

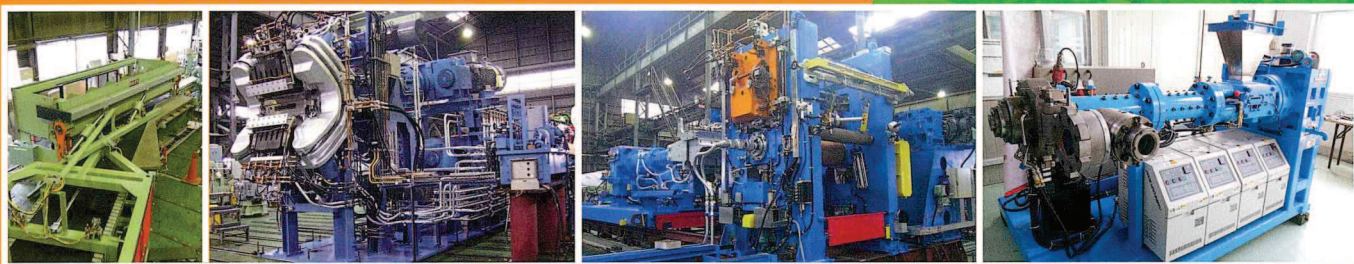


NAKATA ENGINEERING

Kobe, Japan

Quality Technology Communication

Corporate Profile



Corporate Profile



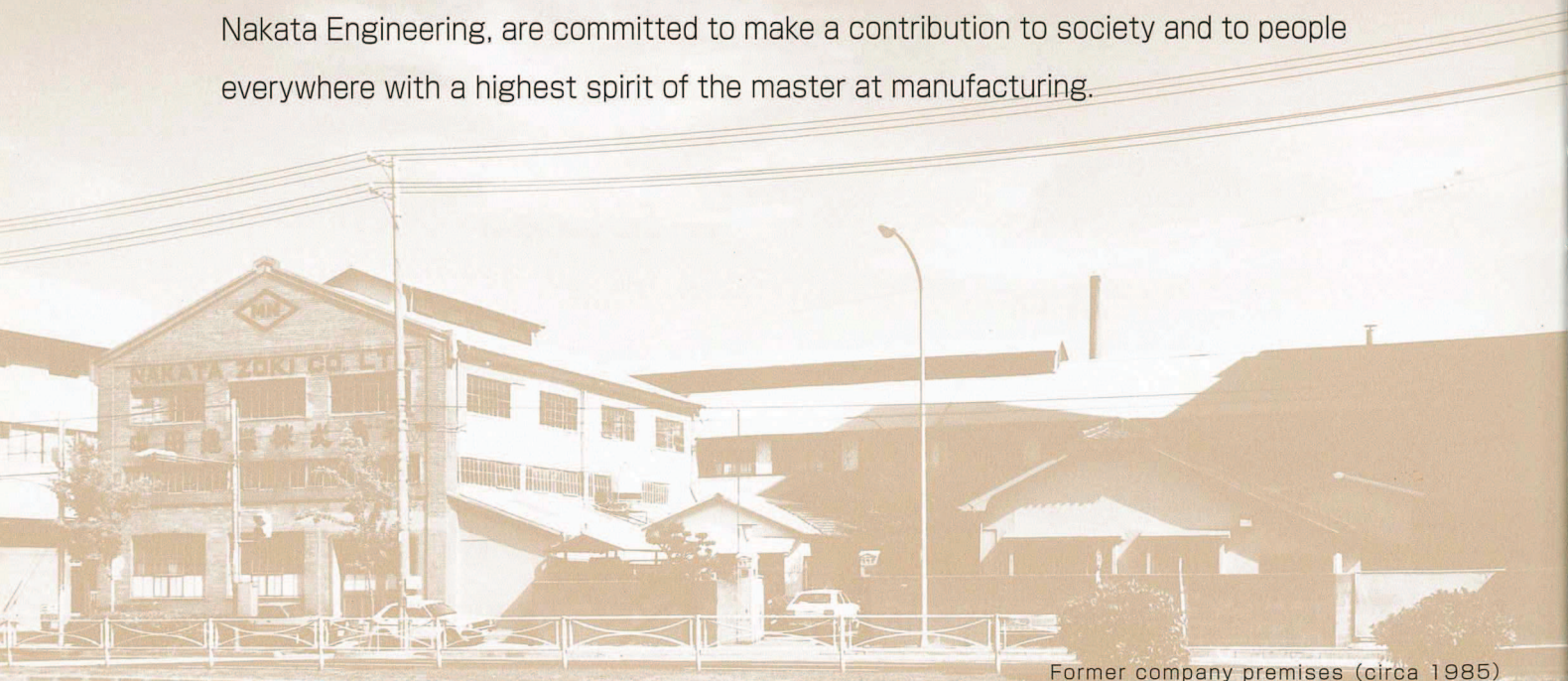
NAKATA ENGINEERING Co.,Ltd.

For the next 100 years, Challenge to the further innovation!!

Every day, all of us use numerous products made of rubber, which are indispensable to our contemporary way of life. Among them are tires for trucks and automobiles, belting, hoses, gloves, and innumerable other items. The list goes on and on, from golf balls, tennis balls and other sports equipment, to rubber dampers that protect buildings from earthquakes, and parts for all types of high-tech equipment. As history progresses, so does the growth in the number of fields where rubber plays a vital role.

