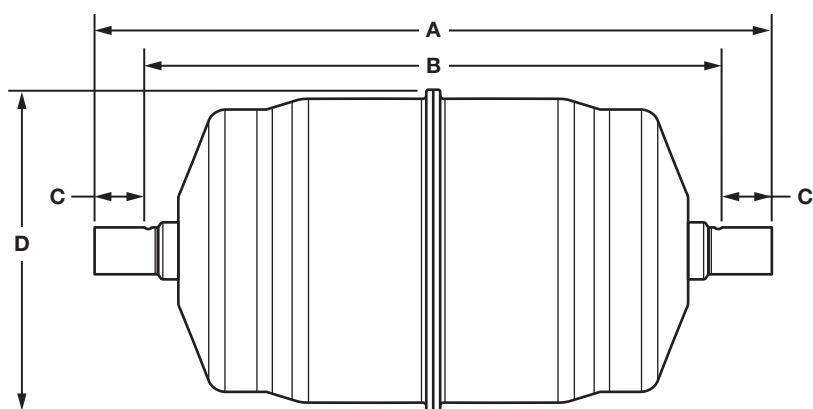
MODEL	RATINGS AT AHRI STANDARD CONDITIONS							
	FLOW CAPACITY Tons at 1 psi ΔP (kW at 0.07 bar ΔP)							
	R-32	R-407A	R-407C	R-407F	R-410A	R-448A	R-449A	R-454B
BF-052S	2.9 (10.2)	1.9 (6.7)	2.0 (7.0)	2.0 (7.0)	2.0 (7.0)	1.9 (6.7)	1.9 (6.7)	2.4 (8.4)
BF-053S	6.6 (23.1)	4.3 (15.1)	4.6 (16.1)	4.7 (16.5)	4.6 (16.1)	4.3 (15.1)	4.3 (15.1)	5.4 (18.9)
BF-083S	8.6 (30.1)	5.6 (19.6)	6.0 (21.0)	6.1 (21.4)	6.0 (21.0)	5.6 (19.6)	5.5 (19.3)	7.0 (24.5)
BF-084S	13.5 (47.3)	8.8 (30.8)	9.5 (33.3)	9.6 (33.6)	9.5 (33.3)	8.8 (30.8)	8.7 (30.5)	11.1 (38.9)
BF-163S	8.6 (30.1)	5.6 (19.6)	6.0 (21.0)	6.1 (21.4)	6.0 (21.0)	5.6 (19.6)	5.5 (19.3)	7.0 (24.5)
BF-164S	13.5 (47.3)	8.8 (30.8)	9.5 (33.3)	9.6 (33.6)	9.5 (33.3)	8.8 (30.8)	8.7 (30.5)	11.1 (38.9)
BF-165S	16.0 (56.0)	10.4 (36.4)	11.3 (39.6)	11.4 (39.9)	11.3 (39.6)	10.4 (36.4)	10.3 (36.1)	13.1 (45.9)
BFB-052S	2.9 (10.2)	1.9 (6.7)	2.0 (7.0)	2.0 (7.0)	2.0 (7.0)	1.9 (6.7)	1.9 (6.7)	2.4 (8.4)
BFB-053S	6.6 (23.1)	4.3 (15.1)	4.6 (16.1)	4.7 (16.5)	4.6 (16.1)	4.3 (15.1)	4.3 (15.1)	5.4 (18.9)
BFB-083S	8.6 (30.1)	5.6 (19.6)	6.0 (21.0)	6.1 (21.4)	6.0 (21.0)	5.6 (19.6)	5.5 (19.3)	7.0 (24.5)
BFB-084S	13.5 (47.3)	8.8 (30.8)	9.5 (33.3)	9.6 (33.6)	9.5 (33.3)	8.8 (30.8)	8.7 (30.5)	11.1 (38.9)
BFB-163S	8.6 (30.1)	5.6 (19.6)	6.0 (21.0)	6.1 (21.4)	6.0 (21.0)	5.6 (19.6)	5.5 (19.3)	7.0 (24.5)
BFB-164S	13.5 (47.3)	8.8 (30.8)	9.5 (33.3)	9.6 (33.6)	9.5 (33.3)	8.8 (30.8)	8.7 (30.5)	11.1 (38.9)
BFB-165S	16.0 (56.0)	10.4 (36.4)	11.3 (39.6)	11.4 (39.9)	11.3 (39.6)	10.4 (36.4)	10.3 (36.1)	13.1 (45.9)

*Contact your Parker Sporlan sales engineer for additional configurations.

