

55-06 Synopsis of Air Abrasion Units (Project 98-08) (7/98)

Air abrasion units are currently enjoying considerable interest. DIS has received an increasing number of inquiries about this technology. Air abrasion works by impacting small alpha alumina particles (27 or 50 micron) at high velocities onto the surface to be abraded. Existing dental clinic compressed air, or if need be a supplemental compressor, supplies the air pressure required to direct the particles through a small nozzle at high velocities. Manufacturer claims include: tooth preparation without local anesthesia, detection of previously undiagnosed caries, conservative removal of incipient caries rather than traditional "watch and recall" philosophy, and improved bonding to not only enamel and dentin but also to porcelain and metals. Disadvantages noted by users include: a lack of tactile sense during preparation, inability to remove soft caries, a steep learning curve, use limited to Class I, IV, and V preparations, patient discomfort at the more efficient higher cutting pressures, and decreased visibility with increased powder debris due to overspray. Some Class II and III preparations are possible but require greater operator expertise. Supplemental evacuation units are helpful in controlling the powder overspray. Face shields are recommended to prevent scratching of operator eyewear, especially magnification loops. Due to the high air pressures required with air abrasion, particular attention must be taken by the operator in controlling the air/abrasive stream. There is at least one reported case in the literature that describes subcutaneous, orbital, and mediastinal emphysema secondary to use of an air-abrasive device. The use of rubber dam is mandatory when utilizing this technology to reduce the chance of air emphysema. The literature reports that air abrasion creates cavity preparations that have rounded cavosurface margins and rounded internal line angles. The abraded surface is microscopically rough and the dentinal tubules are occluded, however the smear layer is removed. Histologically, the pulpal changes seen with a highspeed handpiece with water spray are comparable to those seen with air abrasion with either 27 μ or 50 μ particles at 80 psi. A recent study reported that 27 μ particles at 160 psi were the least traumatic to the pulp. Interestingly, higher air pressures are attributed to greater patient discomfort. Multiple studies have shown that air abrasion does not alleviate the need for normal acid etching and bonding procedures. Composite bond strengths to enamel and dentin are significantly less when air abrasion alone is compared to acid etching. Similarly, microleakage is significantly increased when air abrasion alone is compared to acid etching. Most studies have found that bond strengths to enamel and dentin are independent of particle size and air pressure, but at least one study has demonstrated the best overall bond strengths to several restorative materials including composite, titanium, amalgam, gold, and porcelain were obtained with 50 μ particles at 120 psi.

This synopsis ([Attachment 1](#)) will enable readers to compare such variables as price, standard accessories, appearance, controls, particle size selection, air pressure range, availability of adjunctive suction, and other pertinent features in one single format.

Synopsis of Air Abrasion Units

Product Name	Abradent Model DV-1	PrepStar
Manufacturer	Crystal Mark DDS, Inc. 613 Justin Ave Glendale, CA 91201-2396 (888) 264-4337 (818) 247-3574 FAX	Danville Engineering 2021 Omega Road San Ramon, CA 94583 (800) 827-7940 (510) 838-0944 FAX
Price	Retail: \$3850.00 Govt: \$2995.00	Retail: \$2695.00 Govt: \$2425.00
Delivery System	Counter-top	Counter-top
Air Source	Dental office air (40 psi minimum required) Nitrogen or CO ₂ tank	Dental office air (60 psi minimum required); Optional PrimeAir Oilless compressor
Particle Size	27.5μ	27μ & 50μ
Powder Canisters / Switchable	Single / No	Single / No
Autoclavable Handpiece / Tips	Yes	Yes
Pressure Range	(0 – 140 psi)	(60 – 120 psi)
Adjustable Powder Flow	Yes (0 to 5 gm/min)	Yes (0.7 to 4.2 gm/min)
Cutting Modes	Continuous, Optional Power Pulse Mode (\$500)	Continuous
Nozzle Size / Delivery Angle	.011" .014" .018" .028" .032" / 45° 90° 180° Swivel handpiece allows ± 15° with 45° and 90° delivery angle tips	.015" .019" .026" / 45° 80° 120°
Low Powder Indicator	No	No
Trouble Indicator	No	No
Source-Air Filtering	Yes; oil & moisture	Yes; oil & moisture; Additional optional air filter available
Built-In Auxiliary Suction	No; Optional Dental Aerosol Evacuator (DAE) available (127 CFM)	No; Optional External RapidVac Dust Collector (36-40 CFM) available
Size & Weight	11"H x 13"W x 11" D 43 lbs	5.5"H x 6.5"W x 9" D 4.5 lbs
Compressor Noise Level	Not applicable	Optional PrimeAir Compressor (65 decibels @ 3ft)
Training Available	Yes; 8-hour course in California (no charge). Transportation at purchaser's expense. 2-hour regional course (no charge)	Video & operational instructions
Electrical	120v and 240v; UL pending	120v and 240v for optional RapidVac and PrimeAir
Comments	Low-tech appearance; analog gauges and mechanical switches. Weight precludes easy transport between operatories. Air pressure dependent on maximum office pressure obtainable, generally only 80 psi. Optional dental aerosol evacuator available (\$1695 w/o dryer, \$2195 with dryer). Dryer is used to remove excess moisture from poor quality source air. Abrasion resistant mirrors (\$65 or three for \$150)	Low-tech appearance; analog gauges and mechanical switches. Air pressure dependent on maximum office pressure obtainable, generally only 80 psi unless order optional air compressor. Optional PrimeAir Oilless Compressor (Retail:\$1499, Govt: \$1349); Optional External RapidVac Dust Collector (Retail: \$1290, Govt: \$1161); Optional air filter (Retail: \$299, Govt: \$269)

