The Winning Force

DURMA

# BRILASE

## Laser Power Supply


durmazlar

DURMA The Winning Force

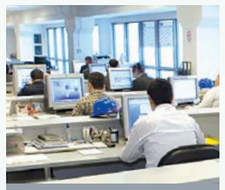
As a total supplier for sheet metal manufacturing with almost 60 years of experience, Durma understands and recognizes the challenges, requirements and expectations of the industry.
We strive to satisfy the ever higher demands of our customers by continuously improving our products and processes while researching and implementing the latest technologies.

In our three production plants with a total of 150.000 m², we dedicate 1,000 employees to delivering high quality manufacturing solutions at the best performance-to-price ratio in the market.

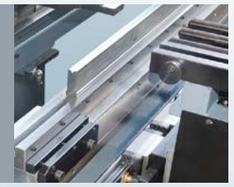
From the innovations developed at our Research & Development Center to the technical support given by our worldwide distributors, we all have one common mission: to be your preferred partner.

Present Durmazlar machines with DURMA name to the world.

1
High technology, modern production lines



2
Top quality components



3
High quality machines designed in R&D Centre

durmazlar

# Brilase

## Turkey’s first Fiber Laser Power Source...

Durma has developed Turkey’s first highest power Fiber Laser Resonator System. Due to their superior beam quality; fiber lasers are the first choice for precise cutting, welding, micro-material processing and marking applications.

## What is a FIBER LASER?

Fiber laser is a type of solid-state laser but compared to other laser types it’s compact, has high electrical and optical efficiency, is able to dissipate heat energy very easily and has the lowest maintenance cost. It’s called a fiber laser because the gain medium is an optical fiber. However, the fiber optic cables used here have some structural differences.


## DOUBLE CLADDING GAIN FIBER

The gain fiber, which is optically pumped by several diode lasers, has a special structure compared to traditional optical fibers. With its double cladding (or double core) structure, the pump laser is collected into the inner cladding. As it propagates through the inner cladding, the pump laser enters the doped core. Due to the excitation of the dopant material ions by the pump laser, stimulated emission occurs and stays in the core by total internal reflection.

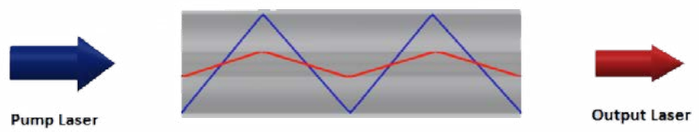



Figure 1 The propagation of laser beam through the gain fiber

The dopant material of the gain fiber core is Ytterbium, a rare earth element, due to its high optical efficiency (>%68).

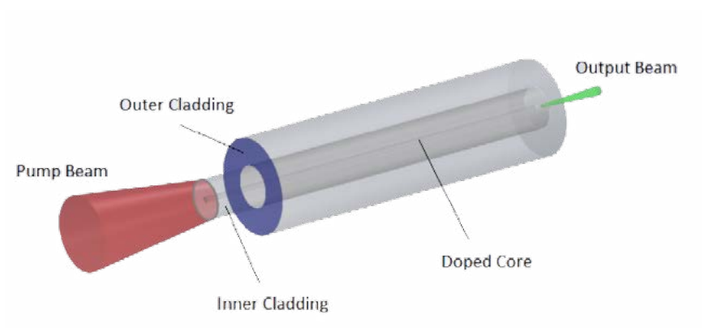



Figure 2 Cross section of the doped double cladding gain fiber and beam propagation



## FIBER LASER STRUCTURE

Fiber laser consists of 3 main sections

1) Pumping: The pump laser coming from the diode lasers are coupled into a single optical fiber by a combiner fiber element which has multiple diode laser input ports and a single output and transferred to the gain fiber.

2) Oscillator: When the pump laser propagates through the ytterbium (Yb) doped core, it's stimulated by the Yb ions and amplified by the fiber bragg gratings (FBG). FBGs act as resonator mirrors; one as a high reflective placed on the beginning of the doped gain media, the other one as an output coupler having lower reflective properties placed on the other end of the doped gain media.

3) Beam delivery: This section is necessary to transfer the amplified laser beam from the oscillator section to the cutting head to process material or to another coupling element.

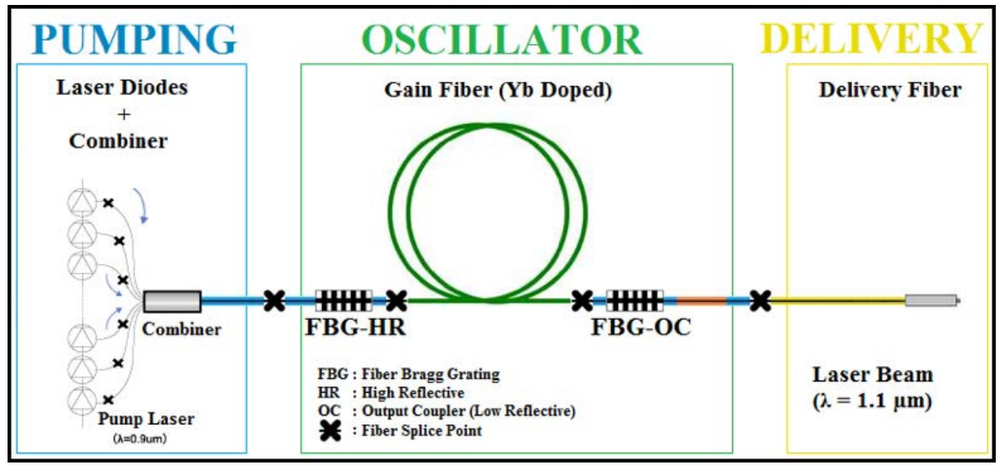



Figure 3 Fiber Laser Structure

## INCREASING THE POWER LEVEL

In order to obtain laser power in the kilowatt regime, the fiber laser system is merged into a single module structure. Depending to the desired power level, these modules are combined by again a fiber coupling element. (See figure 4).

