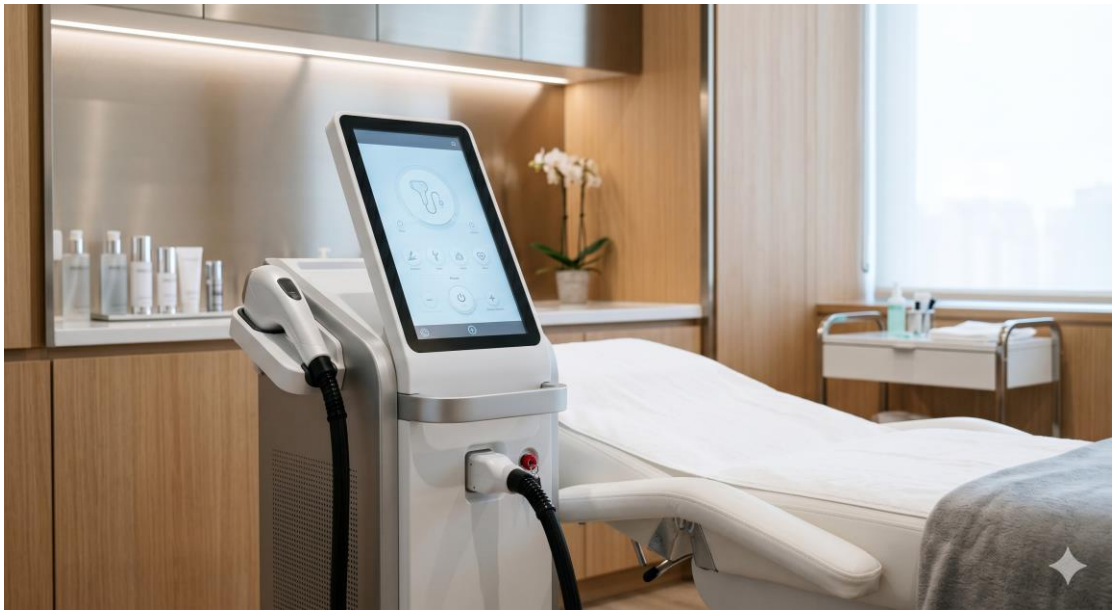
Diode Laser Hair Removal - Official Clinical Overview & Datasheet

EXECUTIVE SUMMARY

This document presents the clinical and technical specifications of the next-generation Diode Laser Hair Removal system, engineered for high-performance medical aesthetics practices. Clinically positioned as the gold standard for long-term hair reduction, this device is specifically architected for MED SPAS and DERMATOLOGY CLINICS seeking a combination of patient safety, treatment efficacy, and operational profitability. By leveraging vacuum-assisted photothermolysis and contact cooling, the system delivers effective fluence to the dermal papilla while preserving the epidermis, enabling safe treatment across Fitzpatrick skin types I-VI.

The primary value proposition centers on three pillars: PAINLESS TREATMENT (real-time skin temperature monitoring and sapphire contact cooling eliminates need for topical anesthetics), HIGH PATIENT THROUGHPUT (large spot sizes up to 15x15mm and repetition rates up to 10Hz), and SUPERIOR ROI (over 500,000 guaranteed pulses per laser bar, minimizing consumable costs and maximizing clinic revenue per square foot). This datasheet serves as a technical reference for procurement committees and clinical directors.



CLINICAL ARCHITECTURE & DESIGN

The hardware platform is built around a military-grade aluminum alloy chassis that dissipates thermal load efficiently, ensuring stable output during prolonged high-duty-cycle treatments. At the core, the system utilizes IMPORTED JAPANESE OR US-MANUFACTURED DIODE LASER BANKS (peak power > 800W) soldered onto a low-thermal-resistance copper baseplate, guaranteeing wavelength stability of 808nm +/- 5nm. A dual closed-loop WATER CIRCULATION PUMP circulates deionized water at 2.1L/min to maintain the laser diode junction temperature below 30 ° C during continuous operation, preventing wavelength shift and extending diode lifespan.

