





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Discover more about  
**Blade RF Sealed Series**

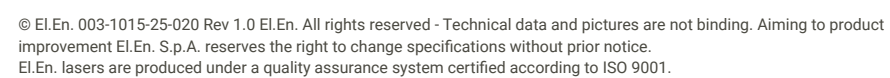


## Sealed Series

## BLADE RF

**RF 88 / RF 177 / RF 303**  
**RF 404 / RF 505 / RF 606**

High Peak Power **RF CO<sub>2</sub> Lasers**  
**80W to 600W** Power





# Experience Rooted in Passion

BLADE RF Sealed Laser sources are designed, developed, and manufactured in El.En.'s Italian facility. For over 40 years, El.En. has passionately committed itself to achieving the highest levels of engineering and reliability, creating devices with advanced technological capabilities. In addition to laser sources, El.En. also develops scan heads and galvanometric components for a perfect integration. With more than 4000 industrial installations, El.En. has been chosen to achieve exceptional performance in a wide range of industries. Embrace the precision, innovation, and expertise of El.En.'s laser solutions, empowering your industrial applications with cutting-edge technology.

## Introducing the Sealed Series

The Blade RF Sealed series guarantees excellent performance with its high-peak power capabilities. This technology, combined with RF excitement, ensures reliable operation and optimal stability throughout work processes. Its compact size allows seamless integration into various setups, making it ideal for powers ranging from 80W to 600W. With three different wavelengths

available (10.6µm, 10.2µm, and 9.3µm), it caters to diverse customer needs. With Blade RF Sealed series, performance meets versatility and compact integration.



## Key features

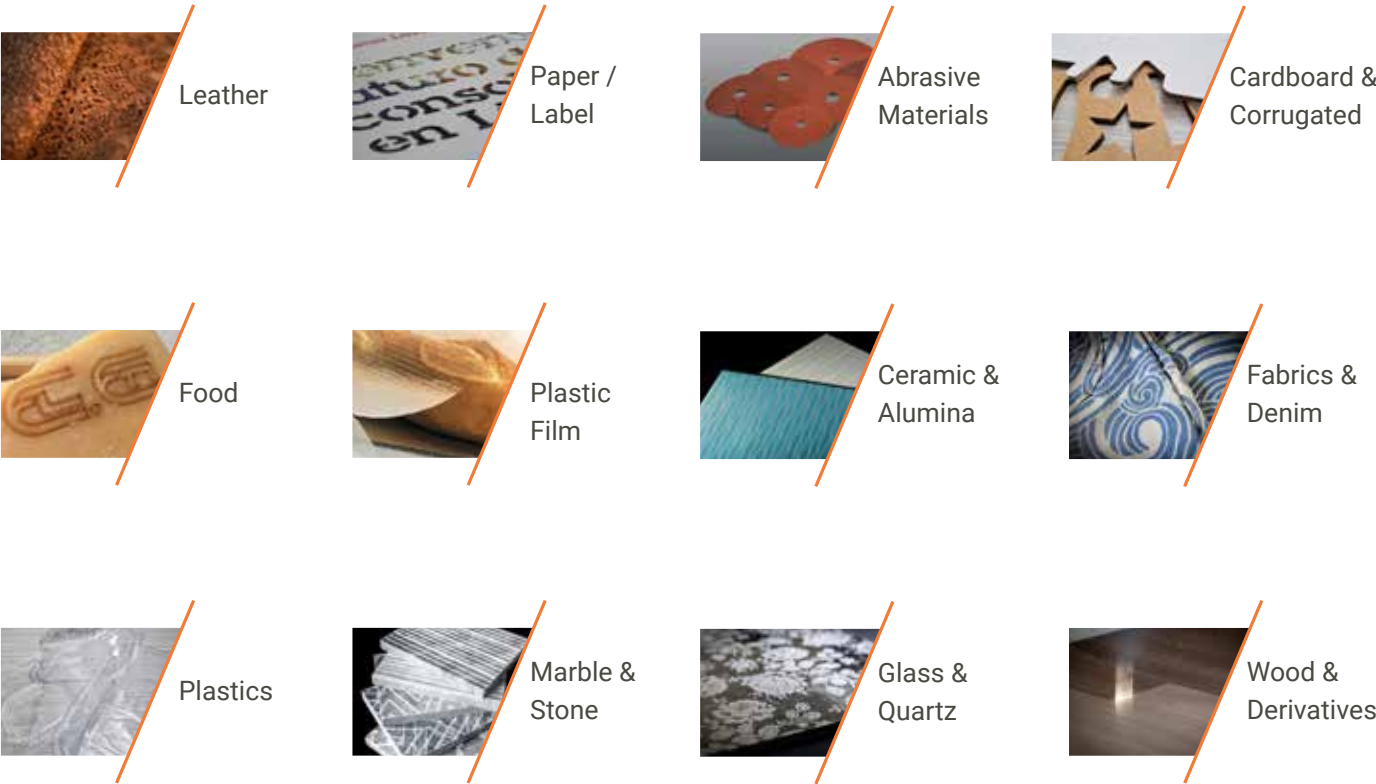
- High Peak Power Sealed technology
- Radio Frequency excited
- Extremely compact & easy to integrate
- Wide Range of Wavelengths
- High reliability & high beam quality
- High electrical/optical conversion efficiency
- Integrated RF power supply
- TCP/IP connection for remote diagnostics and control
- On board HMI panel on RF 505 & RF 606

