CHEMISTRY THAT MATTERS™

SABIC PLASTIC APPLICATIONS DEVELOPMENT CENTER

CONTENTS

SAFETY FIRST

We hope your visit to SPADC is both enjoyable and informative. To ensure your health and safety during your visit, please carefully review the safety information provided in this brochure and follow the instructions.
We welcome you to SPADC and wish you a pleasant and memorable experience.

Personal protective equipment (PPE) must be worn in many areas at SPADC. For your safety, you must use the appropriate protective gear when entering areas requiring PPE.

It is forbidden to film or take photographs without authorization.

Smoking is only allowed in designated areas.

You are not allowed to eat or drink in laboratories or processing areas.

Do not enter any restricted areas unless you are authorized and instructed accordingly.

ACTIONS REQUIRED IN CASE OF EMERGENCY

Obey alarm signals and follow the instructions of EHSS personnel. Sirens emitting a continuous tone indicate that you must evacuate the building immediately.

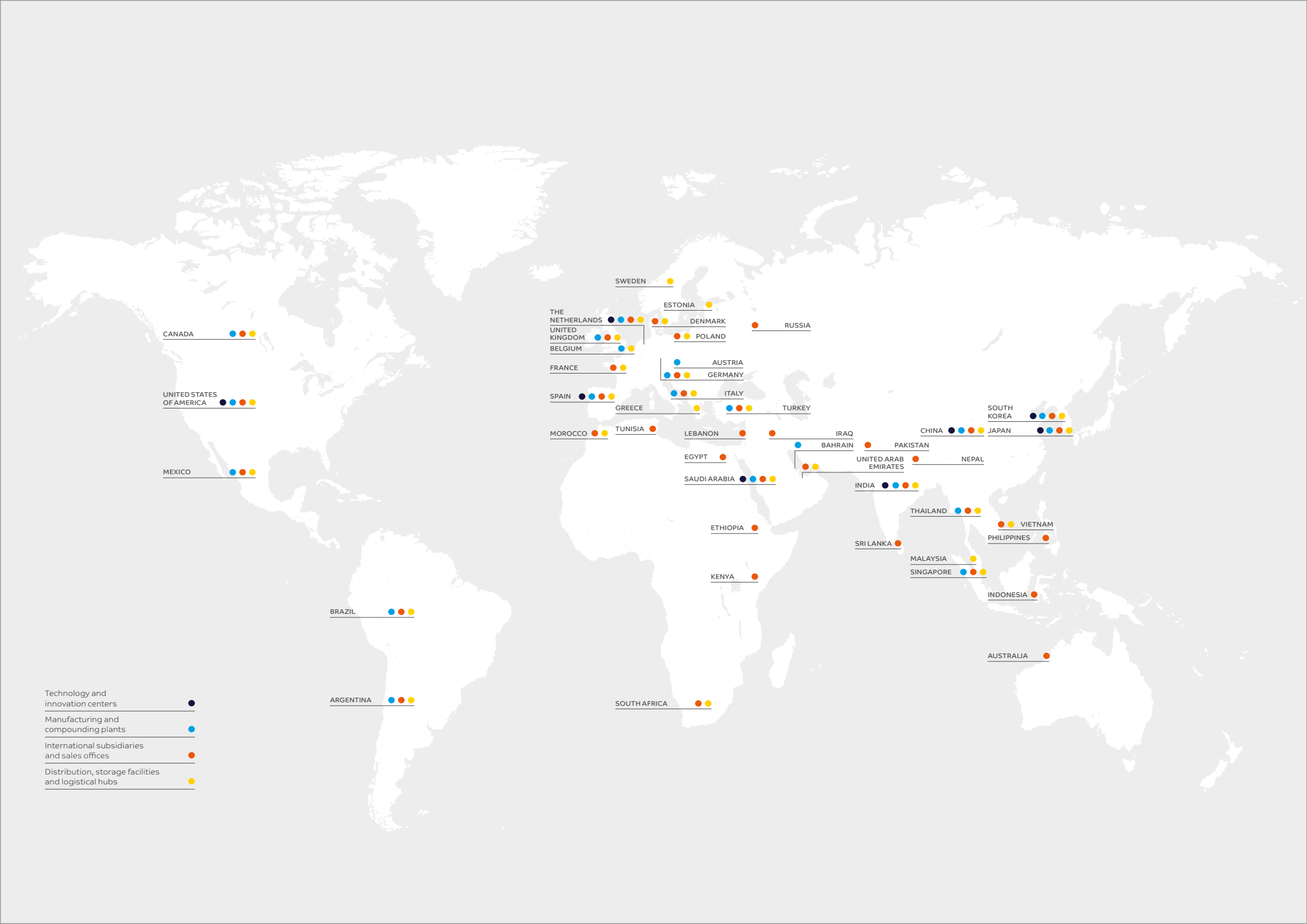
In an emergency, leave the building through emergency exits and escape routes. Do not use elevators. Do not close doors behind you.

