

Airstack

Airstack

Air Source Heat Pump Product Data Catalog

For Modules: ARP010X, ARP015X, ARP020X, ARP030X, ARP060X



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Product Features

Highly Efficient

- Energy efficiency is a prime consideration in designing any HVAC system. Airstack heat pumps are among the most efficient in the industry.
- Digital controls and multiple modules and compressors means Airstack heat pumps closely match actual operating loads to achieve best efficiency and significantly reduce energy consumption and operating costs compared to single-compressor units
- COP levels of up to 4.1
- Airstack heat pumps can help owners achieve USGBC LEED points and energy credits
- Many utility companies offer significant rebates for installing energy efficient products like Airstack heat pumps

Highly Dependable

- Multiple modules offer multiple independent refrigeration circuits for redundancy and reliability
- Comprehensive computer monitoring and control of operations for efficient operation
- Automatic lead/lag compressor rotation (not applicable with VME options)

Design Flexibility

- Purchase and install only the modules and capacity needed
- Expandable—add modules and capacity as needed
- Wide range of module combinations available including:
 - Free cooling modules
 - Tanks
 - Glycol shot feeders
 - Pumping packages
 - Super quiet modules

Wide Range of Options

- Expansion tanks
- Air separator
- Copper/copper coils
- Stainless steel construction
- Specialty coatings
- Special valves
- Controls interface options
- Simultaneous heating and cooling with VME options

Easy To Install

- Compact modules fit through standard doors and into elevators
- Modules connect easily and quickly to provide 10 to 600 tons capacity
- All refrigeration systems are factory charged and run tested

Easy To Operate

- Plain English LCD display
- Simple keypad operating controls

Easy to Service

- Individual modules can be isolated and serviced with other modules operating
- Proprietary service training not required
- Most components are standard, off-the-shelf parts



Model Number Nomenclature



¹ ASP-Air Stack Packaged (standard air cooled chiller), ARP-Airstack Reversing heat Pump (standard air source heat pump with reversing valve), ASA-Air Stack Auxilliary condenser (air cooled chiller with heat recovery condenser), ARA-Airstack Reversing heat pump Auxilliary condenser (reversing heat pump with heat recovery condenser)

- ²A Copeland Scroll (ZR), B-Bristol, C Trane Cornerstone, D-Copeland Digital Scroll, F-Danfoss Turbocor Flooded, H Hanbell, R Bitzer Screw, S Trane Scroll, T Danfoss Turbocor DX,
- Z Copeland scroll (old elec), X Copeland Scroll (ZP), N-None
- ³ A 208/3/60, L 230/3/60, H 460/3/60, C 575/3/60, D 200/3/50, E 400/3/50, F 380/3/60, S 220/230/1/60, V Other
- ⁴ A Air Cooled, C Remote Condenser, D Cond Unit, H-Heat Recovery, R Heat Pump
- ⁵ A Brazed SS, B Brazed SMO, C S&T copper, D S&T cu-Ni, O remote by others, R-Remote by MS, V Other, N-None
- ⁶A Cu tube Al fin, B Cu tube Cu fin, C- Microchannel, V Other
- ⁷ A None, B Bronzeglow, H Heresite, E Electrofin, S Standard, V Other
- ⁸E-ECM Fan, H High static, L -Single Fan, S standard, V -Other
- ⁹A brazed SS, B brazed SMO, E double wall brazed, N None, V other
- ¹⁰ R-410A, R-134a, 407c

Free Cool / Dry Cooler / Remote Condenser Module

<u>rree</u>	<u>2 (001/ Dr</u>	<u>y coole</u>	<u>r / kem</u>	<u>ote con</u>	<u>aenser mo</u>	
FCP	2	H	С	А	A S	
						Fan Config (E- ECM fans, H - high static, L - single fan, S - standard, V -other)
					Coil Coatin	g (A - None, B - Bronzeglow, H - Heresite, E - Electrofin, V - Other)
				Coil (A	- Cu tube Al f	in, B - Cu tube Cu fin, C- Microchannel, V - Other)
			Water	Piping (C -	Copper, S - St	ainless, P - PVC, B - Black iron, V - Other, N - None)
		Voltage	e (see volt	age codes)		
	Frame I	Designatio	on (1 - 32	x 58, 2 - 36	5 x 72, 3 - 36 x	: 84, 4 - 72 x 84, 5- other; A - 3V, B - 4V, C - 5V, D - 6V, E - 7V, F - 8V, G-2V)
Ser	ries (FCP - Fre	eCool Moo	dule, DCP ·	- Dry Coole	r, RCP - Remo	te Condenser)



