

## ULTRASONIC ATOMIZERS

Low and Medium Atomization Rate – 20 kHz and 40 kHz

- From microliters to liters – continuous or intermittent
- Dispenses material with virtually no overspray
- Pressureless atomization – low velocity mist
- Low cost atomizing probe replacement
- Minimal atmospheric contamination
- Virtually uncloggable



*VC 5020 AT / VC 5040 AT*



### TYPICAL APPLICATIONS

- Coating non-woven fabric, paper, etc.
- Laboratory spray drying
- Injecting moisture into a gas stream
- Applying minute amount of oil, fragrance or flavor onto a product
- Injecting small volume of reagents into a reactor

### GENERAL DESCRIPTION

Unlike conventional atomizing nozzles that rely on pressure and high-velocity motion to shear a fluid into small drops, the ultrasonic atomizer uses only ultrasonic vibrational energy to generate a gentle, low-velocity spray. Overspray is practically eliminated, resulting in substantial material savings and reduction in airborne pollution. The liquid can be dispensed to the atomizing probe (nozzle) by either gravity or a small low-pressure metering pump, and atomized continuously or intermittently. The rate at which the liquid is atomized depends, within limits, solely on the volume that is being delivered onto the atomizing surface, and the frequency. Typically, the higher the frequency, the lower the processing capability. The amount of material atomized can be as little as 2  $\mu\text{l}/\text{sec}$ . Because the droplets typically drift downward at low velocity under the influence of gravity, the probe should be mounted with the tip facing downward, and air turbulence kept to a minimum. A wide variety of coatings, chemicals, lubricants, and particulate suspensions can readily be atomized. However, factors such as viscosity, miscibility, and solid content deserve consideration. For optimum atomization, the viscosity should be under 50 cps and the solid concentration kept below 30%. Although lower frequencies are capable of atomizing higher viscosity liquids, because the atomization process depends on setting a liquid film into motion, typically the higher the viscosity – the lower the flow rate, and the more difficult the application. The atomization of liquids containing long-chained polymer molecules is problematic, even in diluted form, due to the highly cohesive nature of the material. In many cases, mixtures with particulates can be atomized, because the solids are simply carried along in the drops. The low transport velocity of the liquid through the probe permits even abrasive slurries to be processed with negligible erosion of the passageway. Compared with conventional pressurized nozzles, the feed channel running through the probe and exit orifice are relatively large, and practically uncloggable. Drop size is primarily a function of frequency, and the higher the frequency, the smaller the drop diameter. With water, the median drop size at 20 kHz is 90 microns, and 50 microns at 40 kHz.

## HOW DOES IT WORK?

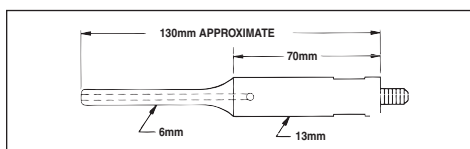
The ultrasonic power supply converts 50/60 Hz to high frequency electrical energy. This electrical energy is transmitted to the piezoelectric transducer within the converter, where it is changed to mechanical vibrations. The ultrasonic vibrations are intensified by the probe and focused at the tip where the atomization takes place. The liquid travels through the probe, and spreads out as a thin film on the atomizing surface. The oscillating tip disintegrates the liquid into micro-droplets, and ejects them to form a gentle, low velocity spray.

## SPECIFICATIONS

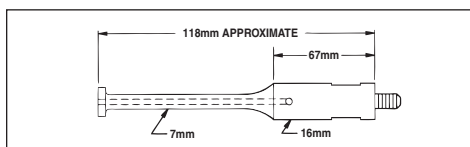
POWER SUPPLY	Net power output: 50 Watts. Frequency: 20 kHz (Model VC 5020 AT). 40 kHz (Model VC 5040 AT) Dimensions: (H x W x D): 4½" x 9¾" x 12½" (115 x 250 x 320 mm) Weight: 3 lbs. (1.4 kg)
CONVERTER	Piezoelectric lead zirconate titanate crystals (PZT) 20 kHz - Model CV 18. Compatible with VC 5020 AT 40 kHz - Model CV 24.* Compatible with VC 5040 AT Diameter: 1¼" (32 mm) Length: CV 18 - 5¾" (146 mm). CV 24 - 4¾" (121 mm) Weight: ¾ lb. (340 g) Cable length: 5' (1.5 m)
STANDARD ATOMIZING PROBE**	Orifice ⅜" (2.3 mm). Threaded port #10-32 UNF thread. Titanium alloy Ti-6Al-4V. Autoclavable. Tubing required: ⅝" (4 mm) inside diameter. 20 kHz: 630-0437 40 kHz: 630-0499
MEDIAN DROP SIZE	20 kHz: 90 microns. 40 kHz: 50 microns
ELECTRICAL REQUIREMENTS	Unless otherwise requested, units are shipped wired for 117 volts, 50/60 Hz. For export please specify desired voltage options.

