

CO2 Fractional Laser - Official Clinical Overview & Technical Datasheet

CLINICAL ARCHITECTURE & PERFORMANCE REFERENCE MANUAL: CO2 FRACTIONAL LASER

EXECUTIVE SUMMARY

The CO2 Fractional Laser System represents a paradigm shift in aesthetic dermatology, leveraging the principles of fractional photothermolysis to deliver the proven efficacy of ablative 10,600nm wavelength with dramatically reduced patient morbidity. By generating an array of microscopic treatment zones (MTZs), this architecture preserves intervening healthy tissue to facilitate rapid epidermal repair and robust dermal remodeling. This document provides a comprehensive technical overview and performance datasheet for the system, detailing its optical architecture, treatment capabilities, and safety protocols for clinical integration .



CLINICAL ARCHITECTURE & DESIGN

The system is engineered around a high-performance RF-excited CO₂ laser source that delivers a precise 10,600nm wavelength. This wavelength corresponds to a peak in the water absorption spectrum, ensuring efficient and controlled tissue vaporization. The laser energy is transmitted through a precision-engineered articulated arm (360-degree rotation capability) to a diverse array of treatment handpieces .

KEY INDICATIONS & CAPABILITIES

- * ****Skin Resurfacing:**** Clinically proven to improve facial wrinkles, photodamage, and textural irregularities .
- * ****Scar Revision:**** Effective in reducing the appearance of atrophic acne

scars, surgical scars, and burn-related hypertrophic scars .

- * ****Soft Tissue Surgery:**** Non-fractional modes enable precise incision, excision, ablation, vaporization, and coagulation of body soft tissues in dermatology, plastic surgery, and general surgery .

COMPLIANCE & STANDARDS

The system is designed to meet the most rigorous international regulatory standards for medical device safety and performance, including US FDA 510(k) clearance and CE marking under the Medical Device Directive. Compliance is maintained with key standards, including:

- * IEC 60601-1 (Medical Electrical Equipment - General Requirements for Basic Safety and Essential Performance)
- * IEC 60825-1 (Safety of Laser Products)
- * IEC 60601-2-22 (Particular Requirements for Basic Safety and Essential Performance of Surgical, Cosmetic, Therapeutic and Diagnostic Laser Equipment)
- * ISO 10993 Series (Biological Evaluation of Medical Devices) .

TECHNICAL SPECIFICATIONS

Parameter	Specification
Laser Type	RF-Excited CO2 Laser
Wavelength	10,600 nm
Maximum Output Power	> 60 W (Peak up to 240W)
Pulse Duration	0.1 ms - 10 ms
Pulse Energy (Fractional)	2 - 250 mJ
Scan Area (Fractional)	1x1 mm to 20x20 mm
Spot Size (Min/Max)	0.1 mm / 2.0 mm
Cooling System	Self-contained, closed-cycle cooling system
User Interface	LCD Touchscreen
Dimensions (WxDxH)	410 x 655 x 1070 mm
Weight	Approx. 45 kg
Electrical Ratings	220-230V~, 50/60Hz, 600VA, Single Phase

CLINICAL PROTOCOLS & TREATMENT PARAMETERS

The system offers advanced parameter flexibility to tailor treatments to individual patient anatomy and skin conditions. Key parameters include adjustable pulse energy (2-250 mJ), pulse duration (0.1ms to 5ms), and scan

area (up to 20x20 mm) . For optimal clinical outcomes, especially in patients with Fitzpatrick skin types III-IV, adjustments to energy and density are recommended to minimize the risk of post-inflammatory hyperpigmentation (PIH) .

****Core Modes of Operation:****

- * ****Fractional Mode:**** Generates a scanning grid of microscopic laser beams to create MTZs, promoting rapid healing and collagen remodeling.
- * ****Ultra/Super Pulse Mode:**** Delivers high peak power in a short pulse duration for precise ablation with minimal residual thermal damage.
- * ****Continuous Wave (CW) Mode:**** Provides a continuous laser output for incisional and excisional surgical applications .