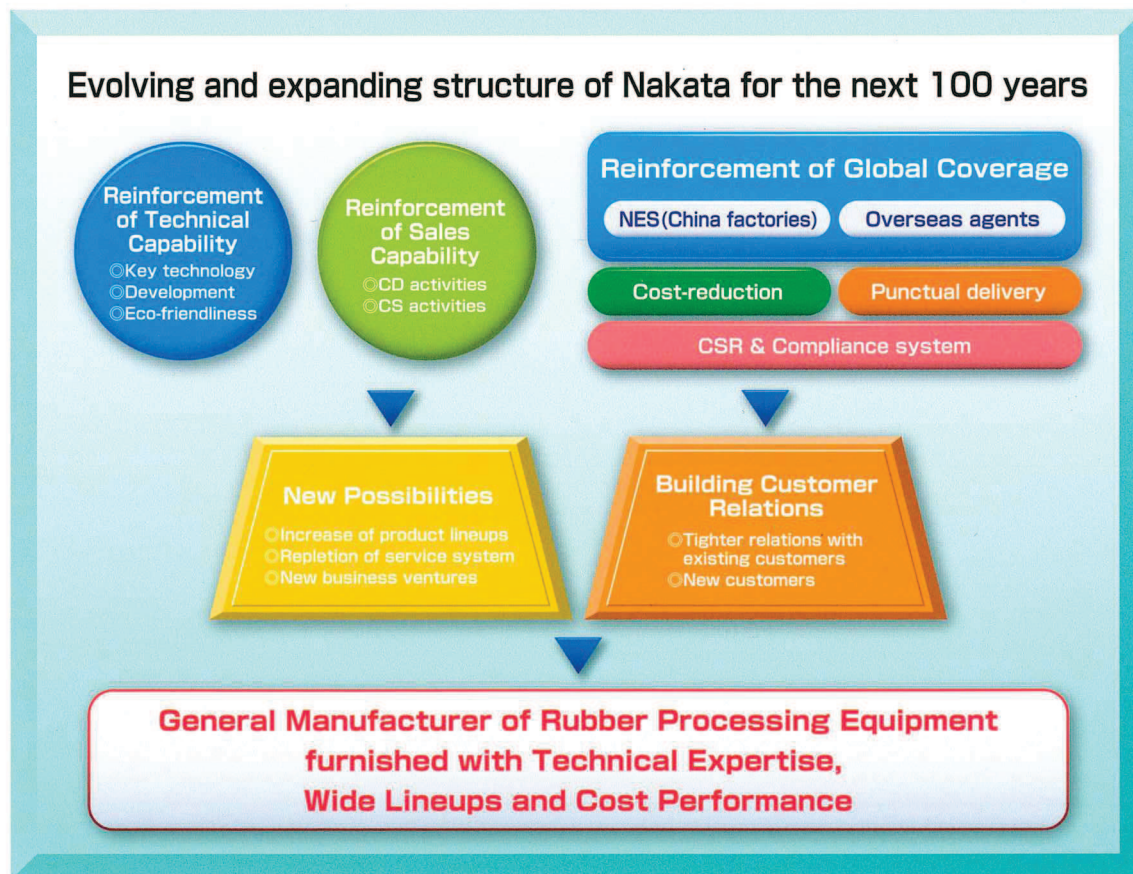
Nakata Engineering Co., Ltd. was established in Kobe, the cradle of the Japanese rubber industry, in 1914, the year World War I began. Since then, we have focused solely on designing and manufacturing specialized production machinery for our customers in the rubber industry. In 2014, Nakata Engineering attained the 100th anniversary. We believe that this monumental moment was made possible thanks to supports and favors of our great customers. We will be pleased to continue helping them achieve greater efficiency, standardization, and quality control of their products.

The 100th anniversary is just one of our milestones. Our eyes oversee the following 100 years. We will keep working out with the customers for a series of numerous technical breakthroughs, and pioneering a future of the rubber technology. We, Nakata Engineering, are committed to make a contribution to society and to people everywhere with a highest spirit of the master at manufacturing.

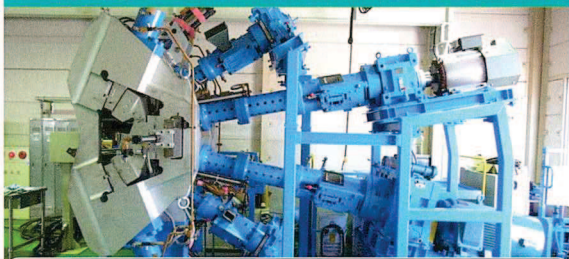


Former company premises (circa 1985)

Nakata rubber technology... always on the cutting edge.



An aggressive approach to R&D makes Nakata a global rubber industry leader.



EFE(Environmentally Friendly Equipment)Project
(Low noise) (Energy saving (low CO² emission))

Taking pride in our status as a leading manufacturer of equipment for the rubber production industry, and taking advantage of the experience we have built up over many years in the business, Nakata Engineering continues aggressively pursuing new avenues in research and development.

Day after day, what we manufacture is "trust."



The value of a manufacturer lies in its ability to make products of superior quality, quickly and at as low a cost as possible. If any of these three - quality, speed and affordability - is missing from the equation, it will be impossible for that manufacturer to earn the trust of its customers. Nakata Engineering emphasizes a seamless link between its manufacturing and quality control divisions, and our employees are hard at work every day, making every effort to streamline operations and reduce material costs of manufacturing.

Quality and technological advancement recognized over the world. Nakata: a global brand.

Countries Nakata exports to

Nakata Engineering products are exported to countries all over the world, and are hard at work at this very moment.
The Nakata network extends beyond Europe and North America to encompass the globe, from Asia to the Middle East, South America to Africa.



Major domestic customers

BANDO CHEMICAL INDUSTRIES, LTD.
BRIDGESTONE CORPORATION
CANON INC.
CANON CHEMICALS INC.
C.I.KASEI CO., LTD.
FUKOKU CO., LTD.
FUJIKURA RUBBER KOGYO CO.
HAYAKAWA RUBBER CO., LTD.
HITACHI CABLE, LTD.
HIROSHIMA KASEI, LTD.
HOKUSEI RUBBER INDUSTRY CO., LTD.
INDAC CORPORATION
IRUMAGAWA RUBBER CO., LTD.
KINUGAWA RUBBER INDUSTRIAL CO., LTD.
KINYOSHA CO., LTD.

KOBE STEEL, LTD.
KOKOKU INTECH CO., LTD.
KURARAY PLASTICS CO., LTD.
MAXELL KUREHA CO., LTD.
MEIJI RUBBER & CHEMICAL CO., LTD.
MIKASA CO.
MITSUBISHI HEAVY INDUSTRIES, LTD.
MITSUBISHI CORPORATION
MITSUBOSHI BELTING LTD.
MOLTEN CORPORATION
MORIYA CORPORATION
NOK CORP
NAIGAI RUBBER INDUSTRY CO., LTD.
NISIKAWA RUBBER CO., LTD.
NICHIAS CORPORATION

NICHIRIN CO., LTD.
NITTA CORPORATION
NITTO KAKO CO., LTD.
NITTO DENKO CORPORATION
NIPPON VALQUA INDUSTRIES, LTD.
NOBUKAWA CO. OILS CORPORATION
OH-JI RUBBER & CHEMICALS CO., LTD.
PACIFIC INDUSTRIAL CO., LTD.
SHOWA-RUBBER CO., LTD.
SHIRAIISHI CALCIUM KAISHA, LTD.
SHJN-ETSU CHEMICAL CO., LTD.
SUMITOMO CHEMICAL CO., LTD.
SUMITOMO RUBBER INDUSTRIES
SUMITOMO ELECTRIC INDUSTRIES, LTD.
SYNZTEC CO., LTD.