## Seamless integration

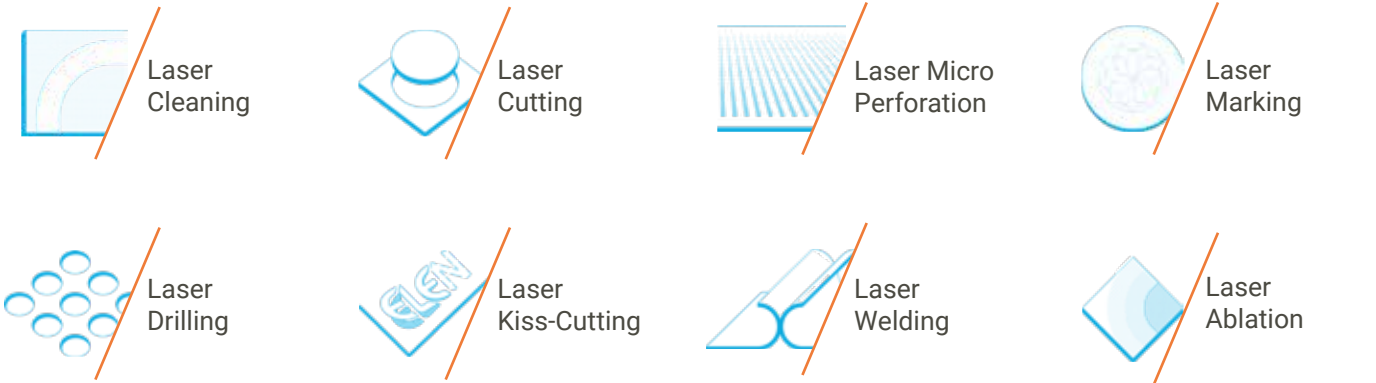
The BLADE RF Sealed series offers six different power solutions (80W, 150W, 300W, 400W, 500W and 600W) in compact sizes. This versatility enables seamless integration into a wide range of systems, providing flexibility to adapt to different power requirements and diverse operational scenarios. The BLADE RF Sealed series enables a comprehensive integration of El.En.'s cutting-edge technologies within the same system: laser sources, scan heads and dedicated software control are designed to operate together synergistically. This versatile and harmonized integrability empowers endusers or integrators with enhanced efficiency, productivity and performance across various applications and industries. Moreover, the BLADE RF Sealed series ensures compatibility with components other than those from El.En., offering added convenience for integration into existing setups. Each model within the Sealed series has been accurately engineered to deliver exceptional performance and reliability. Whether it's precision cutting, engraving, or marking, these lasers provide the versatility for a wide range of applications.

