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Analysis of Plastics Industries in the Major Industrial Countries

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December 1981
Final Report

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16. Abstract

This report provides data needed to support an assessment of the relative position of the US plastics resins industry, on a worldwide basis, in terms of its being able to support automotive manufacturing operations. The use of plastics in US and foreign automobiles is reviewed. Capacity, production and use statistics for major automotive plastics are presented. Historic and current prices for these plastics in the various countries of interest are presented and discussed in terms of the relative advantage of the US plastics resins industry.

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PREFACE

The purpose of this study was to provide supporting data to current, on-going studies and analyses of the U.S. motor vehicle industry and its supplier industries, that are being performed by the Office of Energy and Environment of the Transportation Systems Center, U.S. Department of Transportation.

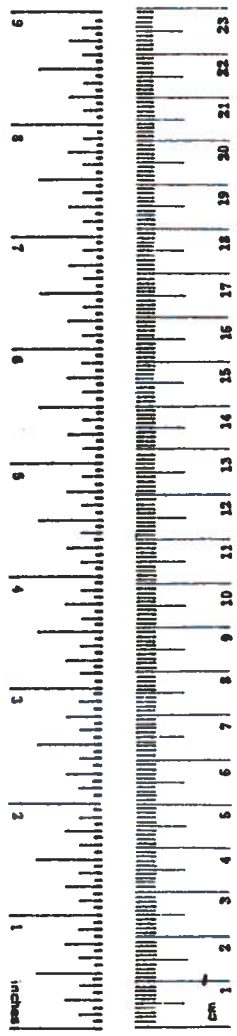
The author would like to acknowledge the help and assistance of the TSC Technical Monitor, Judith Gertler, in the performance of this study.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

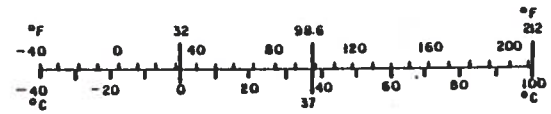
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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1. INTRODUCTION AND SUMMARY

The purpose of this report is to provide DOT with the data needed to support an assessment of the position of the U.S. plastics resins industry in the world market. DOT's interest in this information derives from the increasing use of plastics by automotive manufacturers.

As discussed in more detail in Section 2., the use of plastics in U.S. and foreign cars has increased markedly in the past twenty years. At the moment, somewhat less than 100 kg of plastics are used in the construction of an average car. This usage may increase by as much as 50 to 100 percent within the next two decades. The principal plastics used are polyurethane, unsaturated polyesters, polypropylene, ABS (acrylonitrile-butadiene-styrene) and polyvinyl chloride. Increased use of unsaturated polyesters, polypropylene, and possibly high-density polyethylene (if used in gas tanks) would account for most of the increased use of plastics in automobiles of the future.

Capacity, production and use statistics for the major commodity plastics were collected for the principal producing countries to the extent that these were available. Statistics for low and high density polyethylene, polypropylene, polyvinyl chloride, polystyrene, ABS and related polymers, unsaturated polyester resins, and polyurethane precursors and resins, are presented in Section 3 for each of the following countries: United States, Canada, West Germany, United Kingdom, France, Italy, Netherlands, Belgium, and Japan. These countries account for the majority of the world's production capacity. Summary statistics for the United States, Western Europe, and Japan are presented in Table 1-1. In 1978 the combined production capacities of the United States, Western Europe and Japan, accounted for the following percentages of total worldwide capacity (not counting the Eastern Bloc countries) of the following representative commodity plastics (1-1):

High Density Polyethylene	96%
Polypropylene	94%
Polystyrene	87%
Polyvinyl Chloride	84%

In the above, inclusions of non-European Economic Community (EEC) countries in the Western European total is offset by the non-inclusion of Canada.

Historical and current price data for the major commodity plastics in these countries were collected from a variety of sources, as discussed in Section 4. As can be seen from this price data, the U.S. and Canadian petrochemical manufacturers in general, and the resin manufacturers in particular, have a product cost advantage over their Western European and Japanese competitors. This cost advantage derives, in part, from the following:

- Lower cost of raw materials: the U.S. petrochemical industry is based on natural gas liquids whereas the Western European and Japanese petrochemical industries use petroleum naphtha as their main raw material. The relative advantage of U.S. producers is indicated by the data presented in Figure 1-1.

TABLE 1-1 SUMMARY 1978 PLASTIC STATISTICS FOR THE UNITED STATES, WESTERN EUROPE AND JAPAN (1000 MT/YR)

	UNITED STATES	WESTERN EUROPE	JAPAN
LD Polyethylene			
Year End Capacity	3407	5400	1546
Production	2930	4100	1119
Consumption	2636	3600	888
HD Polyethylene			
Year End Capacity	2300	2210	950
Production	1704	1580	647
Consumption	1515	1330	446
Polypropylene			
Year End Capacity	1983	2100	1161
Production	1254	1350	745
Consumption	1111	1080	584
Polyvinyl Chloride			
Year End Capacity	3013	5300	1993
Production	2400	3887	1204
Consumption	2297	3500	1148
Polystyrene			
Year End Capacity	2319	2250	979*
Production	1594	1450	548
Consumption	1531	1300	979*a
ABS & SAN			
Year End Capacity	717	500	-
Production	543	-	348
Consumption	515	326	-
Unsaturated Polyester			
Year End Capacity	870	849	250
Production	516	-	184
Consumption	492	432	168
Polyurethane Raw Materials			
Year End Capacity	-	1565	169
Production	909	-	169
Consumption	783	970	154[a]

* includes ABS and SAN

a shipments

\- data not available

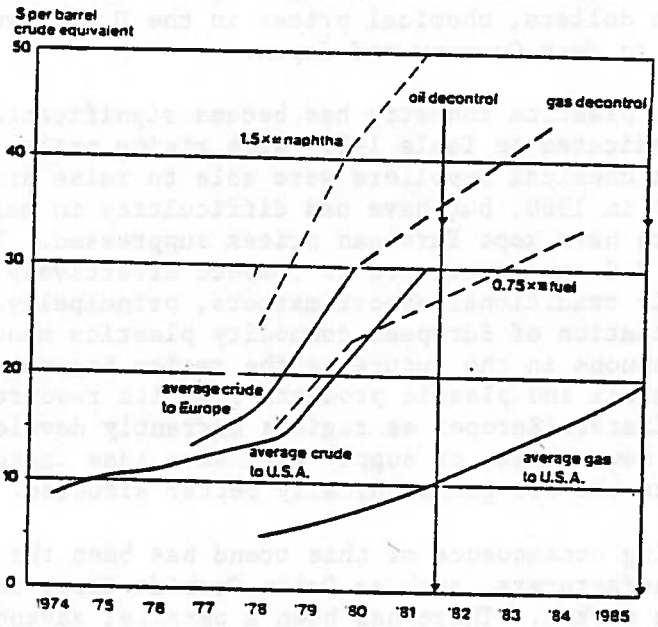

FIGURE 1-1 RELATIVE COST OF PETROCHEMICAL FEEDSTOCKS IN U.S. AND EUROPE

Source: Ref. 1-2

• Lower processing costs: American firms have an advantage over their European and Japanese competitors in that the U.S. home market is larger and more homogeneous than the European or Japanese markets. The average capacity of U.S. manufacturing facilities is greater than that of foreign manufacturers that serve more fragmented markets. Economies of scale, combined with lower costs for converting natural gas as compared to naphtha into petrochemical building blocks, provide the U.S. manufacturers with another cost advantage (1-3).

Another significant advantage to the U.S. manufacturers has been the decline of the value of the U.S. dollar relative to the foreign currencies, especially the German mark and the Japanese yen, as shown in Figure 1-2. The U.S. dollar is considered undervalued with regard to these currencies, a situation which has helped U.S. producers in general, and petrochemical suppliers in particular. The relative advantage of U.S. manufacturers of industrial chemicals versus their German and Japanese counterparts is indicated in Figure 1-3. When prices are figured in local currencies, U.S. prices have increased more than those in Japan and Germany since 1973. However, after converting these prices into dollars, chemical prices in the U.S. have increased significantly less than in West Germany and Japan.

The European plastics industry has become significantly less profitable since 1973, as indicated in Table 1-2. With rising prices of feedstocks late in 1979, European chemical suppliers were able to raise prices to more profitable levels early in 1980, but have had difficulties in maintaining these levels. U.S. exports have kept European prices suppressed. The lower U.S. cost base has allowed U.S. manufacturers to compete effectively with European manufacturers in their traditional export markets, principally Africa and South America. The situation of European commodity plastics manufacture is likely to become more tenuous in the future as the region becomes exposed to intermediate petrochemical and plastic products from its resource suppliers in the Middle East and Eastern Europe, as regions currently developing production capacity. These new sources of supply will have less impact on the Japanese and U.S. producers who are geographically better situated.

An interesting consequence of this trend has been the withdrawal of U.S. petrochemical manufacturers, such as Union Carbide Corp. and Monsanto Corp. from the European market. There has been a parallel advance of Western European companies into the U.S. (1-3). BASF, Bayer, Hoechst, ICI and Solvey are only a sample of the large European manufacturers who have made major

TABLE 1-2 PROFITABILITY OF EUROPEAN PLASTICS MANUFACTURE

	Ratio of Selling Price to Manufacturing Cost		
	1973	1974	1978
Low Density, Polyethylene	95%	119%	69%
Polypropylene	130	108	65
Polyvinyl Chloride	90	111	67
Expanded Polystyrene	143	133	54