TAKECHI CO., LTD.
TIGERS POLYMER CORPORATION
TOKAI RUBBER INDUSTRIES, LTD.
TOHOKU RUBBER CO., LTD.
TOYO TIRE & RUBBER CO., LTD.
TOGAWA RUBBER CO., LTD.
TOYODA GOSHI CO., LTD.
MOONSTAR COMPANY
UCHIYAMA MANUFACTURING CORP
YAMAUCHI CORP
THE YOKOHAMA RUBBER COMPANY, LTD.
YKK ARNC.
(alphabetical order)

Major overseas customers

● ARTA WHEEL TIRE COMPANY
● BRIDGESTONE AMERICAS HOLDING, INC.
● BRIDGESTONE EUROPE S. A.
● CEAT TYRE INDIA LTD.
● CHENG SHIN RUBBER IND. CO., LTD.
● DENA TIRE & RUBBER MFG. CO., LTD.
● FEDERAL CORPORATION
● GOODYEAR DUNLOP TIRES N. A. LTD.
● GOODYEAR DUNLOP TIRES EUROPE BV.
● GRANDTOUR TIRE CO., LTD.
● GUZHOU TYRE CO., LTD.
● HANKOOK TIRE MFG. CO., LTD.
● HUNG A CO., LTD.
● HWA FONG RUBBER IND. CO., LTD.

● IRAN YASA TIRE & RUBBER MFG. CO., LTD.
● KENDA RUBBER INDUSTRIAL CO., LTD.
● KERMAN TIRE & RUBBER COMPLEX
● KIAN TIRE MFG. CO., LTD.
● KUMHO TIRE CO., LTD.
● N. C. R. RUBBER INDUSTRY CO., LTD.
● NANKANG RUBBER TIRE CO., LTD.
● NOKIAN TYRES LTD.
● P.T. INDUSTRI KARET DELI
● BELANGPERDANA TYRE INDUSTRY
● GADJAH TUNGGAL
● SUMI RUBBER INDONESIA
● PONG CODAN RUBBER
● PT. INOUE RUBBER INDONESIA

● PT. SURYARAYA RUBBERINDO INDUSTRIES
● QINDAO RUBBER COMPANY LIMITED
● SHANDONG GUANGRAO ZINGYUAN RUBBER CO., LTD.
● SHANDONG SANGONG RUBBER CO., LTD.
● SHANDONG YONGSHENG RUBBER CO., LTD.
● SIME TYRES INTERNATIONAL (M) SDN. BHD.
● THE GOODYER TIRE & RUBBER COMPANY
● THE WEST CO.
● VEE RUBBER CO., LTD.
● VEYANCE TECHNOLOGIES, INC.
● YAZO RUBBER INDUSTRIES COMPLEX
● YOKOHAMA TIRE CORPORATION

(alphabetical order)



Corporate Profile

Corporate name	: Nakata Engineering Co.,Ltd.	Representative	: Ippei Oda President and Representative Director
Head Office & Factory	: 619 Minami, Kande-cho, Nishi-ku, Kobe 651-2312, Japan Phone: +81-(0)78-965-1015 Fax: +81-(0)78-965-1020	Established	: 1914
		Capital	: ¥10 million
		Employees	: 150
		Factory area	: Approx. 40,000 m ²
Suzhou Nakata Engineering Co., Ltd. :	Gangao Rd.#23, Zhangjiagang Free Trade Zone, Jiangsu, China TEL (0512)58322331	Focus of business	: Design, manufacture and sales of tire manufacturing equipment and equipment related to rubber and synthetic resins
		Banks of account	: Sumitomo Mitsui Banking Corp., Kobe Sales Office Iyo Bank, Kobe Branch

Nakata Engineering Products

- | | |
|--|--|
| 1.Raw rubber cutting machines | 6.Automobile tire production equipment |
| 2.Various types of mixing rolls | 1)Extrusion lines |
| 3.Various types of extruders | 2)High speed tread skivers |
| 1)Hot feed type extruders | 3)Topping calenders |
| 2)Cold feed type extruders (pin type, vent type) | 4)Automatic joint breaker cutter |
| 3)Gear pump extruders | 5)Automatic joint ply cutter |
| 4)Multiplex extruders (duplex, triplex, quadruplex,quintuplex) | 6)Bead winding machines |
| 5)Roller head extruders | 7)Uniformity machines (high & low speed types) |
| 6)Roller die extruders | 8)Bladder presses |
| 4.Various types of extrusion heads | 9)Testing equipment, etc. |
| 5.Various types of calender machines | 7.Tire tube production equipment |
| | 8.Various types of curing presses |

History of Nakata Engineering Co.,Ltd.

- June 1914** Masashi Nakata established Japan's first company to build machinery for the rubber manufacturing industry.
- Oct. 1944** Nakata Zoki Co., Ltd. was established.
- Sept. 1949** After achieving a reputation for excellent products based on a time-honored tradition of craftsmanship, making Nakata a supplier for nearly all domestic rubber companies, the company began exporting overseas, to India, Pakistan, Southeast Asia, East Africa, Australia and New Zealand. For its role in advancing Japan's production machinery exports, Nakata received an award from the Ministry of International Trade and Industry in recognition of our efforts.
- Sept. 1967** To achieve future growth, the company reorganized, with Sumitomo Electric Industries, Ltd. participating in the management.
- June 1969** The company entered into a technical license agreement with Paul Troester Maschinen-Fabriken of Germany concerning cold feed type and vent type extruders, and continuous vulcanization equipment.
- Sept. 1972** The company became an affiliate of Sumitomo Rubber Industries, Ltd. following the transfer of shares from Sumitomo Electric Industries, Ltd.
- June 1981** The technical license agreement with Paul Troester Maschinen-Fabriken was revised to include manufacture and sales of shear head roller-head units and calenders with interchangeable roller-sleeves for roller-heads.
- June 1983** Entered into a patent license agreement with Uniroyal Englebert Reifen GmbH of Germany concerning pin type extruders; also entered a license agreement with Paul Troester Maschinen-Fabriken for production and sales of pin type extruders.
- July 1992** Entered a business partnership with Kobe Machinery Co., Ltd. to enhance future growth.
- Jan. 1995** The main production system was moved to Nishi-ku, Kobe, due to damage resulting from the great Hanshin-Awaji Earthquake.
- Apr. 1996** Kobe Machinery Co., Ltd. was merged into the company and the corporate name was changed to Nakata Engineering Co., Ltd.
- June 2002** ISO9001 (Quality Management System) certification attained
- Sept. 2002** A production & sales agreement for gear pumps & gear extruders was made with Paul Troester of Germany
- Dec. 2004** ISO14001 certification attained
- Sept. 2008** Suzhou Nakata Engineering Co., Ltd. established in China.
- Sept. 2009** Suzhou Nakata Engineering No.2 factory in operation.
- June 2014** The 100th Anniversary.