## ATOMIZING PROBES

### 20 kHz

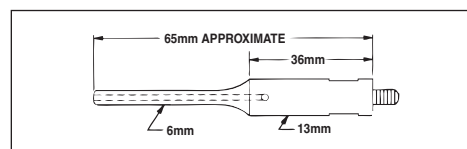


Standard tip half wave  
Low atomization rate. Up to 60 ml./min.  
Part No. 630-0437

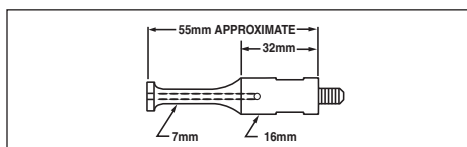


Flat tip half wave  
Medium atomization rate. Up to 100 ml./min.  
Part No. 630-0545

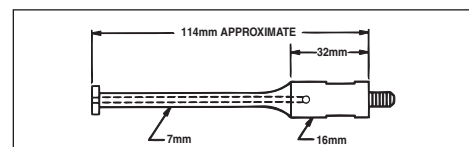
### 40 kHz



Standard tip half wave  
Low atomization rate. Up to 30 ml./min.  
Part No. 630-0499



Flat tip half wave  
Medium atomization rate. Up to 50 ml./min.  
Part No. 630-0552



Flat tip full wave  
Medium atomization rate. Up to 50 ml./min.  
Part No. 630-0547

Note: Because ultrasonic probes are tuned to resonance, their lengths may vary slightly due to variations in the titanium's modulus of elasticity.

## ORDERING INFORMATION

### Part No.

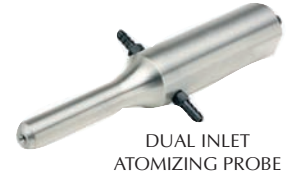
50 Watt ultrasonic atomizer 20 kHz . . . . . VC 5020\*\*\*  
50 Watt ultrasonic atomizer 40 kHz . . . . . VC 5040\*\*\*

\* A shorter version of converter CV 24 (3½" (89 mm) long and 1¼" (32 mm) in diameter is available as model CV 243 for use with automated system.  
\*\* A different atomizing probe can be substituted for the standard probe.  
\*\*\* Shipped complete and ready for operation with an atomizing probe, tool kit, and instruction manual.  
Please specify part numbers when ordering power supply, converter, and probe.  
Example: VC 5020 AT power supply with CV 18 converter and 20 kHz atomizing probe Part No. 630-0437.

## ATOMIZERS FOR HIGH ATOMIZATION RATE

Two types of atomizing probes are available for processing volumes up to 20 liters per hour\* – a dual inlet atomization probe and a wide dispersion atomizing probe. The dual inlet probe operates at 20 kHz. The wide dispersion probe operates at 20 kHz or 40 kHz.

With the dual inlet probe the mixed liquids flow through the probe and spread out as a thin film on the tip surface. The oscillations disintegrate the liquid into micro-droplets and eject them to produce a fine, low velocity spray. One port can be sealed when only one liquid has to be processed. Threaded ports #10-32 UNF thread. Required connecting tube ID  $\frac{5}{32}$ " (4 mm).



With the wide dispersion atomizing probe, the liquid which is dispensed onto the probe surface via a small tube runs downward and spreads out as a thin film on the tip surface. The oscillations disintegrate the liquid into micro-droplets, and eject them to produce a fine, low velocity spray.



With both probes, atomization can be continuous or intermittent. The probes are fabricated of titanium alloy Ti-6Al-4V and are autoclavable.

\*With water

## ATOMIZING PROBES FOR HIGH ATOMIZATION RATE

	20 kHz DUAL INLET ATOMIZING PROBE	WIDE DISPERSION ATOMIZING PROBES	
		20 kHz (H x W) $5\frac{3}{16}$ " x 1" (132 x 25 mm)	40 kHz (H x W) $2\frac{5}{8}$ " x 1" (67 x 25 mm)
PART NO.	630-0434	630-0590	630-0587
COMPATIBLE WITH	VCX 130 FSJ*	VCX 130 FSJ*	VC 5040 AT
CONVERTER	CV 18	CV 18	CV 24
MAX. FLOW RATE*	20 l/hour	20 l/hour	10 l/hour
MEDIAN DROP SIZE*	90 microns	90 microns	50 microns

\*Without the standard  $\frac{1}{4}$ " (6 mm) probe