## Applications

The Blade RF Sealed laser sources are versatile and can be utilized in various applications, including high-performance remote processing, digital converting for the packaging industry, cutting and engraving of plastics, wood, leather, fabrics and many other materials. They excel in cutting of paper and cardboard for Packaging, offering exceptional stability, precision and performance. With its three distinct wavelengths, this laser series excels in specific materials processing such as glass or polypropylene, and in challenging applications like LCD processing, labels kiss-cutting, and food industry solutions. With its adaptability and capabilities, the Blade RF Sealed series proves to be a reliable choice for a wide range of industries, enhancing productivity and offering excellent laser processing in diverse applications.



## Processing





## Laser Specifications

| Model  | RF 88                                     | RF 177                                    | RF 303 / 303 P* / 303 G*                  | RF 404 / 404 G*                           | RF 505                                    | RF 606                                    |
|--|---|---|---|---|---|---|
| Rated Power (W) <sup>(1)</sup>                       | 80 (1 <sup>a</sup> )                      | 150                                       | ≥300                                      | 400                                       | 500                                       | 600                                       |
| Effective Peak Power (W) <sup>(2)</sup>              | 200                                       | 600                                       | 1100                                      | >1200                                     | 1650                                      | 1650                                      |
| Power Stability (long term) <sup>(3)</sup>           | ±5%                                       | ±5%                                       | ±5%                                       | ±5%                                       | ±5%                                       | ±5%                                       |
| Wavelength (μm)                                      | 10.6 ± 0.4                                | 10.6 ± 0.4                                | 10.6 ± 0.4   10.2 ± 0.2   9.3 ± 0.2       | 10.6 ± 0.4   9.3 ± 0.1                    | 10.6 ± 0.4                                | 10.6 ± 0.4                                |
| Polarization   | Linear (Parallel to Base)                 | Linear (Perpendicular to Base)            | Linear (Perpendicular to Base)            | Linear (Perpendicular to Base)            | Linear (Perpendicular to Base)            | Linear (Perpendicular to Base)            |
| Beam Diameter (1/e <sup>2</sup> at the exit) (mm)    | 9.4 ± 0.5                                 | 6.0 ± 0.5                                 | 8.0 ± 0.5                                 | 8.0 ± 0.5                                 | 10 ± 1                                    | 10 ± 1                                    |
| Beam Divergence (1/e <sup>2</sup> full angle) (mrad) | 3.0 ± 0.3                                 | 3.0 ± 0.3                                 | ≤2.0                                      | ≤3.0                                      | ≤2  | ≤2  |
| Maximum Pulse Frequency (kHz)                        | 50  | 100                                       | 100                                       | 100                                       | 100                                       | 100                                       |
| Pulse Width Range (μs)                               | 2 ÷ 1000                                  | 2 ÷ 1000                                  | 2 ÷ 150                                   | 2 ÷ 150                                   | 2 ÷ 150                                   | 2 ÷ 150                                   |
| Maximum Duty Cycle                                   | 60%                                       | 50%                                       | 50%                                       | 60%                                       | 60%                                       | 60%                                       |
| Mode Quality (M <sup>2</sup> )                       | < 1.2                                     | < 1.15                                    | < 1.2                                     | < 1.2                                     | < 1.2                                     | < 1.2                                     |
| Beam Ellipticity                                     | 1.2 : 1                                   | 1.15 : 1                                  | 1.2 : 1                                   | < 1.2 : 1                                 | < 1.2 : 1                                 | < 1.2 : 1                                 |
| Optical Pulse Rise/Fall Time (μs)                    | < 50                                      | < 50                                      | < 50                                      | ≤60 / ≤100   ≤60 / ≤80                    | ≤50                                       | ≤50                                       |
