This project is co-financed by
the European Union and the Republic of Türkiye.

dtech
Ege Deep Tech Factory

EGE DEEP-TECH FACTORY

REPUBLIC OF TÜRKİYE
MINISTRY OF INDUSTRY
AND TECHNOLOGY

EGİAD

EGE UNİVERSİTESİ

EGE
Teknopark

Ege D-Tech Poject is carried out under the Competitive Sectors Programme, financed within the framework of the financial cooperation of the European Union and the Republic of Türkiye and implemented by the Ministry of Industry and Technology. The project, implemented with partners such as Ege University, Ege Teknopark, and the Aegean Young Business Association (EGIAD) is planned to be completed in 3 years with a budget of 3 million Euros.

Ege Deep-Tech Factory

The Ege Deep Technology Factory, implemented within the scope of the Ege D-Tech Project, is dedicated to the production and testing of innovations in deep technology. It provides hardware materials and machinery for startups to utilize in the creation and testing of innovations.
By offering hardware materials and machines tailored for startups, the aim is to facilitate easier access for entrepreneurs to this exciting world.

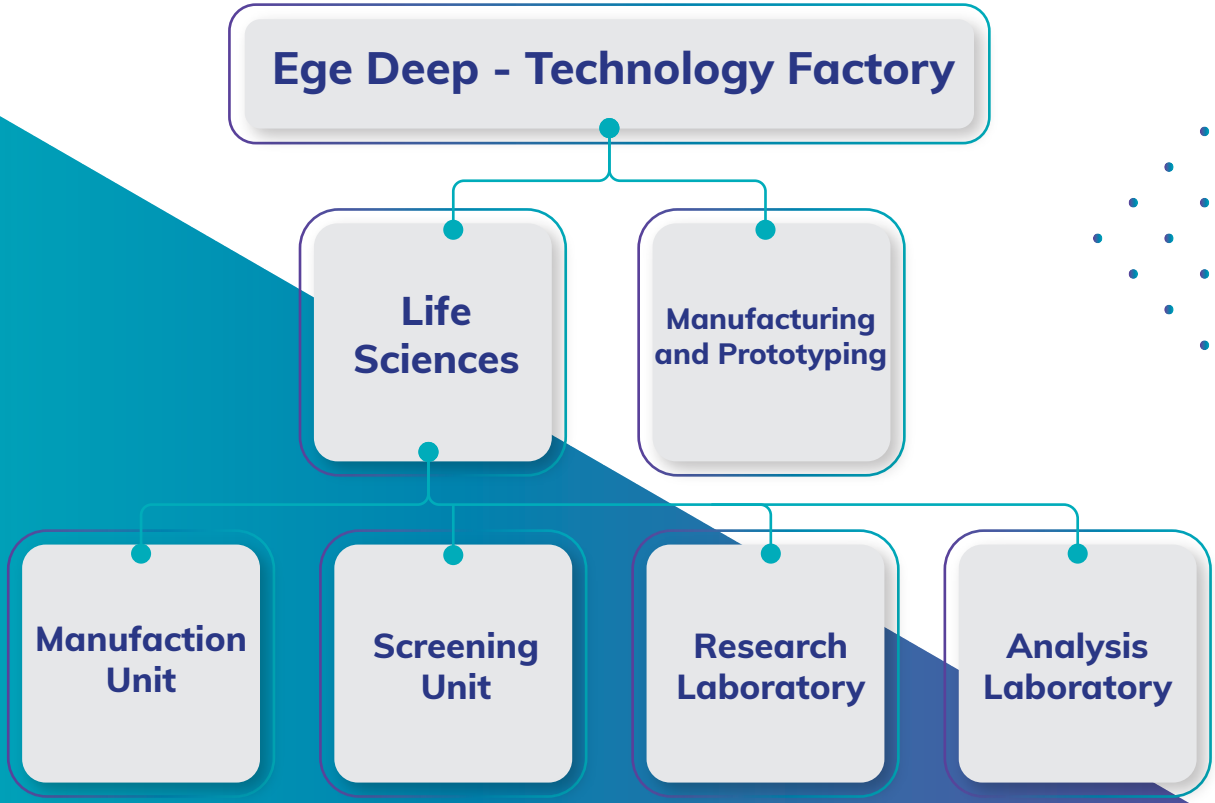
Manufacturing and Prototyping for Startups!