Data in this table was provided by manufacturers

Synopsis of Air Abrasion Units

Product Name	Air-Touch Desktop Model	Air-Touch Tower Model
Manufacturer	Dentsply Midwest 901 West Oakton Street Des Plaines IL 60018-1884 (800) 800-2888 (708)-640-6165 FAX	Dentsply Midwest 901 West Oakton Street Des Plaines IL 60018-1884 (800) 800-2888 (708)-640-6165 FAX
Price	Retail: Dual Chamber: \$7,495.00 Single Chamber: \$6,495.00 Govt: Dual Chamber: \$4,872.00 Single Chamber: \$4,222.00	Retail: Dual Chamber: \$17,495.00 Single Chamber: \$15,495.00 Govt: Dual Chamber: \$11,372.00 Single Chamber: \$10,072.00
Delivery System	Counter-top	Portable, self-contained unit on wheels
Air Source	Dental office air or bottled gas	Built-in 1/3 HP oil-less compressor or CO ₂ tank
Particle Size	27μ & 50μ	27μ & 50μ
Powder Canisters / Switchable	Choice of either single or dual / Yes for dual chamber model	Choice of either single or dual / Yes for dual chamber model
Autoclavable Handpiece / Tips	Yes	Yes
Pressure Range	(40 – 120 psi) in 10 psi increments	(40 – 120 psi) in 10 psi increments
Adjustable Powder Flow	No manual adjustment; automatic adjustment (3.2 gm/min to 5 gm/min depending on air pressure)	No manual adjustment; automatic adjustment (3.2 gm/min to 5 gm/min depending on air pressure)
Cutting Modes	Continuous, Timed (0.2, 0.5 to 2.5 sec in 0.5 sec increments), Boost	Continuous, Timed (0.2, 0.5 to 2.5 sec in 0.5 sec increments), Boost
Nozzle Size / Delivery Angle	.015" .018" .027" / 45° 90° 120°	.015" .018" .027" / 45° 90° 120°
Low Powder Indicator	Yes	Yes
Trouble Indicator	Yes	Yes
Source-Air Filtering	Yes; filter membrane moisture control	Yes; filter membrane moisture control
Built-In Auxiliary Suction	No	Yes; built-in auxiliary intra- and extra-oral suction (19 CFM)
Size & Weight	9.5"H x 11.5"W x 16" D; 25 lbs	35"H x 14"W x 17.5" D; CO ₂ Model: 99 lbs, Compressor Model: 130 lbs
Compressor Noise Level	Not Applicable	65 decibels @ one meter
Training Available	Yes; Videocassette, In-office clinical instruction (\$1000 honorarium)	Yes; Videocassette, In-office clinical instruction (\$1000 honorarium)
Electrical	120v and 240v; UL listed, CSA certified	120v and 240v; UL listed, CSA certified
Comments	Hi-tech appearance. Membrane touch controls facilitate infection control. Comprehensive self-diagnostics and trouble-shooting guide. Air pressure dependent on maximum office pressure obtainable, generally only 80 psi unless use bottled gas.	Hi-tech appearance. Membrane touch controls facilitate infection control. Comprehensive self-diagnostics and trouble-shooting guide. Unique built-in intra- and extra-oral vacuum.

