ENERZI®

Heating Reinvented

LEADERSHIP IN MATERIALS PROCESSING SOLUTIONS

Contents

Our Leadership

At Enerzi Microwave Systems, we recognize that success lies not only in the strength of our existing products but also in our ability to constantly evolve and adapt to the ever-changing needs of our customers. With this in mind, we are committed to expanding our product portfolio, introducing groundbreaking solutions that redefine industry standards and enable businesses to thrive in a dynamic market landscape.

Our unwavering dedication to excellence drives us to push the boundaries of microwave technology, offering unparalleled efficiency, reliability, and versatility in every product we create. From industrial microwave systems to customized solutions, we empower our customers to optimize their processes, maximize productivity, and unlock new opportunities for growth.

Our vision extends far beyond product innovation. We are building a collaborative ecosystem of partnerships, where we work hand in hand with our stakeholders to create lasting value. By fostering strong relationships and delivering exceptional service, we aim to be your trusted long-term business partner, providing tailored solutions that address your unique challenges and accelerate your success.

INNOVATION & ENTREPRENEURSHIP ARE THE TWO SIDES OF THE SAME COIN!

Dr. Prakash Mugali
Founder & Chairman

Mr. Kirankumar Hittalmani
Chief Executive Officer & MD

Background

Established in 2007, Enerzi Microwave Systems Pvt. Ltd. is the leading brand of Industrial Microwave Heating Systems. Enerzi has carved a niche for itself in the Indian and Global markets. It has diverse market segments with expertise in a variety of applications.

The seed to all these achievements is a lab development back in 2005. In a small workshop of about 200 sq.ft., in Bengaluru, a crude tabletop furnace was developed by the founding team consisting of Mr. Prakash and Dr. Krupashankara along with a highly dedicated group of technocrats and Mr. Nazim Pasha, who supported us with mechanical fabrication. This system was designed with 3 magnetrons of 0.8 kW each. The Magnetrons were operated by voltage doubler circuits as the power supply. The photo shows Mr. Prakash Mugali carrying out microwave leakage measurements around this first ever microwave furnace built by the company along with his friend Mr. Shanbag.

After two years of research and development, the founders decided to start Enerzi. Eventually on August 20, 2007 Enerzi was incorporated with a vision to develop systems and solutions based on microwave technology. Joining of more experts like Mr. Neelesh Chougule, Dr. Chandrashekhara, Mr. R. Nakarajan, Mrs. Maneesha Wali and Dr. R. G. Math added a whole new energy to its growth story. Year after year, Enerzi has been creating new benchmarks for itself and has been evolving as a company to provide better and technologically superior products & solutions to its customers. It has believed in the holistic growth of all its stakeholders and is constantly working towards creating a global brand in its market segment.

VISION

To be a global brand in electro-magnetic heating solutions.

MISSION

To provide innovative, economical, energy efficient and eco-friendly heating solutions for our customers in food & materials processing.

Board of Directors

Dr. PRAKASH MUGALI | Founder & Chairman

He holds a Bachelors Degree in Engineering (Electronics & Communications) from Visvesvaraya Technological University (VTU), Belagavi & PG Diploma in Finance from Symbiosis, Pune. He possesses more than 20 years of experience in Industrial Electronics and Electro-mechanical Equipment Design and Manufacturing. Having got an opportunity to work with many eminent scientists in India and abroad, he has been leading the company to develop various markets for different microwave applications. He is a professional Martial Arts and Leadership Coach with 3rd Degree Blackbelt in Unarmed Combat from Unarmed Commando & Combat Academy, Mumbai and various other credentials (www.transformex.in).

Mr. KIRANKUMAR HITTALMANI | Managing Director

Kirankumar Hittalmani is an innovator and visionary with 18+ years in Automotive Systems. Holds an MBA and BE in Automobile Engineering, blending broad knowledge with practical expertise. Led roles at Bosch for over a decade, and 4 years at Continental Automotive Components Pvt Ltd, excelling in global projects in key markets: Germany, UK, Japan, Korea, China, and Iran. His diverse experience and global achievements are invaluable as CEO & MD.

Mrs. REKHA MUGALI | Executive Director

She holds a Bachelors Degree in Engineering (Electrical & Electronics) from Visvesvaraya Technological University (VTU), Belagavi & MBA in Human Resources from Sikkim Manipal University, Belagavi. She possesses more than 15 years of experience in analysis, design, coding, testing and implementation of real-time/embedded and distributed systems in avionics domain, industrial electronics, control systems and consumer electronics. She has worked in renowned MNCs in USA and India. She has been heading the administration of the company and various QMS implementations.

Mr. RUPESH AGASHIMANI | Executive Director

He holds a Bachelor's Degree in Commerce. He has been heading the administration and finance of the company for the past 10 years. With his extensive knowledge and experience in related fields, Rupesh is well-versed in finance, administration, and has expertise in financial management, budgeting, and other financial aspects of the company. Rupesh is a valuable asset to the company, providing financial expertise to support the organization's growth and success.

Board of Advisors

Dr. KRUPASHANKARA M. S. | Co-Founder & Founding Director

He holds a Bachelor's in Mechanical Engineering (University of Mysore), Master's in Materials Science (University of Maryland, USA) a PhD in additive manufacturing technology (Visvesvaraya Technological University, Karnataka). He has 15 years industrial and 23 years of academic and research experience. He has worked in many multinationals with 7 US patents in the area of microwave processing, synthesis and densification of nano-powders and has 2 international awards for his work. His efforts in indigenization of microwave assisted vulcanization systems and recycling of nuclear waste in India, laid the foundation for the establishment of Enerzi Microwave Systems Pvt. Ltd., in 2007.

