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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION  
Austria

MARKET STUDY ON ETHYLENE-PROPYLENE DIMONOMER  
IN THE ASEAN REGION

June 1991

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FINAL REPORT

Project No. DP/RAS/85/010  
Contract No. 90/107P

SGV  
CONSULTING  
SYCIP, CORRES, VELAYO & CO



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United Nations Industrial Development Organization  
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Attention: U. Loeser  
Officer-in-charge  
Feasibility Studies Branch

Gentlemen:

Re: Project No. DP/RAS/85/010 Contract No. 90/107P  
Preparation of 3 Market/Opportunity Studies

We are pleased to submit our final report on the Market Study on Ethylene-Propylene Dimonomer (EPDM) in the ASEAN Region. This study was identified by the Committee on Industry, Mineral, and Energy (COIME) with assistance from UNIDO for prospective implementation of a manufacturing project in Malaysia and for possible inclusion in the ASEAN Industrial Joint Venture (AIJV) program.

The study covers both the demand and supply aspects of EPDM in the ASEAN Region, notably Malaysia, Indonesia, the Philippines, Singapore, and Thailand. The market analysis focuses on the following aspects:

- o Size of the market for EPDM including magnitude of imports and exports among countries in the Region (there is presently no manufacturing facility in the Region);
- o Major user industries and indications of growth;
- o Major suppliers and distribution networks of EPDM in each covered country; and
- o Import duties and prevailing market prices of EPDM.

The market data in the report were gathered from primary and secondary sources. Primary data were gathered through interviews with consumers and importers of EPDM. Secondary data were obtained from trade publications, industry associations, and government agencies. We were assisted in the data gathering by our offices in the ASEAN countries.

Very truly yours,

*SGV & Co.*

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION  
Austria

MARKET STUDY ON ETHYLENE-PROPYLENE DIMONOMER  
IN THE ASEAN REGION

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## 1. EXECUTIVE SUMMARY

This regional market study on ethylene-propylene dimonomer (EPDM) was identified by the ASEAN Committee on Industry, Minerals and Energy (COIME) with assistance from UNIDO for prospective implementation of a manufacturing project in Malaysia and for possible inclusion in the ASEAN Industrial Joint Ventures (AIJV) program. As an AIJV project, its products will enjoy a margin of preference of 90 per cent on prevailing tariff to be extended by participating ASEAN countries for a period of four years.

### 1.1 MARKET SIZE AND USER INDUSTRIES

The estimated 1989 ASEAN market for EPDM is 5,970 metric tons as shown below. About half of total consumption was utilized in the manufacture of rubber automotive components.

(in metric tons)

Industry	Malaysia	Indonesia	Philippines	Singapore	Thailand	Total
Automotive	710	1,150	270	---	875	3,005
Electronics and electrical	---	---	---	1,150	535	1,685
Machinery parts	---	---	10	1,140	---	1,150
Rubber shoes	---	50	40	---	---	90
Wires and cables	40	---	---	---	---	40
<b>Total</b>	<b>750</b>	<b>1,200</b>	<b>320</b>	<b>2,290</b>	<b>1,410</b>	<b>5,970</b>

Source: Interviews.

EPDM is a type of synthetic rubber that is specified in the manufacture of selected rubber automotive components because of its high resistance to ozone, heat, weathering and other degradation. It also has the ability to accept high loading of reinforcing agents, fillers and plasticizers. It is the material (100 per cent) used in the manufacture of weatherstrips and rubber seals, radiator hoses and muffler hangers. EPDM is also used as an ingredient (about 20 per cent to 40 per cent by weight) in the manufacture of other rubber automotive components including engine mountings, bumper stops, pedal pads and mud flaps.

The electronics and electrical products industries are the second biggest users of EPDM in the ASEAN Region. Manufacturers in Singapore and Thailand use EPDM in the production of disk drives, hose jacketing for air conditioners, and other electrical appliances.

1.2 SOURCES OF SUPPLY

The requirements for EPDM by the ASEAN countries are met entirely by importations. The major country suppliers include the United States, Japan, France and the Netherlands.

1.3 PROJECTED DEMAND

The demand for EPDM by the ASEAN Region in the next 10 years is projected to grow at an annual average rate of 12 per cent based on the projected expansion rates of the user industries. Total ASEAN market demand by the year 2000 is projected at 20,000 metric tons as shown in the table below.

(in metric tons)						
Year	Malaysia	Indonesia	Philippines	Singapore	Thailand	Total
1989	750	1,200	320	2,290	1,410	5,970
1990	820	1,330	360	2,520	1,620	6,650
1991	900	1,450	420	2,770	1,860	7,400
1992	1,000	1,600	470	3,050	2,140	8,260
1995	1,330	2,130	690	4,060	3,250	11,460
2000	2,140	3,420	1,350	6,530	6,560	20,000
Annual Growth Rate (1989 to 2000):	10%	10%	14%	10%	15%	12%

#### 1.4 DISTRIBUTION CHANNELS AND PRICES

Industry users of EPDM in the ASEAN countries import their requirements directly from foreign EPDM manufacturers or through local traders and distributors.

Prices of commercial EPDM vary with the concentration of its monomers. Generally, EPDM with the highest molecular weight is more expensive than the oil-extended EPDM or those with lower molecular weight. "Off-grade" EPDM which is used in the shoe-manufacture industry, is the cheapest among the commercial EPDMs. Interviews indicate that prices of EPDM, a petrochemical product, change with the fluctuations in the price of petroleum.

Based on data obtained from the Business Statistics Monitor (BSM), a private company that compiles importation manifests, the average price of EPDM in the Philippines increased from US\$830 per metric ton in 1984 to US\$1,150 per metric ton in 1988 as shown in the table below. Data on the historical CIF values of imported EPDM in the other ASEAN countries is not available.

Year	CIF Value (US\$ per metric ton)
1984	830
1985	840
1986	670
1987	760
1988	1,150

Source: Business Statistics Monitor.

The prevailing price of EPDM in the ASEAN market ranges from US\$1,800 to US\$3,200 per metric ton as shown in the next page.

Country	(US Dollars per metric ton)	
	CIF Value	Domestic Price
Malaysia	2,180	2,700 - 3,200
Indonesia	1,540	1,800
Philippines	1,600 - 2,600	2,800 - 3,200
Singapore	2,240 - 2,610	2,500 - 3,000
Thailand	1,800	2,600 - 2,800

Source: Interviews  
Foreign Trade Statistics.

#### 1.5 TARIFF AND DUTIES

Import duties of EPDM in the ASEAN Region range from zero to 50 per cent as shown in the following table.

Country	Import Duty (%)
Malaysia	
EPDM in unvulcanized, uncompounded rubber plates, sheets and strips	30
EPDM in primary form	0
Indonesia	5
Philippines	
EPDM in other forms	30
EPDM in primary form	20
Singapore	0
Thailand	
EPDM in plates, sheets or strips	50
EPDM in primary form	30

## 1.6 RAW MATERIALS

Actual data on raw material utilization in the manufacture of EPDM could not be obtained as there are no local manufacturers and formulators or compounders of EPDM in any of the ASEAN countries. Based on available technical information, the major raw materials for EPDM are:

- o ethylene,
- o propylene,
- o diene monomers including 1,4-hexadiene (HD), dicyclopentadiene (DCPD), and ethylene norbornene (ENB),
- o stabilizers, and,
- o antioxidants including alkylated diphenylamines, alkylated and arylated p-phenylenedi-amines, N-Phenyl-2-naphthylamine, and acetone-diphenylamine condensate.

