

## Skin Rejuvenation Laser - Official Clinical Overview & Datasheet

### EXECUTIVE SUMMARY

This document presents the clinical and technical specifications of the next-generation Skin Rejuvenation Laser system, engineered for high-performance dermatological clinics and medical spas. Leveraging tri-wavelength diode technology (755nm, 808nm, 1064nm) combined with dynamic pulse control, the device addresses the full spectrum of photoaging, vascular lesions, and dyschromias. Its primary clinical positioning is as a dual-modality platform capable of performing painless laser skin rejuvenation and permanent hair reduction within a single handpiece, maximizing both patient comfort and clinical throughput.

For practice owners, the system delivers a superior return on investment through low consumables cost, ultra-long diode life (over 10 million shots), and a zero-downtime treatment protocol. Unlike traditional IPL or single-wavelength lasers, this device offers real-time impedance matching and contact cooling to ensure consistent fluence delivery across all skin types, including Fitzpatrick IV-VI. The product is uniquely positioned to replace legacy systems by providing faster treatment sessions (up to 40% reduction in procedure time) with fewer adverse events, making it the definitive choice for premium aesthetic practices.



## CLINICAL ARCHITECTURE & DESIGN

The system utilizes a modular hardware architecture centered around imported Genuine Japanese or German laser diode bars, hermetically sealed in an impact-resistant housing. These bars are configured in a stacked array to deliver peak powers up to 3000W, ensuring rapid fluence delivery that bypasses the thermal relaxation time of competitive chromophores. The power supply incorporates dual oversized capacitors and a proprietary voltage regulation module, guaranteeing less than +/- 3% fluctuation in fluence output across continuous 8-hour operation cycles.

Advanced thermal management is achieved via a three-stage closed-loop cooling mechanism. Stage one employs a high-torque brushless water pump

circulating distilled coolant through a micro-channel cold plate interfacing directly with the diode bars. Stage two integrates four TEC (thermoelectric cooler) modules that actively remove residual heat from the handpiece's sapphire window, enabling sustained contact temperatures between 0°C to 4°C without condensation. Stage three utilizes radial fans with variable speed control based on real-time thermal sensor feedback, ensuring whisper-quiet operation (< 55dB) even at maximum duty cycle. The ergonomic handpiece features a weight-balanced design (less than 300g) and a rotatable 15x15mm spot tip to facilitate treatment of both large surfaces (back, legs) and delicate periorbital areas.

#### KEY INDICATIONS & CAPABILITIES

- Multi-Wavelength Chromophore Targeting: Proprietary pulse-stacking technology allows simultaneous or sequential emission of 755nm (melanin-specific for lentigines and freckles), 808nm (deep penetrating for hair follicles and dermal heating), and 1064nm (vascular-specific for telangiectasias and leg veins) without handpiece swapping.
- Smart Clinical Feedback UI: A 10.4-inch capacitive touchscreen with adaptive brightness runs a real-time tissue impedance analyzer. The system automatically calculates recommended fluence (1-120 J/cm<sup>2</sup>) based on detected skin resistance, patient age, and treatment zone, reducing operator error by up to 70%.

- Permanent Hair Reduction Efficiency: Delivers 20-30% greater follicle destruction compared to single-wavelength systems by utilizing synchronized dual-pulse emission (Pre-heating pulse at 808nm followed by coagulation pulse at 1064nm). Clinical studies indicate over 85% reduction after 4-6 sessions for all hair types, including fine vellus and terminal hair.
- Epidermal Preservation System: Dynamic cooling with cryogen-free sapphire contact ensures the epidermis remains below 25°C even at fluences exceeding 40 J/cm<sup>2</sup>. The system includes a motion sensor that automatically halts laser emission if the handpiece dwell time exceeds 200ms on a single spot, preventing thermal blistering.
- Zero-Downtime Pigment Clearance: For melasma and solar lentigo treatment, the device offers a fractionated mode (5-10% coverage density) that creates microscopic treatment zones without confluent thermal injury. Patients experience mild erythema for <2 hours versus 48-72 hours with ablative lasers.

## COMPLIANCE & STANDARDS

This medical device system is manufactured in an ISO 13485:2016 certified facility and complies with all applicable international regulatory standards. It holds Medical CE Certification (Directive 93/42/EEC, Class IIb) validated by a Notified Body for active therapeutic laser systems. The product has received 510(k) clearance from the US FDA for indications including hair removal, wrinkle

reduction, and treatment of benign pigmented lesions. Electrical safety is certified to IEC 60601-1 (Third Edition) and IEC 60601-2-22 (Particular requirements for laser equipment). Laser class is 4, compliant with 21 CFR 1040.10 and 1040.11. All optical components meet RoHS and REACH environmental standards.

## TECHNICAL SPECIFICATIONS

The following table provides the calibrated operational parameters for the Skin Rejuvenation Laser system. All values are measured at the distal tip of the handpiece under standard environmental conditions (22°C, 50% RH).

<b>Parameter</b>	<b>Specification</b>
Laser Type / Wavelength	Triple Wavelength Diode Laser (755nm / 808nm / 1064nm $\pm$ 5nm)
Fluence (Energy Density)	1 - 120 J/cm <sup>2</sup> (adjustable in 0.5 J/cm <sup>2</sup> steps)
Spot Size	15mm x 15mm (standard) / 10mm x 30mm (Slim) / 8mm circular (Precision)
Pulse Width	10 - 500 ms (Single, Double, or Triple pulse stacking modes)

Repetition Rate	Single shot (footswitch) or up to 5 Hz (continuous)
Cooling System	TEC + Sapphire Contact (0-4°C) + Closed-Loop Water + Variable Speed Fans
Laser Classification	Class 4 Medical Laser (IEC 60825-1:2014)
Display Interface	10.4" TFT-LCD Capacitive Touchscreen, 1280 x 800 resolution
Electrical Requirements	100-240 VAC, 50/60 Hz, Max power consumption: 2000 VA
Dimensions (W x D x H)	Main Console: 420mm x 510mm x 960mm   Handpiece: 230mm x 55mm x 45mm
Weight	Net: 38 kg (83.8 lbs)   Shipping: 52 kg (114.6 lbs)
Operational Lifetime	>10 million shots or 5 years (Diode bar warranty)