Make your way to the designated assembly point and await further instructions. Report any missing colleagues to the EHSS officer. Do not re-enter the building unless you are told that it is safe to do so.

If you do not feel well, please let us know, as we have a clinic on site. If you need any assistance, inform the EHSS team or contact the doctor or nurse on site by calling 1999.

SABIC T&I'S PRINCIPLES

SABIC has long recognized the need to be at the cutting edge of technological development. We are the forefront of innovation since SABIC was founded in 1976. SABIC was created to turn natural gas resources into valuable industrial commodities. Earlier, these natural gas resources were regarded as waste, and burned off during oil extraction. Since then, we have progressed to become one of the leading players in the petrochemical industry. Over the years, we have developed an approach to Technology and Innovation (T&I) that puts customers' needs first. We have invested heavily in technological development and technical support functions and have established an increasingly independent research program that benefits other industries as well as our own. As the world's resources become scarce and raw materials increasingly valuable commodities, we have to look for new ways to innovate and make the difference for our customers.


SWEDEN
ESTONIA
THE NETHERLANDS
DENMARK
RUSSIA
UNITED KINGDOM
POLAND
BELGIUM
AUSTRIA
FRANCE
GERMANY
ITALY
SPAIN
GREECE
TURKEY
SOUTH KOREA
CHINA
JAPAN
MOROCCO
TUNISIA
LEBANON
IRAQ
BAHRAIN
PAKISTAN
EGYPT
UNITED ARAB EMIRATES
NEPAL
SAUDI ARABIA
INDIA
THAILAND
VIETNAM
ETHIOPIA
PHILIPPINES
SRI LANKA
MALAYSIA
SINGAPORE
KENYA
INDONESIA
CANADA
UNITED STATES OF AMERICA
MEXICO
BRAZIL
AUSTRALIA
ARGENTINA
SOUTH AFRICA
Technology and innovation centers
Manufacturing and compounding plants
International subsidiaries and sales offices
Distribution, storage facilities and logistical hubs