In the manufacturing and prototyping section, the 3D Polymer Printer utilizes engineering polymers to produce complex designs with high strength and precision, all without the need for support structures. Additionally, the 3D Optical Scanner allows for the rapid and highly accurate creation of three-dimensional models. The cutting-edge 3D metal printer, offering various material options, enables the production of intricate designs as single pieces. Devices such as the Industrial FFF 3D Printer, FDM 3D Printer, Wire Erosion, and Fiber Laser Cutting are available for confident prototyping and manufacturing processes.

Innovative Technology in Life Sciences!

In the life sciences division, the STELLARIS DLS Digital Light Sheet Microscope provides the opportunity to thoroughly examine live and fixed 2D and 3D samples. Meanwhile, the Triple Quadrupole GC-MS/MS device allows for the analysis of volatile or semi-volatile substances, cosmetics, aromatic compounds, oils, pesticides, petroleum, and pharmaceutical components, determining their structures and substance quantities.
State-of-the-art devices and comprehensive analyses can elevate projects such as bioprocess operations, lyophilization, extraction-purification, cold press oil processes, DNA isolation and analysis, and 3D bioprinting systems.

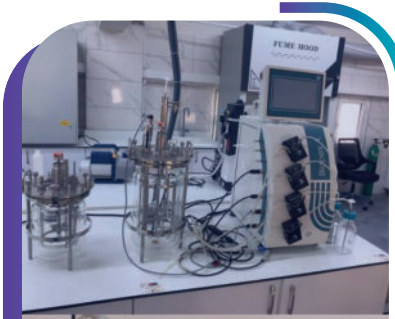
EGE DEEP-TECH FACTORY


Ege Deep - Technology Factory
Life Sciences
Manufacturing and Prototyping
Manufaction Unit
Screening Unit
Research Laboratory
Analysis Laboratory

MANUFACTURING UNIT

BIOPROCESS OPERATIONS

With our bioreactors having volumes of 2.5 and 25 liters, it is possible to produce the desired product or its active components. The scaling process can be conducted to reduce the margin of error in industrial productions.



APPLICATION AREAS

- Enzyme Production
- Microbial Fermentation
- Fungal Production
- Scaling
- Production Efficiency Analysis

SOLID-LIQUID EXTRACTION UNIT

With the Solid-Liquid Extraction Unit, a portion or nearly all of the substances within a solid material can be extracted with an appropriate solvent liquid.
The extraction process, which typically takes a long time under normal conditions, can be shortened.

What are the raw materials that can be extracted and the products that can be obtained?

Raw materials:

- Flowers, leaves, roots, seeds, vegetables, and fruits, etc.

Products:

- Natural extract, active substance, aroma, essence, coloring, etc.

Technical Data

Solvent tank volume: 50 L
Extractor tank volume 10 L
Solvent type: Water and organic solvents
Filter specifications: Stainless steel (10 – 500 µm)
Maximum temperature: 120°C

LIQUID PRODUCT FILLING MACHINE

The Liquid Product Filling Machine is a packaging machine that enables the filling of fluid products into ready-made packages, buckets, bottles, or containers. Its significant distinction from counterparts lies in its ability to handle the filling of products with high viscosity.

Technical Data

Filling volume range: 100 – 500 mL

Production speed: 68 – 340 liters/hour

Measurement uncertainty: %1

WHICH PRODUCTS CAN BE FILLED?