We at Nakata Engineering are engaged in the design and manufacture of tire manufacturing equipment, and other equipment for production of all types of rubber products.

We will continue striving to maintain and strengthen our status as a solidly reliable, comprehensive supplier of equipment for manufacturing rubber products, meeting each and every customer need, and earning the trust of our business partners by providing, researching and developing products they can depend on.



Products



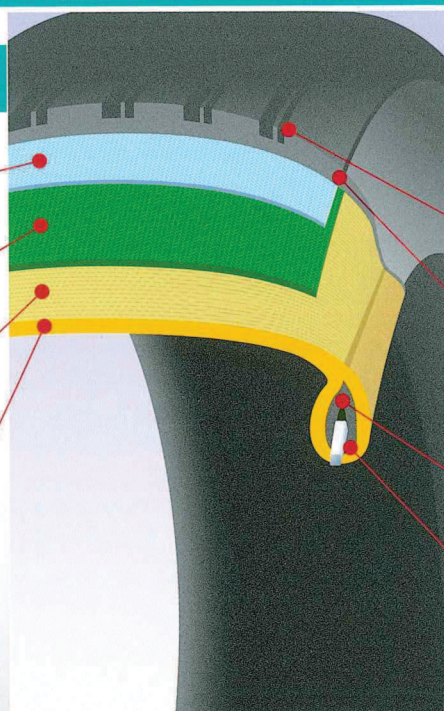
TIRE PRODUCTION EQUIPMENT

● JLB LINE

- BREAKER CUTTER
- AUTO SPICER

- PLY CUTTER
- AUTO SPICER

- GUM CALENDER
- ROLLER HEAD EXTRUDER
- MULTIPLEX ROLLER HEAD EXTRUDER
- MINI CALENDER
- INNER LINER EXTRUSION LINE



- TRIPLEX EXTRUDER
- QUADRUPLER EXTRUDER
- QUINTUPLEX EXTRUDER
- CHIMNEY-FEATURED EXTRUDER
- TREAD EXTRUSION LINE

- DUPLEX EXTRUDER
- TRIPLEX EXTRUDER
- QUADRUPLER EXTRUDER
- SIDEWALL EXTRUSION LINE

- BEAD APEX M/C
- APEX FILLERING M/C
- GP APEXER

- NON-GRIP BEAD WINDING M/C
- SINGLE-WIRE BEAD WINDING M/C
- BEAD WRAPPING M/C

Head Office & Factory

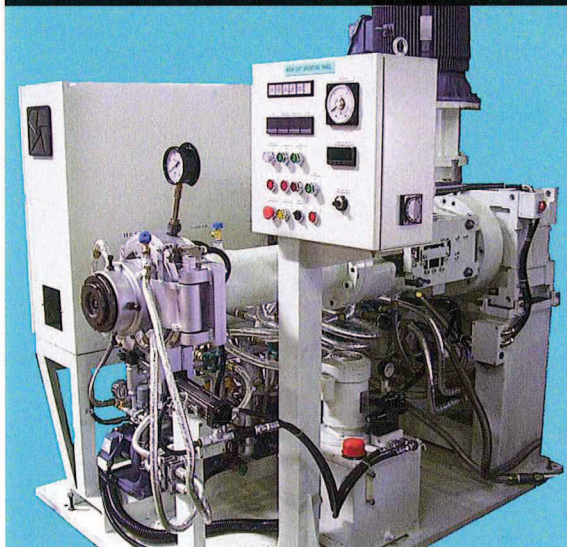


Suzhou Nakata Engineering Co., Ltd.



EXTRUDERS

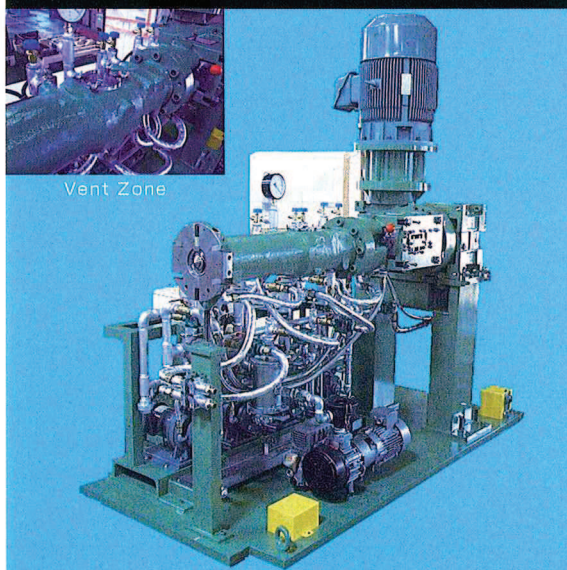
COLD FEED TYPE EXTRUDERS



Cold feed type extruders are constructed with specially designed screws best suited for cold feeding. The primary components of each machine are an extruder unit, a temperature control unit, a drive motor, and a temperature control panel.

1. Ordinary temperature rubber in the form of tapes, pellets or slabs can be fed directly to the extruder, with no preheating in warming mills before the extruder.
2. A range of screws is available for a wide variety of compound and extrusion applications.
3. During the extrusion process, uniform temperature and plasticity is applied to the rubber compound to provide greater uniformity in the shape and size of extruded components.
4. Rubber feed to the extruder can be automatic, reducing the number of operating personnel.
5. An automatic temperature control unit, with a circulating pump, controls cylinder temperature to within ± 1 degree C, so the shape and size of the extruded products are uniform.