²K - medium shot feeder & exp tank, L-Large shot feeder & Exp tank, M - Mini shot feeder & Exp tank, T - Exp tank, N - None

VME (Virtual Moveable Endcap) Module

VM	E	1	Н	4	Α	1
						Configuration ¹
					Va	lve Location (A - Both Sides, E - Evaporator side only, C - Condenser side only, S - Source, L - Ioad)
				Valve	e Size (ir	iches)
			Volta	ge (See V	/oltage (odes)
		VME	Version Nu	mber (1 o	or 2)	
-	Series (VME -	Virtual Mov	veable Er	ndcap)	

1 - standard, 2- total access, 3 - evap ext headers, 4 - cond ext headers, 5 - both ext headers, A - 31.5 x 24, B - 36 x 24, C - 72 x 24, V - others

Disclaimer: The nomenclature on this page covers multiple modules, not every option is available for the Air Source Heat Pump. Please contact Multistack for product specific nomenclature.

Amperage Codes/MOP

А	70
В	80
C	90
D	100
E	110
F	125
G	150
Н	175
Ι	200
J	225
K	250
L	300

М	350
Ν	400
0	450
Р	500
Q	600
R	700
S	800
Т	350/500
U	400/500
۷	450/500
W	450/600
Х	500/600

Voltage Codes

	J
А	208/3/60
В	24/1/60
C	575/3/60
D	200/3/50
E	380 - 415/3/50
F	380/3/60
G	120/1/60
Н	460/3/60
Ι	
J	
K	

L	230/3/60
М	208/1/60
Ν	575/1/60
0	200/1/50
Р	380-415/1/50
Q	380/1/60
R	460/1/60
S	220/230/1/60
T	
U	
V	OTHER

General Data

GENERAL DATA TABLE	OF AIR SOURCE	HEAT PUMP ST	ANDARD –X MO	DULES	
Compressor	ARP010X	ARP015X	ARP020X	ARP030X	ARP060X
Туре	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
Nominal Capacity (per compressor)	5	7.5	10	15	30
Quantity	2-TANDEM	2-TANDEM	2-TANDEM	2-TANDEM	2-TANDEM
Load Heat Exchanger	ARP010X	ARP015X	ARP020X	ARP030X	ARP060X
Туре	BRAZED PLATE	BRAZED PLATE	BRAZED PLATE	BRAZED PLATE	BRAZED PLATE
Weight	54.4	63.8	83.7	100	214.4
Evap Water Storage (Gals. Each)	1.08	1.4	2.03	2.54	5.86
Quantity	1	1	1	1	1
Header Storage (Gals./Module)	6.4	6.4	18.0	21.0	36.4
Mech. Module Front Water Vol. (Gals./Module)	7.48	7.8	20.03	23.54	41.9
Mech. Module Rear Water Vol. (Gals./Module)	1.08	1.4	2.03	2.54	N/A
Refrigerant Type	R-410A	R-410A	R-410A	R-410A	R-410A
Number of Circuits	1	1	1	1	1
Fans	ARP010X	ARP015X	ARP020X	ARP030X	ARP060X
Motor Type	TEAO*	TEAO*	TEAO*	TEAO*	TEAO*
НР	1	1	2	2	2
Quantity	2	2	2	2	4
Fan Type	Axial	Axial	Axial	Axial	Axial
Fan Material	Composite	Composite	Composite	Composite	Composite
Air Flow (cfm) (per module)	6,600	8,500	16,000	22,000	44,000
Source/Sink Heat Exchanger Coils	ARP010X	ARP015X	ARP020X	ARP030X	ARP060X
Fin Material	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Tube Material	Copper	Copper	Copper	Copper	Copper
Tube Diameter (in.)	3/8	3/8	3/8	3/8	3/8
Number of Rows	6	6	6	6	6
Coil Dimensions (Quantity)	32 x 51 (2)	30 x 49 (2)	30 x 61½ (2)	42 x 73½(2)	42 x 73½ (4)
Refrigerant Type	R-410A	R-410A	R-410A	R-410A	R-410A
Charge (lbs./circuit)	24	25	45	56	126
Number of Circuits	1	1	1	1	1
Operating Weight (with AL/CU coils)	1475	1475	2025	2480	4875
Shipping Weight (with AL/CU coils)	1400	1400	1850	2205	4525
*TEAO= Totally Enclosed Air Over					