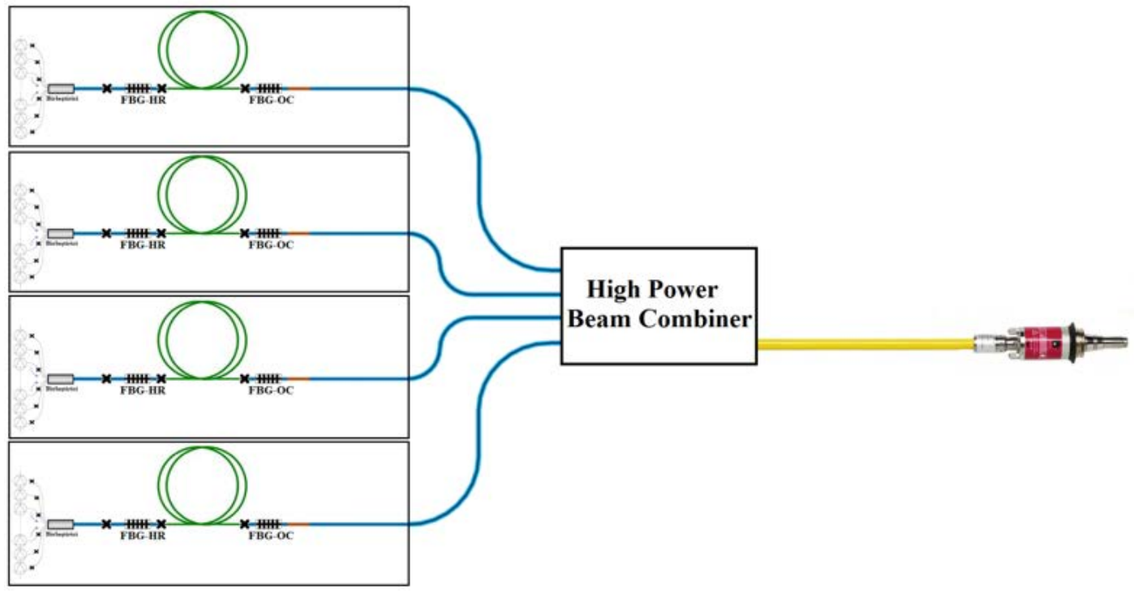



Figure 4 Increasing the laser power by combining the fiber laser modules





## BRILASE

6 kW of laser power is obtained due to the modular structure of the BRL-M fiber laser modules which is developed by the R&D team of *DURMA*.

## BRL-M Optical Features:

| | Min. | Normal | Max. | Unit |
|---|---|---|---|---|
| Mode Of Operation | CW / Pulsed | | | |
| Polarisation | Random | | | |
| Central wavelength | 1064 | 1070 | 1075 | nm |
| Operating Power | | 1000 | 1200 | W |
| Optical Efficency @915nm | 68 | | | % |
| Emission Bandwidth | | <4.0 | | nm |
| Beam Quality | | <1.1 (<0.373 mm mrad) | | $M^2$ (BPP) |

BRL-4000

BRL-4000 4 kW Fiber Laser System

# BRL-4000 Fiber Laser System

| | Min. | Normal | Max. | Unit |
|---|---|---|---|---|
| Mode of Operation | CW / Pulsed | | | |
| Polarisation | Random | | | |
| Central Wavelength | 1075 | 1080 | 1085 | nm |
| Operating Power | | 4000 | 4800 | W |
| Emission Bandwidth | | <8.0 | | nm |
| Output Fiber Core Diameter (um) | 50 | | | |
| Beam Parameter Product BPP (mm*mrad) | 3.5 | | | |
| Connection Type to The Cutting Head | QBH/QD (On Demand) | | | |
| Output Fiber Length (m) | 18 | | | |



BRL-6000

BRL-6000 6 kW Fiber Laser System

| | Min. | Normal | Max. | Unit |
|---|---|---|---|---|
| Mode of Operation | CW / Pulsed | | | |
| Polarisation | Random | | | |
| Central Wavelength | 1075 | 1080 | 1085 | nm |
| Operating Power | | 6000 | 7000 | W |
| Emission Bandwidth | | <8.0 | | nm |
| Output Fiber Core Diameter (um) | 100 | | | |
| Beam Parameter Product BPP (mm*mrad) | 3.5 | | | |
| Connection Type to The Cutting Head | QBH/QD (On Demand) | | | |
| Output Fiber Length (m) | 18 | | | |

DURMA

FIBER LASER


PUNCH


PLASMA


L ANGLE PROCESSING CENTER

IRON WORKER


POWER OPERATED SHEAR

DURMA


PRESS BRAKE


VARIABLE RAKE SHEAR


ROLL BENDING


PROFILE BENDING


BANDSAW


CORNER NOTCHER

DURMA

Today, Tomorrow and Forever With You...

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