Data in this table was provided by manufacturers

Synopsis of Air Abrasion Units

Product Name	KCP 5 Prepjet	KCP 10 Prepjet
Manufacturer	American Dental Technologies 28411 Northwestern Highway Suite 1100 Southfield, MI 48034 (800) 359-1959 (810) 353-0663 FAX	American Dental Technologies 28411 Northwestern Highway Suite 1100 Southfield, MI 48034 (800) 359-1959 (810) 353-0663 FAX
Price	Retail: \$3995.00 Govt: \$3995.00	Retail: \$6995.00 Govt: \$6995.00
Delivery System	Counter-top	Counter-top
Air Source	Dental office air with built-in air-booster	Dental office air with built-in air-booster
Particle Size	27 μ & 50 μ	27 μ & 50 μ
Powder Canisters / Switchable	Single / No	Dual / Yes
Autoclavable Handpiece / Tips	Yes	Yes
Pressure Range	(0 – 130 psi)	(40, 60, 80, 100, 120, 130 psi)
Adjustable Powder Flow	No (constant 4.5 gm/min)	No (constant 4.5 gm/min)
Cutting Modes	Continuous	Continuous
Nozzle Size / Delivery Angle	.015" / 120°	.015" / 120°
Low Powder Indicator	No	No
Trouble Indicator	No	No
Source-Air Filtering	Yes; oil & moisture	Yes; oil & moisture
Built-In Auxiliary Suction	No; Optional external vacuum system (CFM value not available)	No; Optional external vacuum system (CFM value not available)
Size & Weight	13"H x 9"W x 18" D 29 lbs	13"H x 9"W x 18" D 32 lbs
Compressor Noise Level	Not Applicable	Not Applicable
Training Available	Video & operational instructions	Video & operational instructions
Electrical	120v and 240v	120v and 240v
Comments	Low-tech appearance; analog gauges and mechanical switches. Optional external vacuum system available (Retail: \$1505, Govt: \$1505)	High-tech attractive appearance. Membrane touch controls facilitate infection control. Optional external vacuum system available (Retail: \$1505, Govt: \$1505)

Data in this table was provided by manufacturers

Synopsis of Air Abrasion Units

Product Name	KCP 100 Whisperjet	KCP 1000
Manufacturer	American Dental Technologies 28411 Northwestern Highway Suite 1100 Southfield, MI 48034 (800) 359-1959 (810) 353-0663 FAX	American Dental Technologies 28411 Northwestern Highway Suite 1100 Southfield, MI 48034 (800) 359-1959 (810) 353-0663 FAX
Price	Retail: \$12,900.00 Govt: \$12,900.00	Retail: \$16,395.00 Govt: \$16,395.00
Delivery System	Portable unit on wheels	Portable unit on wheels
Air Source	Dental office air with built-in air-booster	Built-in 0.6HP compressor
Particle Size	27 μ & 50 μ	27 μ & 50 μ
Powder Canisters / Switchable	Dual / Yes	Dual / Yes
Autoclavable Handpiece / Tips	Yes	Yes
Pressure Range	(40, 80, 100, 120, 140 psi)	(40, 80, 100, 120, 140, 160 psi)
Adjustable Powder Flow	No (constant 4.5 gm/min)	No (constant 4.5 gm/min)
Cutting Modes	Continuous	Continuous
Nozzle Size / Delivery Angle	.015" / 120°	.015" / 120°
Low Powder Indicator	No	Yes
Trouble Indicator	No	No
Source-Air Filtering	Yes; oil & moisture	Yes; oil & moisture
Built-In Auxiliary Suction	No; Optional external vacuum system ((CFM value not available)	No; Optional external vacuum system ((CFM value not available)
Size & Weight	29"H x 8"W x 17" D 56 lbs	29"H x 8"W x 17" D 91 lbs
Compressor Noise Level	Not Applicable	Information not provided
Training Available	In-office ½ day training; video & operational instructions	In-office ½ day training; video & operational instructions
Electrical	120v and 240v	120v and 240v
Comments	High-tech attractive appearance. Membrane touch controls facilitate infection control. Optional external vacuum system available (Retail: \$1505, Govt: \$1505)	High-tech attractive appearance. Membrane touch controls facilitate infection control. Optional external vacuum system available (Retail: \$1505, Govt: \$1505)