- Ketchup – mayonnaise
- Honey
- Sauces
- Body lotion
- Gel
- Liquid soaps
- Shampoos
- Etc., liquid products

COLD PRESS OIL MACHINE

The Cold Press Oil Machine allows for the extraction of oil from substances containing oil, such as the fruit, seed, or kernel of a plant, without the use of heat or chemical solvents. It enables the extraction of oil solely through pressing and filtering, without the need for heat or chemical solvents.

Advantages of oils obtained through the hot pressing method include:

- They have a higher phenolic content and nutritional value.
- The chemical properties of the oils remain unchanged.
- It preserves the immune-boosting vitamin E.

Technical Data:

Seed pressing capacity: 10 – 90 kg/hour

Operating time: 24/7

Extractable Products

Nigella seeds, flaxseeds, coconut, pomegranate seeds, cumin seeds, poppy seeds, grape seeds, canola seeds, flax seeds, sesame, mustard seeds, almonds, hazelnuts, apricot kernels, pumpkin seeds, sunflower seeds, peanuts, cocoa plant, nettle, pepper seeds, tomato seeds, chia seeds, etc., various seed varieties.

SCREENING UNIT

STELLARIS DLS DIGITAL LIGHT SHEET MICROSCOPE

The imaging system, combining laser-scanning confocal and digital light-sheet (DLS) microscopy in one place, allows for obtaining high-quality images tailored to experimental needs without the need for hardware changes.

Which Samples Can Be Screened?

- **Imaging samples at the cellular level, whether labelled with fixed fluorescent dyes or live, using stable (fixed) fluorescent markers.**
- **2D imaging of various tissue sections, monolayer cultures, etc.**
- **3D imaging of organoids, tissues, spheroids, or different types of samples post-tissue clearing.**

Technical Features and Advantages

Features: Inverted stand, motorized (x, y, z) microscope stage, temperature, and carbon dioxide-controlled incubation chamber, DLS condenser.
Lasers: UV Diode 405nm, OPSL 488nm, OPIS 561nm, Diode 638nm lasers, providing the ability to visualize a wide range of wavelength intervals.
Detectors: Power HyD S, Trans PMT detectors.
Objectives: Specialized objectives for DLS and confocal imaging, ranging from 1.6x to 63x.
LIGHTNING: Revealing details and fine structures not visible in traditional imaging with the LIGHTNING feature, allowing in-depth imaging.
LASX Navigator: Matching other areas with the initial image by creating an overall view of samples through the LAS X Navigator interface.
DLS: Minimizing photo-damage with the DLS microscope, preserving cell viability, and enabling long-term 3D imaging of cellular movement and tissue formation at high speeds.

ANALYSIS AND RESEARCH LABORATORIES

TRIPLE QUADRUPOLE GC-MS/MS ANALYSIS

Gas Chromatography – Mass Spectrometry (GC-MS) is a device utilized in structural analysis and quantification of substances. It separates components in a mixture, aiding in the structural identification of each content. It offers advantages such as the identification of samples with very low volumes and rapid analysis times.

It is used in the analysis of:

- **Volatile or semi-volatile substances**
- **Cosmetic products**
- **Aromatic compounds**
- **Oils**
- **Pesticides**
- **Petroleum and pharmaceutical components**

Technical Specifications

The latest version of the compact benchtop Triple Quadrupole (MS/MS) system, the new 7010B Triple Quadrupole GC/MS, is used to achieve attogram detection limits in Electron Ionization (EI) mode.

Detection Limit: The setup specification demonstrates a detection limit as low as 2 fg octafluoronaphthalene (OFN) injected using the HES EI source, with an indicated Installation Detection Limit (IDL) of ≤ 0.5 fg.
Efficiency: The high-efficiency EI source generates at least 20 times more ions compared to the previous generation, resulting in increased efficiency.
Automation: Automatic Sample Introduction System and Robotic Tool Change (RTC) allow for automatic transitions between liquid, headspace, and SPME fibers.
MRM Speed: 800 MRM transitions/second **Mass Range:** m/z10-1050 **Scan Speed:** ≤ 20,000 Da/second

LYOPHILIZER

Lyophilization technology is utilized in various fields to remove moisture from a substance by facilitating the direct transition of the liquid within the substance into the gas phase after freezing.