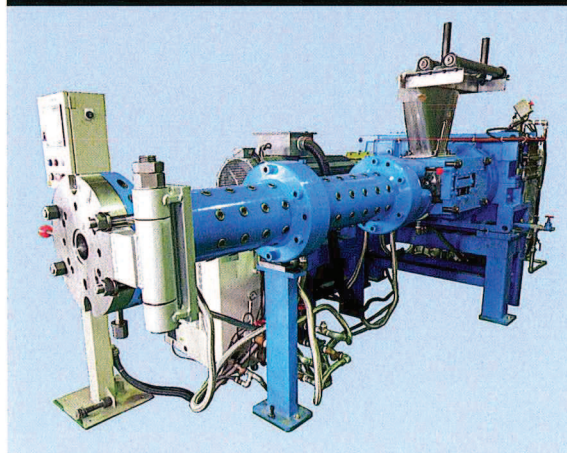
VENT TYPE EXTRUDERS



Single screw vent type extruders have screws of an original and unique design. The primary components of each machine are an extruder unit, a temperature control unit, a drive motor, a temperature control panel, and vacuum pump.

1. Compound can be cold fed to the feed section.
2. A single, specialty geometry screw and vacuum pump completely vent bubbles out of extruded components.
3. Depending on the type of compound, the screw can be replaced quickly when necessary.
4. Because there is minimum of revolving or connecting parts, the costs of upkeep are kept low, and the machine is easy to inspect and maintain.
5. Requires a small floor area.
6. An automatic temperature control unit, with a circulating pump, controls cylinder temperature to within ± 1 degree C, so the shape and size of the extruded products are uniform.

PIN TYPE EXTRUDERS



The pin type extruder incorporates a special design with 60 to 100 pins protruding from the cylinder wall toward the screw's center. These pins enhance the mixing and dispersing of the rubber as it is kneaded between the screw and the cylinder, making the pin type extruder extremely flexible as a universal extruder that is applicable to many rubber compound formulations for diverse applications.

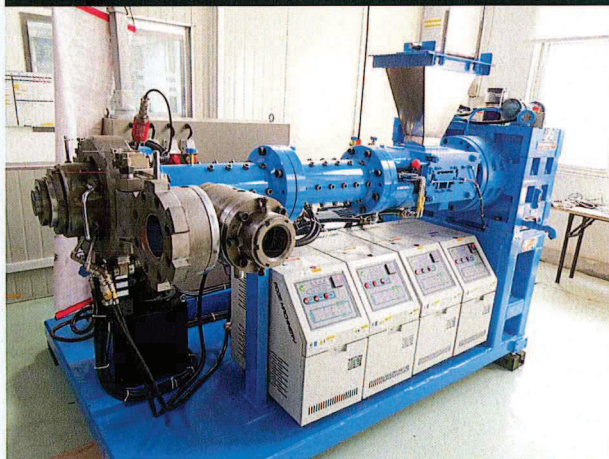
1. Applicable to a wide range of rubber compounds.
2. Pins enhance mixing to provide high uniformity in dispersion and plasticization of material.
3. Output is 20% to 60% higher than a conventional cold feed type extruder of the same size.
4. Rubber can be extruded at relatively low temperatures.
5. The low energy consumption (WH/KG) helps keep costs down, while conserving resources.
6. System is self-cleaning.

FEATURES & BENEFITS OF NAKATA EXTRUDERS

RZ-H EXTRUDER DEVELOPED AT SUZHOU NAKATA

Global procurement made it possible for our China factory to develop a low cost extruder, yet with Nakata technology. (Currently, diameters 90 and 60 mm extruders are in its lineup.) Nakata Engineering will continue to develop machinery meeting customers' budgets and requirements.

PIN TYPE EXTRUDER



RZ-H extruders have a control cabinet and TCUs on its base plate combined together. This feature can realize reduction of timeframe from installation through start-up.

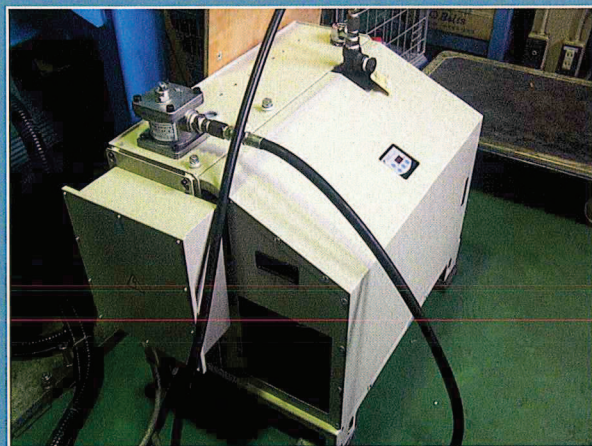


RZ-H extruders are convertible into a vent type or non-pin cold feed type by choice of its cylinder barrels.

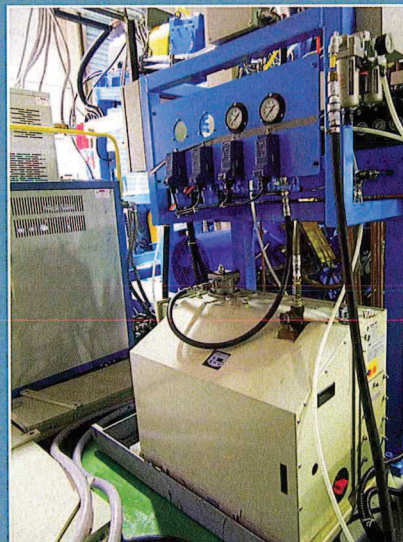
HYBRID HYDRAULIC UNIT

Our EFE (Environmentally Friendly Equipment) project led us to employ a hydraulic unit of "low noise" and "energy saving" type.

Noise can be reduced by 20% approximately to less than 70dB. While the conventional unit has a 1.5kW induction motor, the new unit has a 5kW high efficiency motor. It also has a 60-liter small fluid tank, less than half the conventional one. This is a hydraulic unit superior in many environmental factors.



It is also possible to replace only the tank part to a Hybrid Hydraulic Unit making use of the existing manifold of your hydraulic system.



