Tosoh Corporation

General Presentation
Delivering on our promise of quality products through The Chemistry of Innovation.

Tosoh Corporation is a global chemical company that supplies manufacturers with the materials they need to create the products that make modern life all that it is. And everything it can be.

We invite you to take a closer look at the wide world of Tosoh.
Fiscal 2017 Consolidated Net Sales
US$6.6 billion

<table>
<thead>
<tr>
<th>Group</th>
<th>Net Sales (US$)</th>
<th>Share of Net Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHLOR-ALKALI GROUP</td>
<td>US$2.6 billion</td>
<td>37.6%</td>
</tr>
<tr>
<td>PETROCHEMICAL GROUP</td>
<td>US$1.5 billion</td>
<td>21.8%</td>
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<tr>
<td>SPECIALTY GROUP</td>
<td>US$1.6 billion</td>
<td>23.7%</td>
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<tr>
<td>ENGINEERING GROUP</td>
<td>US$799.0 million</td>
<td>11.7%</td>
</tr>
<tr>
<td>OTHER GROUP</td>
<td>US$361.3 million</td>
<td>5.3%</td>
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</tbody>
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Note: For reference purposes only. US dollar amounts have been translated, unless otherwise indicated, from yen at the rate of ¥112.19 = US$1, the prevailing exchange rate at the end of the fiscal year ended March 31, 2016.
Look around you, it is almost impossible to find a manufactured item that does not include something from Tosoh.

*Does not include the 10,000-plus parts that go into Tosoh’s clinical diagnostic systems.
12,292 people

*Tosoh is committed to people, the source of its vitality.*
*Tosoh is proud of the multiethnic, multicultural community it has become.*
*Our diversity brings fresh ideas and creativity to all aspects of our business.*
As we continue to expand globally, our focus remains on creating a corporate culture where people can realize their potential and be a part of the local community.
Tosoh is dedicated to improving the quality of life through environmental preservation, to ensuring the safety and health of its employees and society, and to achieving economic progress.
Through R&D, the Tosoh Group strengthens its businesses and enhances its ability to generate tomorrow’s products today. The company combines its own R&D programs with joint research at external research facilities, including at universities and other educational institutions and at public research laboratories. Tosoh is also investing in venture funds.
Tosoh balances petrochemicals, urethanes and isocyanates, and the largest chlor-alkali commodity operations of their kind in Asia with highly profitable specialty operations.
Products and Markets

Tosoh serves the chemical and petrochemical, construction, automotive, consumer electronics, information technology, bioscience, and environmental markets.

Petrochemicals Group
- Olefins
- Polymers

Chlor-alkali Group
- Chlor-alkali
- Cement
- Urethane

Specialty Group
- Organic Chemicals
- Bioscience Products
- Advanced Materials

Engineering Group
- Water Treatment
- Construction

Yokkaichi Complex
Mie, Japan
Petrochemicals

Olefins

- Ethylene
- Propylene
- C4 Fraction
- Tertiary-butyl alcohol
- Cumene
- Aromatic compounds, BTX (benzene, toluene, xylene)

On the Road: A Part of Your Daily Life

Tosoh furnishes an array of materials that underpin the electronics, automobile, and plastics industries. Our synthetic rubber helps wet suits insulate wearers from the cold; our engineering plastic polyphenylene sulfide (PPS) strengthens car engine parts; our Melthene® polyolefin resin fastens the easy-to-peel lids on yogurt and other food containers; and our Ryuron® polyvinyl chloride (PVC) paste puts that soft stretch in rubber gloves.
Polymers

Polyvinyl chloride (PVC)
High-density polyethylene (HDPE)
Low-density polyethylene (LDPE)
Linear low-density polyethylene (LLDPE)
Ethylene vinyl acetate (EVA) copolymer
Adhesive polymer
PVC paste (Ryuron®)
Polychloroprene rubber
Chlorosulfonated polyethylene (CSM)
Alkylated CSM
Polyphenylene sulfide (PPS) resins
C₉ hydrocarbon resins

In the Living Room: A Part of Your Daily Life
Tosoh is there while you’re relaxing in your living room. Our polyvinyl chloride covers the inside of your house with easy to clean wallpaper and the outside with durable siding. It also covers the electrical cords that bring your appliances to life and the solar panels that provide your house with energy.
Chlor-alkali Division

- Caustic soda
- Vinyl chloride monomer (VCM)
- Calcium hypochlorite (Niclon®)
- Sodium bicarbonate

Urethane Division

- Isocyanate raw materials and functional urethane
  - Methylene diphenyl diisocyanate (MDI)
  - Toluene diisocyanate (TDI)
  - Hexamethylene diisocyanate (HDI)
- Polyurethane adhesives
- Coating resins
- Elastomers
- Polyisocyanates for polyurethane paints
- Polyols

In the Kitchen: A Part of Your Daily Life

Tosoh supplies essential products that go into plastics, glass, pulp and paper, aluminum, and soaps and detergents. Our resins are used in everything from refrigerators to mixing bowls and utensils; our caustic soda keeps clothes clean; and our Niclon® calcium hypochlorite makes drinking water safe.
Cement

Ordinary portland cement
Portland fly ash cement
Portland blast furnace slag cement