What Sets It Apart from Other Drying Methods?

- It ensures the stabilization of samples by using low temperatures instead of high temperatures that can harm active ingredients.
- The shape of the dried product remains intact, and it extends the shelf life of the product more than other methods.
- It minimizes the weight and volume of samples, reducing transportation and storage costs.

Technical Specifications

Condenser Temperature: -55 C°

Ice Holding Capacity: 4.5 kg/24 hours

Condenser Volume: 11L

Number of Shelves: 3

Shelf Diameter: 27 cm

Shelf Area: 0.61 m²

ROTARY EVAPORATOR

The rotary evaporator facilitates the separation of solvents within a sample or solid material within a solvent by lowering the boiling point of solutions, allowing evaporation at temperatures lower than required. This separation is achieved through the process of vaporization.

Application Sectors

- **Pharmaceutical**
- **Food**
- **Cosmetic**
- **Petrochemical**

Technical Specifications

Rotation Speed Range: 10 – 280 rpm

Temperature Range: 20 - 80 °C

Pressure Range: 1 - 1400 mbar

Maximum Flask Volume: 5 L

MECHANICAL HOMOGENIZER

A digital speed-indicated mechanical homogenizer offers a broad range of speed options from 600 to 10,000 rpm. This device allows for high circumferential speeds, even with small-diameter rotors, thanks to its high viscosity limit. The ability to maintain a constant speed, even with varying viscosities, enables consistent and repeatable operations.

Technical Specifications

Volume Range: 0.25-30 L

Max Speed: 10000 rpm

Max Viscosity: 5000 mPas

3D PRINTING SYSTEM

A Turkish-origin 3D next-generation bioprinter allows for multi-stage bioprinting. Its design enables working with fragile and easily contaminated materials, facilitating the bioprinting of complex/detailed 3D models.

Utilized for the bioprinting of 3D tissues, it offers the possibility of more accurate examination in drug discovery studies compared to other in vitro cultures, allowing for the ethical screening of potentially toxic substances directly in humans.

Technical Specifications

Pressure Sensitivity: 0.1 psi
Bioprinting Nozzles: Available in different sizes and types
Printing Technology: FDM/FFF
Printing Volume: G130 x D90 x Y80mm
Extruders: 5 adet
Layer Thickness: <10 µm (0,01 mm)

Biocompatible polymers, biomaterial inks, and cell suspensions are utilized for:

- Production of bone and cartilage
- Production of soft tissue
- Creation of solid 3D models such as plant-based meat alternatives, synthetic seafood, or cell/tissue scaffolds

HIGH-SPEED COOLING CENTRIFUGE

The high-speed cooling centrifuge is utilized for the solid-liquid separation process of various biological, chemical, and microbial samples.

Maximum Speed:

Maximum Speed: 16000 rpm

Temperature Range: -20 – 40 °C

Maximum RCF (Relative Centrifugal Force): 24325 xg

Maximum Volume: 6 x 250 mL

Rotation Range: 0° – 90°

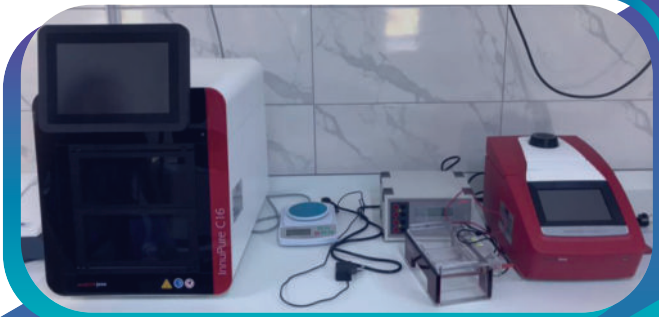
Application Areas:

Due to its high-speed and cooling features not found in standard centrifuges, it can be comfortably and safely used for speed- and temperature-sensitive samples, including:

- Living cells
- Proteins
- Nuclei
- Samples sensitive to speed and temperature, such as chloroplasts

DNA ISOLATION AND ANALYSIS

The DNA Isolation and Pipetting System offer two different technologies within a single device. After precisely conducting the DNA isolation process, it automatically utilizes the pipetting system to perform the purification process. Following the isolation process, DNA analysis can be carried out using PCR and horizontal electrophoresis devices.