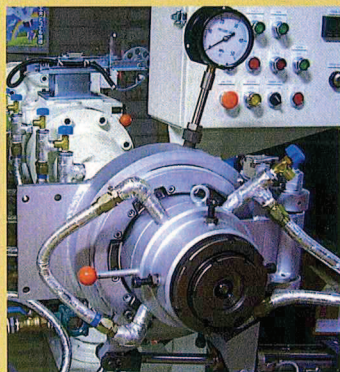
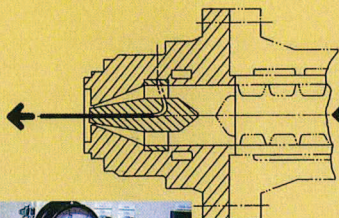
A combination of Hybrid Hydraulic Unit and a manifold unit.

EXTRUDER HEAD TYPES

TESTING AND DEVELOPMENT OF EXTRUDERS

Tube head

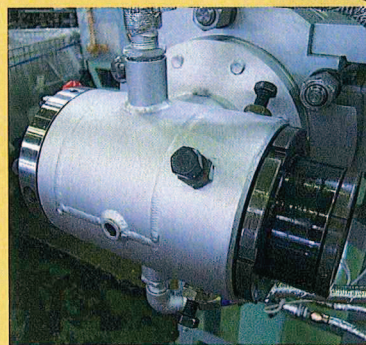
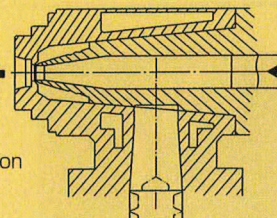
For circular or square hoses
Extrusion



Cross head

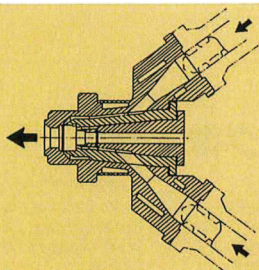
(for duplex extrusion)

For rubber-like rollers
or printers' blankets
Metal insertion extrusion
is possible



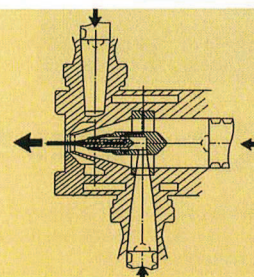
Double head

For double extrusion
Example -
for door seals
for bicycles

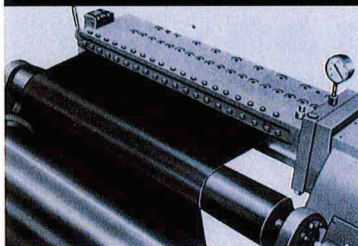


Triple head

For triplex extrusion
For automobiles
For weather strips

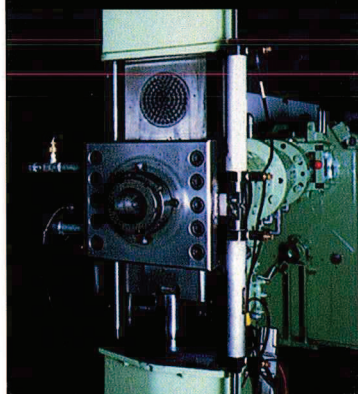


L-TYPE HEAD



This head is designed to extrude at right angles (L-Type) to the extruder screw. It is equipped with devices to adjust the extrusion rate and thickness to deliver the sheet uniformly, at internal head pressures up to 200kg/cm². For head temperature control, it is equipped with a built-in electric heater. Forming range: 1000m x 1 to 5mm.

SCREEN CHANGER



The vacuum screen changer is a device to remove foreign materials that may enter the rubber compounds. It is mounted on the part of the head located at the top of the extruder. The vacuum screen changer consists of a pair of breaker plates divided into upper and lower parts, which can be interchanged quickly and automatically in vacuum condition. The vacuum screen changer is a device essential for efficiently producing continuous extrusions that are not mixed with air.

EXTRUDER INTERFACE TECHNOLOGY

1. Overview

Extremely accurate, high speed cuts (15 cuts per minute, with 21-degree cuts and a width of 200 mm) are made possible by applying a highly reliable AC servomotor and highly accurate ball screw to the shear cutter developed through Nakata Engineering's cutting-edge technology and many years of experience. A newly designed mechanism also realized low noise. Through the use of an AC servomotor and high-accuracy ball screw in the joint apparatus as well, and the inclusion of a double zipper unit, this cutter is capable of high-speed, wide (up to 400mm) steel breaker cuts and joints. In addition to steel breakers, Nakata is also designing and producing auto joint and steel ply cutters, and supplying numerous cutters to the tire industry.



Steel Breaker Cutter with Auto Splicer



2. Double zipper for wide joints



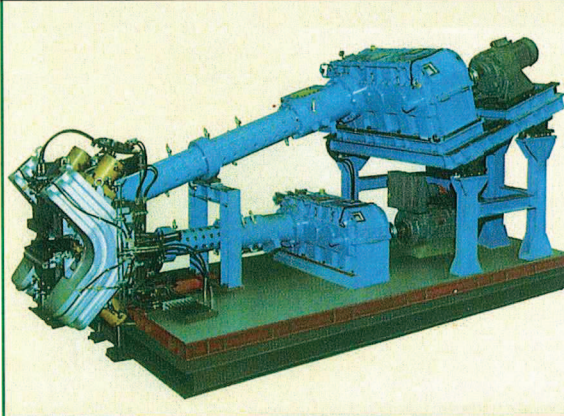
3. Specifications

Main specifications of new steel breaker cutter		Main specifications of conventional model
Cut cycle	Max. 15 cuts/minute (Width 200mm, 21 degrees)	Max 12 cuts/minute
Cut accuracy	±0.5mm	±0.5mm
Cut width	From 90 to 400 mm	From 90 to 320 mm
Cut angle adjustment range	From 21 to 30 degrees	From 21 to 30 degrees
Feeder movement	AC servomotor	AC servomotor
Cutter action	AC motor + clutch · brake	Hydraulic action shear cutter
(Joint apparatus)		
Joint cycle	Max 15 joints/minute (200mm / 21 degrees)	Max 12 joints/minute
Joint apparatus	Double zipper format	Single zipper format
Zipper movement	AC servomotors (2)	Air cylinder
Winder	Wide / narrow - 2 types - reel winder	Narrow reel only
Let off stand	Double let off stand	Double let off stand