Dr. CHANDRASEKHAR | Ex-Director, Laird Technologies India Pvt. Ltd.

He has more than 40 years of experience in Industrial Research & Development in Materials Science. He was involved in setting up of CTI, BHEL as its DGM. Served as Technical Director of John F. Welch Technology Centre (JFWTC) at GE. A certified Master Black Belt in Six Sigma & served Laird Technologies as Director & set up a successful Corporate R&D Center for the company. He is a consultant for the Indo-Norwegian Programme on Environment, Member of the Divisional Scientific Committee of NAL, Guest Faculty at IISc & Manipal Institute of Technology. He has won "Excellence in Teaching" award EEDP at JFWTC. He has published a number of journal papers & holds several international patents.

Mr. RAJ BELGAUMKAR | Consultant-Finance

Raj is a Management Consultant with 20 years of professional experience in Risk Management in the US, followed by 18 years of business and advisory experience in India. He is MBA in Finance from the City University of New York. As he had lived in US for 17 years, he has global exposure and has worked in reputed organizations like Citibank and American Express. This allows him to bring a unique perspective to analyzing businesses and offering solutions. Since his return to India in 2005, he has been able to find a balance between his passion for social responsibility and entrepreneurship.

Mr. R. G. MATH | Senior Principal Scientist, CFTRI

Currently heading CSIR-CFTRI Resource Center as the Principal Scientist, he has been a successful researcher for over 30 years in the field of Food Processing Technologies. His areas of expertise include Design and Development of Microwave processing of Agri-Commodities, Design and Development of Food Processing Machinery, Food Engineering, Techno-economic feasibility report writing, Resource Survey & Finite element analysis. He has published more than 30 papers in reputed National and International Journals and holds 2 patents.

MADC

Microwave Applications Development Center

Microwave Heating is a newly emerging way of heating and most of the applications need a systematic approach of study. Enerzi understands its responsibility in providing an atmosphere to develop new applications or adapt microwave technology to the existing processes. To address this need, Enerzi has set up a Microwave Applications Development Center (MADC).

The MADC currently has the following equipment to enable developments for a variety of applications;

- Semi-Automatic Hydraulic Press (50 Tonnes)
- Lab scale Batch Type Microwave Furnace (1.5 kW, RT to 1200 deg. C)
- Batch Type Prototype Microwave Furnace (4.5 kW, RT to 1600 deg. C)
- Automatic Continuous Type Microwave Furnace (4.5 kW, RT to 1600 deg. C)
- Calibrated Measuring Instruments to measure Weight, Temperature, Power and Energy.

Enerzi is constantly developing the knowledge-base needed to adapt Microwave Technology to various applications and has lined up research programs both in-house and in collaboration with other organizations.

The above facilities are available to any Industry, Institute and student for carrying out research in their areas of interest or to utilize the same for quick trials and experiments on a nominal charge basis. We are more than eager to work with you on new research areas.


ENERZI

Testimonials

MR. RAJESH KHANNA
CEO, Wendt India Ltd.

Congratulations for the successful completion of 15 years. It is nice to note that, with humble beginning in the year 2007 to this year, you have grown consistently. We came across Enerzi, when we were looking forward to add a cost effective process in our manufacturing of Diamond / CBN wheels. We met the young and dedicated team headed by you, willing to understand our requirement and working on this new concept using microwave, which was unheard in the abrasive industry. I was not only impressed by your deep insight, in Microwave applications, but also on your adopting the advance processes coupled with frugal engineering to make this innovation at low cost. I am happy to note and wish that you continue to retain the dominant position in your domain, while aspiring to address global market. All the very best.

MR. JITENDRA J. JADHAV
Director, CSIR-NAL & CSIR-CFTRI

I am very much impressed from my visit to Enerzi, Belagavi. It was a great experience to have technical interactions with these entrepreneurs, who are doing exceedingly outstanding projects / designs in Microwave applications. I would like to put on record, the professionalism & the leadership of the company management. It was a learning experience for me. I want to thank the entire team of Enerzi for excellent hospitality extended to CSIR-NAL team. I am sure the joint team effort of CSIR-NAL and Enerzi will make significant impact on polymer composites & food processing applications. I wish the visionary team of Enerzi all the very best in all their future projects.

MR. BALARK BANERJEA
General Manager, Tata Industries Ltd.

Enerzi Microwave Systems Pvt Ltd. has been providing services to Tata Industries Limited for the past one year. They have been supporting us in effective maintenance and operations of our thermal sterilisation machine. They are supplying trained manpower who undergo further planned training programs, including classroom and on the job modules, enabling them to operate the equipment efficiently. They are also involved in minor improvement, localisation of spares, spares maintenance, record maintenance, problem identification & root cause analysis, preventive, planned and breakdown maintenance of the machine. They have been responsive to our requirements and have handled the overall operations very proactively.

MR. CYRUS AGA
Technical Director, Goldseal Engg. Ltd.

It has been a great pleasure to work with Prakash & his team at Enerzi. Starting with microwaves over ten years ago, we now use a wide range of curing and conveying equipment for our extrusion lines. Enerzi provides a great mix of performance and price which matches our requirements. Best of luck for the future Prakash.. From the Gold Seal family.

MR. MOHIT MENDIRATTA
Managing Director, R. K. Profiles Pvt. Ltd.