Automatic Nucleic Acid Isolation Device (InnuPure C16 touch (845-00020-2))

Technical Specifications

Plate Formats: ANSI/SLAS Format, 96 Deep-Well Plate, 12-Well Strip
Sample Number: 1-16
Extraction Time: 32-75 minutes
Tube Formats: Elution Tubes (0.65 µL), 8-tube elution strips (200 µL)
Pipetting Channels: 1-16

ELECTROPHORESIS IMAGING DEVICE

The Electrophoresis Imaging Device is used for the separation and analysis of molecules, whether in a liquid or solid medium, particularly nucleic acids stained with fluorophores. The device can accommodate up to 6 stimulation channels for enhanced capabilities in molecular analysis.

Used for Which Substances?

- Proteins found in bodily fluids and tissues
- Peptides
- Amino acids
- Organic acids
- Nucleic acids
- Simple ions

Technical Specifications

Imaging Types: UV and White Pad

UV: DNA and RNA gels

White Pad: Protein gels, X-Ray films, Autorad, SSCP gel, Petri colonies, and Flask

Dyes visible under UV: Ethidium Bromide, Sybr-Safe, Sybr-Green, Gel-Red, Gel-Green, Sybr-Gold, GFP, Pro-Q Emerald, Sypro Ruby, FITC, DAPI

Dyes visible under White Pad: Coomassie Blue, Silver Stain, Ponceau S Red, Copper stain

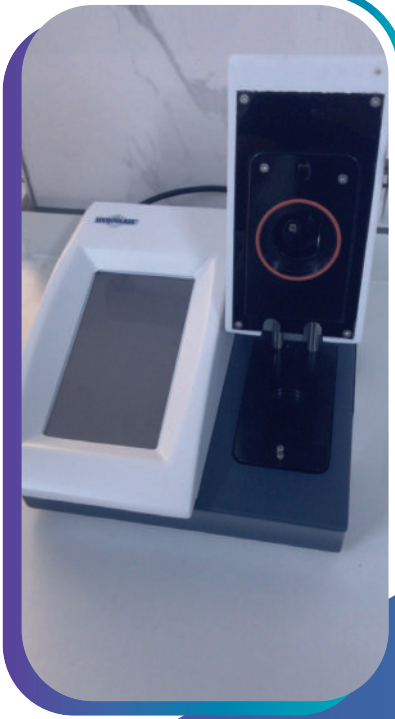
BİOSAFETY CABINET LEVEL II

A Biosafety Cabinet Level II is an enclosed, ventilated laboratory workspace designed to safely handle materials contaminated with pathogens requiring a specific level of biosafety. It ensures a secure environment for working with materials that are contaminated (or potentially contaminated) with specific pathogens.

What Processes are Carried Out in a Biosafety Cabinet Level II?

- Microbiological studies
- Cell culture
- Pharmaceutical procedures
- Toxicology

WATER ACTIVITY METER



Water activity is a measure of the amount of free water present in a food product, indicating how tightly water is bound structurally and chemically in food items.

Technical Specifications

Average Processing Time: 5 minutes

Optimal Operating Temperature: 25°C

AUTOCLAVE

Autoclave devices are used to examine how various substances react under high temperature and pressure conditions. Exhibiting high performance in the process of pressurized steam sterilization, the autoclave is built with a highly durable structure designed to withstand high temperatures. It incorporates a safety system against high pressure and high temperatures.