Source: Shell Chemical Company as reported in Reference 1-1

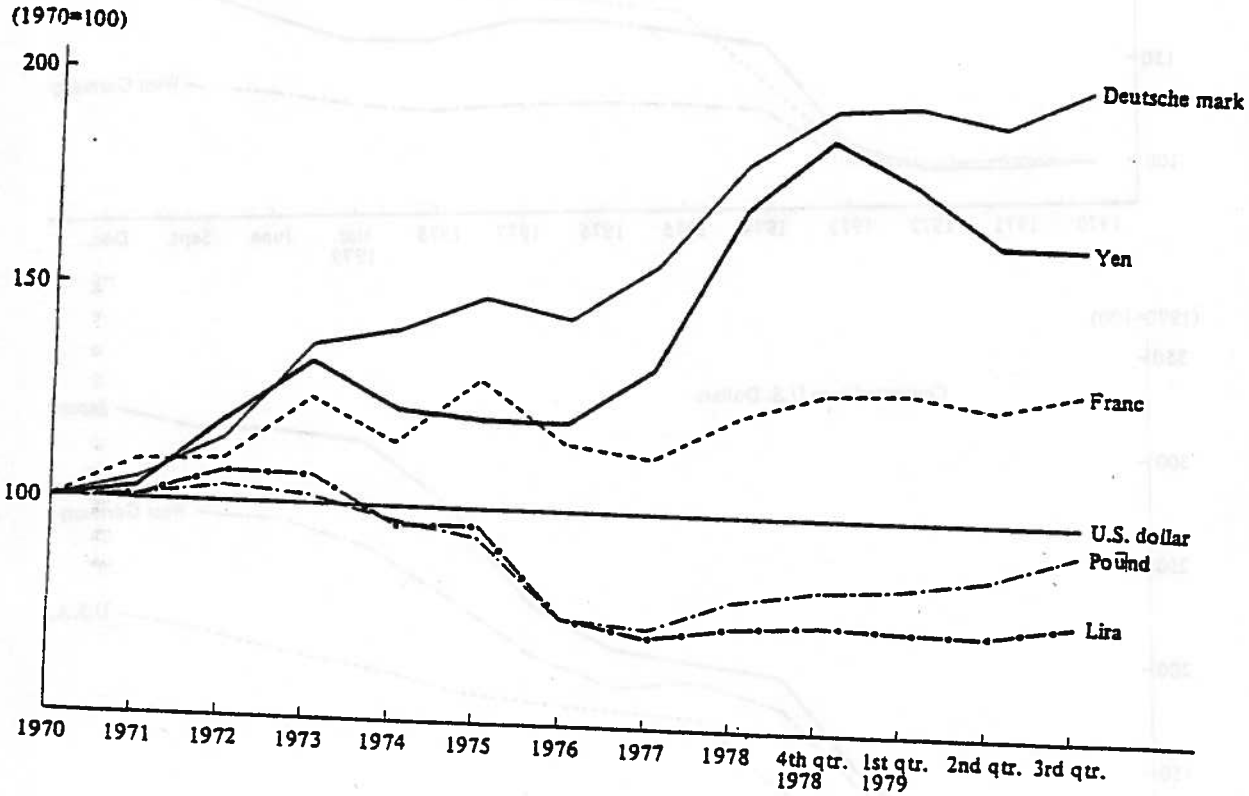

FIGURE 1-2 CURRENCY TRENDS OF MAJOR CURRENCIES COMPARED TO THE US DOLLAR

Source: Ref. 1-3

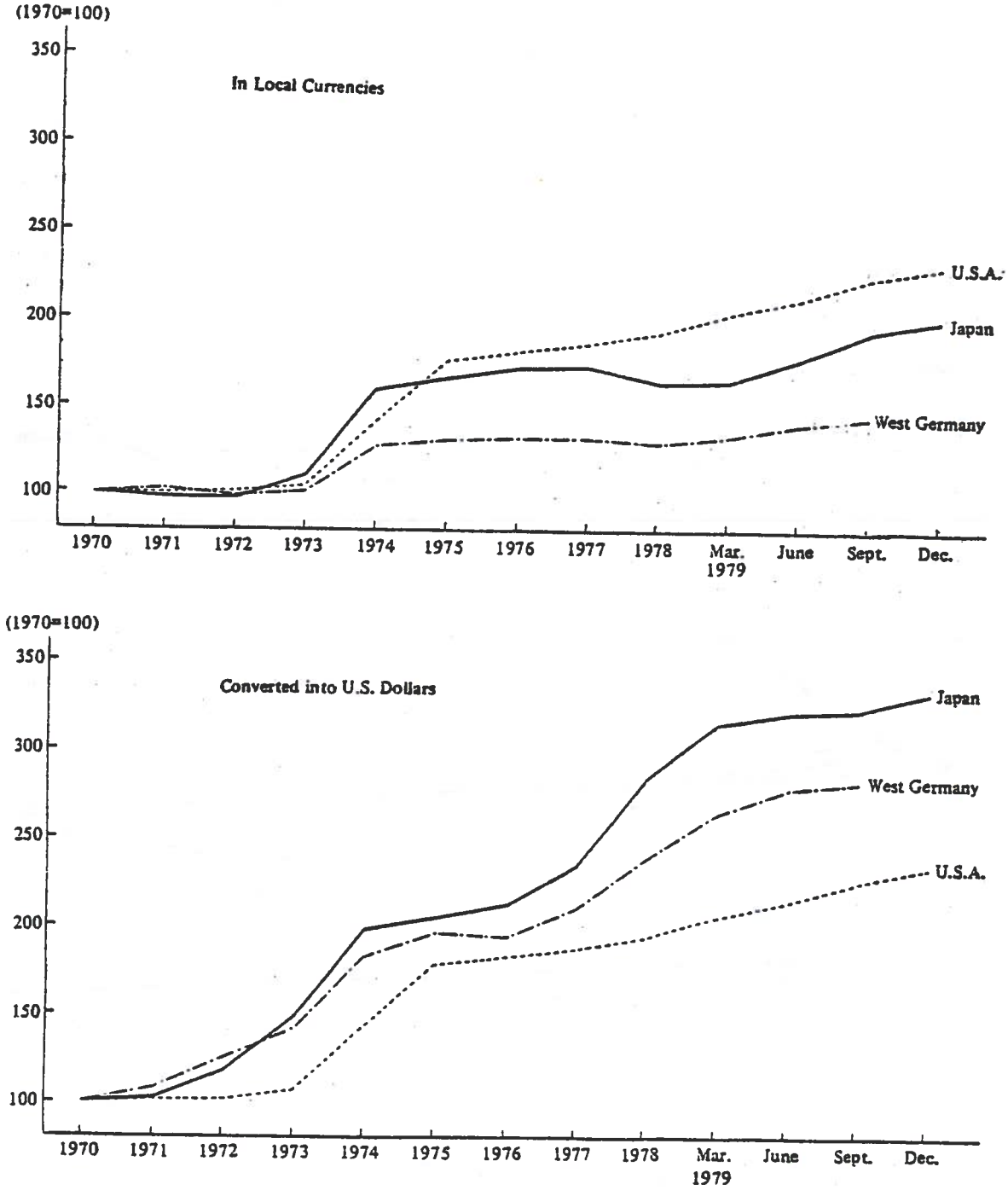

FIGURE 1-3 WHOLESALE PRICE TRENDS OF INDUSTRIAL CHEMICALS IN MAJOR COUNTRIES

Source: Ref. 1-3

investments in petrochemical and resin manufacturing facilities in the U.S.

The Japanese petrochemical and plastics industry is also in a vulnerable position. It relies on foreign raw materials that are costly and operates many plants that are not to world scale. The industry is fragmented, very competitive, and not very profitable. Exports to other Asian markets are significant and are being challenged by the growing petrochemical industries of other Asian countries, such as Taiwan, which are building up their petrochemical industries with extensive government subsidy (1-5).

The future profitability of the petrochemical and plastics resin companies of the world will depend on their being able to assure themselves stable sources of raw materials, on one hand, and to develop less capital intensive manufacturing processes, and higher performance materials which can be sold to value and command a price premium over commodity materials sold to cost.

One of the major areas of technical development is the diversification of feedstock options. For the nearer term, petrochemical manufacturers are interested in having the flexibility to use diverse traditional feedstocks, rather than any specific one, i.e. ethylene crackers capable of operating on naphtha, gas oil, natural gas liquids and/or liquified petroleum gases. In the longer term, there is interest in developing other options such as natural gas cracking, coal gasification (including acetylene formation), coal liquification, and biomass conversion. It is important to note that the petrochemical industries of South Africa (1-6) and Brazil (1-7), are already partially based on the use of coal and biomass respectively, and that New Zealand will be developing an industry based on native natural gas resources. Figure 1-4 identifies some possible process routes (1-7) based on alternate feedstocks/energy sources.

The other major area of technical development will be the development of improved products and processes. An excellent example has been the development of linear low-density polyethylene (LLDPE) which will result in major restructuring of the polyethylene industry. The new process technology will blur the distinction between high and low density polyethylene, will result in improved products for specific applications, and has significantly improved economies over traditional high pressure technology because of lower capital costs and lower utility consumption (1-8). Another example has been the development of improved manufacturing and compounding processes for the manufacture of hybrid and composite materials, such as the SMC, HMC and XMC approaches to fiber glass reinforced polyester. Another example is the development of materials and processes compatible with high volume operations that require a low dwell time, such as thermoplastic stamping.

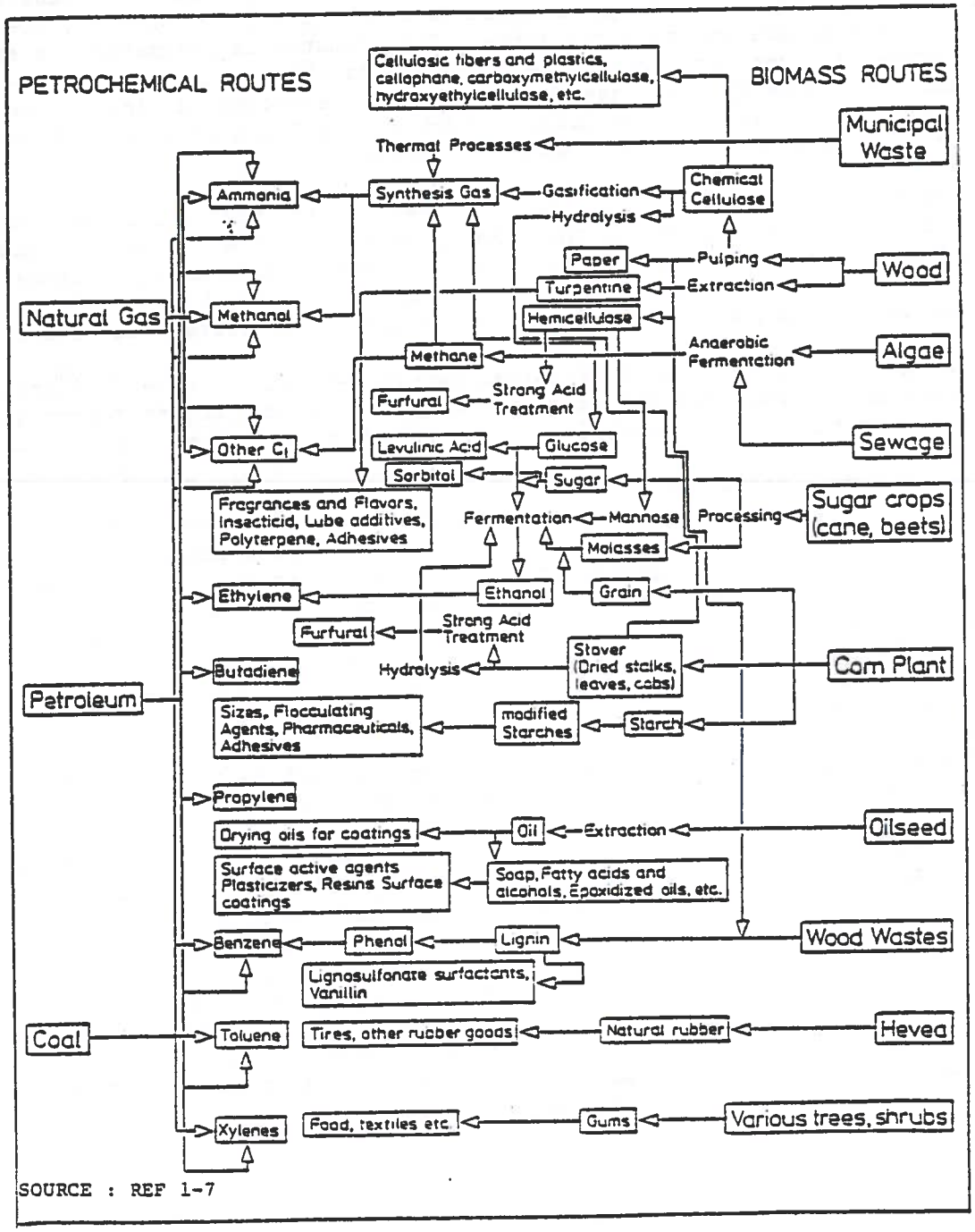

FIGURE 1-4 PETROCHEMICAL AND BIOMASS ROUTES TO ORGANIC CHEMICALS

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2. USE OF PLASTICS IN AUTOMOBILES