Congratulations on successfully completing a decade in this business. I am happy to recollect that our working relationship with your organization is also nearing 15 years. Your systems supplied to us have been working to our expectations and are continually improving in terms of quality and performance. We have special appreciation for your great after-sale support and hope the same continues in future. Your in-depth knowledge of the subject is really appreciable. We will be happy to have your company as part of our growth story in the coming years. All in all you are a great company to work with!!

MR. AMIT BISHNOI
Plant Head, Cooper, Standard India Pvt. Ltd.

First of all I would like to congratulate you all on successfully completing 10 years of your association with Cooper Standard India Pvt Ltd. 15 years ago you have played a very significant role in revolutionising rubber industry in India. Since then you have been implementing innovative ideas into reality in microwave system technology. Cooper Standard is using your systems in all our sealing plants in India. Your systems provide a great value for money, are trouble free and user friendly. I wish you continue to touch great heights and diversify your ideas in other fields in the upcoming future.

PROF. DINESH AGRAWAL
Director, MPEC- Penn State, University, USA

I am very happy that Enerzi has successfully completed 15 years as the leading microwave systems manufacturing company in India. Application of microwaves in processing of variety of materials in ceramics, metals, food, medical, etc. has been widely recognized. I am very happy that your company is filling the much needed gap of domestically made microwave furnaces for research labs and industry for various applications. I also congratulate you for being selected for the prestigious State Government Award for Manufacturing Excellence. I wish you all the best in continuing your efforts to develop microwave technology for other applications to benefit the mankind in saving energy, time and cost.

MR. HALUK GORGULU
Chairman of the Board, TEKLAB, Turkey

I am writing to let you know how very pleased I am with the set up of High Temperature Microwave Furnace, the training & education provided for the users and for our technical persons. It is running smoothly since September 2017, when you installed the equipment. Your equipment has a really good apperance and working condition. The technology and workmanship for the equipment is really very good as well. Your communication with our technical staff and our customer was really warm and professional. We at Teklab Company, would like to thank you for your great support and we will gladly work on other projects in the near future.

2006

A dedicated team of entrepreneurs lead by Mr. Prakash and Dr. Krupashankara come together and build the first Industrial Microwave System of the company in a small workshop in Bengaluru.

2007

Mr. Prakash & Dr. Krupashankara incorporate Enerzi Microwave Systems Pvt. Ltd. inaugurating its first place of operations in Bengaluru.

2008

Mr. Bart Petrini - EVP & GM, EDG, Richardson Electronics visits Enerzi to witness its innovations in Industrial Microwave Heating components.

2012

Enerzi gets through the CE certification for its products and becomes a preferred brand for not only Indian market but also for global customers. Enerzi shifts and expands its factory in Belagavi.

2013

Enerzi delivers its first complete vulcanization line and creates the next level of milestone as a proven turnkey solution provider.

2014

Enerzi installs the largest Industrial Microwave Drier made in India for ceramic drying and makes an entry into industrial ceramic processing.

2018

SIDBI-ET Most Tech Savvy Company of the year in the hands of Shri Shiv Pratap Shukla, Minister of State for Finance.

2019

Enterprise of the year in Technology award by TiE Hubli in the hands of Sadhguru Jaggi Vasudev, Founder of Isha Foundation.

2020

Design and Development of a Continuous Medical waste Sterilisation system for treating medical consumables.

2009

Enerzi launches the first state of the art continuous microwave oven for rubber vulcanization. This achievement marked a milestone for Enerzi as a turnkey solution provider.

2010

Enerzi developed and supplied the state of the art high temperature microwave furnace with a maximum temperature of 1800 deg. C. This created a benchmark for high tech microwave furnaces in the country.

2011

Enerzi enters food processing segment through innovative design and developed conveyor microwave ovens for food processing applications including drying.

2015

Enerzi receives National Award for Innovation in Industrial Processing of Materials leading to energy savings in industries and gets appreciation from Government of India.

2016

Enerzi signs a joint venture MoU with Ferrite Microwave Technologies LLC for developing large power microwave systems in India, taking the Make in India drive further to the next level.

2017

Enerzi receives Manufacturing Excellence Award from Department of Industries and Commerce, Government of Karnataka and is appreciated for its innovations in India.

2021

Design, Development and Installation of largest Microwave Core Dryer in India for drying of Foundry Sand Cores. This has now become the flagship product of Enerzi.

2022

Enerzi signed a partnership agreement as the Service Partner for Muegge GmbH for servicing the high tech Microwave Components and Generators.

Journey

Our Partners

Partnership with OPTRIS GmbH

Partnership with CSIR - NAL

MoU with National Aerospace Laboratories (CSIR-NAL)

- For Design & Development of Dual Frequency Microwave Curing System for Polymer Composites.
- Mr. Prakash Mugali is seen with Dr. J. S. Mathur (Head - KTMD), Dr. G. N. Dayananda (Head-CSMST), Mr. T. H. Samiullah (Dep. Head - CSMST), Dr. Sandhya Rao (Sr. Scientist - CSMST) from CSIR-NAL and Dr. Krupashankara M. S.

Partnership with MUEGGE GmbH

Signed a Service Partnership with MUEGGE GmbH to provide after sale technical support to MUEGGE Customers in India.

Academic Partners

MoU with KLE Society's
Dr. M. S. Sheshgiri College of Engg. & Technology

- For setting up a Center of Excellence in the areas of Power Electronics, Embedded Systems and RF & Microwave Instrumentation.
- Prof. S. B. Kulkarni (HOD - E&C), Dr. Basavaraj Katageri (Principal), Mr. Prakash Mugali and Dr. Rajashri Khanai (Professor).

