



CANNABIS & HEMP

APEX

Microbial Disinfection



APEX is the cannabis industry's premier non-ionizing, and cost-effective solution for yeast, mold, and pathogen reduction. Using the precision of radio frequency technology combined with Ziel's patented process solutions, APEX reduces total yeast and mold count (TYMC) to less than 10,000 cfu/g without compromising sensory or product quality.

APEX technology is chemical-free and suitable for organic operations.

Leveraging Ziel's patented¹ process solutions to eliminate *Salmonella*, *E. coli* and other microbial pathogens in food products, APEX was specifically developed for cannabis to reduce a broad spectrum of microorganisms. APEX effectively reduces microbial pathogens without the use of chemicals or ionizing radiation, making it a superior application for cannabis.

Yeast and Mold

The ideal growing environment for cannabis and hemp is also the ideal environment for yeast and mold to flourish. High yeast and mold counts are a primary reason for regulatory microbial compliance failure in cannabis and hemp flower. Products that fail regulatory testing impair top-line revenue, increase risk of product recalls, and can jeopardize a cultivator's license.

Radio Frequency (RF)

RF works by creating an oscillating electromagnetic field between two electrodes in the APEX cavity. Operating at a 27.12 MHz frequency level, polar water molecules contained in the natural moisture of the cannabis rotate 27 million times per second, generating friction and thus the heat necessary to kill microbial pathogens. The long radio wave profile penetrates uniformly throughout the flower, creating 'volumetric heat,' as opposed to

traditional thermal heating. Ziel's proprietary process settings, administered by a Siemens PLC/HMI system, precisely control heat in real time via temperature probes, reducing targeted microbials to safe levels, without compromising the flower's potency, terpene profile, or sensory qualities.

Benefits:

- Non-ionizing radiation and chemical-free
- Near zero THC loss
- Proven to reduce TYMC to <10,000 cfu/g consistently in one cycle, with starting counts as high as 500,000 cfu/g.
- Moisture loss of typically $\leq 0.5\%$
- Treats 0.5 - 2.7 kg/batch (1-6 lbs/batch)
- Treatment time per batch: 20 to 30 minutes
- Treats dry flower between 8% to 15% moisture
- Customized process setting available to meet specific product requirements
- Treats dry trimmed flower and milled flower
- Suitable for organic operations

1. U.S. Patent No 10,517,308

Easy to Operate

APEX's HMI user interface consists of easy-to-use menus of preprogrammed processing formulas, developed by Ziel staff on-site with your team. The system monitors the progress and temperature of each treatment to provide real-time user feedback. Data logs are generated automatically to assist in quality control monitoring and reporting. Optional remote monitoring and software upgrades are available via a standard internet connection.

Since APEX requires no additional supplies other than electricity, there are no chemicals or waste products for disposal. The system has a low operating cost, consumes energy efficiently, is safe to operate, and environmentally friendly.

Installation

Ziel provides a turnkey solution for your operation. Our professional installation and process settings teams coordinate directly with your facilities and QA teams to design customized treatment recipes and train your



APEX HMI interface with preprogrammed process solutions provides consistent results

operators. Requiring just a 480V 3-phase electrical connection, APEX necessitates no additional siting requirements.

TECHNICAL SPECIFICATIONS

Product Applications	Cannabis and Hemp flower
Processing Capacity	Treats 0.5-2.7 kg/batch (1-6 lbs/batch)
Processing Time	Treatment time per batch: 20 to 30 minutes
RF Power	7 kW
Electrical Requirements	400/480 VAC +/-5%, 3-Phase + ground, 50/60 Hz, 32/38 A connected load
Codes & Standards	CE mark; UL and CSA compliant FCC compliant
System Dimensions	2800 mm (L) x 1520 mm (W) x 3110 mm (H) 9'-3" (L) x 5'-0" (W) x 10'-3" (H)
Gross Weight	821 kg / 1,810 lbs
Material Construction	Food grade stainless steel construction
Operating Environment	Indoor location, well ventilated room 15° C to 40° C (59° F to 104° F) Relative humidity 10% to 90% non-condensing environment
Life Expectancy	20+ year major structural equipment
Warranty	1 year limited parts & labor
Manufactured	Italy



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