2.1 U.S. PASSENGER CARS

While total U.S. domestic plastics sales were 13,996,000 metric tons in 1978, U.S. passenger car manufacturers consumed approximately 716,000 metric tons of plastics in MY 1978.* There are over 20 generic types of plastics used in automobiles, but the following five plastics account for over 85 percent of plastics consumed in passenger vehicles: polyurethanes, reinforced polyester resins, polypropylene and its co-polymers, polyvinyl chloride, and ABS (acrylic-butadiene-styrene) resins, as outlined in Table 2-1. MY 1978 automotive consumption of any of the other resins was less than 25,000 tons. Overall plastics consumption by MY 1978 passenger cars was only 5.1 percent of total domestic plastics consumption in calendar year 1978. For the five major plastics outlined, consumption by MY 1978 passenger cars ranged from 5.0 percent (for PVC) to 20.4 percent (for reinforced polyester) of total domestic consumption of the specific generic class of plastics considered.

Prior to 1970, average use of plastics in American passenger cars was less than 100 lbs/vehicle (45 kg/vehicle). Average use has approximately doubled in the past decade, as indicated in Figure 2-1. The data for MY 1980 cars are preliminary and are subject to revision.

Figure 2-1 indicates a continued growth in average plastic use per passenger car up to 1975 followed by a plateau, indicating no further growth.

TABLE 2-1 1978 U.S. PLASTICS CONSUMPTION, 1000 METRIC TONS

	Consumption in Passenger Cars* (model year)	Total Domestic Consumption (calendar year)
ABS	64	461
Polypropylene	136	1217
Polyurethane	154	783
Polyvinyl Chloride	118	2375
Reinforced Polyester	145	710
Other	97	8450
Total	714	13996

*Includes automobiles produced in U.S. and Canada

Source: Reference 2-1

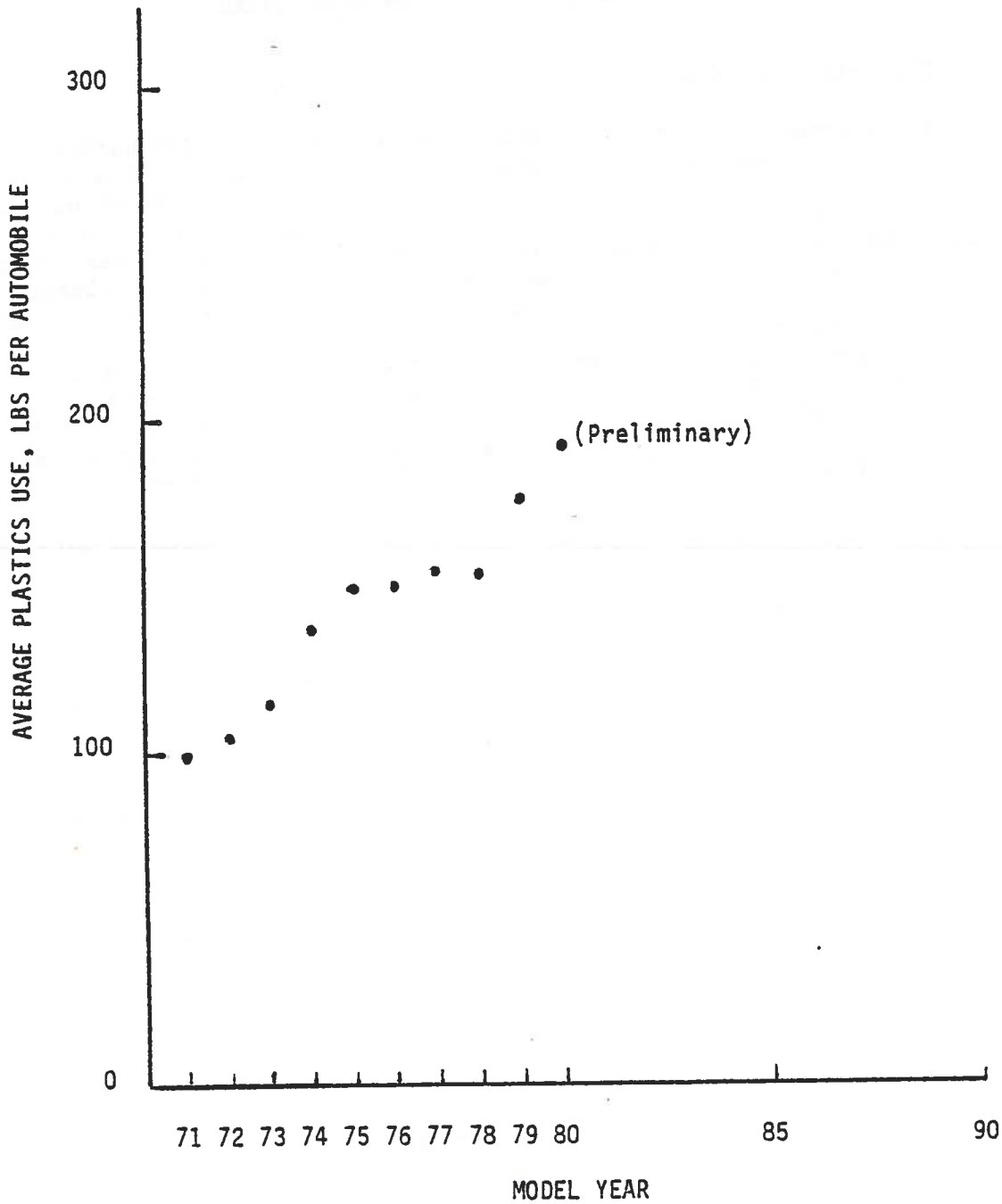

FIGURE 2-1 USE OF PLASTICS IN U.S. PASSENGER CARS OVER THE PAST DECADE

Sources: Modern Plastics and MVMA Statistics

up to 1978. Average plastics consumption increased again to about 196-200 lbs per vehicle with model years 1979 and 1980. Results of a recent survey of suppliers and users conducted by Plastics Technology Magazine (2-2) predict further increases to 95 kg (210 lbs) in MY 1981, from 105 to 114 kg (230 lbs to 250 lbs) in MY 1985, and of 114 to 145 kg (250 lbs to 320 lbs) by MY 1990, as indicated in Figure 2-2.

The historical data and the 1980 trend projections, are much lower than prior projections that were listed in a previous DOT study by the author (2-3). A few years ago, the general consensus was that the plastics content of an average automobile would increase from about 80 kg (176 lbs) in 1976 to 90-100 kg (200-220 lbs) in 1980, up to 120-160 kg (260-350 lb) by 1985, and possibly as much as 250 kg (550 lb) by 1990. Current longer term projections, which are much more modest, may still be overly optimistic, because of greater likelihood that the U.S. industry will produce small cars, and technological improvements in competing materials.

2.2 FOREIGN VEHICLES

Significantly less information has been published on the use of plastics in foreign automobiles than for U.S. production automobiles. The articles that have been obtained indicated that, at least for European cars, the general trend lines are not that different than those occurring in this country. Plastics use has increased sharply since 1960, particularly in the past ten years, as shown in Tables 2-2 to 2-5.

In 1978, these data indicate that plastics use in automobiles was proportionately higher for European automobiles than for Ammerican automobiles. A 1978 American passenger car with a nominal curb weight of 1600 kg (3500 lbs) had a plastics content of about 80 kg (175 lbs), or about 5 weight percent. Renault and Fiat automobiles introduced in the same year had plastics contents of 6.9 percent and 7.8 percent, respectively. In 1978, plastics represented about 6.5 percent of the total material weight of an average B.M.W. car (2-7). Current use of plastics in European passenger cars is estimated to range from 25 kg (55 lb) to 80 kg (175 lb) depending on the size of the vehicle (2-4, 2-8).

A comparative breakdown of plastics use in American and European "saloons" is given in Table 2-6. It is to be noted that relative use of PVC and "other" plastics is somewhat higher in the European example than for the American one. The plastics use assigned to the American automobile in Table 2-4 is about 12 kg (24 lbs) higher than that estimated from Modern Plastics and MVMA data in Figure 2-1, but lower than the value given by Ref. 2-3.

Projections with regards to the future use of plastics in European and American cars are also presented in Table 2-6. The projections for U.S. passenger automobiles are much higher than those reported in Figure 2-2, which are claimed to represent current U.S. expert opinion. The 1985 and 1990 projections for the European cars are in general agreement with the values reported in Figure 2-2 for U.S. cars. One would expect such an agreement if it were assumed that the U.S. automobile industry would be producing world size cars in the post-1985 period.