MoU with KLS Gogte Institute of Technology

- For setting up a Center of Excellence for Research in Industrial Microwave Applications.
- Prof. A. S. Deshpande (Principal), Mr. Prakash Mugali, Mr. U. N. Kalkundrikar (Chairman-Governing Council) & Prof. J. Kittur (Dean - R&D).

Microwave Heating Fundamentals

Emergence of Microwave Technology

Microwave heating is a phenomenon discovered during the research on radar systems during World War II. The first industrial use of microwave processing was in the food industry. Although considerable research and development took place in the 1950s and 1960s to develop other industrial applications, few emerged. Interest in microwaves increased in the 1980s as a way to raise productivity and reduce costs. There are currently many successful applications of microwave processing in a variety of industries, including food, rubber, pharmaceuticals, polymers, textiles and metallurgy.

What are Microwaves?

Microwave refers to the portion of the electromagnetic spectrum between 300 MHz and 300 GHz.

RADIO FREQUENCY (RF)	MICROWAVE (MW)	INFRA RED (IR)	VISIBLE (VIS)	ULTRAVIOLET (UV)

Microwave radiation travels at speed of light, i.e., c = 300000 km/s in free space and the relationship between wavelength (λ) and frequency (f) is : l = c / f

DESIGNATION	FREQUENCY	WAVELENGTH
L band	915 MHz	32.7 mm
S band	2450 MHz	12.2 mm
C band	5800 MHz	5.2 mm

Principle of Microwave Heating

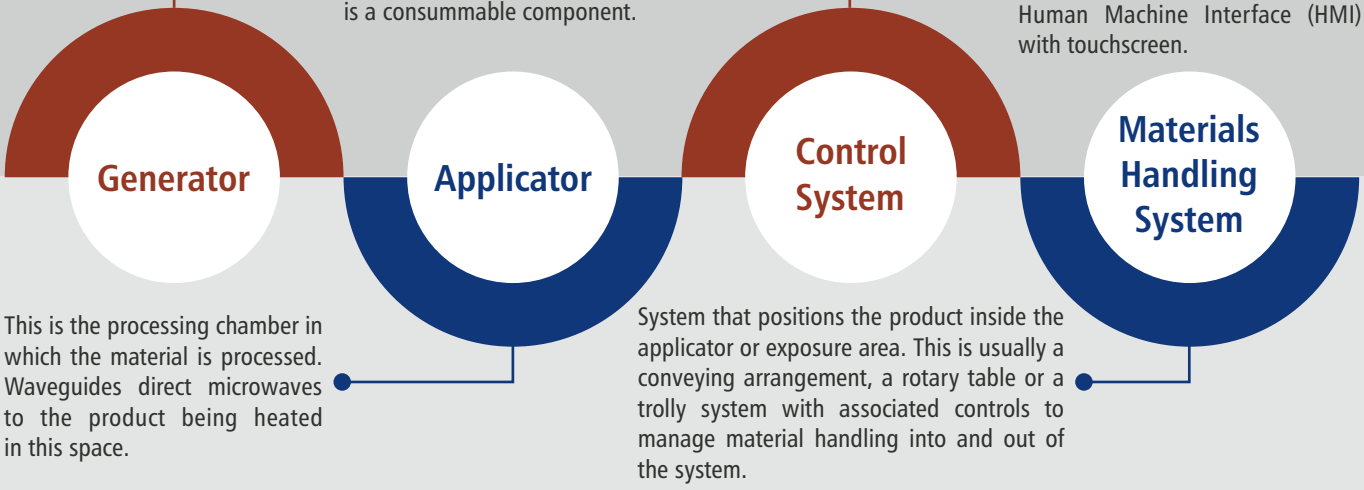
To avoid conflict with communications equipment, several frequency bands have been set aside for industrial microwave processing. Traditionally Microwaves are used to heat materials that are electrically non-conducting (dielectrics) and composed of polar molecules. Polar molecules /domains have an asymmetric structure and align themselves to an imposed electric field. When the direction of the field is rapidly alternated, the molecules /domains move in synchronization producing heat in the material.