The composition of EPDM rubbers varies from 60 to 85 mole percent ethylene while their diene contents range from four to five weight percent depending on the individual grades of EPDM rubbers and their producers. EPDM rubbers contain a small concentration of stabilizers and antioxidants.

The use of the diene or third monomer varies with the producers. The most widely used diene monomer for commercial EPDMs however, is the ENB. Interviews indicate that Polysar, Exxon, and DSM (Holland) use this monomer for the manufacture of EPDM. Du Pont uses 1,4-hexadiene (HD) for its third monomer.

The 1990 prices of the abovementioned raw materials for EPDM in the ASEAN Region based on interviews and available trade statistics are as follows:

Raw Material	Prevailing CIF Price (US\$ per metric ton)
Ethylene	660 - 990
Propylene	600
Diene monomer	n.a.
Stabilizer	n.a.
Antioxidant	3,440 - 5,000

n.a. - Not available.

#### 1.6 ASSESSMENT OF MARKET POTENTIAL

The EPDM market in the ASEAN Region can be evaluated on the following key areas: current and potential size of the market, supply considerations, and price orientation.

##### 1.6.1 Projected Market Size

Demand for EPDM in the Region is projected to reach 11,460 metric tons in 1995 and to double to 20,000 metric tons by year 2000.

A substantial portion of demand would come from requirements of the automotive manufacture industry which is envisioned to expand significantly in the Region. Malaysia is in a good position to supply the requirements of its local car manufacturing firm, Proton, which is already manufacturing passenger cars for the domestic and export markets.



#### 1.6.2 Supply Considerations

There is currently no manufacturer of EPDM in the Region. Production of EPDM is planned as a project for the downstream processing of ethylene and propylene which will be produced by planned petrochemical projects in Malaysia.

#### 1.6.3 Price Orientation

A major consideration in penetrating the market is a competitive pricing strategy. The proponents of an EPDM manufacturing project in Malaysia would have an advantage in the domestic market considering that it would incur lower freight costs and would not have to pay tariff. The proponents would also have advantages in selling to the other ASEAN countries since they would have lower freight charges compared with American and European suppliers and would enjoy preferential tariff rates in Indonesia, the Philippines and Thailand (Singapore does not impose import duty on EPDM) as a result of their participation in the AIJV program.

#### 1.6.4 Conclusion

There are favorable factors that make the EPDM market in the ASEAN Region attractive. The automotive manufacture industry which accounts for about half of EPDM usage is envisioned to expand at a fast rate -- the market is not yet saturated and mature, and there are still opportunities for growth. EPDM also has realizable and potential uses in high growth industries including electronics, electrical machinery and appliances, and other machineries.

There is currently no local manufacturer of EPDM in the Region. The EPDM market which is more than 10,000 metric tons could be tapped with the establishment of a 10,000 metric ton per year plant (according to the Malaysian Industrial Development Authority or MIDA, a 10,000 metric ton plant is an economic size plant). If the project is registered under the AIJV program, its products will enjoy preferential tariff to be extended by participating ASEAN countries. The project's ASEAN partners could also help in marketing EPDM in the other ASEAN countries.

## 2. INTRODUCTION

### 2.1 PROJECT BACKGROUND

The study on the market for ethylene-propylene dimonomer (EPDM) was identified by the ASEAN Committee on Industry, Minerals and Energy (COIME) with assistance from UNIDO for prospective implementation of a manufacturing project in Malaysia and for possible inclusion in the ASEAN Industrial Joint Ventures (AIJV) program. As an AIJV project, its products will enjoy a margin of preference of 90 per cent on prevailing tariff to be extended by participating ASEAN countries for a period of four years. Moreover, in some cases, the products will be entitled to exclusivity privileges for three years whereby no additional production capacity is allowed to be established within the ASEAN Region for similar products unless 75 per cent of the production is exported outside the Region.

### 2.2 OBJECTIVE

This market study aims to provide potential AIJV promoters and investors with market information on EPDM to ascertain the market potential of the product in the ASEAN Region.

### 2.3 SCOPE OF THE STUDY

The study covers both the demand and supply aspects of EPDM in the ASEAN Region, notably Malaysia, Indonesia, the Philippines, Singapore and Thailand. The market analysis focuses on the following aspects:

- o Size of the market for EPDM including magnitude of imports and exports among countries in the Region (there is presently no manufacturing facility in the Region);
- o Major user industries and indications of growth;
- o Major suppliers and distribution networks of EPDM in each covered country; and
- o Import duties and prevailing market prices of EPDM.

## 2.4 METHODOLOGY

Primary and secondary sources were used in gathering data for the study. Primary data were obtained through interviews with importers and users of EPDM. Secondary data were obtained using the trade statistics of each ASEAN member country, and other government and industry publications.

## 2.5 PRODUCT DESCRIPTION

Ethylene-propylene dimonomers (EPDMs) are terpolymers which are polymerized from ethylene, propylene and a small percentage of a diene which provides unsaturation in side chains pendant from the saturated "backbone". EPDMs can be vulcanized with peroxides, but the unsaturation also permits conventional sulfur vulcanization. Larger amounts of unsaturation yield generally faster-curing EPDMs, and they can be blended with other rubber to impart resistance to weathering and other degradation.

EPDMs are one of two general types of ethylene-propylene rubber which have grown to the status of general-purpose rubber through their outstanding resistance to oxygen, ozone and heat, coupled with the ability to accept high loading of reinforcing agents, fillers and plasticizers.

The other type of ethylene-propylene rubber is made up of EPMS which have a chemically saturated polymer chain of the polymethylene type. This characteristic accounts for the excellent resistance to degradation of EPMS. Unlike EPDMs which allow conventional sulfur vulcanization, EPMS are completely saturated and require organic peroxides or radiation for vulcanization.

The beneficial properties of ethylene-propylene rubber include the following:

- o resistance to ozone and weathering
- o resistance to heat aging and compression-set
- o chemical resistance
- o low temperature flexibility

- o low specific polymer gravity of 0.86
- o good physical properties in highly filled compounds
- o fast mixing, molding and extrusion characteristics
- o excellent electrical properties (corona resistant, high dielectric strength and low power factor).

Because of their unique physical properties, ethylene-propylene rubber finds a wide variety of applications including the following:

- o electrical insulation, jacketing
- o footwear, sponge, proofed fabrics
- o auto weatherstrip, rubber window seal and gasket, hose, belt
- o automotive molded parts, appliance parts
- o parts requiring outstanding ozone and heat resistance.

### 3. THE MALAYSIAN MARKET

#### 3.1 MARKET SIZE AND USER INDUSTRIES

The usage of EPDM in Malaysia in 1989 is estimated at 750 metric tons. Of the total EPDM consumption, about 95 per cent is used in the manufacture of rubber automotive components. The remaining five per cent is used in the manufacture of wires and cables.