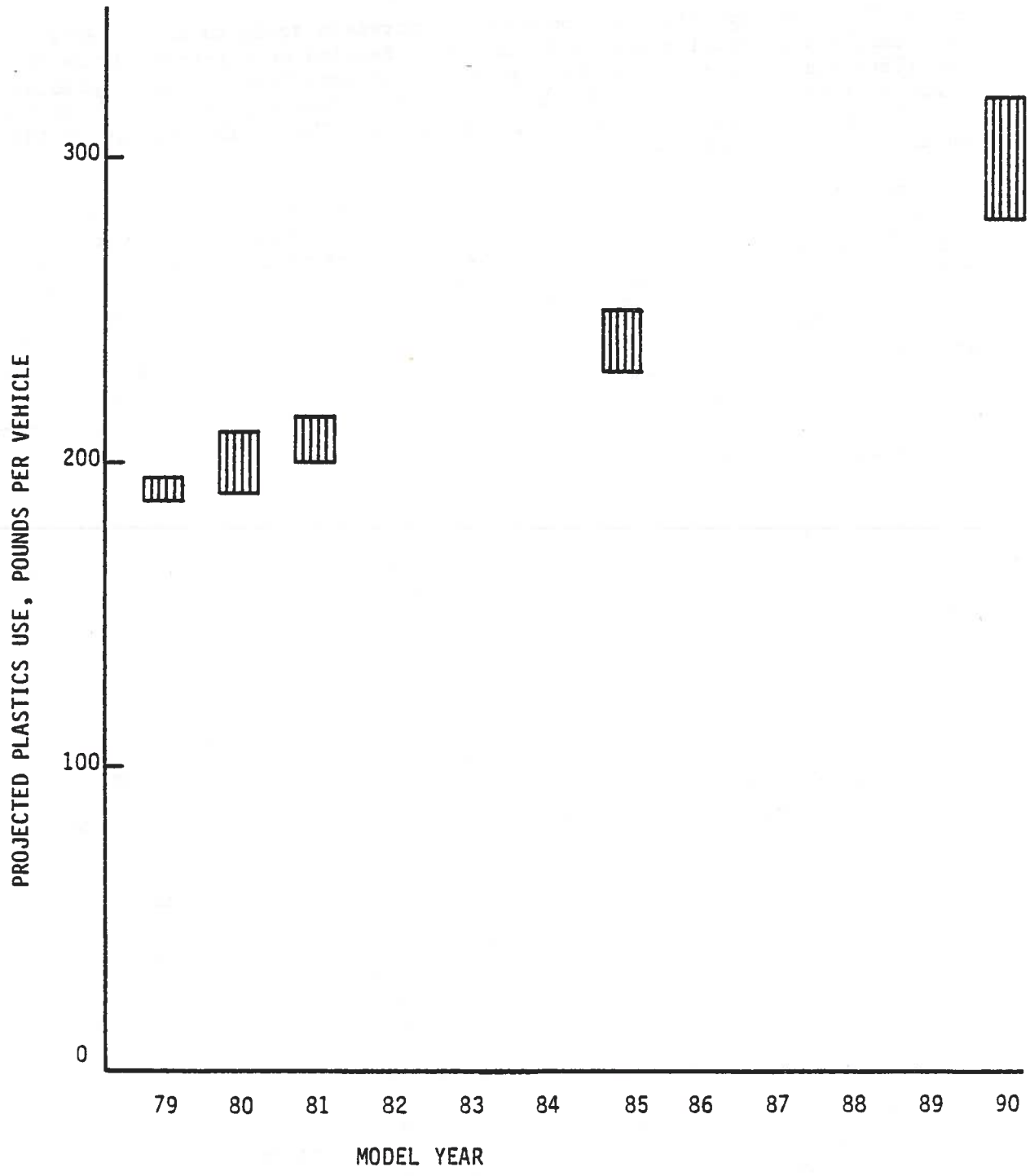

FIGURE 2-2 PROJECTED USE OF PLASTICS IN U.S. PASSENGER AUTOMOBILES

(Source: Survey Results Reported in Plastics Technology, August 1980)

TABLE 2-2 PLASTICS USE IN RENAULT CARS

Type	Year First Produced	Weight Plastic Kg	Plastic Content %
R 4	1961	13	2.0
R 8	1962	18	2.5
R 6	1968	22	2.8
R 12	1970	33	3.7
R 5	1972	33.5	4.6
R 30	1975	66	5.0
R 14	1976	53	6.1
R 18	1978	63.5	6.9

Source: Ref. 2-5

TABLE 2-3 PLASTICS USE IN FIAT CARS

Type	Year First Produced	Car Weight kg	Approximate Weight Plastic kg	Approximate Plastics Content %
1100	1952	900	3	0.3
1300	1962	920	13	1.4
850	1964	640	18	2.8
124	1966	820	26	3.2
125	1967	965	40	4.2
128	1970	770	32	4.2
127	1971	670	28	4.2
126	1973	520	29	5.6
128	1976	770	52	6.8
RIT	1978	880	67	7.8

Source: Ref. 2-4

TABLE 2-4 PLASTICS USE IN BMW CARS

Model	Year First Produced	Weight of Plastic per Vehicle kg
1800-2000 Tii	1963	40
1502-2002 Tii	1968	55
2500-3.3L	1968	70
518-528i	1972	75
316-323i	1975	75
728-645i	1977	110

Source: Ref. 2-7

TABLE 2-5 AVERAGE USE OF PLASTICS IN GERMAN CARS

Year	Weight of Plastic per Vehicle, kg
1960	10
1965	20
1970	38
1975	54
1980	68
1985 (projected)	80

Source: Ref. 2-7

TABLE 2-6 COMPARATIVE AUTOMOBILE USE OF PLASTICS IN AMERICAN AND EUROPEAN PASSENGER AUTOMOBILES

	1978 Plastics Use			
	U.S. Saloon*		Western European Saloon*	
	kg	(lb)	kg	(lb)
Polyurethane	21.6	(47.6)	15.4	(33.9)
Polyvinyl chloride	13.5	(29.7)	15.4	(33.9)
Polypropylene	15.3	(33.7)	8.4	(18.5)
Polyesters	14.4	(31.7)	7.7	(17.0)
ABS	9.0	(19.8)	7.0	(15.4)
Other	16.2	(35.7)	16.1	(35.5)
Total Plastics	90.0	(198.2)	70.0	(154.2)
Curb Weight	1700	(3740)	1200	(2640)
Weight Percent Plastics	5.3		5.8	

	Projected Plastics Use			
	U.S. Car		Western European Car	
	kg	(lb)	kg	(lb)
1985	150	(330)	100	(220)
1990	220	(484)	130	(286)

*"Saloon" is the British equivalent of "sedan."

Source: Ref. 2-8

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2-9 Loc. Cit. Ref. 2-4, p. 12.

3. FOREIGN PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS

Statistics were collected for the production and consumption of the major plastics produced by the leading producing nations. To the extent possible, for each country, statistics are reported for low density (LD) polyethylene, high density (HD) polyethylene, polypropylene, polyvinyl chloride, polystyrene, ABS (acrylonitrile-butadiene-styrene) and SAN (styrene-acrylonitrile) polymers, unsaturated polyester resins, and polyurethane resins and precursors. The following statistics were reported for each material: year end capacity, production in year, imports in year, exports in year, and apparent (app.) consumption. In all cases, these statistics are presented for 1978. Depending on the data base used, statistics for other years in the 1975 to 1979 period are also reported.

Worldwide production capacity figures for the major thermoplastics as of the end of 1978 are presented in Table 3-1.

3.1 NORTH AMERICA

Statistical data for the United States are summarized in Table 3-2. Canadian data are presented in Table 3-3. The apparent consumption data presented in Table 3-2 are the total consumption values reported in Modern Plastics (3-10, 3-11) less the export volumes reported in the same references. The data for polyurethane include polyurethane foams and thermoplastic polyurethanes Production values are not reported in Table 3-2 since no explicit references were found. Discounting changes in inventory, these values could be calculated from the consumption and import/export data presented. More detailed information on the U.S. plastics industry for 1977 and prior years can be found in Reference 3-16.

It should be noted that there is significant trade in plastics between the U.S. and Canada. For both countries, the other is the major source of imported plastics.

3.2 WESTERN EUROPE

Statistical plastics data for Western Europe, as a whole, and the major producing and consuming countries are presented in Tables 3-4 to 3-11.

The data for Western Europe are presented in Table 3-4.
The data for West Germany are presented in Table 3-5.
The data for France are presented in Table 3-6.
The data for Italy are presented in Table 3-7.
The data for the United Kingdom are presented in Table 3-8.
The data for Belgium and the Netherlands, individually, and the BENELUX countries, as a whole, are presented in Table 3-9, 3-10 and 3-11.

As can be noted from these tables, no one source of data provided all the information desired for any given country. In some instances, the statistics presented included more than one plastic of interest. In many countries, separate statistics are not available for ABS and SAN - these figures are

included within the data for polystyrene. In some cases, one statistic is presented for HD and LD polyethylene. These anomalies are noted in the individual tables. Only a minimum amount of information is obtainable for the Belgian chemical industry - for which the only official statistics are import data. This is a reflection of the fact that the country is small and the petrochemical industry is concentrated with only a few firms operating, most notably Solvey & Cie. The official German statistical data leave something to be desired, as discussed in Ref. 3-18. For example, high and low density polyethylene production statistics are confounded. Except for polyvinyl chloride and its co-polymers, no mention is made of other major plastics including polystyrene.

TABLE 3-1 1978 WORLDWIDE PRODUCTION CAPACITY FOR MAJOR THERMOPLASTICS

Material	Worldwide Production Capacity (10^3 Metric Tons/Yr)	
	Excluding East Bloc Nations	Including East Bloc Nations
LD Polyethylene	12,400	14,200
HD Polyethylene	6,150	*
Polypropylene	*	6,000
Polyvinyl Chloride	13,000	15,000
Polystyrene	6,500	*

Source: Kunstoffe German Plastics, October 1979, various articles on individual polymers, Refs. 2-1 to 2-9.

3.3 JAPAN

Statistical data for the Japanese Plastics industry are presented in Table 3-12. This table also contains a shipment category, which reflects total sales, both domestic and export.

*Information not available.

TABLE 3-2 U.S. PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				3407[1]	3453[1]	
Production						
Imports				16[2]	8[2]	
Exports				310[3]	416[3]	
App. Consumption				2636[1]	2810[1]	
HD Polyethylene						
Year End Capacity				2300[1]	2350[1]	
Production						
Imports				28[2]	47[2]	
Exports				217[3]	329[3]	
App. Consumption				1515[1]	1732[1]	
Polypropylene						
Year End Capacity				1983[1]	2260[1]	
Production						
Imports				5[2]	1[2]	
Exports				148[3]	364[3]	
App. Consumption				1111[1]	1299[1]	
Polyvinyl Chloride						
Year End Capacity				3013[1]	3194[1], 3270[5]	
Production						
Imports				20[2]	4[2]	
Exports				123[3]	169[3]	
App. Consumption				2297[1]	2397[1]	
Polystyrene						
Year End Capacity				2319[1]	2264[1]	
Production						
Imports				16[2]	15[2]	
Exports				79[3]	119[3]	
App. Consumption				1531[1]	1593[1]	
ABS and SAN						
Year End Capacity				717[1]	740[1]	
Production						
Imports				2[2]	<1[2]	
Exports				30[3]	61[3]	
App. Consumption				515[1]	581[1]	
Unsaturated Polyester						
Year End Capacity				870[4]		
Production						
Imports				<1[2]	<1[2]	
Exports				24[3]	50[3]	
App. Consumption				492[1]	500[1]	
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports*				1[3]	4[3]	
Exports*				127[3]	176[3]	
App. Consumption				783[1]	810[1]	

*Sum of Toluene Diisocyanate, polyethylene glycol and polypropylene glycol

Sources: 1) Refs. 3-10, 3-11 2) Refs. 3-12, 3-13 3) Refs. 3-14, 3-15, 4) Ref. 3-9, 5) Ref 3-26.