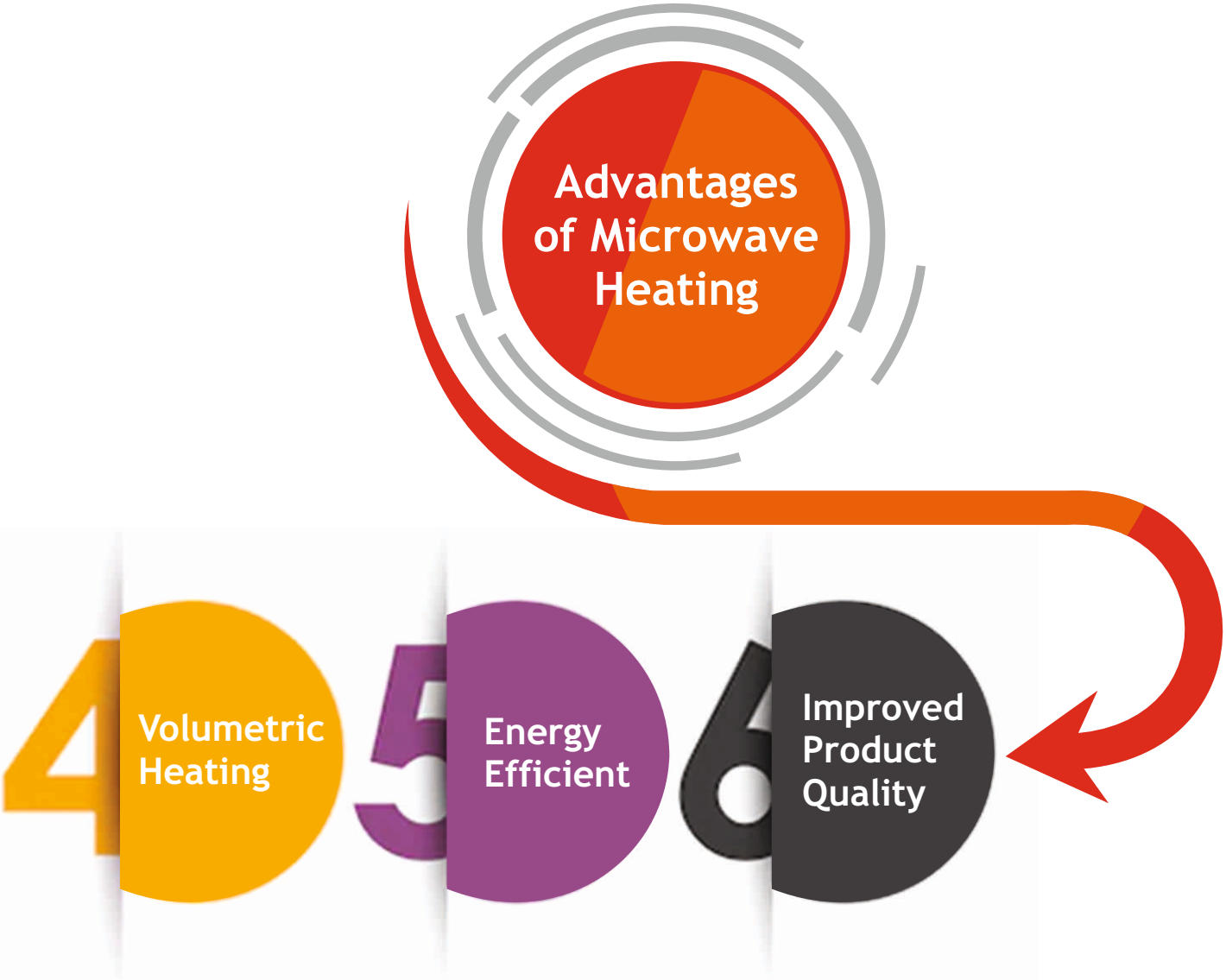
However in recent years, other aspects of microwave interaction with materials has been exploited to extend the microwave processing arena for applications that were once thought to be impossible like Powder Metallurgy. In this case the magnetic dipole movement and hysteresis losses leading to generation of heat is the dominant method of heating. The effect of eddy current losses also contributes significantly in such cases where the processed materials are electrically conductive. The ongoing research in this area is ever expanding the horizon of microwave processing applications.

When materials are exposed to microwave radiation, microwaves partially get Reflected (R), Absorbed (A) or Transmitted (T) depending on the dielectric properties of the material – Permittivity (ε) and Permeability (μ); which is a function of chemical composition, phase and temperature of the material. The absorbed portion of the incident microwaves, heats the material by polarization of the atomic / molecular structure or through dipole movement. As the microwaves travel through the material, it gets attenuated, resulting in volumetric heating.

Microwaves are generated by magnetron tubes, which are composed of a rod-shaped cathode surrounded by a cylindrical anode. Electrons flow from the cathode to the anode, creating an electric and magnetic field. The field frequency is a function of the dimension of the slots and cavities in the magnetron. Oscillations in the slots and cavities form microwaves, which are then radiated out through an antenna projecting out of the cathode space.

A Microwave Processing System usually comprises of four components :





Products

Microwave Plasma System for Nano-Powder Synthesis

Nano-Powder Synthesis can be achieved through several means and using Plasma for this process has been a latest development. Amongst this, further, Microwave Plasma route for Nano-Powder Synthesis is very nascent and encouraging. Microwave Plasma Systems are very unique in the context that they use lesser power and generate a more effective Plasma Zone for Nano-Powder Synthesis. There is considerable work done on this subject to establish that the end products (Nano-Powders) arising out of this method are much better in quality and the yield is far better as compared to other methods. Enerzi is proud to have developed these systems for Research and Development establishments and for Educational Institutes.

Microwave Drying Systems

Drying process is removal of moisture from a part or a product. Based on the properties of the part or product to be dried, the drying process involves various steps and machinery. Traditionally known method of drying any part or product is achieved through exposing the product to solar energy, referred to as sun drying in simple terms. Due to the obvious limitations of this traditional method, various types of heating equipment were developed over a period of time to achieve drying independent of weather conditions.

The heating equipment like oil & gas fired ovens, electrical heating ovens and several other variants of the above said means of heating, have dominated all the processes involving heating including drying. These conventional techniques have existed for long as well proven methods of drying any part or product.