Glycol and Propylene Table/Piping Diagram

Multistack Glycol Solution Information Low Temperature Operation with Glycol

In chilled water systems where water temperatures of less than 40°F and ambient temperatures of 32° F are likely to occur, it is necessary to add a glycol-based heat transfer fluid to the system. Both Ethylene and Propylene are available and they offer the same basic freeze and corrosion protection although there are performance differences in the solutions.

*Note: When the load heat exchanger acts as a condenser, the affect of glycol is negligable.

*Warning: Without freeze protection, adequate system volume is criticle to maintain proper operation during defrost cycle.

ETHYLENE GLYCOL							
Ethylopo 0/	Freeze Point		Conscitu	Douror	Flow	Drocerne Drop	
Ethylefie %	۴	°C		rower	FIOW	riessure Drop	
10	26	-3.3	0.996	0.999	1.035	1.096	
20	18	-7.8	0.986	0.998	1.06	1.219	
30	7	-13.9	0.978	0.996	1.092	1.352	
40	-7	-21.7	0.966	0.993	1.131	1.53	
50	-28	-33.3	0.955	0.991	1.182	1.751	

PROPYLENE GLYCOL							
Dronylono %	Freeze Point		Constitu	Dowor	Elow	Duran Duran	
Propylelle %	°F	°C	Capacity	rower	FIOW	Pressure Drop	
10	26	-3	0.987	0.992	1.01	1.068	
20	19	-7	0.975	0.985	1.028	1.147	
30	9	-13	0.962	0.978	1.05	1.248	
40	-5	-21	0.946	0.971	1.078	1.366	
50	-27	-33	0.929	0.965	1.116	1.481	

REQUIRED LOAD-WATER PIPING (SUPPLIED AND INSTALLED BY OTHERS)

(*If Pump Module is Supplied by Airstack, eliminate external pump shown below.)



Electrical Data

ELECTRICAL DATA									
	Number of	RLA per Comp	ressor	FLA per Fan Motor			Max Pump FLA**		
Model	Compressors	3 phase	1 phase	Number of Fan	3 phase	1 phase	Dump UD	3 phase	1 phase
		208/230/460/575V	230V	Motors	208/230/460/575V	230V	Ритр пр	208/230/460/575V	230V
ARP010X	2	24/21.5/10.5/8.6	32.0	2	4.2 / 4.0 / 2.0 / 1.5	5.0			
ARP015X	2	36.5 / 33 / 16.5 / 13		2	4.2 / 4.0 / 2.0 / 1.5	N/A			
ARP020X	2	44 / 40 / 20 / 16		2	7.4/7.2/3.6/2.9	N/A			
ARP030X	2	68/61/31/25		2	7.4/7.2/3.6/2.9	N/A			
ARP060X	2	№ / № / 60 / 48		4	7.4/7.2/3.6/2.9	N/A			
ARP060X*	2	[№] / [№] / 60 / 48	NI/A	1	38.9/36.2/18.1/14.1	N/A			
FCP1	N/A	N/A	IN/A	2	4.2 / 4.0 / 2.0 / 1.5	N/A			
FCP2	N/A	N/A		2	7.4/7.2/3.6/2.9	N/A			
FCP3	N/A	N/A		2	7.4/7.2/3.6/2.9	N/A			
FCP4	N/A	N/A		2	7.4/7.2/3.6/2.9	N/A			
FCP4*	N/A	N/A		1	38.9/36.2/18.1/14.1	N/A			
							1	4.1/3.8/1.8/1.5	
							1.5	5.9/5.4/2.7/2.2	
							2	6.8/6.1/3.1/2.4	
							3	9.54/8.6/4.3/3.5	
							5	15.0/13.7/6.8/5.5	
Dump							7.5	21.8/19.8/9.9/8.1	
Fullip							10	27.7/25.2/12.6/9.9	N/A
Modules							15	41.6/37.8/18.9/15.3	
							20	53.5/48.6/24.3/19.8	
							25	67.3/61.2/30.6/24.3	
							30	79.2/72.0/36.0/28.8	
							40	102.2/93.6/46.8/36.9	
							50	128.7/117.0/58.5/46.8	
Glycol Feeder							N/A	2/2/1/1	2
*Refers to sinale	low sound fan or	otion. ** Pump motor na	imenlates are	unique to each iob.	Amperaae may yary sliaht	lv.			