TABLE 3-3 CANADIAN PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				430	446	
Production			221	283	391	
Imports			57	60	31	
Exports			24	55	96	
App. Consumption			254	288	326	
HD Polyethylene						
Year End Capacity				240	256	
Production			83	168	200	
Imports			50	32	38	
Exports			5	45	56	
App. Consumption			128	155	182	
Polypropylene						
Year End Capacity				140	136	
Production			7	36	65	
Imports			60	51	36	
Exports			-	7	16	
App. Consumption			67	80	85	
Polyvinyl Chloride						
Year End Capacity				300	308	
Production			100	125	152	
Imports			40	43	48	
Exports			4	6	10	
App. Consumption			136	162	190	
Polystyrene						
Year End Capacity				155	156	
Production			98	100	120	
Imports			23	26	32	
Exports			5	10	15	
App. Consumption			116	116	137	
ABS and SAN						
Year End Capacity				57	60	
Production			38	40	47	
Imports			8	9	7	
Exports			3	2	2	
App. Consumption			43	47	52	
Unsaturated Polyester						
Year End Capacity						
Production					28	
Imports					4	
Exports					2	
App. Consumption					30	
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption						

Sources: 1977-1978 - Ref. 3-24; 1979 - Ref. 3-27

TABLE 3-4 WEST EUROPEAN PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
LD Polyethylene											
Year End Capacity		4300				5400					6600
Production		3700				4100	4524*				4600
Imports											
Exports						+600@					+400@
App. Consumption		3100				3600	585*	585*			4200
HD Polyethylene											
Year End Capacity		1680				2210					2880
Production		1300				1580	1767*				1830
Imports						~30					
Exports						300	284*				
App. Consumption		1030				1330					1620
Polypropylene											
Year End Capacity		970				2100					2500
Production		800				1350	1528*				1870
Imports						9					
Exports						285	201*				
App. Consumption		600				1080					1600
Polyvinyl Chloride											
Year End Capacity						5300	5500**				
Production							4041*				
Imports						110					
Exports						497	451				
App. Consumption			2800			3500					
Polystyrene (GP+HI)											
Year End Capacity		2000				2250					2370
Production		1300				1450	1403*				1700
Imports											
Exports						+150@	119*				+250@
App. Consumption		1150				1300					1450
ABS and SAN											
Year End Capacity		360				450-500	500-550				
Production											
Imports											
Exports											
App. Consumption		282				326	300				450
Unsaturated Polyester											
Year End Capacity						849					
Production											
Imports											
Exports											
App. Consumption			370	410	414	432					
Polyurethane Raw Materials											
Year End Capacity					TDI	315			TDI	353	
					MDI	270			MDI		370
					Polyols	980			Polyols	1000+	
Production											
Imports											
Exports											
App. Consumption	770			900		970					

Sources: Ref. 3-1 to 3-9, *Ref. 3-29, **Ref. 3-26
@ positive trade balance

TABLE 3-3 WEST GERMAN PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				1205[1], 998[2] 1308[5]		
Production (LD + HD combined)	1068[1]	1470[1]	1434[1]	1522[1]		
Imports						
Exports						
App. Consumption	640[1]	720[1]	760[1], 740[2]	820[1], 803[2]		
HD Polyethylene						
Year End Capacity				935[1], 890[2], 925[5]		
Production						
Imports						
Exports						
App. Consumption	275[1]	345[1]	355[1], 355[2]	370[1], 368[2]		
Polypropylene						
Year End Capacity				410[1], 355[2]		
Production						
Imports						
Exports						
App. Consumption	125[1]	170[1]	190[1], 190[2]	220[1], 217[2]		
Polyvinyl Chloride						
Year End Capacity				1330[1], 1395[2], 1545[5]		
Production	921[1]	1082[1]	1023[1]	1150[1]		
Imports						
Exports						
App. Consumption	800[1]	910[1]	920[1], 920[2]	970[1], 965[2]		
Polystyrene						
Year End Capacity				989[1], 510[2], 777[5] (with ABS + SAN)		
Production						
Imports						
Exports						
App. Consumption	285[1]	330[1]	330[1], 320[2]	360[1], 349[2]		
ABS and SAN						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption	55[1]	80[1]	85[1], 85[2]	90[1], 89[2]		
Unsat. Polyester						
Year End Capacity				170[3]		
Production (misc. unsat PE)	68[1]	67[1]	69[1]	65[1]		
Imports						
Exports						
App. Consumption	67[3]	68[3]	69[3]	70[3]		
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption	200[1]	230[1]	235[1], 235[2]	250[1], 247[2], 244[4]		

Sources: 1) Ref. 3-18, 2) Ref. 3-30, 3) Ref. 3-9, 4) Ref. 3-8, 5) Ref. 3-28, 6) Ref. 3-26

TABLE 3-6 FRENCH PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				1360[5]		
Production	480[2]	688[2]	715[2]	736[2]	901[1]	
Imports	137[2]	192[2]	213[2]	240[2]	225[1]	
Exports	283[2]	365[2]	386[2]	441[2]	510[1]	
App. Consumption	333[2]	479[2]	520[2]	560[2]	619[1]	
HD Polyethylene						
Year End Capacity				410[5]		
Production	143[2]	226[2]	239[2]	245[2]	272[1]	
Imports	62[2]	90[2]	81[2]	89[2]	104[1]	
Exports	74[2]	126[2]	145[1]	152[2]	170[1]	
App. Consumption	131[2]	178[2]	182[2]	188[2]	205[1]	
Polypropylene						
Year End Capacity						
Production	49[2]	75[2]	91[2]	146[2]	202[1]	
Imports	28[2]	38[2]	46[2]	49[2]	55[1]	
Exports	11[2]	15[2]	33[2]	68[2]	101[1]	
App. Consumption	66[2]	96[2]	100[2]	115[2]	146[1]	
Polyvinyl Chloride						
Year End Capacity				975[5]	1145[5]	
Production	474[2]	616[2]	645[2]	665[2]	783[2]	
Imports	166[2]	210[2]	215[2]	210[2]	227[1]	
Exports	115[2]	183[2]	217[2]	234[2]	279[1]	
App. Consumption	525[2]	632[2]	642[2]	650[2]	720[1]	
Polystyrene (includes ABS + SAN, except for 1979)						
Year End Capacity				585[5]		
Production	230[2]	334[2]	341[2]	319[2]	269[1]	
Imports					82[1]	
Exports					145[1]	
App. Consumption	263[2]	318[2]	309[2]	283[2]	205[1]	
ABS and SAN (included in PS)						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption						
Unsat. Polyester						
Year End Capacity				130[2]		
Production	60[2]	69[2]	65[2]	68[2]		
Imports						
Exports						
App. Consumption	59[2], 51[3]	68[2], 53[3]	67[2], 55[3]	70[2], 63[2]		
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption				122[4]		

Sources: 1) Ref. 3-31 2) Ref. 3-19 3) Ref. 3-9 4) Ref. 3-8 5) Ref 3-28 6) Ref. 3-26

TABLE 3-7 ITALIAN PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				1045[5]	1003[2]	
Production			610[1]	570[1]		
Imports						
Exports						
App. Consumption			550[1]	590[1], 725[2] (incl. HD)		
HD Polyethylene						
Year End Capacity				306[5]	297[2]	
Production			170[1]	130[1]		
Imports						
Exports						
App. Consumption			140[1]	135[1]		
Polypropylene						
Year End Capacity					325[2]	
Production			260[1]	285[1]		
Imports						
Exports						
App. Consumption			205[1]	240[1], 180[2]		
Polyvinyl Chloride						
Year End Capacity				1152[5]	1105[2], 1110[6]	
Production			715[1]	680[1]		
Imports						
Exports						
App. Consumption			460[1]	490[1], 490[2]		
Polystyrene (includes copolymers except for * data)						
Year End Capacity				460(*)[5]	500[2]	600[2]
Production			320[1]	340[1]		
Imports						
Exports						
App. Consumption			375[1]	318[1], 320[2]		
ABS and SAN (in PS statistics)						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption						
Unsat. Polyester						
Year End Capacity					190[3]	
Production						
Imports						
Exports						
App. Consumption	82[3]	69[3]	71[3]	62[2], 73[3]		
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption				145[2], 160[4]		

Sources: 1) Ref. 3-20 2) Ref. 3-32 3) Ref. 3-9, 4) Ref. 3-8, 5) Ref. 3-28 6) Ref. 3-26

TABLE 3-8 BRITISH PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				475[5]		
Production	305[1]	390[1]	362[1]	338[1] 341[2]	340[2]	
Imports	66[1]	125[1]	141[1]	161[1] 147[2]	230[2]	
Exports	67[1]	80[1]	74[1]	60[1] 50[2]	68[2]	
App. Consumption	304[1]	435[1]	429[1]	439[1] 443[2]	490[2]	
HD Polyethylene						
Year End Capacity				172[5]		
Production						
Imports						
Exports						
App. Consumption		120[1]	135[1]	150[1] 150[2]	176[2]	
Polypropylene						
Year End Capacity						
Production	180[1]	238[1]	245[1]	268[1] 270[2]	250[2]	
Imports	18[1]	26[1]	42[1]	57[1] 57[2]	85[2]	
Exports	38[1]	75[1]	91[1]	104[1] 97[2]	92[2]	
App. Consumption	160[1]	189[1]	196[1]	221[1] 230[2]	243[2]	
Polyvinyl Chloride						
Year End Capacity				835[5]	750[6]	
Production	337[1]	400[1]	390[1]	380[1] 390[2]	428[2]	
Imports	63[1]	104[1]	92[1]	100[1] 104[2]	120[2]	
Exports	68[1]	84[1]	82[1]	75[1] 92[2]	95[2]	
App. Consumption	332[1]	420[1]	400[1]	405[1] 418[2]	440[2]	
Polystyrene						
Year End Capacity				325[5]		
Production				135[2]	126[2]	
Imports				53[2]	60[2]	
Exports				22[2]	20[2]	
App. Consumption		160[1]	150[1]	166[1] 166[2]	166[2]	
ABS and SAN						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption		36[1]	37[1]	41[1] 45[2]	52.5[2]	
Unsaturated Polyester						
Year End Capacity				140[3]		
Production				66.9[2]	61.4[2]	
Imports				9.5[2]	9.2[2]	
Exports				11.4[2]	8.2[2]	
App. Consumption	58[3]	62[1] 63[3]	69[1] 66[3]	69[1] 63[2] 67[3]	62.4[2]	
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption		83[1]	84[1]	89[1] 89[2] 103[4]	94.5[2]	

Sources: 1) Ref. 3-21 2) Ref. 3-33, 3) Ref. 3-9, 4) Ref. 3-8 5) Ref. 3-28, 6) Ref. 3-26

TABLE 3-9 BELGIAN PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				670[3]		
Production	-	-	-			
Imports	116[1]	176[1]	154[1]			
Exports	243[1]	278[1]	403[1]			
App. Consumption	-	-	-			
HD Polyethylene						
Year End Capacity				315[3]		
Production	-	-	-			
Imports	43[1]	58[1]	51[1]			
Exports	65[1]	108[1]	127[1]			
App. Consumption	-	-	-			
Polypropylene						
Year End Capacity						
Production	-	-	-			
Imports	17[1]	26[1]	32[1]			
Exports	3[1]	9[1]	84[1]			
App. Consumption	-	-	-			
Polyvinyl Chloride						
Year End Capacity				240[3]	245[4]	
Production	-	-	-			
Imports	39[1]	60[1]	65[1]			
Exports	135[1]	166[1]	160[1]			
App. Consumption	-	-	-			
Polystyrene						
Year End Capacity				380[3] (includes ABS + SAN)		
Production	-	-	-			
Imports	39[1]	39[1]	48[1]			
Exports	138[1]	163[1]	159[1]			
App. Consumption	-	-	-			
ABS and SAN						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption						
Unsat. Polyester						
Year End Capacity						
Production					2[2]	
Imports						
Exports						
App. Consumption						
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption						