Table 1  
Malaysia  
Estimated EPDM Consumption  
by Major User Industry, 1989

Industry	Volume (metric ton)	Share (per cent)
Automotive	710	95
Wires and cables	40	5
Total	750	100

Source: Interviews.

##### 3.1.1 Automotive Manufacture Industry

The 1989 consumption of EPDM by the local automotive industry is estimated at 710 metric tons. Interviews indicate that EPDM is used mainly in the manufacture of weatherstrips, radiator hoses and muffler hangers. These products contain 100 per cent EPDM.

The estimated usage of EPDM by type of rubber product is shown in the following table.

Table 2  
Malaysia  
Estimated EPDM Usage  
of Rubber Automotive Components Manufacturers  
by Type of Product, 1989

Product Type	Volume (metric ton)	Share (per cent)
Weatherstrips and rubber seals	500	70
Radiator hoses	120	17
Muffler hangers	40	6
Others	50	7
Total	710	100

Source: Interviews.

There are 12 identified producers of rubber automotive components in Malaysia as shown in the following table.

Table 3  
Malaysia  
Identified Local Producers  
of Rubber Automotive Components

Name of Company	Product Type
Fudex Rubber Products (M) Sdn. Bhd.	Radiator hoses
Good Rubber Works Industries Sdn. Bhd.	Radiator hoses Air hoses
Heaveplast (M) Sdn. Bhd.	Automobile gaskets Weatherstrips Wiper blade strips
Kumpulan Jebco (M) Sdn. Bhd.	Bumper stops
Malaysia Auto Products Sdn. Bhd.	Load bearing mountings Bumper stops Pedal pads and seals
Plaat Malaysia Sdn. Bhd.	Mud flaps
Pong Codan Rubber (M) Sdn. Bhd.	Weatherstrips
Tan Kor Seng & Sons Rubber	Bearings Hoses Mats
Titivang Rubber Industries Sdn. Bhd.	Mud flaps
Unika Rubber Products Sdn. Bhd.	Automotive rubber components
United Industries Sdn. Bhd.	Mud flaps Radiator hoses
Wenco Industries	Automotive rubber components

Sources: Trade Index of Malaysia, 1990.  
Importers, Exporters and Manufacturers  
in Malaysia, 1988/89.  
Malaysia Telephone Directory, 1990.



The automotive rubber components are supplied to a total of 13 motor vehicle manufacturers and assemblers in the country. Three companies manufacture passenger cars only, seven manufacture both passenger cars and commercial vehicles including Asian utility vehicles, light commercial vehicles, and trucks and buses, and three manufacture commercial vehicles only.

The biggest car manufacturer in Malaysia is Perusahaan Otomobil Nasional Sdn. Bhd. (Proton) which produces the country's national car, the Proton Saga. Presently, the company has a production capacity of 80,000 cars a year and controls more than 70 per cent of the local passenger cars market.

Proton is 70 per cent-owned by the state enterprise Heavy Industries Corp. of Malaysia (HICOM) and 30 per cent-owned by Mitsubishi Motors Corporation and its mother company, Mitsubishi Corporation.

Proton's closest competitors in the domestic market are Nissan-assembler Tan Chong Motor Holdings and Toyota-assembler UMW Corporation.

The local motor vehicle manufacturers and assemblers are presented in the following table.

Table 4  
Malaysia  
Motor Vehicle Production  
by Manufacturer/Assembler and Brand  
1986 to 1990  
(in units)

Manufacturer/ Assembler	Vehicle Brand	1986	1987	1988	1989	1990*
<b>Passenger Cars:</b>						
Asia Automobile Ltd.	Mazda	1,183	411	165	-	-
	Peugeot	122	64	-	-	-
	<b>Subtotal</b>	<b>1,305</b>	<b>475</b>	<b>165</b>	<b>-</b>	<b>-</b>
Asia Motor Industries Sdn. Bhd.	Mercedes-Benz	169	392	-	-	-
	Ford	1,538	716	524	1,743	3,646
	BMW	-	50	165	853	971
	Mazda	-	-	-	260	1,138
	<b>Subtotal</b>	<b>1,707</b>	<b>1,158</b>	<b>689</b>	<b>2,856</b>	<b>5,755</b>
Assembling Services Bhd.	Toyota	3,993	1,371	3,590	4,634	5,228
	Daihatsu	1,420	766	998	2,044	2,328
	<b>Subtotal</b>	<b>5,413</b>	<b>2,137</b>	<b>4,588</b>	<b>6,678</b>	<b>7,556</b>
Automotive Manufacturer Industries Sdn. Bhd.	Isuzu	280	96	1	24	-
	Citroen	8	-	-	1	215
	<b>Subtotal</b>	<b>288</b>	<b>96</b>	<b>1</b>	<b>25</b>	<b>215</b>
Kilang Pembena Kereta Sdn. Bhd.	Mitsubishi	1	-	-	-	-
Oriental Assembler Sdn. Bhd.	Honda	2,531	1,557	3,473	6,460	7,267
	Mercedes-Benz	-	92	387	750	1,058
	Peugeot	-	109	411	519	271
	<b>Subtotal</b>	<b>2,531</b>	<b>1,758</b>	<b>4,271</b>	<b>7,729</b>	<b>8,596</b>

Manufacturer/ Assembler	Vehicle Brand	1986	1987	1988	1989	1990*
<b>Passenger Cars:</b>						
Perusahaan Otomobil Nasional Sdn. Bhd.	Proton	24,931	24,182	44,732	n.a.	n.a.
Sarawak Motor Industries Sdn. Bhd.	BMW	163	8	-	-	-
Swedish Motor Assemblies Sdn. Bhd.	Volvo	330	392	1,260	1,975	1,855
	Suzuki	-	-	-	20	703
<b>Subtotal</b>		<b>330</b>	<b>392</b>	<b>1,260</b>	<b>1,995</b>	<b>2,558</b>
Tan Chong Motor Assemblies Sdn. Bhd.	Nissan	5,327	3,429	5,579	8,667	7,201
	Subaru	19	57	41	31	31
	Audi	-	-	12	34	97
<b>Subtotal</b>		<b>5,346</b>	<b>3,486</b>	<b>5,632</b>	<b>8,732</b>	<b>7,329</b>
<b>Total - Passenger Cars</b>		<b>42,015</b>	<b>33,692</b>	<b>61,338</b>	<b>28,015</b>	<b>32,009</b>
<b>Commercial Vehicles:</b>						
Asia Automobile Ltd.	Mazda	787	450	136	-	-
Asia Motor Industries Sdn. Bhd.	Ford	2,520	1,635	3,261	7,131	7,869
	Landrover	493	300	248	730	553
	Suzuki	508	71	765	1,864	1,075
<b>Subtotal</b>		<b>3,521</b>	<b>2,006</b>	<b>4,274</b>	<b>9,725</b>	<b>9,497</b>
Assembling Services Bhd.	Toyota	5,605	3,528	5,836	12,982	12,363
	Daihatsu	1,734	1,219	3,005	5,708	7,004
	Hino	-	-	341	668	912
	Kenworth	-	-	-	-	67
<b>Subtotal</b>		<b>7,339</b>	<b>5,447</b>	<b>9,260</b>	<b>19,358</b>	<b>20,346</b>