SABIC VALUES

INSPIRE

We generate pride and commitment to make an impact

ENGAGE

We connect with others to achieve more together

CREATE

We find and embrace new and better ways of working

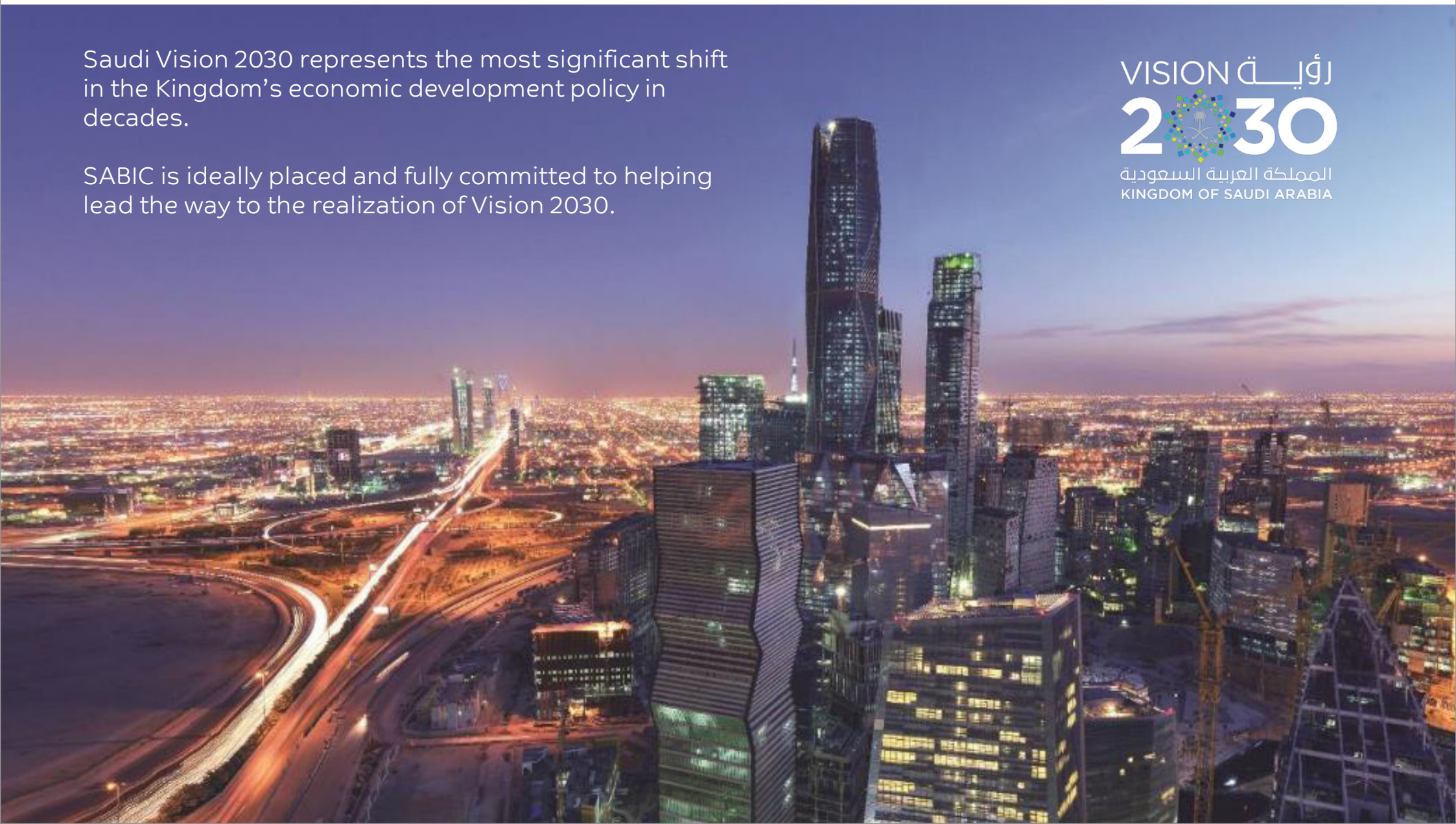
DELIVER

We take responsibility to drive meaningful results

COMMITTED TO LEADING THE WAY TOWARDS THE REALIZATION OF VISION 2030

Saudi Vision 2030 represents the most significant shift in the Kingdom's economic development policy in decades.