Sources: 1) Ref. 3-22 2) Ref. 3-9 3) Ref. 3-28 4) Ref. 3-26

TABLE 3-10 NETHERLANDS PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979	1980
LD Polyethylene						
Year End Capacity				635[3]	620[1]	
Production	36[1]	475[1]	490[1]	530[1]		
Imports	53[1]	78[1]	73[1]	90[1]		
Exports	328[1]	417[1]	461[1]	506[1]		
App. Consumption	85[1]	136[1]	102[1]	114[1]		
HD Polyethylene						
Year End Capacity				80[3]	80[1]	
Production	55[1]	75[1]	72[1]	70[1]		
Imports	19[1]	28[1]	24[1]	29[1]		
Exports	53[1]	70[1]	53[1]	46[1]		
App. Consumption	21[1]	33[1]	43[1]	53[1]		
Polypropylene						
Year End Capacity					145[1]	
Production	40[1]	55[1]	72[1]	100[1]		
Imports	8[1]	18[1]	20[1]	23[1]		
Exports	26[1]	38[1]	48[1]	74[1]		
App. Consumption	22[1]	35[1]	44[1]	49[1]		
Polyvinyl Chloride						
Year End Capacity				330[3]	331[1] 332[4]	
Production	220[1]	290[1]	270[1]	305[1]		
Imports	102[1]	131[1]	127[1]	129[1]		
Exports	188[1]	236[1]	228[1]	253[1]		
App. Consumption	134[1]	185[1]	169[1]	181[1]		
Polystyrene				(includes ABS/SAN)		
Year End Capacity				460[3]	307[1]	
Production	175[1]	195[1]	200[1]	180[1]		
Imports	51[1]	61[1]	59[1]	60[1]		
Exports	197[1]	185[1]	181[1]	179[1]		
App. Consumption	29[1]	71[1]	78[1]	61[1]		
ABS and SAN						
Year End Capacity					140[1]	
Production	47[1]	80[1]	85[1]	90[1]		
Imports						
Exports						
App. Consumption	3[1]	5[1]	5[1]	5[1]		
Unsaturated Polyester						
Year End Capacity				35[2]		
Production						
Imports						
Exports						
App. Consumption						
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports		11.6[1]	12.0[1]	14.7[1]		
Exports		18.2[1]	20.0[1]	24.4[1]		
App. Consumption						

Sources: 1) Ref. 3-23 2) Ref. 3-9 3) Ref. 3-28 4) Ref. 3-26

TABLE 3-11 BENELUX PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YR)

YEAR	1975	1976	1977	1978	1979	1980
Polystyrene						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption						
ABS and SAN						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption						
Unsaturated Polyester						
Year End Capacity				37[1]		
Production						
Imports						
Exports						
App. Consumption	19[1]	25[1]	21[1]	23[1]		
Polyurethane Raw Materials						
Year End Capacity						
Production						
Imports						
Exports						
App. Consumption				103[2]		

Sources: 1) Ref. 3-9 2) Ref. 3-8

TABLE 3-12 JAPANESE PRODUCTION AND CONSUMPTION STATISTICS FOR MAJOR AUTOMOTIVE PLASTICS (1000 MT/YEAR)

YEAR	1975	1976	1977	1978	1979
LD Polyethylene					
Year End Capacity		1394[2]		1546[1] 1546[2]	
Production	940[1]	957[1] 957[2]	970[1] 970[2]	1119[1] 1119[2]	2165[3](**)
Imports		2[1]	2[1]	10[1]	
Exports		220[1]	240[1]	245[1]	
App. Consumption	882(**)[1]	739[1]	732[1]	884[1]	
Shipments				1787[3](**)	2208[3](**)
HD Polyethylene					
Year End Capacity		947[2]		943[1] 954[2]	
Production	354[1]	436[1] 436[2]	496[1] 496[2]	647[1] 647[2]	
Imports		-1[1]	-1[1]	-1[1]	
Exports		138[1]	198[1]	181[1]	
App. Consumption		298[1]	298[1]	446[1]	
Polypropylene					
Year End Capacity		1059[2]		1161[1] 1161[2]	
Production	595[1]	669[1] 669[2]	608[1] 608[2]	745[1] 745[2]	1022[3]
Imports		-1[1]	1[1]	1[1]	
Exports		116[1]	142[1]	162[1]	
App. Consumption	440[1]	553[1]	467[1]	584[1]	
Shipments					
Polyvinyl Chloride					
Year End Capacity		1979[2]		1993[1] 1993[2]	1820[5]
Production	1125[1]	1044[1] 1044[2]	1031[1] 1031[2]	1204[1] 1204[2]	1592[3]
Imports		18[1]	15[1]	33[1]	
Exports		160[1]	149[1]	89[1]	
App. Consumption	960[1]	903[1]	897[1]	1148[1]	
Shipments				1161[3]	1551[3]
Polystyrene					
Year End Capacity		770[2]		1329(*)[1] 1329(*)[2]	
Production	379[1]	465[1] 875(*)[2]	481[1] 900[2]	548[1] 1032(*)[2]	1227(*)[3]
Imports					
Exports					
App. Consumption					
Shipments				979(*)[3]	1186(*)[3]
ABS and SAN					
Year End Capacity					
Production	215[1]	295[1]	298[1]	348[1]	
Imports					
Exports					
App. Consumption					
Unsaturated Polyester					
Year End Capacity				250[4]	
Production	120[1]	150[1]	161[1]	184[1]	204[3]
Imports					
Exports					
App. Consumption	115[4]	142[4]	151[4]	168[4]	
Shipments				175[3]	196[3]
Polyurethane Raw Materials					
Year End Capacity					
Production	122[1]	141[1]	142[1]	169[1] 169[3]	191[3]
Imports					
Exports					
App. Consumption					
Shipments				154[3]	174[3]

NOTES (*) Includes ABS and SAN in polystyrene statistics
(**) Included LD and HD polyethylene in LD polyethylene statistics

Sources: 1) Ref. 3-25 2) Ref. 3-34 3) Ref. 3-35 4) Ref. 3-9 5) Ref. 3-26

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4. MARKET PRICES OF AUTOMOTIVE PLASTICS IN DIFFERENT COUNTRIES

This chapter summarizes the historic and current price data that were collected during the course of the study for selected grades of the various automotive plastics of interest in the United States, Western European countries, and Japan. Because of the major currency fluctuations that have occurred in the past decade, prices are presented in both the local currency and in equivalent U.S. dollars.

4.1 UNITED STATES

U.S. bulk list prices of major plastic resins are published on a regular basis in trade magazines, such as Modern Plastics and Plastics Technology. U.S. prices of representative automotive plastics for the past three years are presented in Table 4-1.

4.2 WESTERN EUROPE

Until April 1980, European Chemical News (ECN), a London-based publication, published a market report on a bi-weekly basis which presented local delivered prices for about 210 chemicals in Belgium, France, West Germany, Holland, Italy, and the U.K. The prices are based on single deliveries of the quantities specified and do not necessarily represent the lowest prices applied to large bulk purchases. The ECN market report also included in its listing the U.S. bulk prices for the same materials of approximately the same time. These prices were obtained with permission from the Chemical Marketing Reporter. A timely guide to exchange rates based on the world value of sterling was included with each market report.

A number of automotive plastics were included in the 210 chemicals reported in the ECN market report. Local currency prices in the European countries listed above, and in the United States, for the period April 1975 to April 1980, for different plastics and presented in Tables 4-2 to 4-11, as indicated below:

Table 4-2	ABS resin, Natural
Table 4-3	General Purpose Thermoset Polyester Resin
Table 4-4	H.D. Polyethylene Resin
Table 4-5	Polypropylene Resins
Table 4-6	Polystyrene, High Impact
Table 4-7	Polyurethane Precursor - Toluene Di-isocyanate
Table 4-8	Polyurethane Precursor - Polyethylene Glycol
Table 4-9	PVC - Paste Forming Grade
Table 4-10	PVC - General Purpose Mechanical Grade
Table 4-11	SAN Resin

The prices presented in Tables 4-2 to 4-11 are also presented in terms of equivalent U.S. dollars per kilogram in Tables 4-12 to 4-21, using the currency conversion factors listed in Table 4-22.

ECN stopped publishing the list prices in its market report last April because of "increasing difficulties in obtaining realistic price levels for

TABLE 4-1 RECENT HISTORY OF REPRESENTATIVE U.S. BULK LIST PRICES OF MAJOR AUTOMOTIVE PLASTICS

Date	1/78	1/79	1/80	7/80
Source of Data	Reference 4-1	Reference 4-2	Reference 4-3	Reference 4-4
Material		Price, $/kg (¢/lb)		
ABS, high impact	1.34 (61)	1.41 (64)	1.70 (77)	1.92-1.96 (87-89)
Polyester, unsaturated, GP	0.79 (36)	0.82-0.84 (37-38)	1.12-1.17 (51-53)	1.23-1.30 (56-59)
Polyethylene, High Density, GP Blow Molding	0.70 (31 3/4)	0.67-0.69 (30¼-31¼)	0.92-0.93 (41¾- 42½)	0.91-1.00 (41¼-45¼)
Polypropylene, GP Homopolymer	0.66 (30)	0.66 (30)	0.84 (38)	0.97 (44)
Polystyrene, High Impact	0.64 (29)	0.64-0.66 (29-30)	1.06 (48)	1.06-1.15 (48-52)
Polyurethane				
Polymeric TDI	1.19 (54)	1.26-1.30 (57-59)	1.61 (73)	
Flexible Slab Stock Polyol	0.77 (35)	0.84 (38)	1.04 (47)	
Thermoplastic PUR	2.97 (135)	3.30 (150)		3.39-5.95 (154-270)
Polyvinyl Chloride				
Homopolymer, dispersion	0.86 (39)	0.90-0.95 (41-43)	0.76 (34½)	1.21-123 (55-56)
Homopolymer, suspension	0.59 (27)	0.62-0.64 (28-29)	1.09 (49½)	0.85-0.88 (38½-40)
Styrene-Acrilonitrile (SAN)	0.88 (40)	0.99 (45)	1.26-1.34 (57-61)	1.43 (65)

TABLE 4-2 LOCAL CURRENCY EUROPEAN LIST PRICES FOR ABS RESINS

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	51.00	43.50	6.84	3.55	Data Not Available	1300	62.00
10/1/79	57.00	43.50	6.84	3.55		1300	62.00
4/16/79	57.00	43.50	6.84	3.55		1300	62.00
10/13/78	57.00	43.50	6.84	3.55		1300	62.00
4/7/78	57.00	43.50	6.84	3.55		1100	62.00
4/8/77	42.50	43.50	6.84	3.55		1100	62.00
4/2/76	42.50	43.50	6.84	3.55		900	60.00
4/4/75	42.50		4.30	3.04		700	44.00