Data in this table was provided by manufacturers

Synopsis of Air Abrasion Units

Product Name	Mach 5.0	Mach 5.0 Plus
Manufacturer	Kreativ, Inc. 1517 Industrial Way, SW Albany, OR 97321 (800) 573-2858 (541) 924-2479 FAX	Kreativ, Inc. 1517 Industrial Way, SW Albany, OR 97321 (800) 573-2858 (541) 924-2479 FAX
Price	Retail: \$13,500.00 Govt: \$13,500.00	Retail: \$18,500.00 Govt: \$18,500.00
Delivery System	Counter-top	Portable, self-contained unit on wheels
Air Source	Dental office air	Built-in 0.6 HP oil-less compressor
Particle Size	27 μ , 27.5 μ , 34 μ , 50 μ	27 μ , 27.5 μ , 34 μ , 50 μ
Powder Canisters / Switchable	Single / No	Single / No
Autoclavable Handpiece / Tips	Yes	Yes
Pressure Range	(0 – 125 psi) continuous adjustment	(0 – 120 psi) continuous adjustment
Adjustable Powder Flow	Yes; (0 to 8 gm/min in 0.1 gm increments)	Yes; (0 to 8 gm/min in 0.1 gm increments)
Cutting Modes	Continuous, Micropulse, Powerpulse	Continuous, Micropulse, Powerpulse
Nozzle Size / Delivery Angle	.011" .014" .018" .026" .032" / 45° 67° 90°	.011" .014" .018" .026" .032" / 45° 67° 90°
Low Powder Indicator	Yes	Yes
Trouble Indicator	Yes	Yes
Source-Air Filtering	Yes; oil & moisture; Additional optional air filter available	Yes; Four-stage filtration system
Built-In Auxiliary Suction	No; Optional External KleenAir II Vacuum available (80-120 CFM)	No; Optional External KleenAir II Vacuum available (80-120 CFM)
Size & Weight	14.75"H x 9"W x 18" D; 30 lbs	28.5"H x 9"W x 18" D; 85 lbs
Compressor Noise Level	Not Applicable	75 decibels @ six feet
Training Available	Yes; Clinical seminars (transportation at buyer's expense) and salesman in-office instruction on operation and maintenance	Yes; Clinical seminars (transportation at buyer's expense) and salesman in-office instruction on operation and maintenance
Electrical	120v and 240v; UL and IEC-601-1	120v and 240v; UL and IEC-601-1
Comments	Hi-tech appearance. Membrane touch controls facilitate infection control. Remote control panel can be mounted on dental unit. Air pressure dependent on maximum office pressure obtainable, generally only 80 psi. Optional external KleenAir II vacuum available for \$2495 retail and govt.	Hi-tech appearance. Membrane touch controls facilitate infection control. Remote control panel can be mounted on dental unit. Optional external KleenAir II vacuum available for \$2495 retail and govt.