WIRING SIZING (MCA= MINIMUM CIRCUIT AMPACITY)

MCA = (1.25 x RLA1*) + RLA2 + RLA3...

MAXIMUM OVERCURRENT PROTECTION (MOP)

 $MOP = (2.25 \text{ x RLA1}^*) + \text{RLA2} + \text{RLA3} \dots$

Where MOP does not equal a standard size fuse, the next larger fuse should be used. **NOTES:**

- 1. Compressor Rated Load Amps (RLA) are based on 145°F Saturated Condensing Temperature.
- 2. *RLA1 = RLA of the largest motor in the system. RLA2 & RLA3 = RLA of other motors in the system.
- 3. Wire sizing is based on Nat. Electr. Code (NEC)rating for 75°C wire.
- 4. Wiring distance from branch circuit shall not exceed 100 feet.

MCA	WIRE SIZE (AWG) 75°	WIRE SIZE (AWG) 75°
	(3 Conductors/1 Conduit)	(6 Conductors/2 Conduit)
200	3/0	
230	4/0	
255	250 MCM	
285	300 MCM	
310	350 MCM	
335	400 MCM	
380	500 MCM	
420	600 MCM	4/0
510		250 MCM
570		300 MCM
620		350 MCM
670		400 MCM
760		500 MCM
800		600 MCM

Pump Selection

PMP - DUAL PUMP SELECTION CHART

(ALL PUMPS IN PRIMARY/STANDBY ARRANGEMENT-DATA FOR SINGLE PUMP)

Charts Show Pump BHP Requirement at given condition

ARMSTRONG SERIES 4382 – 3x3x6 Pump								
Total head in feet								
Flow (USGPM)	60	80	100	120	140			
40		3.07	3.87	4.66	5.47			
80		3.58	4.47	5.37	6.29			
120	3.55	4.52	5.51	6.50	7.51			
160	4.82	5.91	7.00	8.09	9.20			
200	6.71	7.94	9.13	10.34				
240		10.97	12.27					

ARMSTRONG SERIES 4382 – 4x4x6 Pump								
Total head in feet								
Flow (USGPM)	60	80	100	120	140			
50		3.80	4.89	6.10	7.44			
100		4.52	5.77	7.12	8.57			
150	3.98	5.30	6.70	8.16	9.71			
200	4.78	6.26	7.79	9.39				
250	5.81	7.54	9.14	10.90				
300	7.16	9.03	10.91					
350	8.90	11.07						

ARMSTRONG SERIES 4382 – 6x6x6 Pump								
Total head in feet								
Flow (USGPM)	60	80	100	120	140			
200		7.86	10.24	12.78	15.47			
300		9.75	12.39	15.15				
400	8.99	11.82	14.73	17.72				
500*	10.93*	14.14*	17.34*	20.59*				
600*	13.06*	16.68*	20.26*					
700*	15.48*	19.51*						
800*	18.35*	22.76*						

*For selections above 400 gpm contact Multistack®

Notes:

- 1. DO NOT SELECT IN SHADED AREA.
- 2. All selections are based on 40% Ethylene Glycol solution.
- 3. Pump nominal speed is 3,600 rpm (additional options available, contact Multistack).
- 4. All pump modules have automatic changeover controls in the event of loss of flow and manual lead/lag selector switch.