Microwave Sintering Furnaces

Sintering is a method used to densify powder material through atomic diffusion. Atomic diffusion occurs in materials with high rate at elevated temperatures. In most of the sintering processes, the powdered material is held in a mold or it is held in shape by high pressure compressing of the mixture of base material with a temporary binder and then heated to a temperature below the melting point. The atoms in the powder particles diffuse across the boundaries of the particles, fusing the particles together and creating one solid piece. Because the sintering temperature does not have to reach the melting point of the material, sintering is often chosen as the shaping and manufacturing process for materials with extremely high melting points such as Alumina, Boron Carbide, Boron Nitride, Tungsten and Molybdenum. Sintering is traditionally used to sinter ceramic objects; but finds applications in powder metallurgy also. A relatively newer but vastly used science of sintering metal powders to form various parts is known as Powder-Metallurgy.

Microwave sintering furnaces (lab or production scale) operate with Microwave radiation as a source of heating and offer distinct advantages to conventional furnaces. We offer a variety of Microwave furnaces for laboratory applications and production plants. We also provide solutions with hybrid furnaces where electrical heaters are combined with microwave energy for specific materials which do not absorb microwaves at lower temperatures. The furnaces we offer have controlled atmosphere with or without vacuum. They are designed to process material in batch or continuous mode.

Rubber Vulcanization Ovens

Vulcanization is a chemical process for converting rubber or related polymers into more durable materials through the addition of sulfur or other equivalent "curatives." These additives modify the polymer by forming crosslinks (bridges) between individual polymer chains. Vulcanized materials are less sticky and have superior mechanical properties. A vast array of products is made with vulcanized rubber including tires, automotive weather strips, sealings, shoe soles, hoses, and hockey pucks. The process is named after Vulcan, the Roman God of Fire.

Uncured Natural Rubber is sticky, deforms easily when warm, and is brittle when cold and hence is very poor in elasticity. The reason for inelastic deformation of un-vulcanized rubber can be found in its chemical structure. Rubber is composed of long polymer chains. These chains can move independently relative to each other, which lets the material change shape. Crosslinking introduced by vulcanization prevents the polymer chains from moving independently. As a result, when stress is applied the vulcanized rubber deforms, but upon release of the stress, it reverts to its original shape.

Microwave Disinfestation Systems

The Post Harvest Losses (PHL) have been estimated to be in excess of 10% of production a few years ago. Of these, more than 50% is attributed to Infestation from the eggs, larvae & adults of the burrowing pests.

Grains that suffer from infestation are paddy, wheat, corn, maize, spices & cereals.

Binderjet Sand 3D Printer

Introducing Enerzi's revolutionary Binderjet Sand 3D Printer, proudly made in India. With precise layer-by-layer deposition of a liquid binding agent onto a bed of sand powder, our advanced system creates intricate three-dimensional objects. This versatile printer eliminates the need for traditional support structures, reducing post-processing efforts. Accelerate production times, reduce material waste, and unlock complex geometries. Our Binderjet Sand 3D Printer offers reliability, precision, and repeatability. Join industry leaders revolutionizing manufacturing processes with our made-in-India technology. Experience the power of Enerzi's Binderjet Sand 3D Printer and elevate your production capabilities.

MPCVD Components & Consumables

SMPS Microwave Power Supply

SMPS power supplies from 6 kW to 100 kW for 2.45 Ghz and 915 MHz frequencies with state of the art control system and features.

Microwave Head

Rugged and Reliable Microwave Heads come with water cooling provision and all the feedback sensors and Instrumentation for SMPS Power Supplies.

Mass Flow Controller

High Precision Mass Flow Controllers and Pressure Controllers for various process gases and flow ranges.

3-Stub Tuners

Specially designed 3-Stub Tuner for tuning reflected power made in Aluminum and Stainless Steel with Manual Stubs.

Quartz Components

High quality, optical grade Quartz discs, tubes and slabs of all thicknesses and dimensions made to order.

Pyrometer

Latest technology Dual Color Ratio Pyrometers and Single Color Pyrometers for accurate and reliable temperature sensing from 350 to 3000 deg. C

Vacuum Pumps

Heavy duty Vacuum Pumps with all the necessary accessories to provide long duration smooth operation.

Waveguide Components

Waveguides ranging from smallest size for 2.45 GHz to largest size for 915 MHz in Aluminum and Stainless Steel.

Valves & Fittings

Manual and Pneumatic operated Diaphragm Valves, Gas Fittings and Tubings for various flow and pressure ratings.

Molybdenum Plates

Best quality powder metal sintered Molybdenum Discs and Rods of various sizes.

Custom Built Systems

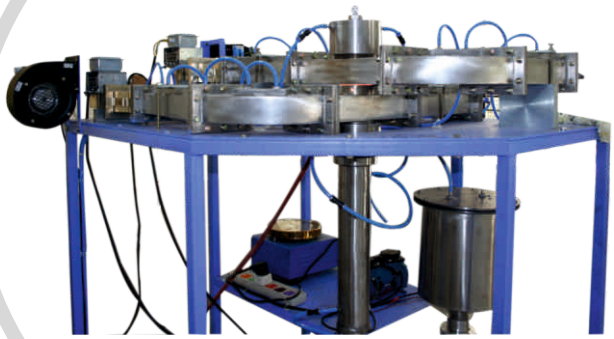
Enerzi specializes in building state of the art Microwave Heating Systems for specific applications as can be seen from the product-line. However, we at Enerzi thoroughly understand that Microwave Heating is a recent technology and offers a great hope to develop numerous products for a variety of applications. Hence we have been passionately working on new ideas and concepts with technology support from various research organizations. Some of the key systems we have developed are;

Dual Frequency Microwave System

This Custom Built System, first of its kind in the world has provision of both 915 MHz and 2450 MHz microwave processing along with hot air circulation. This system is built for curing of polymer composites and ceramic products. It has an effective hot zone of 1.5 m3. The system is equipped with state of the art control features and safety interlocks to enable trouble free operation.