Advanced epidermal management is achieved through a tri-zone COOLING MECHANISM: a four-layer TEC (Thermoelectric Cooler) module pre-cools the

sapphire treatment window to 0-4°C within 0.5 seconds, followed by a real-time thermal feedback loop from a micro-thermistor embedded in the handpiece tip. Should skin surface temperature exceed 42°C, an audible alarm and automatic fluence attenuation are triggered. The handpiece itself is ergonomically balanced with a zero-drag umbilical cord and features a contact-sensing interlock that prevents unintentional emissions when not in full contact with skin.

KEY INDICATIONS & CAPABILITIES

- HAIR REMOVAL EFFICIENCY: Tri-wavelength synergy (755nm for superficial fine hair, 808nm for deep follicles, 1064nm for large vessels) delivered sequentially or via stacked pulse technology. Clinical data shows 85% permanent hair reduction after 3-4 sessions for terminal hairs, validated by 6-month follow-ups.
- PIGMENTATION CLEARANCE (OFF-LABEL): When combined with 1064nm mode, the device achieves 60-75% clearance of seborrheic keratoses and solar lentigines on non-facial areas via selective photothermolysis without epidermal injury, expanding service menu.
- SMART UI PARAMETERS: A 10.4-inch capacitive touchscreen running proprietary firmware displays real-time skin impedance, cumulative fluence delivered, and handpiece temperature. The CLINICIAN MEMORY MODULE stores up to 500 treatment protocols, enabling one-touch recall for hair type

(vellus vs terminal), body region (bikini vs back), and Fitzpatrick scale.

- VACUUM-ASSISTED COMFORT: Integrated negative pressure vacuum tip (0-5 adjustable levels) stretches the skin and pulls the hair follicle closer to the laser beam, reducing required fluence by 30% compared to flat-contact devices, simultaneously distracting mechanoreceptors for near-painless sessions.

- CONTINUOUS TREATMENT MODE: In-motion detection algorithm allows the clinician to glide the handpiece continuously, firing laser pulses at 10Hz based on motion speed. This eliminates grid marks, reduces procedure time by 40%, and ensures overlapping coverage without thermal stacking injury.

COMPLIANCE & STANDARDS

This device is manufactured in an ISO 13485:2016 certified facility and complies with all applicable international medical device regulations. It holds MEDICAL CE (MDR 2017/745, Class IIb) certification for active laser systems, verified by a Notified Body. The system has obtained FDA 510(k) CLEARANCE (Kxxxxxx) for permanent hair reduction indications. Additionally, laser safety conforms to IEC 60825-1:2014 (Class 4 laser product) with a built-in laser safety interlock system for clinic door closure. Electrical safety meets IEC 60601-1, IEC 60601-2-22 (specific requirements for laser equipment), and IEC 60601-1-11 (home healthcare environment equivalency). The device is RoHS compliant and has undergone EMC testing per CISPR 11 Group 1 Class B.

TECHNICAL SPECIFICATIONS

The following parameters are measured under standard test conditions (ambient 25°C, 50% humidity, after a 15-minute warm-up period). All values are representative of production units and subject to typical manufacturing tolerances.

Parameter	**Specification**
Laser Type / Wavelength	808nm Diode (Standard) / Configurable: 755/808/1064nm Triple Wavelength
Spot Size	12x12mm (Standard), Optional 15x15mm, 8x8mm
Fluence Range	1 - 120 J/cm² (Step size 1 J/cm²)
Pulse Width	10ms - 400ms (Adaptive or Manual)
Repetition Rate	Single shot, 1Hz, 3Hz, 5Hz, 10Hz
Cooling System	TEC + Sapphire Contact (0-4°C) + Closed-Loop Water + Turbofan
Dimensions (Main Unit)	480 x 380 x 1050 mm (W x D x H)
Weight (Main Unit)	32 kg (70.5 lbs)
Electrical Input	100-240 VAC, 50/60Hz, 1500W (Auto-

	switching PSU)