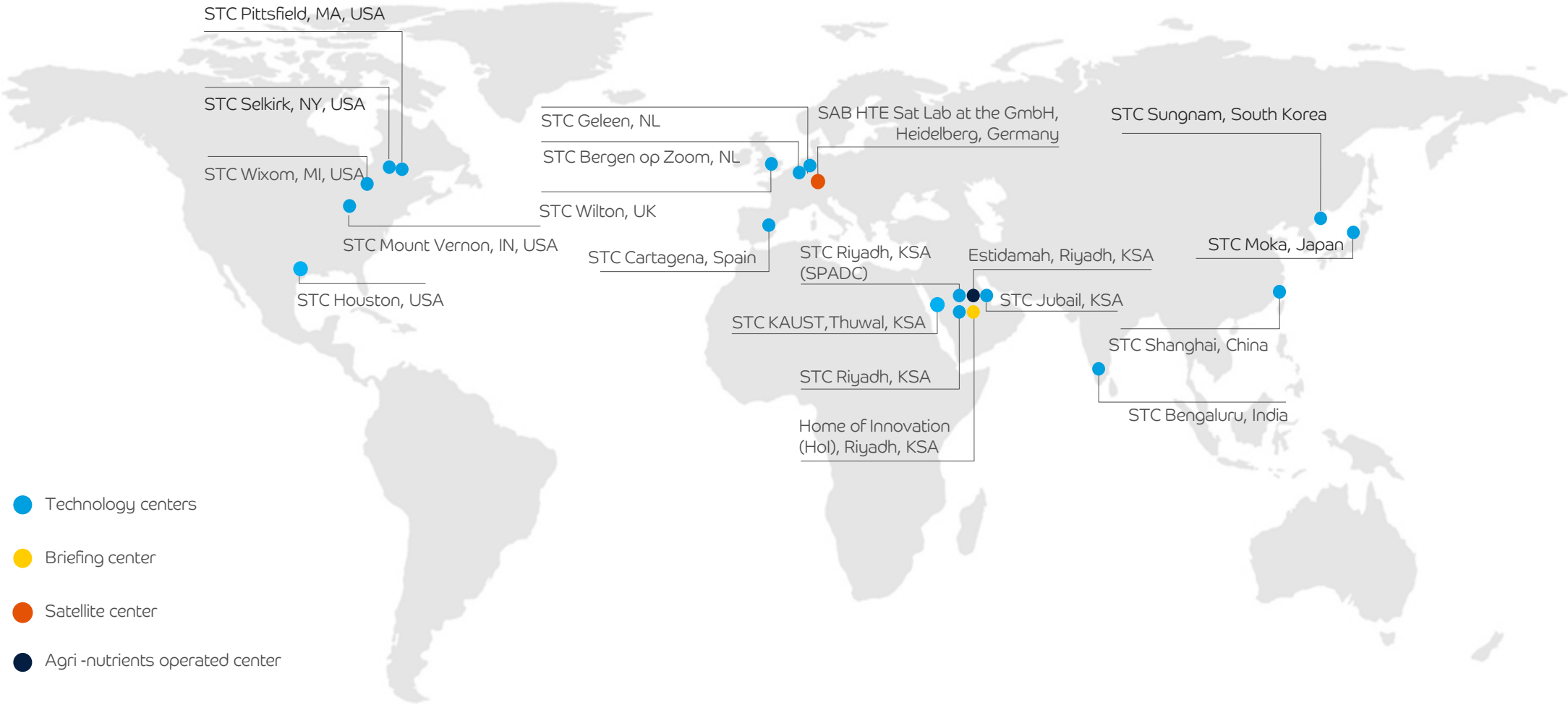
SABIC is ideally placed and fully committed to helping lead the way to the realization of Vision 2030.



SABIC GLOBAL T&I CENTERS

SABIC corporate Technology and Innovation offers a full range of technological research, development and technical services to SABIC's businesses in chemicals, polymers, Agri-nutrients, Metals and specialties. SABIC T&I operations span North America, Europe, and Asia through various technology centers. These centers provide support to SABIC businesses and production facilities around the globe. We make chemicals, plastics, and other basic materials, for everything from toys to cosmetics to aircraft components. An immense R&D efforts, with the cooperation of commercial partners and experts from some of the world's leading academic institutions brings a steady stream of improvements that help our customers make product better, lighter, and more affordable in ways that help protect the environment and deliver **CHEMISTRY THAT MATTERS™.**

WE HELP OUR CUSTOMERS MAKE PRODUCTS BETTER, LIGHTER, AND MORE AFFORDABLE IN WAYS THAT HELP PROTECT THE ENVIRONMENT

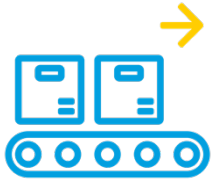

STC Pittsfield, MA, USA
STC Selkirk, NY, USA
STC Wixom, MI, USA
STC Mount Vernon, IN, USA
STC Houston, USA
STC Geleen, NL
STC Bergen op Zoom, NL
STC Wilton, UK
STC Cartagena, Spain
SAB HTE Sat Lab at the GmbH, Heidelberg, Germany
STC Riyadh, KSA (SPADC)
Estidamah, Riyadh, KSA
STC Jubail, KSA
STC KAUST,Thuwal, KSA
STC Riyadh, KSA
Home of Innovation (HoI), Riyadh, KSA
STC Sungnam, South Korea
STC Moka, Japan
STC Shanghai, China
STC Bengaluru, India
Technology centers
Briefing center
Satellite center
Agri -nutrients operated center

SABIC PLASTIC APPLICATIONS DEVELOPMENT CENTER (SPADC)

42,000m² with 300+ Scientists, Engineers and Technicians

~190 Lab Equipment

~300 Unique Tests



60 State-of-the-art Machines

90 Different Applications

Create
a catalyst for new
ideas and thinking

Provide
opportunities
for collaborations

Assist
our customers to
realize their ambitions

A SHORT HISTORY OF SPADC

1983

TSL - Polymer Lab

- Material development.
- Affiliate support.