It incorporates a safety system against high pressure and high temperature.

Technical Specifications

Operating Temperature: 40 - 135°C

Sterilization Temperature: 105 - 135°C

Timer: 1 - 300 minutes

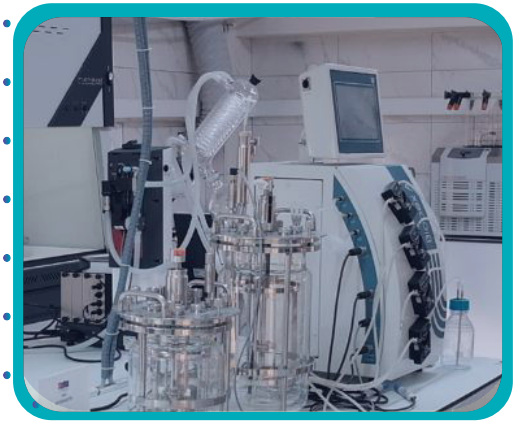
ANALYSES

PHYSICAL-CHEMICAL ANALYSES

- Ash Content Determination
- Moisture Content Determination
- pH Measurement
- Solubility in Water Determination (Refractometric Brix Value)
- Total Phenolic Content Determination (Folin-Ciocalteau Method)
- Total Antioxidant Activity Determination (DPPH Method)
- Total Protein Determination
- Total Fat Determination (Meat and Meat Products)
- Total Fat Determination (Cereal and Fruit-Vegetable)
- Nutritional Table Analysis
- Fat Binding Capacity
- Water Holding Capacity Determination (%)
- Salt Determination
- Invert Sugar Determination
- Ascorbic Acid (Vitamin C) Determination
- Water Activity Determination (aw)
- β-Carotene Determination
- Sterilization Fo Determination
- Dietary Fiber Determination
- Crude Cellulose Determination
- Viscosity Determination
- Black Speck Determination (Tomato Paste)
- Foreign Material Determination in Seeds
- Hectoliter Weight Determination in Seeds
- Stability Determination in Emulsions
- Pulp Amount Determination
- Acidity Determination in Fat
- Acidity Determination in Fruits, Vegetables, and Grains
- Alcohol Determination (Pycnometric)
- Compressibility Determination (Hausner)

MICROBIOLOGICAL ANALYSES

- Aerobic Microbial Count
- Mold Determination
- Yeast Determination
- Species Determination by Gram Staining
- Determination of Antimicrobial Activity
- Colony Morphology



ADVANTAGES

Thanks to the 3D Printer (FDM) available within the Hardware & Prototyping Department, we can produce laboratory equipment with unique designs at a cost-effective price.

MANUFACTURING AND PROTOTYPING

3D METAL PRINTER (SLM)

With our SLM Solutions 280 2.0 model 3D metal printer located in our center, complex designs can be produced as a single piece with high strength and precision, offering various material options. This enables the acceleration of both prototype and batch production processes.
Our machine has a production volume of 280 x 280 x 335 mm³.

Materials that can be produced with the machine include:

- Steel alloys
- CoCr alloys
- Nickel alloys
- Aluminum alloys
- Titanium alloys

3D POLYMER PRINTER (SLS)

With our Proadways Promaker P1000 X model 3D polymer printer in our center, complex designs can be produced as a whole with high strength and precision using engineering polymers, without the need for any support structure. This allows you to expedite your prototype and batch production processes, reducing the assembly count in your designs.

The machine has a production volume of 300 x 300 x 300 mm³.

Materials that can be produced with the machine include:

- **PA11 & PA11-GF, PA12, PP, and TPU**

3D PRINTER (FDM)

With our Creality 3040 model FDM 3D printer in our center, products with complex geometry can be produced with high precision and at a very low cost. This allows for the prototyping and creation of concept models. Additionally, the ability to produce designs as a whole reduces the assembly count.