*Natural, in 10 ton lots

Source: Refs. 4-5 to 4-12

TABLE 4-3 LOCAL CURRENCY EUROPEAN LIST PRICES FOR GENERAL PURPOSE THERMOSET POLYESTER RESINS*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	51.00	35.00	2.50	Data Not Available		1160	68.50
10/1/79	36.00	35.00	2.50			1100	68.50
4/16/79	36.00	35.00	2.50			650	68.50
10/13/78	36.00	35.00	2.50			650	68.50**
4/7/78	36.00	35.00	2.50			650	68.50**
4/8/77	36.00	35.00	2.50			650	54.50**
4/2/76	36.00	35.00	2.50			500	51.50**
4/4/75	37.00	35.00	2.50			500	44.00**

*Ton Lots
**In drums

Source: Refs. 4-5 to 4-12

TABLE 4-4 LOCAL CURRENCY EUROPEAN LIST PRICES FOR H.D. POLYETHYLENE RESIN*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	39.25	28.00	Data Not Available	1.80	Data Not Available	1130	Data Not Available
10/1/79	31.75	18.00		1.80		980	
4/16/79	31.75	28.00		1.80		790	
10/13/78	31.75	28.00		1.80		660	
4/7/78	31.75	28.00		1.80		640	
4/8/77	30.25	28.00		1.80		700	
4/2/76	28.50	28.00		1.80		610	
4/4/75	26.00	28.00		1.80		470	

*Injection grade, 14 ton lots

Source: Refs. 4-5 to 4-12

TABLE 4-5 LOCAL CURRENCY EUROPEAN LIST PRICES FOR POLYPROPYLENE RESINS*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	30.00	27.50	3.00	2.19	1.75	920	Data Not Available
10/1/79	30.00	27.50	3.00	2.19	1.75	660	
4/16/79	30.00	27.50	3.00	2.19	1.75	620	
10/13/78	30.00	27.50	3.95	2.19	1.75	530	
4/7/78	28.00	27.50	3.95	2.19	1.75	550	
4/8/77	28.00	27.50	3.95	2.19	1.75	670	
4/2/76	26.00	27.50	3.95	2.19	1.75	560	
4/4/75	23.50	33.25	3.95	2.19	1.75	510	

*Homopolymer, 20 ton lots except for Belgium where prices apply to 8 ton lots.

Sources: Refs. 4-5 to 4-12

TABLE 4-6 LOCAL CURRENCY EUROPEAN LIST PRICES FOR POLYSTYRENE RESINS*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	45.00	27.50	6.05	2.65	2.30	1230	42.20
10/1/79	30.00	27.50	6.05	2.65	2.30	1190	42.20
4/16/79	30.00	27.50	3.30	2.10	2.30	900	42.20
10/13/78	30.00	27.50	3.30	2.10	2.30	660	42.20
4/7/78	28.00	27.50	3.30	2.10	2.30	680	42.20
4/8/77	37.00	27.50	3.30	2.10	2.30	690	44.20
4/2/76	30.00	27.50	3.30	1.85	2.30	580	41.50
4/4/75	30.50	29.00		1.92	2.27	560	38.20

*High Impact, 20 ton lots

Sources: Refs. 4-5 to 4-12

TABLE 4-7 LOCAL CURRENCY EUROPEAN LIST PRICES FOR POLYURETHANE PRECURSOR TOLUENE DI-ISOCYANATE 80% ISOMER*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	Data Not Available	49.00	5.85	2.85	Data Not Available	1650	73.60
10/1/79		49.00	5.85	2.85		1250	73.60
4/16/79		49.00	5.85	2.85		1200	73.60
10/13/78		48.00	5.85	2.85		1050	73.60
4/7/78		49.00	5.85	2.85		1050	73.60
4/8/77		49.00	5.85	2.85		1050	66.50
4/2/76		49.00	5.83	2.85		830	56.50
4/4/75		49.00	5.83	2.85		700	59.50

*10 ton lots

Sources: Refs 4-5 to 4-12

TABLE 4-8 LOCAL CURRENCY EUROPEAN LIST PRICES FOR POLYURETHANE PRECURSOR POLYETHYLENE GLYCOL*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. ₤/100 kg
4/7/80	Data Not Available	28.50	6.50	2.36	Data Not Available	1050	Data Not Available
10/1/79		28.50	4.98	2.36		780	
4/16/79		28.50	4.98	2.36		780	
10/13/78		28.50	4.98	2.36		720	
4/7/78		28.50	4.98	2.36		720	
4/8/77		28.50	4.98	2.36		650	
4/12/76		28.50	4.98	2.36		640	
4/4/75		28.50	2.60	2.36		680	

*Molecular weight = 4000, ton lots

Source: Refs. 4-5 to 4-12

TABLE 4-9 LOCAL CURRENCY EUROPEAN LIST PRICES FOR PVC - PASTE FORMING GRADE*

Date	U.S. ¢/kg	Belgium BF/kg	France F/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. ₤/100 kg
4/7/80	Data Not Available	28.75	5.06	2.30	1.97	1030	Data Not Available
10/1/79		28.75	3.93	1.90	1.97	940	
4/16/79		28.75	3.93	1.90	1.97	750	
10/13/78		28.75	3.93	1.90	1.97	720	
4/7/78		27.75	2.55	1.90	1.80	715	
4/8/77		27.75	2.55	1.52	1.80	710	
4/2/76		24.00	2.55	1.52	1.80	560	
4/4/75		27.00	2.55	1.52	1.77	455	

*5 ton lots, except for Belgium where prices apply to 10-20 ton lots

Source: Refs. 4-5 to 4-12

TABLE 4-10 LOCAL CURRENCY OF EUROPEAN LIST PRICES FOR PVC - GENERAL PURPOSE MECHANICAL GRADE*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	45.00	23.25	4.41	2.00	Data Not Available	920	Data Not Available
10/1/79	42.00	23.25	2.80	1.50		720	
4/16/79	42.00	23.25	2.80	1.50		570	
10/13/78	42.00	23.25	3.04	1.50		550	
4/7/78	42.00	23.25	3.04	1.50		550	
4/8/77	39.00	23.25	3.04	1.46		575	
4/2/76	34.25	19.50	2.62	1.46		500	
4/4/75	34.00	21.00	2.52	1.46		400	

*5 ton lots except for Belgium where prices apply to 10-20 ton lots

Sources: Refs. 4-5 to 4-12

TABLE 4-11 LOCAL CURRENCY EUROPEAN LIST PRICES FOR STYRENE-ACRYLONITRILE RESIN (SAN)*

Date	U.S. ¢/lb	Belgium BF/kg	France Fr/kg	Germany DM/kg	Holland G/kg	Italy L/kg	U.K. £/100 kg
4/7/80	Data Not Available	32.50	5.42	2.50	Data Not Available	850	59.00
10/1/79		32.50	5.42	2.50		850	59.00
4/16/79		32.50	5.42	2.50		850	59.00
10/13/78		32.50	5.42	2.50		850	59.00
4/7/78		32.50	5.42	2.50		850	59.00
4/8/77		32.50	5.42	2.50		850	52.00
4/2/76		32.50	5.42	2.50		590	40.00
4/4/75			2.70			700	39.00

*10 ton lots

Sources: Refs 4-5 to 4-12

TABLE 4-12 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR ABS RESIN*

Date	U.S.	Belgium	France Price US	Germany $/kg	Holland	Italy	U.K.
4/7/80	1.48	1.54	1.68	2.04	Data Not Available	1.61	1.43
10/1/79	1.26	1.49	1.61	1.94		1.59	1.38
4/16/79	1.26	1.49	1.58	1.88		1.54	1.28
10/13/78	1.26	1.40	1.58	1.79		1.56	1.21
4/7/78	1.26	1.37	1.47	1.76		1.29	1.16
4/8/77	.94	1.19	1.37	1.49		1.24	1.07
4/2/76	.94	1.13	1.45	1.40		1.06	1.15
4/4/75	.94		1.00	1.31		1.10	1.05

*Natural, 10 10 ton lots

Basis: Tables 4-2 and 4-22

TABLE 4-13 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR GENERAL PURPOSE THERMOSET POLYESTER RESIN*

Date	U.S.	Belgium	France Price US	Germany $/kg	Holland	Italy	U.K.
4/7/80	1.12	1.24	.61	Data Not Available		1.44	1.58*
10/1/79	.79	1.20	.59			1.35	1.53*
4/16/79	.79	1.20	.58			.77	1.42*
10/13/78	.79	1.12	.58			.78	1.33*
4/7/78	.79	1.10	.54			.76	1.28*
4/8/77	.79	.96	.50			.73	.94*
4/2/76	.79	.91	.53			.59	.99*
4/4/75	.82	1.01	.59			.79	1.05*

*Ton lots

**In drums

Basis: Tables 4-3 and 4-22

TABLE 4-14 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR H.D. POLYETHYLENE RESIN*

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
			Price U.S. $/kg				
4/7/80	.87	.99	Data Not Available	1.04	Data Not Available	1.40	Data Not Available
10/1/79	.70	.96		.98		1.20	
4/16/79	.70	.96		.95		.94	
10/13/78	.70	.90		.91		.79	
4/7/78	.70	.88		.89		.75	
4/8/77	.67	.76		.75		.79	
4/2/76	.63	.73		.71		.72	
4/4/75	.57	.81		.78		.74	

*Injection grade, 14 ton lots

Basis: Tables 4-4 and 4-22

TABLE 4-15 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR POLYPROPYLENE RESIN*

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
			Price U.S.$/kg				
4/7/80	.66	.98	.74	1.26	.91	1.14	Data Not Available
10/1/79	.66	.94	.70	1.20	.87	.81	
4/16/79	.66	.94	.69	1.16	.86	.74	
10/13/78	.66	.88	.91	1.11	.81	.64	
4/7/78	.62	.87	.85	1.09	.80	.64	
4/8/77	.62	.75	.79	.92	.70	.76	
4/2/76	.57	.71	.84	.86	.65	.66	
4/4/75	.56	.96	.93	.94	.73	.80	

*Hompopolymer, 20 ton lots except for Belgium where prices apply to 8 ton lots

Basis: Tables 4-5 and 4-22

TABLE 4-16 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR HIGH IMPACT POLYSTYRENE RESIN*

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
			Price U.S.$/kg				
4/7/80	.99	.98	1.49	1.52	1.20	1.53	.97
10/1/79	.66	.94	1.42	1.45	1.15	1.46	.94
4/16/79	.66	.94	.76	1.11	1.13	1.07	.87
10/13/78	.66	.88	.76	1.06	1.07	.79	.82
4/7/78	.62	.87	.71	1.04	1.05	.80	.79
4/8/77	.82	.75	.66	.88	.91	.78	.76
4/2/76	.66	.71	.70	.73	.85	.69	.80
4/4/75	.67	.84		.83	.94	.88	.91