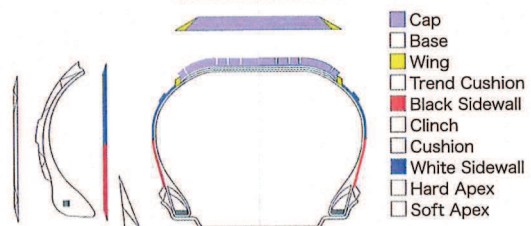
MULTIPLEX EXTRUDERS

Extruders for multi-structure profiles play an extremely important role in improving tire quality. A tire consists of a tread, sidewalls and bead section. The respective components are formed from a number of rubber compounds with properties required for specific aspects of tire performance. With multiplex extruders, the rubber profile components are extrusion molded as a single air-free, multi-layer/compound unit under high pressure. Nakata makes cold feed extruders and pin type extruders up to 300 mm. These machines are arranged in piggyback type of 2, 3, 4 and 5 layers, and in opposed type with 2 and 3 layers. Multi-layer extrusion heads have also been developed and adapted to these units. These have also been incorporated into production lines with good results.

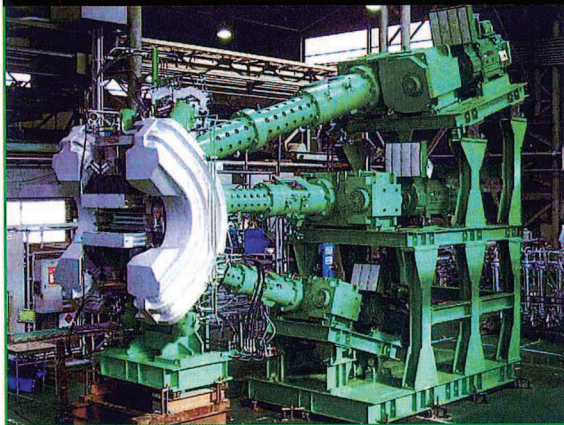
DUPLEX EXTRUDER UNIT



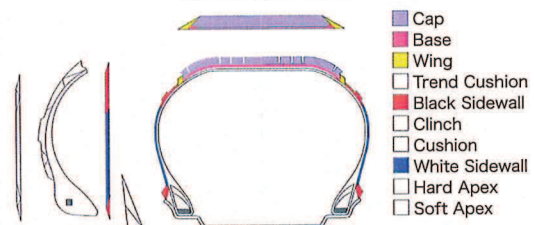
Typical Applications



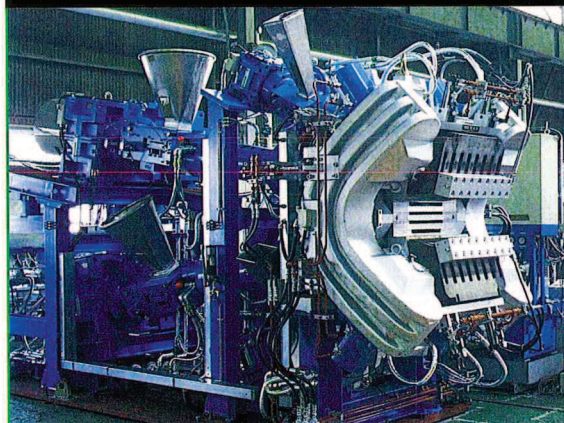
TRIPLEX EXTRUDER UNIT



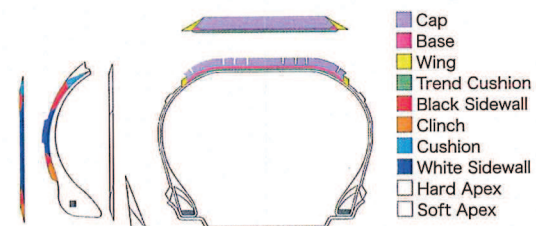
Typical Applications



QUADRUPLUX EXTRUDER UNIT



Typical Applications



EXTRUDER INTERFACE TECHNOLOGY

JLB PRODUCTION SYSTEM



The JLB System produces rubberized jointless bandage tape of Nylon, Rayon, Kevlar, or steel to be used on top of the breakers for high performance tires.

The compact, cost-effective system provides greater flexibility when changing compounds and cord materials compared to full width fabric topping systems.

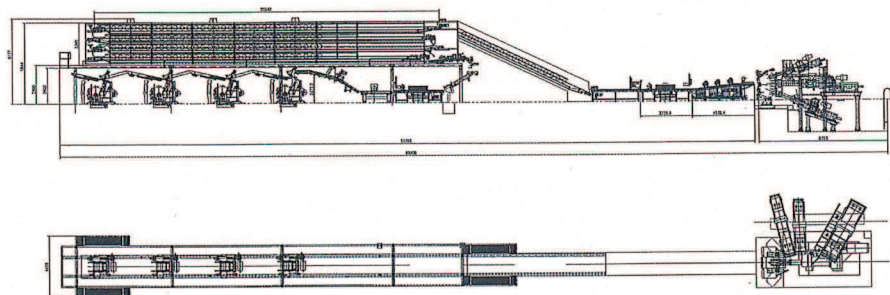
Maximum width is 40 mm, which can be split into four strands, if required, without cutting cords.

Max. line speed is 70 M/min. Suitable for up to 8,000 tires per day.

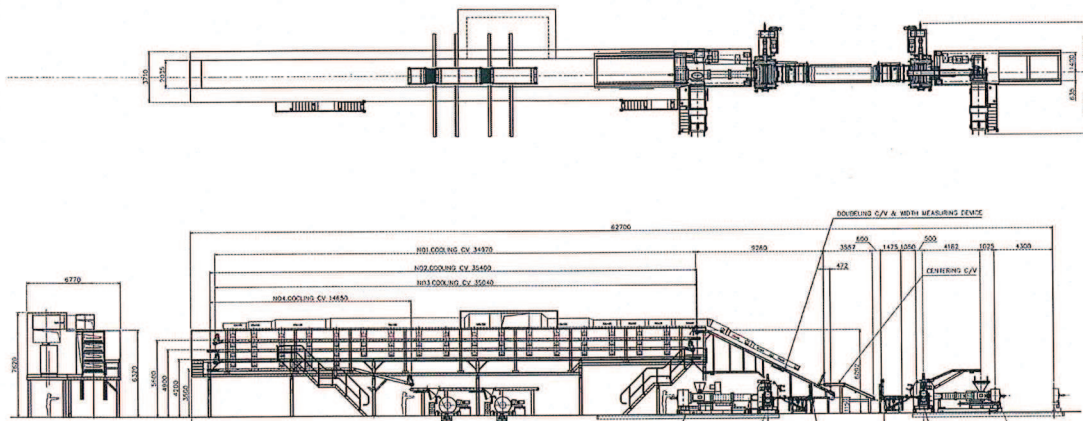
LINE EQUIPMENT

Nakata Engineering supplies whole line equipment including a conveyer system. The schematic drawings below show just a few examples. We offer line system proposals according to customers' numerous requirements.