The low production cost makes it highly attractive for decorative, hobby, and educational purposes. The high precision offered by the machine also enables artistic productions.

The machine has a production volume of 300 x 300 x 400 mm³.

Materials that can be produced with the machine include:

- **PLA**
- **ABS**

INDUSTRIAL FFF 3D PRINTER

With our 3D Gence F421 model FFF 3D printer in our center, complex designs can be produced with high strength and precision.
This allows for the acceleration of both prototype and batch production processes, enabling the testing of designs before mass production . Additionally, the ability to produce designs as a whole reduces the assembly count.

Our machine can handle engineering polymers and their composite derivatives, providing a wide range of materials and colors.

The machine has a production volume of 380 x 380 x 420 mm³.

Materials that can be produced with the machine include:

- **PLA, ABS, ABS-ESD, ASA**
- **PA6, PA-CF, LEXAN, PC, PC-ABS, PC-CF,**
- **PEKK-CF, ULTEM 9085, PEEK, PEKK, PEEK AERO, VICTREX AM™ 200**

3D OPTICAL SCANNER

The semi-automatic Hexagon Smartscan R12 Optical 3D scanner in our center allows for the rapid and highly accurate creation of three-dimensional models of objects. This meets the digitization needs in various fields such as industrial design, product development, and art.

* Quality control
* Reverse engineering

- 2 pieces of Monochrome 12 MP CMOS cameras
- Miniaturized projection
- 17-micron precision

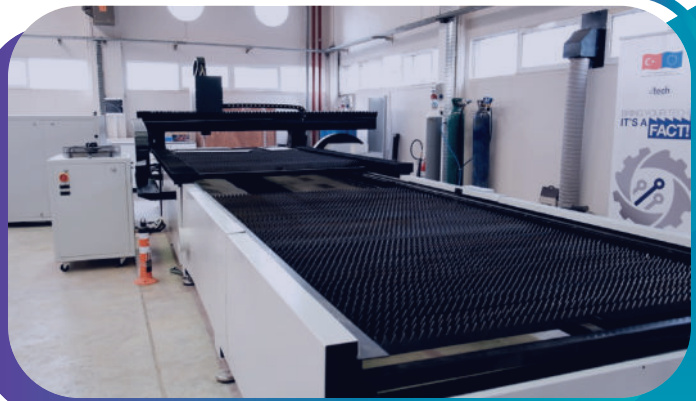
WIRE EDM

The ONA AV35 wire EDM machine in our center allows for the high-precision cutting of metals with high electrical conductivity along complex geometries. Metals with high strength and difficult machinability using other manufacturing methods can be processed more easily with this method.

- **600 mm (x) - 600 mm (y) - 400 mm (z) travel stroke**
- **120 mm - 120 mm movement capability in the UV axis**
- **Part weight up to 1500 kg**
- **Wire diameter option in the range of 0.1 to 0.33 mm**

FIBER LASER CUTTING

With the laser cutting machine in our center, various sheet materials can be precisely and quickly cut into complex geometries.



* 2 kW laser power
* Precitec cutting head
* Table size of 1500 x 3000 mm²

Materials and thicknesses that can be cut with the machine include:

- Black steel S235JR, S355MC (up to 14 mm)
- Stainless steel (up to 8 mm)
- Aluminum (up to 6 mm)
- Brass (up to 4 mm)

To benefit from our devices and services:

0 232 311 44 51

www.egedtech.com

fabrika@egeteknopark.com.tr
teknoparkege@egeteknopark.com.tr

This project is co-financed by
the European Union and the Republic of Türkiye.

This printed publication has been prepared with the financial support of the European Union and the Republic of Türkiye. The content of this publication is the sole responsibility of the consortium leader, International Development Ireland (IDI) LTD, and cannot be interpreted in any way as reflecting the views of the European Union or the Republic of Türkiye.

REPUBLIC OF TÜRKİYE
MINISTRY OF INDUSTRY
AND TECHNOLOGY