Microwave Vacuum Oven

Even though Microwave and Vacuum are not compatible, the combined effect of the two can be exploited to our advantage with special care taken to avoid accidental failures of the system. In most cases, the vacuum is used for evacuation of the processing chamber / applicator. However, in some special applications, it is a technical requirement during processing. Enerzi specializes in designing and developing state of the art Microwave Systems which work with Vacuum levels of 100 torr to 0.001 torr.



Single Mode Microwave System

Sintering of various samples in a Single Mode Microwave applicator is not only very interesting but also challenging for various reasons. Basically it can also be referred to as the Process of heating materials inside the "Waveguide". In fact, Enerzi has developed over the years an in-depth study of the science of Microwave Heating and its various behavior patterns. It can design and develop state of the art Single Mode Microwave Sintering Applicators. In most cases, the application is to study material properties. However, it does not restrict us from exploiting the advantages of Single Mode system for other applications like welding, joining and sintering of metals and ceramics.

Microwave Systems for Resinoid Abrasives Curing

Enerzi offers a wide range of Continuous Microwave Systems for curing of Resin Bonded Abrasive wheels. These wheels require a very slow curing cycle in conventional curing ovens because the material is a poor conductor of heat. Microwave offers a distinct advantage of bulk heating of the wheels and thereby reducing the curing cycle times by order of magnitude. The Continuous Microwave Systems can be custom designed to suit the process requirements for the production scale.

Microwave Coke Making

Enerzi has designed and developed a state of the art Microwave Coke making furnace for converting Coal into Coke. This furnace though very similar to any of our high temperature microwave furnaces of pusher type design, it integrates some of the very unique features suitable for Coke making. The system can process about 25 kg coke per hour and is a lab scale demonstration system. It is observed that microwave based process for making coke results in a superior quality of coke. This technology is in its infancy and there is a significant scope for development.

Microwave Glass Melting Furnace

Glass Melting/Glass Making is an energy intensive process as high temperatures are involved. It is a high volume industry around the world. Microwave Technology in combination with conventional resistance heaters has been developed by us and tested in co-operation of Central Glass and Ceramics Research Institute (CGCRI), Kolkata. There has been a significant amount of work in different parts of the world to demonstrate that Microwave Heating can be effectively used to melt glass in large quantities at industrial scale. The efficiency of Microwave Heating makes it an excellent replacement for the current energy intense heating methods. Microwave Glass Melting also offers a large number of operational benefits too.

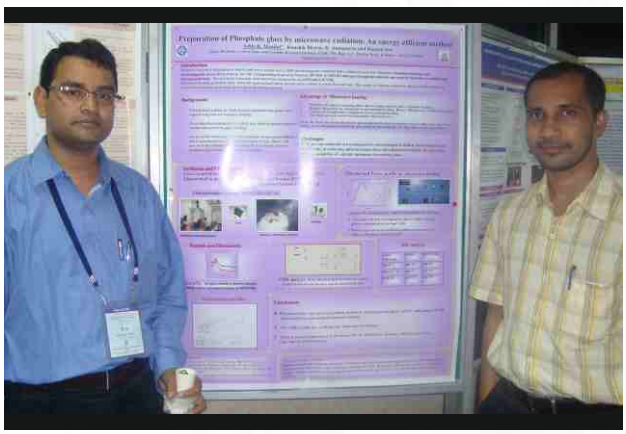
Our Customers

AUTOMOTIVE

- Cooper Standard Automotive Inc.
- Gold Seal Saargummi India Pvt. Ltd.
- R. K. Profiles Pvt. Ltd.
- Anand Nishikawa Company Ltd. (ANCO)
- Nova Technologies
- S. R. Beadings Ltd.
- ALP Overseas Pvt. Ltd.
- Amee Rubber Industries Pvt. Ltd.
- Jayashree Polymers Pvt. Ltd.
- Polyrub Extrusions Pvt. Ltd.

FOOD PROCESSING

- Defence Food Research Laboratory (DFRL)
- Indian Institute of Food Processing Technologies
- Central Food Technological Research Institute
- APA Cold Storage & Exports Pvt. Ltd.
- College of Food Science & Technology
- Food Engineering, IIT Kharagpur
- North East Institute of Science & Technology



MATERIALS PROCESSING

- Centre For Materials For Electronics Technology
- Defence Metallurgical Research Laboratory (DMRL)
- Raja Ramanna Centre for Advanced Technology, DAE
- CSIR-National Aerospace Laboratories
- Central Glass & Ceramic Research Institute (CGCRI)
- Indian Institiute of Science (IISc)
- Institiute of Mineral & Materials Technologies (IMMT)
- Rajiv Gandhi University of Knowledge & Technologies
- Laser Science & Technology Centre, DRDO
- Carborundum Universal Limited
- Sri Rajeshwaranand Paper Mills Ltd.
- Höganäs India Pvt. Ltd.
- Bharat Heavy Electricals Ltd.
- Hipro Ceramics Pvt. Ltd.
- Bhabha Atomic Research Centre, DAE
- Tata Steels Ltd.
- Double Dee Technology Pvt. Ltd.
- Banaras Hindu University
- Manipal Academy of Higher Education
- Wendt (India) Ltd.
- University of Hyderabad
- Laird Technologies India Pvt. Ltd.
- Indian Institutes of Technology (IITs)