Manufacturer/ Assembler	Vehicle Brand	1986	1987	1988	1989	1990*
<b>Commercial Vehicles:</b>						
<b>Automotive Manufacturer</b>						
<b>(M) Industries</b>						
Sdn. Bhd.	Isuzu	1,760	1,734	1,716	3,807	4,711
	Tata	96	105	172	564	513
	Mitsubishi	265	284	1,352	2,845	4,473
	Suzuki	80	7	-	-	-
<b>Subtotal</b>		<b>2,202</b>	<b>2,130</b>	<b>3,240</b>	<b>7,216</b>	<b>9,697</b>
<b>Cycle and Carriage</b>						
<b>Bintang Sdn. Bhd.</b>						
	Mercedes-Benz	454	431	637	880	808
	Mazda	-	-	-	860	2,978
<b>Subtotal</b>		<b>454</b>	<b>431</b>	<b>637</b>	<b>1,740</b>	<b>3,786</b>
<b>Kinabalu Motor</b>						
<b>Industries Sdn. Bhd.</b>						
	Isuzu	549	438	662	845	678
	Pacific	-	-	55	11	5
<b>Subtotal</b>		<b>549</b>	<b>438</b>	<b>717</b>	<b>856</b>	<b>683</b>
<b>Oriental Assembler</b>						
<b>Sdn. Bhd.</b>						
	Honda	21	741	1	5	2
<b>Sarawak Motor</b>						
<b>Industries Sdn. Bhd.</b>						
	Hino	559	-	-	-	-
	Toyota	790	92	-	-	-
	Mitsubishi	117	-	-	-	-
	Pacific	9	-	-	-	-
<b>Subtotal</b>		<b>1,475</b>	<b>92</b>	<b>-</b>	<b>-</b>	<b>-</b>

Manufacturer/ Assembler	Vehicle Brand	1986	1987	1988	1989	1990*
<b>Commercial Vehicles:</b>						
Swedish Motor Assemblies Sdn. Bhd.	Volvo	21	20	-	10	39
Tan Chong Motor Assemblies Sdn. Bhd.	Nissan	3,337	3,745	5,218	9,200	10,077
	Subaru	114	69	292	662	1,053
	Volkswagen	1	11	1	-	11
Subtotal		3,452	3,825	5,511	9,862	11,141
Total - Commercial Vehicles		19,821	15,580	23,776	48,772	55,191
TOTAL - Motor Vehicles		61,836	49,272	85,114	76,787	87,200

\* January to September 1990.

Source: Malaysian Industrial Development Authority (MIDA).

### 3.1.2 Wires and Cables Industry

The local wires and cables manufacture industry uses EPDM as a rubber integral insulator and jacket in wires and cables. Based on interviews, Chong Seng, a wire and cable manufacturer in Johore Bahru is currently using EPDM for its cables.

### 3.2 SOURCES OF SUPPLY

The EPDM requirements in Malaysia are totally sourced from importations. Prior to 1988, trade statistics classify EPDM with "other synthetic rubber". Total import volume of EPDM in 1989 was reported to be only 250 metric tons. The lower import volume compared with estimated domestic consumption of 750 metric tons in 1989 may be attributed to understatement in imports and misclassification of EPDM into "other synthetic rubber".

Malaysia's major country suppliers include the Netherlands and the United States.

Table 5  
Malaysia  
Importation of EPDM by Country of Origin  
1988 to 1990  
(metric ton)

Country	1988	1989	1990*
Netherlands	-	74	1
United States	29	55	67
Belgium	2	40	4
Japan	-	29	47
Taiwan	2	20	76
France	-	16	15
Switzerland	8	7	-
Others	6	5	14
Total	47	246	224

\* - January to July 1990.

Source: Malaysian Export Trade Center (MEXPO).

Interviews indicate that EPDM in Malaysia is largely supplied by Behn Meyer which accounts for about 80 per cent of total EPDM supply in the country. Behn Meyer supplies the Polysar brand of EPDM. Other suppliers of EPDM in Malaysia includes Du Pont, which supplies about 10 per cent of the country's EPDM requirements, and Exxon and Sumitomo which account for the remaining 10 per cent.

### 3.3 PROJECTED DEMAND

The demand for EPDM is estimated to reach 800 metric tons in 1990 and projected to increase to 2,100 metric tons by year 2000. The projections are based on a 10 per cent annual expansion rate by the automotive industry and a five per cent annual growth rate in the wires and cables manufacture industry.

Table 6  
Malaysia  
Projected Demand for EPDM, 1990 to 2000  
(metric ton)

Year	Automotive	Others	Total
1989	710	40	750
1990	780	42	822
1991	860	44	904
1992	950	46	996
1995	1,280	53	1,333
2000	2,070	70	2,140
Annual Growth Rate (1989 to 2000):	10%	5%	10%

#### 3.4 DISTRIBUTION CHANNELS AND PRICES

Local users of EPDM in Malaysia procure their requirements from foreign manufacturers at an average CIF value of US\$2,180 per metric ton in 1989. Locally, EPDM can be procured from traders and distributors at prices ranging from US\$2,700 to US\$3,200 per metric ton.

#### 3.5 TARIFF AND DUTIES

According to Malaysian Export Trade Center (MEXPO), import of EPDM in unvulcanized, un compounded, rubber plates, sheets and strips forms is subject to a 30 per cent import duty. On the other hand, no import duty is levied on imports of EPDM in primary form.

#### 4. THE INDONESIAN MARKET

##### 4.1 MARKET SIZE AND USER INDUSTRIES

The 1989 usage of EPDM in Indonesia is estimated at 1,200 metric tons. The major user is the automotive manufacture industry which accounted for 96 per cent of total usage (see Table 7).

Table 7  
Indonesia  
Estimated EPDM Consumption  
by Major User Industry, 1989

Industry	Volume (metric ton)	Share (per cent)
Automotive	1,150	96
Rubber shoes	50	4
Total	1,200	100

Source: Interviews.

##### 4.1.1 Automotive Manufacture Industry

About 1,150 metric tons of EPDM was consumed by manufacturers of rubber automotive components. As shown in Table 8, the major products which use EPDM are weatherstrips and rubber seals, radiator hoses and muffler hangers. These products are 100 per cent EPDM rubber. In other automotive rubber products, EPDM is blended to increase resistance to ozone, heat and weathering.



Table 8  
Indonesia  
Estimated EPDM Usage  
of Rubber Automotive Components Manufacturers  
by Type of Product, 1989

Product Type	Volume (metric tons)	Share (per cent)
Weatherstrips and rubber seals	800	70
Radiator hoses	180	15
Muffler hangers	60	5
Others	110	10
Total	1,150	100

Source: Interviews.

The identified major manufacturer of automotive rubber products is Inoue Rubber Corporation (IRC). The company currently produces all types of rubber automotive components except load bearing mountings and windshield wiper blades.

Motor vehicle sales determine the usage of EPDM by the automotive rubber components manufacturers. In 1989, the estimated motor vehicle sales in Indonesia is 399,800 units. More than three-fourths of this is accounted for by sales of light commercial vehicles as shown in Table 9.

Table 9  
Indonesia  
Motor Vehicle Sales  
by Type of Vehicle, 1989\*

Type of Vehicle	Units
Passenger cars	25,476
Light commercial vehicles	306,414
Trucks and buses	67,908
<b>Total</b>	<b>399,798</b>

\* Annualized based on January to April 1989 actual figures.