2013

SPADC

- Conceptual design & predictive engineering.
- Product prototyping.
- Application development.

2015

HOI

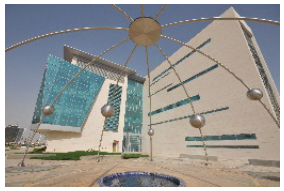
- Collaboration center & demonstration home to stimulate demand.

2016

New capabilities

- Carbon fiber equipment.
- More compounding and extrusion lines.
- Advance Design and Additive Manufacturing (ADAM) lab.

2019-Today



Elaborate Ecosystem

- A comprehensive suite of capabilities helping us to achieve our ambition of delivering sustainable products and differentiated innovation that meet the needs of our customers and stakeholders and help realize Saudi Vision 2030.

Commodity + Engineering Thermoplastics + Extrusion and ADAM + Polyurethane and Polyamide

OUR OBJECTIVE

SPADC has both external and internal objectives. Externally, SPADC chiefly seeks to provide an excellent level of support to our customer base by providing valuable insights into polymer applications, including processing and characterization. SPADC also seeks to foster a collaborative environment for academia and SABIC to come together and provide novel solutions to the world's most pressing problems. Internally, SPADC seeks to support our varied network of affiliates by suggesting solutions to any issues that might come up on the manufacturing forefront as well as envisioning new applications for SABIC to serve with its growing portfolio of innovative materials. SPADC also supports its growing population of scientists by providing capabilities and competencies SPADC serves as a research hub that synergizes with the expanding network of SABIC's T&I centers around the world, supporting the various application segments under SABIC T&I.

SOME OF THE **SEGMENTS** THAT WE FOCUS ON

WHAT WE DO AT SPADC

QUALITY ASSURANCE

Our goal is to assist our customers maximize their productivity by optimizing methods. This can be achieved by using state-of the-art testing equipment and services, which can be customized to suit the requirements of any

REVERSE ENGINEERING

We have the capability of investigative chemical analysis for separation, compositional identification, and in-depth understanding of any product in terms of ingredient quantification. We can also perform root cause analysis to resolve contamination or product failure issues. This is a vital tool for trouble shooting, particularly in new product development, since it allows the development of mitigation plans to curtail repetitive failure.

SIMULATION

We also have the capability of predictive engineering via process simulation and modeling. This is the most -time and cost- effective approach as well as a safer first option preceding actual experimentation.

STRATEGIC INDUSTRIES WE SERVE

PACKAGING

SABIC polymers can help food and beverage producers meet their goals while still providing sustainable benefits like lightweighting and environmentally-focused initiatives.

ELECTRICAL & ELECTRONICS

Manufacturers need to make products in a cost-effective manner, yet meet consumers' expectations for style, ease of use and sustainability. Our materials are the foundation for the next generation of electronic devices.

HEALTHCARE & PERSONAL HYGIENE

To support customers with the changing requirements in the healthcare and pharmaceutical industries, SABIC continues to develop new materials and processing expertise. Our recent innovations focus on addressing important trends such as the need for portable technologies and reduction of healthcare associated infections.

CLEAN ENERGY

SABIC polymers can help create sustainable renewable-energy solutions for the future.

CONSTRUCTION

We provide products to architects and builders who seek solutions to satisfy public demand for environmentally responsible structures while providing design.

TRANSPORTATION

Automobiles, aircraft, and other vehicles require new approaches to meet the ever-rising safety, emission reduction and design freedom requirements amongst others. We put our material design and technical expertise to work to help OEMs meet these challenges and drive innovation to new levels.