Tread/Sidewall interchangeable extrusion line



Inner Liner extrusion line



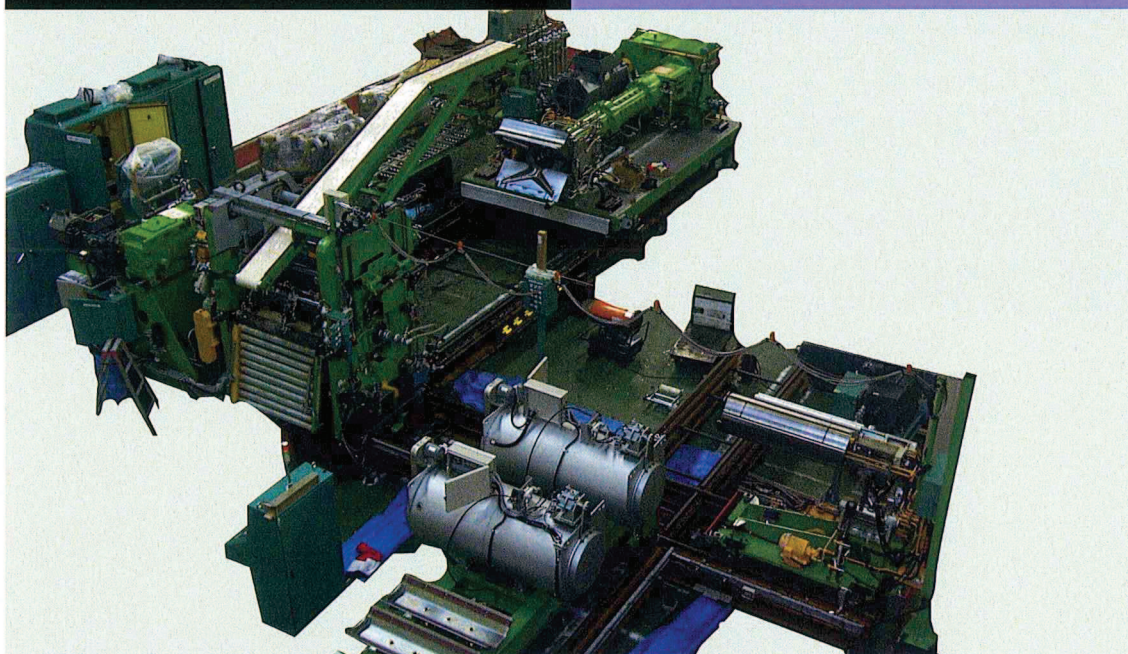
Nakata also supply:

- Tread extrusion line
- Sidewall extrusion line
- Mixing line
- Steel topping system
- Textile topping system
- and etc.

ROLLER HEAD UNITS

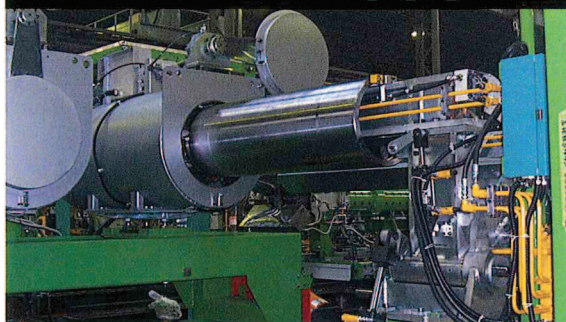
The roller head unit consists of a single or duplex extruder, a die head, and a vertical two-bowl calender with head clamping devices. The broad width head and calender form the rubber compound into a sheet of uniform thickness, which can be varied from 0.5 mm - 20 mm or greater in thickness. Nakata roller head units provide significant benefits over conventional calender systems in the production of inner liners, rubber sheets, V-belts, and elastic components.

AUTOMATIC SLEEVE EXCHANGE ROLLER HEAD UNIT



The sleeve exchange roller head unit is used for profiled inner liner production for passenger, truck, and bus tires. The top roll of the calender incorporates a sleeve, which can carry a profile form. There is an automatic system for storing, preheating and changing the profiled sleeves within three minutes, resulting in high overall productivity and safety. There is an automatic extrusion pressure control system to ensure the accurate thickness of profiled inner liners or profiled sheets in thickness from 0.5mm - 20mm. The unit is ideal for producing air bubble-free profiled inner liner for truck, bus and passenger car tires.

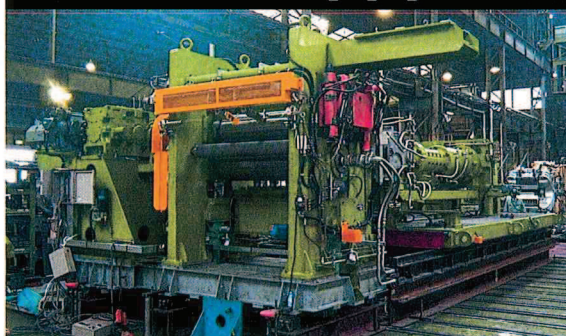
Automatic sleeve exchanging system



A wide variety of exchange mechanisms for different needs and applications

Nakata sleeve exchange roller head units are capable of offering both automatic and manual exchange depending on the customer's operating environment. In the case of automatic exchange, all processes from insertion to and removal of the sleeve from the preheating furnace, to sleeve exchange, can be carried out automatically, resulting in an apparatus that excels in both productivity and safety. Manual exchange employs a specialized C-type hanger, allowing easy attachment and removal of the sleeve.

Manual sleeve exchanging system



Manual sleeve exchange machine part



NAKATA ENGINEERING



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