Source: Swasembada, July 1989.

The major motor vehicle manufacturers and assemblers in Indonesia are listed in the following table.

Table 10  
Indonesia  
Profile of Major Motor Vehicle Manufacturers and Assemblers

Company	Brand of Vehicle Manufactured
Prospect Motor Pt.	Honda
National Astra Motor Pt.	Daihatsu
	Toyota
Indo Mobil Utama Pt.	Suzuki
National Motor Pt.	Mazda
Toyota Astra Motor Pt.	Toyota
Star Motors Indonesia Pt.	Mercedes Benz
IRMC Pt.	Ford
Alun Pt.	Citroen
Krama Yudha Tiga Berlian Motor Pt.	Mitsubishi
Tjahja Sakti Motor Pt.	BMW

Company	Brand of Vehicle Manufactured
<hr/>	
Passenger Cars	
<hr/>	
Multi France Pt.	Renault
Wahana Wirawan Pt.	Peugeot
Indauda Pt.	Nissan Datsun
Central Sole Agency Pt.	Holden
Garmak Motor Pt.	Volvo
	Opel
Commercial Vehicles	
<hr/>	
National Astra Motor Pt.	Daihatsu
Toyota Astra Motor Pt.	Toyota
Indo Mobil Utama Pt.	Suzuki
Krama Yudha Tbm. Pt.	Mitsubishi
Pantja Motor Pt.	Isuzu
Alun Pt.	Citroen
Indauda Pt.	Holden
Garmak Motor Pt.	Chevrolet
Star Motors Ind. Pt.	Mercedes Benz
National Motor Pt.	Hino
United Imer Motor Pt.	Nissan Diesel
Central S.A. Pt.	Volvo
Djakarta Motor Pt.	AMC
Java Motor Pt.	Landrover
United Tractors Pt.	Nissan
Lima Satria Nirwana Pt.	Mercedes Benz

Source: Department of Industry.

#### 4.1.2 Rubber Shoe Manufacture Industry

The rubber shoe manufacture industry consumed about 50 metric tons of EPDM in 1989.

EPDM is used as midsole for ethylene vinyl acetate (EVA) rubber soles because of its flexibility and shock absorbency.

#### 4.2 SOURCES OF SUPPLY

EPDM requirements in Indonesia are met by importations. Japan is the major country supplier of EPDM in 1989, accounting for almost 80 per cent of the country's total importation (see Table 11).

Table 11  
Indonesia  
Importation of EPDM by Country of Origin, 1989

Country	Volume (metric ton)	CIF Value (US\$000)
Japan	930	1,360
United States	150	290
The Netherlands	60	120
Others	60	80
Total	1,200	1,850

Source: Foreign Trade Statistics of Indonesia.

#### 4.3 PROJECTED DEMAND

The demand for EPDM in 1990 is estimated at 1,330 metric tons and is projected to increase to 2,130 metric tons by the year 1995. Demand for EPDM by the local user industries is expected to reach a level of 3,420 metric tons by the year 2000.

Interviews indicate that demand for EPDM by the automotive industry for the period 1990 to 2000 will grow at an annual average rate of 10 per cent. EPDM requirements for rubber soles is also projected to grow by 10 per cent per year.

Table 12  
Indonesia  
Projected Demand for EPDM  
1990 to 2000  
(metric ton)

Year	Automotive	Rubber Shoes	Total
1989	1,150	50	1,200
1990	1,270	60	1,330
1991	1,390	60	1,450
1992	1,530	70	1,600
1995	2,040	90	2,130
2000	3,280	140	3,420

Annual Growth Rate  
(1989 to 2000):            10%                            10%                            10%

#### 4.4 DISTRIBUTION CHANNELS AND PRICES

Interviews indicate that industry users source their requirements for EPDM either through domestic suppliers/trading firms or from foreign manufacturers of EPDM.

The price of EPDM in 1989 in the local market was about US\$1,800 per metric ton.

#### 4.5 TARIFF AND DUTIES

Based on the current Customs Code of Indonesia, imported EPDM is subject to five per cent tariff duty and 10 per cent ad-valorem tax.

5. THE PHILIPPINE MARKET

5.1 MARKET SIZE AND USER INDUSTRIES

The estimated 1989 consumption of EPDM in the Philippines is about 320 metric tons. About 84 per cent of total consumption was used by the automotive manufacture industry as shown in the table below.

Table 13  
Philippines  
Estimated EPDM Consumption  
by Major User Industry, 1989

Industry	Volume (metric ton)	Share (per cent)
Automotive	270	84
Rubber shoes	40	13
Machinery parts	10	3
Total	320	100

Source: Interviews.

5.1.1 Automotive Manufacture Industry

The rubber automotive components manufacturers consumed an estimated 270 metric tons of EPDM in 1989. As shown in the following table, about 70 per cent is accounted for by weatherstrips and rubber seals.

Table 14  
Philippines  
Estimated EPDM Usage  
of Rubber Automotive Components Manufacturers  
by Type of Product, 1989

Product Type	Volume (metric ton)	Share (per cent)
Weatherstrips and rubber seals	190	70
Radiator hoses	40	15
Muffler hangers	10	4
Others	30	11
Total	270	100

Source: Interviews.

The major automotive rubber products that use EPDM are weatherstrips and rubber seals, radiator hoses and muffler hangers. Manufacturers claim that they use 100 per cent EPDM in these products. In other products such as bumper stops and load bearing mountings, manufacturers use EPDM to the extent of 20 per cent to 40 per cent of the weight of the products.

There are four identified major manufacturers of rubber automotive components in the country as presented in Table 15. According to interviews, Transworld Rubber is the biggest manufacturer. It accounts for about 80 per cent of locally manufactured rubber products supplied to automotive manufacturers and assemblers. Transworld Rubber's major buyers include Toyota Motor Philippines Corp., Pilipinas Nissan, Inc. and the Philippine Automotive Manufacturing Corporation (PAMCOR).

Table 15  
Philippines  
Major Manufacturers of Rubber Automotive Components

Company	Product	Annual Capacity (in pieces)
Transworld Rubber Industrial Mfg. Corp.	Weatherstrips	720,000
	Radiator and other industrial hoses	240,000
	Muffler hangers	600,000
Crislin Rubber Products	Mud flaps	4,800
	Load bearing mountings	n.a.
	Bumper stops	n.a.
	Pedal pads and seals	n.a.
Cavalier Marketing & Rubber Manufacturing	Weatherstrips	46,800
	Windshield wiper blades	9,360
	Mud flaps	9,360
	Bumper stops	9,360
	Grommets	124,800
	Pedal pads and seals	31,200
Magna Rubber Manufacturing Corporation	Pedal pads and seals	168,480
	Mud flaps	n.a.
	Bumper stops	n.a.

n.a. - Not available.

Source: Interviews.

Transworld consumed about 200 metric tons of EPDM in 1989. Other rubber automotive component manufacturers including Magna Rubber Manufacturing Corporation and Crislin Rubber Products have a combined consumption of EPDM of 70 metric tons.



Motor vehicle production determines the demand for EPDM by the automotive rubber components manufacturers. During the last three years, production of motor vehicles has significantly increased from 8,286 units in 1987 to 47,152 units in 1989 (see Table 16).