Specifications - BF Series

Dimensions - Inches (mm)

MODEL	CONNECTION SIZE Inches	A Overall Length	B Lay-In Length	C Socket Depth	D Body Diameter
052S	1/4	4.34 (110.2)	3.60 (91.4)	0.37 (9.4)	2.47 (62.7)
053S	3/8	4.48 (113.8)	3.60 (91.4)	0.44 (11.2)	2.47 (62.7)
083S		5.38 (136.7)	4.50 (114.3)	0.44 (11.2)	2.66 (67.6)
163S		6.04 (153.4)	5.16 (131.1)	0.44 (11.2)	2.99 (75.9)
084S	1/2	5.51 (140.0)	4.51 (114.6)	0.50 (12.7)	2.66 (67.6)
164S		6.17 (156.7)	5.17 (131.3)	0.50 (12.7)	2.99 (75.9)
165S	5/8	6.42 (163.1)	5.18 (131.6)	0.62 (15.7)	2.99 (75.9)



Nomenclature

Example: BFB-083S

BF	B	-	08	3	S
Filter-Drier Type	Core Composition		Shell Size	Connection Size	Connection Type
BF = Bi-Flow Drier	(Blank) = 100% MS* B = 4:1, MS:AA*		05 08 16	2 = 1/4" 3 = 3/8" 4 = 1/2" 5 = 5/8"	(Blank) = Flare S = ODF Solder EXT = Extended

*MS = Molecular Sieve, AA = Activated Alumina

PARKER-HANNIFIN CORPORATION OFFER OF SALE

1. **Definitions.** As used herein, the following terms have the meanings indicated.

Buyer: means any customer receiving a Quote for Products.

Goods: means any tangible part, system or component to be supplied by Seller.

Products: means the Goods, Services and/or Software as described in a Quote.

Quote: means the offer or proposal made by Seller to Buyer for the supply of Products.

Seller: means Parker-Hannifin Corporation, including all divisions and businesses thereof.

Services: means any services to be provided by Seller.

Software: means any software related to the Goods, whether embedded or separately downloaded.

Terms: means the terms and conditions of this Offer of Sale.

2. Terms. All sales of Products by Seller are expressly conditioned upon, and will be governed by the acceptance of, these Terms. These Terms are incorporated into any Quote provided by Seller to Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic data interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms or conditions of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. Price; Payment. The Products set forth in the Quote are offered for sale at the prices indicated in the Quote. Unless otherwise specifically stated in the Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2020). All sales are contingent upon credit approval and full payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate, and Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the carrier at Seller's facility. Unless otherwise agreed prior to shipment and for domestic delivery locations only, Seller will select and arrange, at Buyer's sole expense, the carrier and means of delivery. When Seller selects and arranges the carrier and means of delivery, freight and insurance costs for shipment to the designated delivery location will be prepaid by Seller and added as a separate line item to the invoice. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions. Buyer shall not return or repackage any Products without the prior written authorization from Seller, and any return shall be at the sole cost and expense of Buyer.

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6. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING ANY LOSS OF REVENUE OR PROFITS, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

8. Confidential Information. Buyer acknowledges and agrees that any technical, commercial, or other confidential information of Seller, including, without limitation, pricing, technical drawings or prints and/or part lists, which has been or will be disclosed, delivered or made available, whether directly or indirectly, to Buyer ("Confidential Information"), has been and will be received in confidence and will remain the property of Seller. Buyer further agrees that it will not use Seller's Confidential Information for any purpose other than for the benefit of Seller.

9. Loss to Buyer's Property. Any tools, patterns, materials, equipment or information furnished by Buyer or which are or become Buyer's property ("Buyer's Property"), will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using Buyer's Property. Furthermore, Seller shall not be responsible for any loss or damage to Buyer's Property while it is in Seller's possession or control.

10. Special Tooling. "Special Tooling" includes but is not limited to tools, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Goods. Seller may impose a tooling charge for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in the Special Tooling, even if such Special Tooling has been specially converted or adapted for manufacture of Goods for Buyer and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property owned by Seller in its sole discretion at any time.

11. Security Interest. To secure payment of all sums due from Buyer, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect Seller's security interest.

12. User Responsibility. Buyer, through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and any technical information provided with the Quote or the Products, such as Seller's instructions, guides and specifications. If Seller provides options of or for Products based upon data or specifications provided by Buyer, Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event Buyer is not the end-user of the Products, Buyer will ensure such end-user complies with this paragraph.

13. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Quote or the Products. **Unauthorized Uses.** If Buyer uses or resells the Products in any way prohibited by Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Further, Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, arising out of or in connection with: (a) improper selection, design, specification, application, or any misuse of Products; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tools, equipment, plans, draw-

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ings, designs, specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing, tampering with or repackaging the Products; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

14. Cancellations and Changes. Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order for any reason except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

15. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

16. Force Majeure. Seller is not liable for delay or failure to perform any of its obligations by reason of events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, delays or failures in delivery from carriers or suppliers, shortages of materials, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by force majeure shall be tolled for the duration of such force majeure and rescheduled for mutually agreed dates as soon as practicable after the force majeure condition ceases to exist. Force majeure shall not include financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or sub-contractors.

17. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidation of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

18. Termination. Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

19. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

20. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by Seller to Buyer. Seller's obligation to defend

and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

21. Governing Law. These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

22. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

23. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Laws.



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