Data in this table was provided by manufacturers

Synopsis of Air Abrasion Units

Product Name	Lares Associate +	Lares Director +
Manufacturer	Lares Research 295 Lockheed Avenue Chico CA 95973 (800) 347-3289 (916) 345-1870 FAX	Lares Research 295 Lockheed Avenue Chico CA 95973 (800) 347-3289 (916) 345-1870 FAX
Price	Retail: \$8495.00 Govt: \$7221.00	Retail: \$14,995.00 Govt: \$12,595.00
Delivery System	Counter-top	Portable unit on wheels
Air Source	Dental office air (60 psi minimum required); can be supplemented with optional MicroPrep AireBooster or replaced with optional QuikAire Compressor	Built-in 1/2 HP oil-less compressor
Particle Size	27µ	27µ
Powder Canisters / Switchable	Single / No	Single / No
Autoclavable Handpiece / Tips	Yes	Yes
Pressure Range	60, 80, or 120 psi	40 psi, 60 psi, 80-110 psi (in 5 psi increments), 120 psi
Adjustable Powder Flow	Yes; Low (5 gm/min), High (9 gm/min), or Air only	Yes; (5, 7, 9 gm/min) or Air only
Cutting Modes	Continuous	Continuous or Pulsed
Nozzle Size / Delivery Angle	.015" .019" .026" / 45° 80° 90° 120°	.015" .019" .026" / 45° 80° 90° 120°
Low Powder Indicator	No	Yes
Trouble Indicator	No	No
Source-Air Filtering	Yes; oil & moisture	Yes; oil & moisture
Built-In Auxiliary Suction	No; Optional External QuikEvac (97 CFM @ 2 inches)	No; Optional External QuikEvac (97 CFM @ 2 inches)
Size & Weight	10"H x 8"W x 14.5" D 18 lbs	35.5"H x 9.5"W x 14" D 90 lbs
Compressor Noise Level	Not Applicable	Information not provided
Training Available	Detailed training manual. Regional seminars available @ small charge	Detailed training manual. Regional seminars available @ small charge
Electrical	Not Applicable	120v and 240v / IEC 601-1 certified; CSA certification pending
Comments	Clean, high-tech appearance; membrane touch controls facilitate infection control. Air pressure dependent on office air pressure obtainable, generally only 80 psi unless optional air compressor or air booster utilized. Optional QuikAire Oilless Compressor (Retail: \$1449, Govt: \$1232); Optional AireBooster (Retail: \$975, Govt: \$829); Optional External QuikEvac Evacuator (Retail: \$1449, Govt: \$1232)	Hi-tech appearance. Membrane touch controls facilitate infection control. Optional External QuikEvac Evacuator can be included and increases Director+ price to (Retail: \$15,995, Govt: \$13,595)

Data in this table was provided by manufacturers

Synopsis of Air Abrasion Units

Product Name	Lares Producer +	Micadent
Manufacturer	Lares Research 295 Lockheed Avenue Chico CA 95973 (800) 347-3289 (916) 345-1870 FAX	Medidenta International, Inc. 39-23 62 nd Street Woodside NY 11377 (800) 221-0750 (718) 565-6208 FAX
Price	Retail: \$3999.00 Govt: \$3399.00	Retail: \$995.00 Govt: \$995.00
Delivery System	Counter-top	Counter-top
Air Source	Dental office air (60 psi minimum required); can be supplemented with optional MicroPrep AireBooster or replaced with optional QuikAire Compressor	Nitrogen Tank
Particle Size	27 μ	25 μ
Powder Canisters / Switchable	Single / No	Single / No
Autoclavable Handpiece / Tips	Yes	Yes
Pressure Range	60, 80, or 120 psi	(4 0 – 160 psi)
Adjustable Powder Flow	Yes; Continuous adjustment from 3 gm/min to 10 gm/min	No manual adjustment; automatically increases powder with increased air pressure.
Cutting Modes	Continuous	Continuous
Nozzle Size / Delivery Angle	.015" .019" .026" / 45° 80° 90° 120°	.014" .016" .018" .020" / 120°
Low Powder Indicator	Yes	No
Trouble Indicator	No	No
Source-Air Filtering	Yes; oil & moisture	No, uses inert nitrogen gas
Built-In Auxiliary Suction	No; Optional External QuikEvac (97 CFM @ 2 inches)	No
Size & Weight	10"H x 8"W x 14.5" D 16.6 lbs	4.5"H x 3.4"W x 3" D; 4 lbs
Compressor Noise Level	Not Applicable	Not Applicable
Training Available	Detailed training manual. Regional seminars available @ small charge	Videocassette and instructional text. Regional seminars available (\$195)
Electrical	IEC 601-1 and CSA pending	Not Applicable
Comments	Low-tech yet clean and attractive appearance. Mechanical controls with LED psi display. Air pressure dependent on office air pressure obtainable, generally only 80 psi unless optional air compressor or air booster utilized. Optional QuikAire Oilless Compressor (Retail: \$1449, Govt: \$1232); Optional AireBooster (Retail: \$975, Govt: \$829); Optional External QuikEvac Evacuator (Retail: \$1449, Govt: \$1232)	Low-tech appearance; analog gauges and mechanical switches. Price quoted includes Micadent unit, foot control, one handpiece and tip, and two lbs of powder. Additional costs: Additional handle and tip @ \$99 each, Nitrogen tank @ \$199, Transfer hose and quick-disconnects @ \$144.

Data in this table was provided by manufacturers