Table 16  
Philippines  
Motor Vehicle Production by Type of Vehicle  
1987 to 1989

Type of Vehicle	1987	1988	1989
Passenger cars	5,543*	11,038*	28,210*
Asian utility vehicles (AUVs)	1,957	415	2,909
Light commercial vehicles (LCVs)	207	6,875	13,297
Trucks and buses	579	1,484	2,736
Total	8,286	19,812	47,152

\* - Based on sales.

Source: Truck Manufacturers Association (TMA).  
Businessworld.

Total production of motor vehicles is expected to increase further starting 1991 with the launching of the government-sponsored Car Development Program (CDP) in the country. The CDP involves the development of a "People's Car" project that would address market issues like affordability and availability of supply. Two measures have been adopted by the program - the production of lower-end or cheaper cars and the liberalization of used-car importation.

The program provides for a more relaxed set of rules for members such as deferred compliance to the 51 per cent local content requirement, the lower ratio of automotive-related exports to non-automotive exports and the use of semi-knocked down units (SKDs) or the half completed cars during the initial years of operations.

Among the 13 applicants to the project, only four car manufacturing companies were given approval to produce the People's Car while the application of two more car manufacturing companies are still under review.

The companies included in the People's Car project are listed in the following table.

Table 17  
Philippines  
Manufacturers of People's Car

Company	Brand	Model
Pilipinas Nissan, Inc.	Nissan	Nissan March
Toyota Motor Phils.	Toyota	Toyota GL
Columbian Motors Corp.	Kia Pride	Kia Pride
PAMCOR	Mitsubishi	Mitsubishi Colt
Italcar *	Fiat	Fiat Uno
Honda Motors *	Honda	Honda Civic

\* Application still under review.

n.a. - Not available.

Source: Newspaper Articles.

There are 13 major motor vehicle manufacturers and assemblers in the country. Three companies produce both passenger cars and commercial vehicles while ten companies produce commercial vehicles only. Table 18 provides a profile of the major motor vehicle manufacturers in the country.

The country's major car assemblers and manufacturers include Toyota Motor Phils., Pilipinas Nissan and PAMCOR. In 1989, PAMCOR accounted for 10,649 cars or 38 per cent of domestic sales of passenger cars while Nissan and Toyota accounted for 33 per cent and 29 per cent, respectively.

Table 18  
Philippines  
Profile of Major Motor Vehicle Manufacturers and Assemblers

Company	Annual Capacity (units)	Brand of Vehicle Manufactured	Type of Vehicle	Major Stockholders
<u>Passenger Cars:</u>				
PAMCOR	24,000 *	Mitsubishi	Passenger cars AUVs, LCVs	Mitsubishi Corp. & Nissho Iwai Corp. - 51%
Philippine Nissan, Inc.	21,600 *	Nissan	Trucks and buses Passenger cars	Auto Equities of the Philippines - 70% Nissan Motor Co. - 15% Marubeni Co. (Japan) - 15%
Toyota Motor Phils, Corp.	34,200 *	Toyota	Passenger cars	Metropolitan Bank and Trust Co. - 60% Toyota Motor Corp. - 25% Mitsui & Co., Ltd. - 15%
<u>Commercial Vehicles</u>				
Francisco Motors Corp.	n.a.	Anfra Mazda	AUVs Trucks	Francisco Motors Corp. - 100%
Isuzu Motors	2,400	Isuzu	Trucks	Isuzu Motors Ltd. (Japan) - 100%
Universal Motors Corp.	3,600	Nissan	AUVs, LCVs Trucks	n.a.
Alpha Trine Motors	n.a.	Dragon	AUVs	n.a.
Columbian Motors Corp.	n.a.	Daihatsu	LCVs	n.a.
Philippine Hino Inc.	n.a.	Samurai Hino	LCVs Trucks and buses	n.a.
Commercial Motors Corp.	n.a.	Mercedes-Benz	Trucks	n.a.
Masterbuilt	n.a.	n.a.	n.a.	n.a.
Signet Motor Corp.	n.a.	n.a.	n.a.	n.a.
IGRI Industries	n.a.	n.a.	n.a.	n.a.

\* Production capacity for passenger cars only.

AUVs - Asian Utility Vehicles.  
LCVs - Light Commercial Vehicles.  
n.a. - Not available.

Sources: Truck Manufacturers Association (TMA).  
Board of Investments.

5.1.2 Rubber Shoe Manufacture Industry

The rubber shoe manufacture industry used about 40 metric tons of EPDM in 1989. EPDM is used as midsole in the production of rubber soles made from ethylene vinyl acetate (EVA).

Rubberworld Philippines, Inc., the largest manufacturer of rubber shoes in the country, produces about 22.5 million pairs of rubber shoes each year. Of the total, 20 per cent or 4.5 million pairs are with EVA-compatible midsoles. According to interviews, the company used 11 metric tons of EPDM in 1989. Rubberworld carries different brand names including Adidas, Grosby and Mighty Kid.

Expo Rubber Philippines has the biggest EPDM consumption of 20 metric tons. It supplies rubber soles to rubber shoe manufacturers.

Filcon manufactures the Converse line of rubber shoes. In 1989, its total usage of EPDM is estimated at five metric tons.

Texaco Vinyl Products Corporation carries a wide range of footwear including rubber shoes, rubber slippers, and rubber sandals. It imported about five metric tons of EPDM in 1989.

Table 19  
Philippines  
Estimated Consumption of EPDM  
by the Rubber Shoe Manufacture Industry, 1989

Manufacturer	Volume (metric tons)	Share (per cent)
Expo Rubber Philippines	20	50
Rubberworld Philippines, Inc.	10	25
Filcon	5	13
Texaco Vinyl Products Corp.	5	12
Total	40	100

Source: Interviews.

### 5.1.3 Machinery Parts Manufacture Industry

The machinery parts manufacture industry used about 10 metric tons of EPDM in 1989. EPDM is used in the manufacture of rubber parts for machinery and equipment such as rubber rollers for steel, rice, textile and paper mills.

## 5.2 SOURCES OF SUPPLY

The requirements for EPDM in the Philippines are totally satisfied by importations. Major country sources include Japan, the United States, Switzerland, the Netherlands and Hong Kong.

The major brands of EPDM used in the Philippines include the Esprin, Keltan and Royalene brands. Magna Rubber and Rubberworld purchase the Keltan and Royalene brands, respectively, from local traders and indentors. Transworld Rubber uses the three brands of EPDM which it imports directly from their respective country sources (see Table 20.)

Table 20  
Philippines  
Major Brands of EPDM Used by User Industries

Brand Name	Manufacturer (Country)	User Company
Esprin	Sumitomo Corporation (Japan)	Transworld Rubber
Keltan	DSM (Netherlands)	Transworld Rubber Magna Rubber
Royalene	Uniroyal Chemical (United States)	Transworld Rubber Rubberworld

Source: Interviews.

### 5.3 PROJECTED DEMAND

The domestic demand for EPDM is estimated at 320 metric tons in 1990 and is expected to increase to 1,350 metric tons by the year 2000. These projections are based on the expected growth rates of the user industries in the next decade.