CUSTOM-BUILT SYSTEMS

- RV College of Engineering
- Life Innovative Buildmart Pvt. Ltd.
- Ultra-Tech Cement Ltd.
- EKO Vehicles Pvt. Ltd.
- Crompton Greaves Ltd.
- The Energy & Resources Institute
- Institute of Wood Science & Technology (IWST)

EXPORT CUSTOMERS

- Teklab Ic ve Dis Tic.Ltd.Sti., Turkey
- The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia
- Vernadsky Institute of Geochemistry and Analytical Chemistry of the Russian Academy of Sciences (GEOKHI RAS), Russia
- Washington State University, Pullman

Awards, Recognitions & Certifications

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited
certifies that

Enerzi Microwave Systems Pvt. Ltd.
Greintors Compound", Plot No. 89/107, Survey No. 343A/335,
Udyambag, Belgaum – 590 008, INDIA

has implemented a Quality Management System
in accordance with ISO 9001:2015
For Scope of

DESIGN, DEVELOPMENT, MANUFACTURE AND SERVICING OF INDUSTRIAL HEATING EQUIPMENTS

The certificate is valid From 2018-04-27 until 2021-04-26
Subject to successful completion of annual periodic audits

Certificate Registration No. 99 100 18547
Date of initial certification : 2018-04-27

ZERTIFIKAT ◆ CERTIFICATE ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

State Award for Manufacturing Excellence - 2017 from Dr. M. C. Kumari, Minister for SME & Sugar.

EUROPEAN INSPECTION AND CERTIFICATION COMPANY S.A.

NOTIFIED BODY 1128

CERTIFICATE No: EU.IN.CE.0091-09/12

CERTIFICATE OF CONFORMITY
FULLNESS EXAMINATION AND ARCHIVING OF TECHNICAL FILE

Manufacturer	Name	:	ENERZI MICROWAVE SYSTEMS PRIVATE LIMITED
	Address Site 1	:	#49 / D-156-Z, ILM, UDYAMBAGAR, 4TH 'N' BLOCK, 3RD STAGE, RAJAJINAGAR, BANGALORE-560010, INDIA
	Address Site 2	:	# 99/107, SURVEY NO. 343A/335, BESIDE KUNJAL STEELS, UDYAMBAG, BELGAUM- 590008
Technical File No.: EMSPL/CE/1/12-13	Product Name	:	MICROWAVE SINTERING FURNACE
	Model	:	MH 3016 to MH 9020
Applicable Directive		:	Low Voltage Directive 2006/95/EC
Applicable Standards		:	EN 60519-6 :2002

This is to certify that, upon the relevant request of ENERZI MICROWAVE SYSTEMS PRIVATE LIMITED, EUROCERT S.A. as Third Party Authority, has received, archived and proceed to the fullness examination of the Technical Construction File of the above mentioned product.

The Technical Construction File has been archived at EUROCERT's records with code number EU.IN.CE.0091TCF.

Following the fullness examination of the Technical Construction File we confirm that it is adequate in respect with the basic health and safety prerequisites of EU Low Voltage Directive 2006/95/EC.

The manufacturer is obliged to issue a Declaration of Conformity according to the basic requirements of relative directive (2006/95/EC) and places the CE marking with his own responsibility as follows:

CE

All modifications to the Technical File should be first submitted to the Third Party Inspection Authority to ensure further validity of this attestation.

Third Party Authority Stamp
This certificate is valid until 11/09/2017

Date and Place of Issue
ATHENS, 12/09/2012
For EUROCERT S.A.

GEORGEN. SIFONIOS
DIRECTOR OF DEVELOPMENT

89, CHEOS STR. & ULOVRISEOS, 144 32 METAMORFOSI, ATHENS, GREECE
tel.: ++30 210 62.32.493, 30 210 62.33.927 - fax: ++30 210 62.03.016
Internet site: www.eurocert.gr - e-mail: eurocert@otenet.gr

Certified as Visionary SME through VLCi organized by Japan International Cooperation Agency & Confederation of Indian Industry.

National Productivity & Innovation Award - 2015 from Union Minister - MSME, Mr. Kalraj Mishra.

SIDBI-ET Most Tech Savvy Company of the year in the hands of Shri Shiv Pratap Shukla, Minister of State for Finance.

SME100 Award recieved by Enerzi for its innovative products by Shri Nitin Gadkari (Union Minister).

Enterprise of the year in Technology award by TiE Hubli in the hands of Sadhguru Jaggi Vasudev, Founder of Isha Foundation.

Most Innovative company of the year award by Shri Nitin Gadkari (Union Minister) for Innovation in Energy saving technologies developed by Enerzi.

Beyond Work

Trained by Dr. Deepak Rao, Mr. Prakash represented India (as part of UCCA Team) and played the Quarter Final in 7th World Championship of full Contact fighting - MMA, 2017 - Kislovodsk, Russia.

Simple Self Defense Workshop regularly conducted for women police, students & working professionals by Dr. Prakash Mugali as a Women Empowerment Initiative.

Our Esteemed Customers

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UNIVERSITY OF HYDERABAD
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
CSIR-INDIA
DEFENCE R&D ORGANISATION MINISTRY OF DEFENCE
INDIAN INSTITUTE OF TECHNOLOGY KANPUR
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CSIRO
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WENDT

TÜV SÜD ISO 9001

ENERZI®
Heating Reinvented
An ISO 9001:2018 Company

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Udyambag, Belgaum - 590 008,
Karnataka, India.

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