SPADC AT A GLANCE

MATERIALS

Polyethylene (PE)
Polypropylene (PP)
Polyvinyl Chloride (PVC)
Polystyrene (PS)
Polyethylene Terephthalate (PET)
Elastomers
(EPDM, SBR, PBR)
Engineering Thermoplastics
(PC, ABS, POM, PMMA)
Fibers
Polyurethane (PU)

PROCESSING

Mixing & Compounding
Injection Molding
Extrusion
Thermoforming
Harsh Weathering
Part Testing
ADAM Lab

FEATURES

Mechanical
Chemical
Optical
Thermal & Rheology
Weathering
Analytical
Wire & Cable
Rubber & Carbon Black
Fibers
Thermosets

PROCESSING CAPABILITES

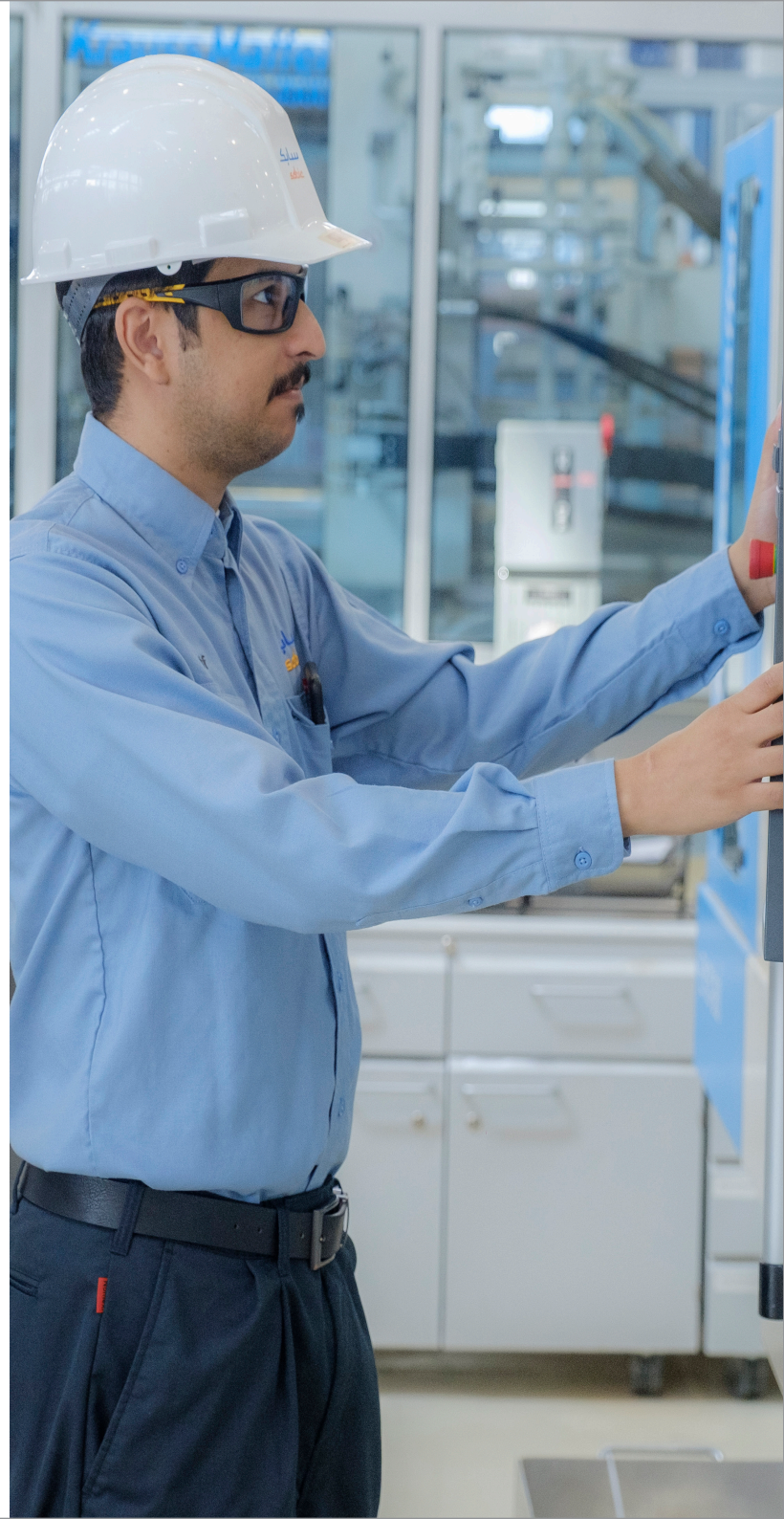
A DEEPER LOOK

SPADC is a state-of-the-art facility with processing capabilities covering many areas to serve the various needs of our customers and our researchers.