The automotive manufacture industry is expected to expand at an average rate of 15 per cent based on indications from the Philippine Automotive Manufacturing Institute. On the other hand, growth of the rubber shoe manufacture industry and other user industries is expected at an average rate of five per cent per year.

Table 21  
Philippines  
Projected Demand for EPDM, 1990 to 2000  
(metric ton)

Year	Automotive	Rubber Shoes and Others	Total
1989	270	50	320
1990	310	50	360
1991	360	60	420
1992	410	60	470
1995	620	70	690
2000	1,260	90	1,350
Annual Growth Rate (1989 to 2000):	15%	5% *	14%

\* Rate may be higher than 5 per cent due to rounding up.

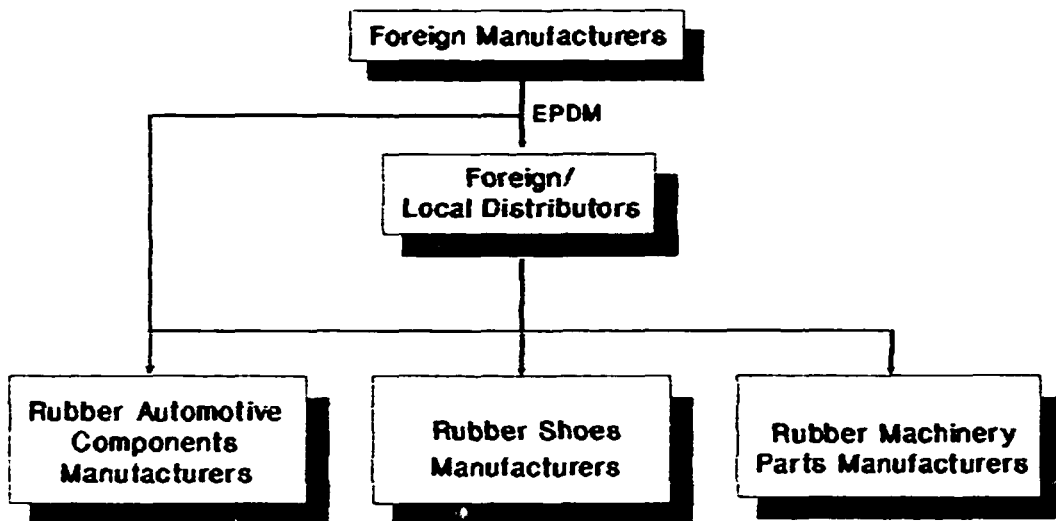
#### 5.4 DISTRIBUTION CHANNELS AND PRICES

Some major domestic users of EPDM procure their requirements directly from foreign manufacturers or foreign distributors. On the other hand, companies with smaller requirements for EPDM buy their requirements from local importers or indentors (see Figure 1).

The major domestic users who directly import EPDM purchase the product at a price ranging from US\$1,600 to US\$2,600 per metric ton. The companies with relatively small requirements for EPDM purchase the product from local importers and indentors at a price ranging from US\$2,800 to US\$3,200 per metric ton.



**Figure 1**  
**Philippines**  
**Channels of Distribution of EPDM**



Source: Interviews.

### 5.5 TARIFF AND DUTIES

Under the current Tariff and Customs Code of the Philippines, the importation of EPDM in primary form, classified under HS-4002.70-10 is subject to customs duty of 20 per cent. The importation of EPDM in other forms, under HS-4002.70-90, is levied with a 30 per cent customs duty. However, Executive Order No. 413 will effectively reduce the tariff rate of raw materials by 10 per cent. Although the implementation of EO No. 413 has been specified on September 1, 1990, this has been indefinitely suspended pending its review by Congress.

Aside from the tariff rate, a value-added tax of 10 per cent is also levied on the importation.

## 6. THE SINGAPORE MARKET

### 6.1 MARKET SIZE AND USER INDUSTRIES

The apparent domestic consumption of EPDM in Singapore is estimated at 2,290 metric tons in 1989. Singapore's 1989 importation totalled to 2,420 metric tons valued at US\$7.0 million. Of this, 130 metric tons was re-exported to other ASEAN countries.

The major users of EPDM in Singapore are rubber components manufacturers for machinery parts, and electrical and electronic products.

Hercules Rubber and Chemical Industries, and HLN Rubber Products Pte. Ltd. are two rubber components manufacturers which indicated that they use EPDM in the manufacture of their products. They reported a combined 1989 consumption of less than 50 metric tons of EPDM.

EPDM also finds application in the production of disk drives. Armstrong Industries (Pte) Ltd., a firm engaged in disk drive production, consumed about three metric tons of EPDM in 1989.

### 6.2 SOURCES OF SUPPLY

#### 6.2.1 Imports

There is no local manufacturer of EPDM in Singapore. The EPDM requirements in the country are sourced mainly from the United States and France. Together, these two countries accounted for 96 per cent of Singapore's total 1989 importation volume of EPDM (see Table 22).

Table 22  
Singapore  
Importation of EPDM by Country of Origin, 1989

Country	Volume (metric ton)	CIF Value (US\$000)
United States	1,170	4,390
France	1,160	2,190
Others	90	440
<b>Total</b>	<b>2,420</b>	<b>7,020</b>

Source: Foreign Trade Statistics of Singapore.

#### 6.2.2 Re-exports

Singapore re-exported about 130 metric tons of EPDM in 1989. As shown in Table 23, the largest country markets were Malaysia and the Philippines.

Table 23  
Singapore  
Exportation of EPDM by Country of Destination, 1989

Country	Volume (metric ton)	CIF Value (US\$000)
Malaysia	50	180
Philippines	40	140
OC Asia	30	120
Others	10	30
<b>Total</b>	<b>130</b>	<b>470</b>

Note: OC Asia - Other countries of Asia.

Source: Foreign Trade Statistics of Singapore.

### 6.3 PROJECTED DEMAND

The country's requirements for EPDM is projected to grow at an average annual rate of 10 per cent based on the rate of expansion of user industries particularly electrical and electronics. Demand for EPDM by 1995 is projected at 4,060 metric tons. By the year 2000, it is expected to reach 6,530 metric tons.

Table 24  
Singapore  
Projected Demand for EPDM  
1990 to 2000

Year	Volume (metric ton)
1989	2,290
1990	2,520
1991	2,770
1992	3,050
1995	4,060
2000	6,530

Annual Growth  
Rate (1989 to 2000): 10 %

### 6.4 DISTRIBUTION CHANNELS AND PRICES

Imported EPDM is distributed through traders or distributors. The average CIF price of EPDM in 1989 ranged from US\$2,240 to US\$2,610 per metric ton. Local users of EPDM in Singapore procured their requirements from local traders and distributors at prices ranging from US\$2,500 to US\$3,000 per metric ton.

### 6.5 TARIFF AND DUTIES

Based on the Singapore Trade Classification and Customs Duties, there is no tariff imposed on imported EPDM.

7. THE THAILAND MARKET

7.1 MARKET SIZE AND USER INDUSTRIES

The 1989 consumption of EPDM in Thailand is estimated at 1,410 metric tons. Identified major users are the automotive manufacture industry and the electronics and electrical industry.

Table 25  
Thailand  
Estimated EPDM Consumption  
by Major User Industry, 1989

Industry	Volume (metric ton)	Share (per cent)
Automotive	875	62
Electronics and electrical	535	38
Total	1,410	100

Source: Interviews.