For Strong Structures: A Part of Your Daily Life
Tosoh cement goes into buildings, bridges, and highways. And the recycling capacity of our cement plant helps significantly reduce the waste produced by Tosoh and communities surrounding the plant.
Organic Chemicals

Ethyleneamines

Polyurethane catalysts (TEDA, TOYOCAT® RZETA®)

Bromine

Hydrobromic acid

Flame retardants (FLAMECUT®)

Chelating agents (TS-300, TX-10)

Nonaqueous solvents (HC series)

Sodium P-styrene sulfonate (Spinomar® NaSS)

High-purity ethylene dichloride

For When You Are Out and About: A Part of Your Daily Life
Tosoh provides cutting-edge technologies to the semiconductor, consumer electronics, automotive, pharmaceuticals, and medical industries.
Bioscience

Automated immunoassay analyzers (AIA®, AIA-CL series)

Reagent systems (AIA-PACK®, AIA-CLPACK®)

Automated glycohemoglobin (GHb) analyzers (HLC® series)

Real-time fluorescence monitoring systems (TRC® series)

High-performance liquid chromatography (HPLC) columns (TSKgel® series)

Separation media for bio-pharmaceutical purification (Toyopearl®)

High-performance gel permeation chromatography (GPC) Systems (EcoSEC® series)

In Health Care Solutions: A Part of Your Daily Life
Tosoh produces a range of scientific and clinical diagnostics products that address the health concerns of developed and developing countries.
Advanced Materials

Yttria-stabilized zirconia powders & compounds (TZ and Zpex® series)

Grinding media (YTZ®)

Zirconia fine beads

Electrolytic manganese dioxide (EMD)

Zeolites for molecular sieves (Zeolum®)

Zeolites for catalysts (HSZ® series)

Silica glass materials

Fabricated quartzware

Machined quartzware

Sputtering targets

For Conserving Natural Resources
Tosoh is taking steps to ensure its share of the surging market for rechargeable lithium-ion batteries, which conserve energy and are becoming increasingly important value-added components of automobiles and electronic products.
To Keeping Water Pure: A Part of Your Daily Life
Tosoh subsidiary Organo Corporation has been an important contributor to progress in industry and daily lives since 1946. Its water treatment systems and products goes into waterworks, sewage treatment plants, power stations, pharmaceuticals manufacturing, food processing operations, information technology and electronics industries.

Water Treatment
(Organo Corporation)
Water Treatment Systems and Products

Construction
(Tohoku Denki Tekko Co., Ltd., etc.)
Construction of machinery, plant, steel structure, environmental and sanitation facilities, containers
Electrical machinery
Instrumentation
Civil engineering
Maintenance and quality assurance
Global Solutions
Tosoh first ventured overseas over 50 years ago, establishing a presence in the United States in the early 1960s. Today, the Tosoh Group boasts a global network that generates a major portion of Tosoh’s sales outside Japan.
Southeast Asia

Tosoh India Pvt. Ltd.
Mumbai, India

Tosoh Quartz Co., Ltd.
Tainan, Taiwan

Tosoh Polyvin Corporation
Batangas, The Philippines

Mabuhay Vinyl Corporation
Makati City, The Philippines

Philippine Resins Industries, Inc.
Makati City, The Philippines

Tosoh Polyvin Corporation
Hsinchu, Taiwan

Tosoh SMD Taiwan, Ltd.
Hsinchu, Taiwan

Tosoh SMD Korea, Ltd.
Kyungki-Do, Korea

Tosoh SMD Korea, Ltd.
Jakarta Pusat, Indonesia

Tosoh Quartz Co., Ltd.
Tainan, Taiwan

Tosoh Asia Pte. Ltd.
Singapore

P.T. Standard Toyo Polymer
Jakarta Pusat, Indonesia

Other Tosoh Group Companies

Organo (Thailand) Co., Ltd.
Organo (Asia) Sdn. Bhd.
Global Sales and Marketing Offices

**Americas**
- Tosoh USA, Inc.
  - Grove City, OH, USA
- Tosoh Specialty Chemicals USA, Inc.
  - Alpharetta, GA, USA

**Europe, North Africa**
- Tosoh Europe B.V.
  - Amsterdam, The Netherlands

**SEA, India, Middle East**
- Tosoh Asia Pte. Ltd.
  - Singapore

**China**
- Tosoh (Shanghai) Co., Ltd.
Additional Information
Vinyl Isocyanate Chain

The vinyl isocyanate chain is a fully integrated sequence of manufacturing operations that produce several key chemicals from the vinyl and isocyanate chains respectively.

Vinyl Chain
The vinyl chain starts with salt and naphtha. Salt is electrolyzed to yield chlorine, caustic soda and hydrogen. The naphtha steam cracking process yields ethylene, carbon monoxide and benzene. Chlorine is reacted with ethylene and hydrogen chloride (a by-product of MDI production) to produce ethylene dichloride (EDC), and the balance is used to manufacture other chlorine derivatives. Tosoh then converts EDC—which can also be combined with caustic soda to produce ethylenamines, another major Tosoh product—to vinyl chloride monomer (VCM), which is converted into various polyvinyl chloride (PVC) resins.

Isocyanate Chain
The naphtha-derived benzene, together with hydrogen and ammonia yields aniline, which, combined with formalin, and the vinyl chain’s chlorine and carbon monoxide leads to methylene diphenyl diisocyanate (MDI), an essential raw material for polyurethanes.