- Molding
- Extrusion
- Mixing & Compounding
- Rubber Processing
- Composites

MOLDING

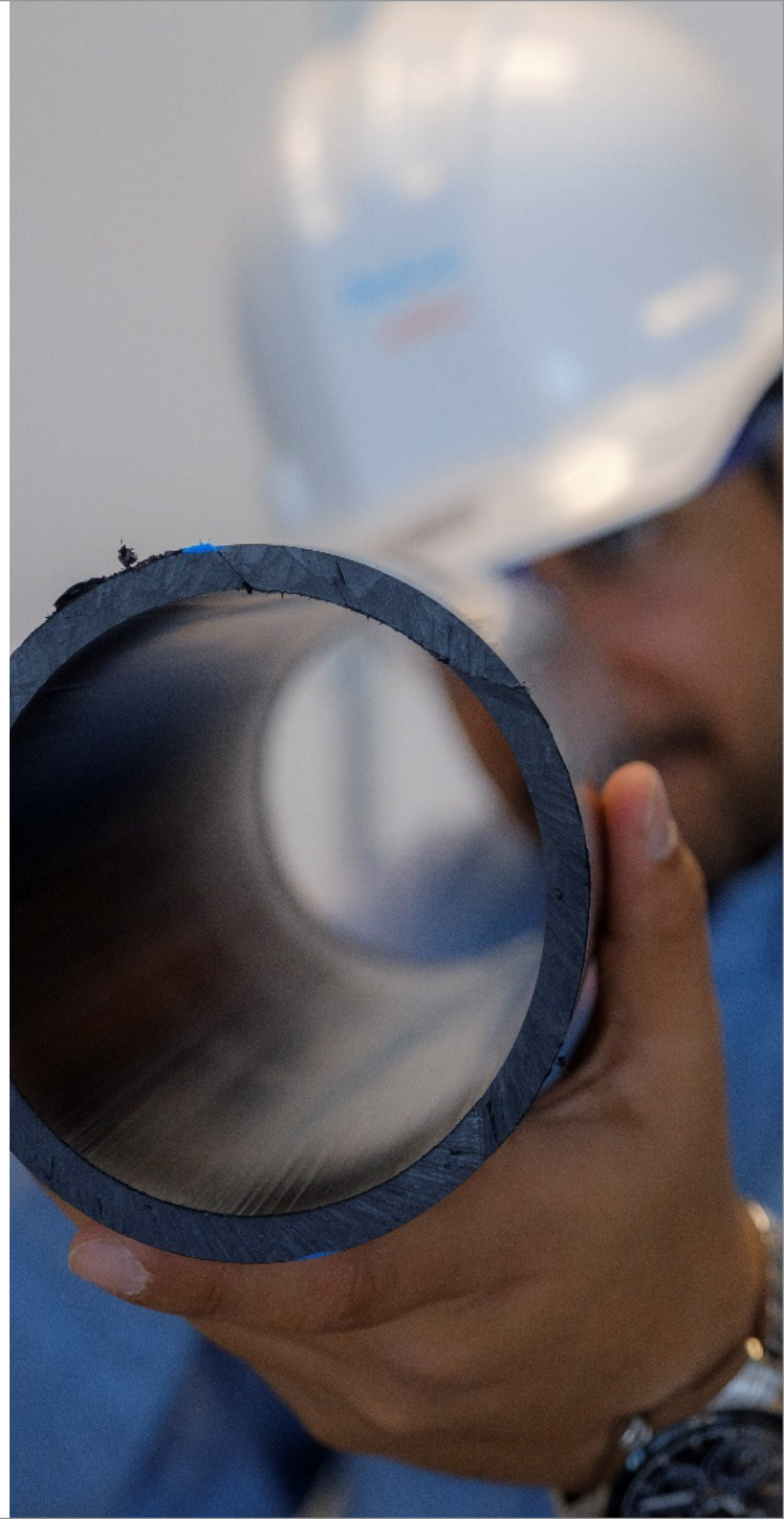
SPADC’s molding capabilities include equipment that offer excellent processing. These molding techniques include injection molding, blow molding and stretch blow molding. SPADC is also equipped with a thermoforming machine to round out our capabilities portfolio.