7.1.1 Automotive Manufacture Industry

The 1989 usage of EPDM in the local automotive manufacture industry is estimated at about 875 metric tons. This is used mainly in the manufacture of weatherstrips and rubber seals, radiator hoses and muffler hangers. Other products which use EPDM include bumper stops, load bearing mountings and windshield wiper blades.

Table 26 shows the estimated EPDM usage of automotive rubber components manufacturers by type of product.

Table 26  
Thailand  
Estimated EPDM Usage  
of Rubber Automotive Components Manufacturers  
by Type of Product, 1989

Product Type	Volume (metric ton)	Share (per cent)
Weatherstrips and rubber seals	520	60
Radiator hoses	210	24
Muffler hangers	20	2
Others	125	14
Total	875	100

Source: Interviews.

The major producers of rubber automotive components in Thailand number about 30 companies. Only two companies however, are considered major manufacturers with a combined market share of 90 per cent. These are Pong Para Codan Rubber Co., and Inoue Rubber Co. (see Table 27).

Table 27  
Thailand  
Major Manufacturers  
of Rubber Automotive Components

Company	Estimated Market Share	Product Type	Annual Capacity (in pieces)
Pong Para Codan Rubber Co., Ltd.	65%	Radiator hoses	30
		Door weatherstrips	150
		Window rubber seals	300
Inoue Rubber (Thailand) Co., Ltd.	25%	Rubber automotive components	n.a.
		Tires	n.a.

Source: Interviews.

Consumption of EPDM by manufacturers of automotive rubber products is based on motor vehicle production. In 1989, Thailand produced over 200,000 units of motor vehicles, reflecting a 30 per cent increase from the previous year's production of about 150,000 units. Light commercial vehicles comprise over 50 per cent of the total production. Table 28 presents the historical motor vehicle production from 1985 to 1989.

Table 28  
Thailand  
Motor Vehicle Production by Type of Vehicle  
1985 to 1989

	1985	1986	1987	1988	1989
Passenger cars	23,862	21,046	2,333	54,459	58,761
Light commercial vehicles	51,544	47,803	60,069	85,436	120,177
Trucks and buses	6,700	5,313	8,746	14,288	25,025
Total	82,106	74,162	98,148	154,183	203,963

Source: Association of Thai Industry.

There are currently 12 major automobile assemblers in Thailand. A profile of these companies is shown in the following table.

Table 23  
Thailand  
Profile of Automobile Assemblers

Name of Company	Annual Production Capacity (in pieces)	Brand Name	Major Stockholders	
Toyota Motor Thailand Co., Ltd.	24,000	Toyota	Toyota Motor Corp. (Japan)	64.63%
Isuzu Motors Co., (Thailand) Ltd.	25,000	Isuzu	Isuzu Motors Co., Ltd. (Japan) Tri Petch Isuzu Sales Co., Ltd.	47.30% 46.90%
Siam Motors Co., Ltd.	4,140	Nissan, Isuzu, Alfa, Subaru, Ford	Siam Motor Co., Ltd.	99.65%
Thai Hino Industry Co., Ltd.	9,600	Hino, Toyota	Thai Hino Motor Sales Co., Ltd. Mitsui & Co., Ltd. Hino Motor Co., Ltd.	30.00% 30.00% 30.00%
NHC Sittipol Co., Ltd.	38,820	Mitsubishi	Mitsubishi Motors Corp.	48.00%
Sukosol and Mazda Motor Industry Co., Ltd.	12,000	Mazda, Ford	Mazda Motors Corp., Ltd. Kij Kamol Sukossal Co., Ltd. Toyomenka Kaisha Co., Ltd.	40.00% 35.60% 24.40%
Siam Automotive Industry Co., Ltd.	18,000	Nissan	Siam Motors Co., Ltd.	100.00%
Bangchan General Assembler Co., Ltd.	6,000	Honda, Opel, Holden	Bangchan Holding Co., Ltd. Honda Cars (Thailand) Co., Ltd.	65.37% 34.00%
YMC Assembly Ltd.	12,000	BMW, Citroen, Peugeot	n.a.	
Thonburi Automotive Assembly Plant Co., Ltd.	4,500	Mercedes Benz	Thonburi Panich Co., Ltd. Viriya Panich Co., Ltd. Prapai Viriyabhorn Lek Viriyabbum	24.40% 24.00% 10.00% 9.50%
Thai Sung Union Car Co., Ltd.	2,400	Isuzu	Prenee Phauenchoke Vichien Phauenchoke	43.00% 41.00%
Thai Swedish Assembly Co., Ltd.	6,000	Volvo	Thai Swedish	30.00% 70.00%

n.a. - Not available.

Source: Ministry of Industry.



7.1.2 Electronics and Electrical Industry

The local electronics and electrical industries use EPDM as the main ingredient in the manufacture of rubber parts for electronic and electrical devices and appliances. An application indicated is in air conditioner hose jacketing.

7.2 SOURCES OF SUPPLY

The demand for EPDM in Thailand is totally satisfied by importation. As indicated in Table 30, Thailand imported about 1,410 metric tons of EPDM in 1989. Over 50 per cent of Thailand's EPDM import volume was sourced from Japan.

Table 30  
Thailand  
Importation of EPDM by Country of Origin, 1989

Country	Volume (metric ton)	CIF Value (US\$000)
Japan	762	1,438
United States	306	572
France	179	334
Netherlands	122	230
Others	41	69
Total	1,410	2,643

Source: Foreign Trade Statistics of Thailand.

7.3 PROJECTED DEMAND

The 1990 domestic consumption for EPDM is estimated at 1,620 metric tons. This is projected to reach 6,560 metric tons by the year 2000 (see Table 31). These per annum projections are based on an estimated 15 per cent growth of the automotive manufacture industry.

Table 31  
Thailand  
Projected Domestic Demand for EPDM  
1990 to 2000

Year	Volume (metric ton)
1989	1,410
1990	1,620
1991	1,860
1992	2,140
1995	3,250
2000	6,560

Annual Growth  
Rate (1989 to 2000): 15%

#### 7.4 DISTRIBUTION CHANNELS AND PRICES

Currently, user industries procure their requirements for EPDM from local distributors or importers at prices ranging from US\$2,600 to US\$2,800 per metric ton. Average CIF Value of imported EPDM in 1989 is about US\$1,800 per metric ton. At present, there are three major suppliers of EPDM in Thailand.

Table 32 lists the major suppliers and their estimated market shares in the country.

Table 32  
Thailand  
Major Importers/Suppliers of EPDM

Name of Company	Type of Business	Market Share (%)
Exxon Chemical Ltd.	Importer of lube addition, elastomers, plastics chemicals, etc.	50
Mitsui & Co. (Thailand) Ltd.	Exporter and importer of iron and steel, chemicals and plastic, rubber, etc.	25
Chem-Lube Intertrade Corp., Ltd.	Importer of rubber, synthetic rubber, etc.	15

Source: Ministry of Industry.

#### 7.5 TARIFF AND DUTIES

Based on the current Customs Code of Thailand, importation of EPDM in primary forms is subject to a 30 per cent import duty while importation of EPDM in plates, sheets or strip is subject to a 50 per cent rate.