

Matrix RF Skin Resurfacing Device - Official Clinical Overview & Technical Datasheet

DEVICE IDENTIFICATION & CLINICAL ROLE

The Matrix RF Skin Resurfacing Device is a next-generation, non-ablative fractional radiofrequency (RF) system engineered for dermal remodeling and epidermal resurfacing. Operating within the 1.0 MHz to 2.0 MHz frequency band, the device delivers bipolar and unipolar fractional RF energy through a matrix-patterned electrode tip, creating microscopic thermal zones (MTZs) that trigger controlled wound healing, neocollagenesis, and elastin regeneration.



INTERNAL HARDWARE TOPOLOGY

The system integrates a solid-state RF generator ($\pm 20\%$ power accuracy), a

high-voltage switching power supply (100-240V AC, 50/60Hz), and a multi-channel impedance monitoring circuit (real-time tissue resistance feedback). The handpiece contains a micro-stepper motor driving a 7x7 or 10x10 electrode pin array (pins spaced 1.2mm apart, each pin 150µm diameter). A closed-loop water circulation module (200ml reservoir, flow rate 1.2L/min) coupled with a TEC (thermoelectric cooler) maintains the sapphire contact plate at a constant 4°C to 10°C, ensuring epidermal protection during 30-60ms RF pulses.

EPIDERMAL PROTECTION MECHANISMS

- Dynamic Impedance Adaptive Control (DIAC): Adjusts RF power 500x per second to prevent hotspots.
- Contact Validation Matrix: Requires full electrode-skin contact (resistance <150 Ohms per pin) before discharge.
- Post-Pulse Sapphire Chill Phase: 300ms active cooling immediately following RF emission, reducing surface temperature rise to <3°C above baseline.

TREATMENT ADVANTAGES

- Fractional resurfacing with minimal social downtime (erythema resolves in 24-48 hours).

- Suitable for Fitzpatrick skin types I-V (customizable energy profile for darker phototypes).
- Dual-mode operation: Superficial resurfacing (60-80µm depth) and deep dermal coagulation (300-400µm depth).
- Pain management: Topical anesthetic optional due to integrated contact cooling.

SPECIFICATION MATRIX

Parameter	Specification
RF Frequency	1.0 MHz / 1.5 MHz / 2.0 MHz selectable
Power Output Range	5W – 60W (bipolar), 10W – 100W (unipolar)
Pulse Duration	10ms – 200ms, 1ms increments
Fractional Matrix	49-pin (7x7) or 100-pin (10x10) disposable tips
Penetration Depth	Epidermal: 60-80µm, Dermal: 300-400µm
Cooling System	TEC + Sapphire + Closed-loop water + Forced air (4°C-10°C contact plate)
Impedance Monitoring	Real-time, 500Hz sampling, range

	50-1200 Ohms
User Interface	10.1 inch capacitive touchscreen, preset protocols for 6 Fitzpatrick types
Dimensions (W x D x H)	35cm x 45cm x 110cm (console)
Weight	18.5 kg (console only), 0.45 kg (handpiece)
Power Supply	100-240V AC, 50/60Hz, 450VA max
Standards Compliance	CE MDR, FDA 510(k), IEC 60601-1, IEC 60601-2-2, ISO 10993 series

REGULATORY COMPLIANCE

The Matrix RF Skin Resurfacing Device carries CE Mark (Class IIa Medical Device under MDR 2017/745), FDA 510(k) clearance (Kxxxxxx), and complies with IEC 60601-1 (electrical safety), IEC 60601-2-2 (HF surgical equipment), and IEC 60601-1-11 (home healthcare environment for clinic use). EMC testing per CISPR 11 Group 1 Class B. Bio-compatibility of electrode pins verified per ISO 10993-5 (cytotoxicity), -10 (irritation), and -23 (systemic toxicity).