AIR SOURCE HEAT PUMP ARP010, ARP015 Diagram





ARP010, ARP015 Diagram, Cont'd

ARP020 Diagram, Single Module



AIR SOURCE HEAT PUMP

ARP020 Diagram

ARP020 Diagram, Multiple Module



AIR SOURCE HEAT PUMP

ARP020 Diagram, Cont'd

ARP030 Diagram, Single Module



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AIR SOURCE HEAT PUMP

ARP30X Diagrams

ARP030 Diagram, Cont'd



ARP060 Diagram, Single Module



AIR SOURCE HEAT PUMP

ARP060 Diagram

ARP60X Diagrams, Cont'd



Virtual Movable End Cap™

Multistack VME (Virtual Movable Endcap) Modular Heat Pumps offer building owners another innovative way to save money and simplify building heating and cooling systems. VME Modular Heat Pumps are available in air- and water-cooled versions, and provide four-pipe simultaneous heating and cooling integrated with heat recovery. This concept eliminates the need for separate heating and cooling systems or a distributed water source heat pump system.



How it Works

A typical modular chiller includes multiple modules with an end cap. The number of modules determines the chiller cooling/ heating capacity. With VME, Multistack installs a series of valves between the chiller modules. Using advanced controls technology the virtual end cap can be moved among the modules to achieve the heating and cooling capacity desired. It is no longer necessary to purchase one set of cooling heat pumps and another set of heat pumps for heating which cannot be mixed. With Multistack VME the same set of chiller modules can be used for heating and cooling simultaneously. Building owners save money by purchasing fewer chiller modules and they save on equipment room space needed. See the following page for a piping diagram!

VME Piping Diagram



VME Piping Diagram

Mechanical Specification

GENERAL

Heat pump Modules shall be ETL listed in accordance with UL Standard 1995, CSA certified per Standard C22.2#236.

Modules shall ship wired and charged with refrigerant. All modules shall be factory run-tested prior to shipment. Compressors, heat exchangers, source/sink heat exchanger fans, piping, and controls shall be mounted on a heavy-gauge steel frame. Electrical controls, contactors, and relays for each module shall be mounted within that module. The module shall be provided within a steel enclosure suitable for outdoor use. Exposed steel surfaces shall be provided with a powder-coat paint finish.

WATER MAINS

Each module shall include supply and return mains for load water. Grooved end connections are provided for interconnection to four-inch (ARP010X, ARP015X), six-inch (ARP020X and ARP030X) or eight-inch (ARP060X) standard piping with grooved-type couplings. Each inlet water header shall incorporate a built-in, 30-mesh in-line strainer system to prevent heat exchanger fouling. (Not available with VME option. VME requires external filtration.)

LOAD HEAT EXCHANGER

Each heat exchanger shall be brazed-plate, constructed of 316 stainless steel, and be designed, tested, and stamped in accordance with U.L. 1995 650 PSIG working pressure.

COMPRESSORS

Each module shall contain hermetic scroll compressor(s) mounted to the module with rubber-in-shear isolators. Each system shall also include high discharge-pressure and low suction-pressure safety cut-outs.

COILS

Ambient air heat rejection/extraction coils shall have aluminum fins mechanically bonded to copper tubing. Coils shall be factory leak-tested.

FANS

Each module shall contain dual fans for the refrigerant circuit. These fans shall be multi-blade vane-axial type, made of plastic composite material for quiet operation. Fans shall be direct driven at a maximum rpm of 1,150. All fan motors shall be pressure controlled and suitable for outdoor use. ARPO60X modules have four fans.

CENTRAL CONTROL SYSTEM

Scheduling of the various compressors shall be performed by a microprocessor-based control system (Master Controller). A new lead compressor is selected every 24 hours to ensure even distribution of compressor run time. (Not applicable in VME option.) The Master Controller shall monitor and report the following on each refrigeration system:

- Discharge Pressure Fault
- Suction Pressure Fault
- Compressor Winding Temperature Fault
- Suction Temperature
- · Load heat exchanger Leaving Chilled-Water Temperature

The Master Controller shall monitor and report the following system parameters:

- Load-Water Entering and Leaving Temperature
- Discharge Refrigerant Temperature
- Load-Water Flow Fault

An out-of-tolerance indication from these controls or sensors shall cause a "fault" indication at the Master Controller and shutdown of that compressor, with the transfer of load requirements to the next available compressor. In the case of a System Fault, the entire heat pump will be shut down. When a fault occurs, the Master Controller shall record conditions at the time of the fault and store the data for recall. This information shall be capable of being recalled through the keypad of the Master Controller and displayed on the Master Controller's LCD. A history of faults shall be maintained, including date and time-of-day of each fault (up to the last 20 occurrences).