| Typical Gas Mix Consumption (NL/year)                | NA  | NA  | NA  | NA  | NA  | NA  |
| Operating Ambient Temperature Range (°C)             | 5 ÷ 35                                    | 5 ÷ 35                                    | 5 ÷ 35                                    | 5 ÷ 35                                    | 5 ÷ 35                                    | 5 ÷ 35                                    |
| Storage Temperature Range (°C)                       | 5 ÷ 50                                    | 5 ÷ 50                                    | 5 ÷ 50                                    | 5 ÷ 50                                    | 5 ÷ 50                                    | 5 ÷ 50                                    |
| Maximum Humidity                                     | Non Condensing at Inlet Water Temperature | Non Condensing at Inlet Water Temperature | Non Condensing at Inlet Water Temperature | Non Condensing at Inlet Water Temperature | Non Condensing at Inlet Water Temperature | Non Condensing at Inlet Water Temperature |
| Electrical Power Requirements                        |   |   |   |   |   |   |
| Input Voltage (V <sub>DC</sub> )                     | 48 ± 1                                    | 48 ± 1                                    | 48 ± 1                                    | 48 ± 1                                    | 48 ± 1                                    | 48 ± 1                                    |
| Max Current (A)                                      | 27  | 60  | 115                                       | 115                                       | 150                                       | 200                                       |
| Peak Current (A)                                     | 32 for 3 ms Max                           | 100 for 3 ms Max                          | 180 for 3 ms Max                          | 200 for 3ms Max                           | 200 for 3ms Max                           | 250 for 3ms Max                           |
| Coolant  |   |   |   |   |   |   |
| Heat Load (W)  | 1500                                      | 3000                                      | 5500                                      | 5500                                      | 7200                                      | 9600                                      |
| Coolant Temperature (°C)                             | 23 ± 1                                    | 23 ± 1                                    | 23 ± 1                                    | 23 ± 0.5                                  | 23 ± 0.5                                  | 23 ± 0.5                                  |
| Water Cooling Input Pressure (bar)                   | 4   | 4   | ≤ 4                                       | 4.5                                       | ≤4  | ≤4  |
| Water Cooling Flow Rate (L/min)                      | 5 ± 0.5                                   | 7 ± 0.5                                   | 10 ÷ 11                                   | 15  | 17 ÷ 18                                   | 17 ÷ 18                                   |
| Dimensions / Weight                                  |   |   |   |   |   |   |
| Laser Dimensions (LxWxH) (mm)                        | 662x110x117                               | 1200 x 190 x 265                          | 1210 x 320 x 305                          | 1210 x 320 x 305                          | 1317 x 355 x 320                          | 1317 x 355 x 320                          |
| RF Power Supply Dimensions                           | 457x57x164                                | Integrated                                | Integrated                                | Integrated                                | Integrated                                | Integrated                                |
| Safety Shutter                                       | NA  | Optional                                  | Optional                                  | Optional                                  | Integrated                                | Integrated                                |
| Laser Weight (kg)                                    | 9   | 37.5                                      | 65  | 65  | 90  | 90  |
| RF Power Supply Weight (kg)                          | 3.8                                       |   |   |   |   |   |

(1) Typical with a frequency of 25kHz and 50% duty cycle. Power reduction of 1% for °C with water cooling temperature above 25°C.  
(2) Typical at 1kHz and 10% duty cycle. The effective power peak is defined as Average power /Duty Cycle.  
(3) With constant frequency and duty cycle and constant water coooling temperature (23.0±0.5)°C after 1h from ignition and 10min of warm up. Stability is defined as 100\*(Pmax-Pmin)/2\*Pmax.  
(1a) Typical with a pulse duration of 300μs and 60% duty cycle. Power reduction of 1% for °C with water cooling temperature above 20°C.

## RF 88