EXTRUSION

SPADC's capabilities also include a variety of extruders that are essential for the cutting-edge research happening at SPADC.

- Blown Film Extrusion
- Cast Film Extrusion
- Profile Extrusion
- Sheet Extrusion
- Pipe Extrusion
- Fiber Spinning



MIXING & COMPOUNDING

Our mixing capabilities extend to handling powders, pellets and liquid additives. Those capabilities are suitable for batches ranging from 1 kg to 100 kg. In addition to a wide variety of compounding technologies, SPADC is equipped with a pulverizer to convert pellets into powder as well as multiple pelletizing systems, which can produce pellets of various shapes.

RUBBER PROCESSING

SPADC boasts of comprehensive suite of capabilities when it comes to handling elastomers. State-of-the-art equipment are available for our stakeholders to work with rubber. Some of the rubber handling capabilities include a banbury mixer, a profile extrusion line, an injection molding line, a compression molding line, as well as multiple rubber mills.

COMPOSITES

SPADC strives to be at the cutting edge of technology to be able to consistently serve our stakeholders. Therefore, the center is equipped with various technologies for the handling of carbon fibers and carbon fiber reinforced composites. SPADC has a compression molding setup, a resin transfer molding setup, as well as a towpreg workcell setup.

SPADC'S PHYSICAL FEATURES

- Mechanical and Optical Lab
- Thermal and Rheology Lab
- Gel Count Lab
- Weathering Lab

MECHANICAL AND OPTICAL LAB

Mechanical testing provides support for research and development, problem solving to fulfill the various needs of simulation analysis. The tests are suitable for plastics, polymers and elastomers.

Tensile Stress Strain	Izod/Charpy Impact Test	Color&Yellowness Index
Rebound Resilience - Rubber	Tear Resistance - Films	Hottack/Sealing – Films

... And more

THERMAL AND RHEOLOGY LAB

Thermal analysis is used to study transitions, dimensional changes and crystallinity, while rheological analysis is used to study flow behavior and molecular structure differences through various ranges of shear rates.

Melt Flow Rate	Low Shear Rheology	Rubber Process Analyzer
Vicat Softening Point	High Shear Rheology	TGA/DSC Analysis

... And more

GEL COUNT LAB

Gel count testing monitors film quality and detects surface defects such as gels, black specks and fish eyes.

Gel count – Cast Film	Film gloss 20/60°	Haze meter
In-line haze meter	Film thickness	Gel count – Blown Film

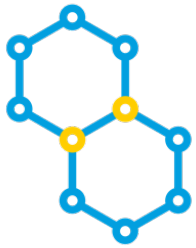
... And more

SPADC'S CHEMICAL FEATURES

- Wet Chemistry
- Chromatography
- Spectroscopy
- Carbon Black Testing

CHEMICAL CHARACTERIZATION CAPABILITIES

- Densitometer
- Column Density
- Ash Content
- Viscometer
- Oil Absorption Number
- HPLC
- GC-GCMS
- Pyrolysis GC
- FTIR
- UV-Vis Spectroscopy



... And more

ADDITIVE MANUFACTURING

Additive Manufacturing or 3D Printing is a process of creating three dimensional physical objects from digital model. The creation of a 3D printed solid object is done using an additive process. In an additive process, an object is made by depositing the material in layers until the entire object is created

ADVANTAGES OF AM

- Faster to Market
- Complex Design
- Improved Material Properties

SABIC GLOBAL ROLE

- Additive Manufacturing
- Application Development
- Material Development

SUPPORT & COOPERATION

As part of our research efforts, we collaborate with other corporations and international research entities. This usually means that we form a partnership to initiate a project, and then jointly fund and supervise the research through to completion. This approach results in finding the best cost-effective solutions to any complex technical problem with the involvement of global experts. It also accelerates the execution of the selected projects to innovate and make the difference for our customers and for us.

CONTACT US

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E info@sabi.com