Individual monitoring of leaving load-water temperatures from each refrigeration system shall be programmed to protect against freeze-up.

The control system shall monitor entering and leaving load-water temperatures to determine system load, and select the number of compressor circuits required to operate. Response times and set points shall be adjustable.



Cont'd on next page...

Mechanical Specification, Cont'd

OPTIONAL SINGLE-POINT POWER CONNECTION

The heat pump shall be provided with a single-point power connection. This will include pre-engineered wiring for field installation and connection to a factory-mounted heat pump junction box. The junction box shall include individual over current protection for each Module Set and provide a single point of connection to building power.

OPTIONAL FREE COOLING MODULE (only available in VME)

Free Cooling Modules shall interconnect through the common heat pump header system and require no additional water connections. Free Cooling Modules shall include glycol cooling coils, temperature-controlled fans, and an automatic 3-way bypass valve to eliminate the need for mechanical cooling under low-ambient conditions. The module shall be completely factory-assembled and tested before shipment.

OPTIONAL PUMP MODULE

The Pump Module shall be interconnected through the common heat pump header system and require no additional water connections. The Pump Module will become an integral part of the heat pump system. The Pump Module shall incorporate dual in-line centrifugal pumps in a Primary/Standby pumping arrangement. Pump starters and controls shall be provided to enable manual selection of lead pump. In addition, in the event of a loss-of-flow failure of the chilled-water system, the Pump Module controls shall disable the lead pump and automatically start the standby pump. The Pump Module shall be completely factory assembled and tested prior to shipment.

OPTIONAL TANK MODULE

A factory-assembled Tank Module shall be provided, including an insulated load water tank. The tank shall be pressure-rated at 150 psi minimum. Tank Modules shall interconnect through the common heat pump header system and require no additional water connections. The Tank Module will become an integral part of the heat pump system. The Tank Module shall be provided with proper drain and fill valving.

OPTIONAL GLYCOL FEEDER MODULE

The optional Glycol Feeder and Expansion Tank shall be incorporated into the heat pump system through a modular arrangement and interconnect through the common heat pump header system, requiring no additional water connections. The system shall include a 48-gallon storage/mixing tank with lid and cover, pump suction hose with inlet strainer, pressure pump with thermal cut-out and integral pressure switch, pre-charged accumulator tank with EPDM diaphragm, manual diverter valve for purging and agitating contents of storage tank, adjustable 5-55 psi pressure regulating valve with pressure gauge, fast fill lever, integral replaceable strainer, built-in check valve, and built-in shutoff valve. The glycol feeder system shall be compatible with glycol solutions of

up to 50% concentration. The pump shall be capable of running dry without damage. The expansion tank shall be welded steel with a butylrubber diaphragm, and capable of a maximum operating temperature of 240°F and a maximum working pressure of 100 psig. The tank shall be interconnected through the common heat pump header system and require no additional water connections. The module shall be completely factory assembled and -tested prior to shipment.

OPTIONAL SOUND-ATTENUATION

Ther are multiple sound options for this heat pump. Contact Multistack for product specific options.



Rooftop installation on a New York City high-rise.

Originators. Innovators. Never the Imitators.

Originators...

Multistack invented the modular water chiller. It started with a radically simple idea: chiller modules that could be brought into the equipment room one at a time, through standard doorways and down elevators, to form a fully integrated chiller system. The idea launched a revolution and transformed Multistack into a leader in the commercial water-chiller industry.

Innovators...

Multistack perfected the modular chiller and leads the industry in innovative and environmentally friendly modular solutions. Since founding in the late 1980s, Multistack has engineered, manufactured, and distributed an impressive array of modular air conditioning firsts: the first on-board strainer, the first modular automatic blow-down device, the first modular chiller for variable flow, the first modular chiller-heater (heat pump), the first modular heat-recovery chiller, the first modular air-to-water heat pump, the first modular chiller to utilize MagLev[™] compressor technology, and the first modular chiller to utilize R-410A.

Never the Imitators...

Multistack sets the standard in the industry for superior customer service, fast and on time shipment, superior product quality, and new product development. Our pioneering leadership in environmental issues is well documented. If you want the best, be sure to specify the original – Multistack[®].





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