*High Impact, 20 ton lots

Basis: Tables 4-6 and 4-22

TABLE 4-17 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR POLYURETHANE PRECURSOR-TOLUENE DI-ISOCYANATE, 80% ISOMER*

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
			Price U.S.$/kg				
4/7/80	Data Not Available	1.74	1.44	1.64	Data Not Available	2.05	1.70
10/1/79		1.67	1.37	1.56		1.53	1.64
4/16/79		1.68	1.35	1.51		1.43	1.52
10/13/78		1.57	1.35	1.44		1.26	1.43
4/7/78		1.54	1.25	1.41		1.23	1.38
4/8/77		1.34	1.18	1.19		1.18	1.14
4/2/76		1.27	1.24	1.12		.98	1.09
4/4/75		1.21	1.37	1.23		1.10	1.42

*10 ton lots

Basis: Tables 4-7 and 4-22

TABLE 4-18 EUROPEAN PRICES IN EQUIVALENT U.S. DOLLARS FOR POLYURETHANE PRECURSOR POLYETHYLENE GLYCOL*

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
		Price U.S.$/kg					
4/7/80	Data Not Available	1.01	1.60	1.36	Data Not Available	1.30	Data Not Available
10/1/79		.97	1.17	1.29		.95	
4/16/79		.98	1.15	1.25		.93	
10/13/78		.91	1.15	1.19		.87	
4/7/78		.90	1.07	1.17		.84	
4/8/77		.78	1.00	.99		.73	
4/2/76		.74	1.06	.93		.73	
4/4/75		.82	.61	1.02		1.07	

*Molecular weight = 4000, ton lots

Basis: Tables 4-8 and 4-22

TABLE 4-19 EUROPEAN LOT PRICES IN EQUIVALENT U.S. DOLLARS FOR PVC - PASTE FORMING GRADE

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
4/7/80	Data Not Available	1.02	1.24	1.32	1.03	1.28	Data Not Available
10/1/79		.98	.92	1.04	.98	1.15	
4/16/79		.99	.91	1.01	.97	.89	
10/13/78		.92	.91	.96	.92	.87	
4/7/78		.87	.55	.94	.82	.84	
4/8/77		.76	.51	.64	.72	.80	
4/2/76		.62	.54	.60	.67	.66	
4/4/75		.78	.60	.66	.74	.71	

*5 ton lots, except for Belgium where prices apply to 10-20 ton lots

Basis: Tables 4-9 and 4-22

TABLE 4-20 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR PVC - GENERAL PURPOSE - MECHANICAL GRADE*

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
			Price, U.S. $/kg				
4/7/80	.99	.82	1.08	1.15	Data Not Available	1.14	Data Not Available
10/1/79	.93	.79	.66	.82		.88	
4/19/79	.93	.80	.65	.80		.68	
10/13/78	.93	.75	.70	.76		.66	
4/7/78	.93	.73	.65	.74		.64	
4/8/77	.86	.63	.61	.61		.65	
4/2/76	.76	.51	.56	.57		.59	
4/4/75	.66	.61	.59	.63		.63	

*5 ton lots except for Belgium where prices apply to 10-20 ton lots

Basis: Tables 4-10 and 4-22

TABLE 4-21 EUROPEAN LIST PRICES IN EQUIVALENT U.S. DOLLARS FOR STYRENE-ACRYLONITRILE RESINS (SAN)*

Date	U.S.	Belgium	France	Germany	Holland	Italy	U.K.
			Price, U.S. $/kg				
4/7/80	Data Not Available	1.15	1.33	1.44	Data Not Available	1.06	1.36
10/1/79		1.11	1.27	1.37		1.04	1.32
4/19/79		1.11	1.25	1.33		1.01	1.22
10/13/78		1.04	1.25	1.26		1.02	1.15
4/7/78		1.02	1.16	1.24		.99	1.11
4/8/77		.87	1.09	1.05		.96	.89
4/2/76		.84	1.15	.98		.70	.77
4/4/75			.63			1.10	.93

*10 ton lots

Basis: Tables 4-11 and 4-22

TABLE 4-22 CURRENCY EXCHANGE RATES

ECN Date	Quotation Date	U.S. Dollar	Belgium Francs	French Francs	German DM	Dutch Guilders	Italian Lire	U.K. Pounds	Japanese Yen
		Units per U.S. Dollar							
10/28/80*	10/27/80	1.00	30.10	4.3300	1.8803	2.0340	889.25	0.4101	214.30
4/7/80	2/11/80	1.00	28.199	4.0694	1.739	1.918	805.64	0.4338	238.178
10/1/79	8/28/79	1.00	29.2724	4.2587	1.3278	2.0058	817.10	0.448	219.274
4/16/79	4/3/79	1.00	31.1657	4.3216	1.8851	2.0278	842.08	0.4837	211.850
10/13/78	9/5/78	1.00	31.1585	4.3257	1.9805	2.1474	830.98	0.5737	190.599
4/7/78	3/28/78	1.00	31.7587	4.6677	2.0141	2.1831	854.54	0.5338	230.318
4/8/77	3/29/77	1.00	36.6410	4.9746	2.3884	2.4946	887.29	0.5818	277.244
4/2/76	3/23/76	1.00	38.5996	4.7110	2.5403	2.6999	846.43	0.5205	300.104
4/4/75	2/17/75	1.00	34.692	4.2696	2.3187	2.4054	636.57	0.4180	293.00

*The Wall Street Journal

Source: Refs. 4-5 to 4-12.

the 210 chemicals quoted. . . . The disappointing response from many companies in Europe to requote for regular price information coupled with the quantum leaps in chemical prices has meant the accuracy of these pages has steadily deteriorated" (4-13).

The information presented in Tables 4-2 to 4-21, while fairly detailed, cannot be validated. It is, at best, a gross indicator of European prices and must be used with caution.

To complement the above, additional data were collected from a variety of other sources. Published sources included official government statistics and news articles to the trade press. This information is summarized in Tables 4-23 to 4-25. In order to further confirm current prices of major polymers in Europe, a subscription was obtained to Platt's Oilgram Polymer scan, a copyrighted newsletter published on a weekly basis by McGraw-Hill, Inc. This service tracks the West European and U.S. gulf spot prices of various grades of polyvinyl chloride, LD polyethylene, HD polyethylene, polystyrene, polypropylene, and ABS. It also reports on the commercial activity involving these plastics in Europe, and, to a limited extent, in Japan.

The relative European and American bulk prices of the major thermoplastics over the past few months are compared in Table 4-26. As can be seen from the table, comparable plastics generally cost less in the U.S. than in Europe. It should be noted that because of stagnant market conditions, the price levels for these plastics have been dropping since August 1980, but that price drops were sharper in Europe than in the United States. This is a partial correction for the rapid escalation in prices that occurred late in 1979 as a result of the Iranian crisis.

4.3 JAPAN

Price data for the Japanese plastics industry are not as readily available in the U.S. as are prices in other major industrial countries. Fortunately, a detailed listing of the historic Japanese domestic and export prices were recently published by the Industrial Bank of Japan (4-30). The domestic prices for the major thermoplastics from March 1975 to September 1978 listed in the reference are presented in Table 4-27. This Table also listes the more recent prices for high density polyethylene which are used as an index of plastic prices by the Industrial Bank of Japan in its monthly report (4-31).

TABLE 4-23 WEST GERMAN PRICE INDEXES FOR SELECTED PLASTICS

Year	1975	1976	1977	1978	1/79	7/79	1/80	9/80
		Index (1970 = 100)						
All Plastics	126	150	127	119	117	140	151	157
Polyethylene	119	123	117	113	109	142	156	162
Polyvinyl Chloride	135	139	137	125	125	156	163	168

Source: Ref. 4-15

TABLE 4-24 RECENT TRENDS IN THE PRICES OF PLASTICS IN THE U.K.

Year	1978	1979				1980			
Quarter	4	1	2	3	4	1	2	3	4
	U K £ / TON (US $ / kg)								
Polyethylene LD	390 (0.76)		490 (1.01)	515 (1.15)	550 (1.25)	600 (1.39)	550 (1.29)		
Polyethylene HD Injection Grade									
Polyethylene HD Blow Molding Grade									
Polypropylene Homopolymer	390 (0.76)		480 (0.99)	500 (1.12)		500 (1.27)			
Polystyrene Crystal	420 (0.82)			620 (1.38)	625 (1.42)	690 (1.59)			
Polystyrene, High Impact	450 (0.88)			650 (1.45)	655 (1.49)	720 (1.66)			
Polyvinyl Chloride, GP	345 (0.67)				460 (1.05)	480 (1.11)		330 (0.79)	
Polyvinyl Chloride Paste									
ABS, Color Grade				1140 (2.54)					
ABS Natural	800 (1.56)				1065 (2.42)	1140 (2.63)			
Currency Conversion Factor Assumed UK £ / US $	0.514		0.484	0.448	0.440	0.434	0.427	0.419	
Sources: Ref. Nos.	4-29		4-18, 4-29	4-16,4-17,4-19	4-20, 4-21, 4,22, 4-29	4-21, 4-22, 4-23, 4-26	4=25	4-26	

TABLE 4-25 RECENT TRENDS IN WEST EUROPEAN PLASTIC RESINS

Year	1978	1979				1980			
Quarter	4	1	2	3	4	1	2	3	4
				Price, DM/KG (US $/kg)					
Polyethylene, LD	1.35 (0.72)			2.45 (1.34)	2.10 (1.21)	2.30 (1.34)	2.40 (1.38)	2.00 (1.15)	
Polyethylene, HD, Injection Grade						2.35 (1.37)	2.25 (1.29)		
Polyethylene, HD Blow Molding Grade						2.45 (1.45)	2.45 (1.41)		
Polypropylene, Homopolymer						2.10 (1.22)	1.90 (1.09)		
Polystyrene, Crystal	1.60 (0.85)			2.45 (1.34)	2.50 (1.44)	2.50 (1.45)	2.55 (1.47)	2.20 (1.26)	
Polystyrene, High Impact	1.75 (0.93)			2.60 (1.42)	2.65 (1.52)	2.65 (1.54)	2.70 (1.55)	2.35 (1.35)	
Polyvinyl Chloride, GP	1.28 (0.68)			1.83 (1.00)		2.00 (1.16)	1.70 (0.98) 1.90 1.09)		
Polyvinyl Chloride, Paste				2.10		2.30 (1.34)	2.25 (1.29)		
ABS									
Currency Conversion Factor Assumed, DM/US $	1.885			1.828	1.739	1.719	1.739	1.745	
Sources: Ref. Nos.	4-28			4-27, 4-28	4-22	4-23	4-24	4-26	

TABLE 4-26 RELATIVE WEST EUROPEAN AND U.S. SPOT PRICES FOR COMMODITY POLYMERS

	North West European Port Spot Price* / U.S. Gulf Port Spot Price
Polyvinyl Chloride, Suspension Grade	1.24 - 1.33
HD Polyethylene, Injection Grade	1.27 - 1.26
Polystyrene, General Purpose	1.08 - 1.23
Polypropylene, Injection Grade	0.98 - 1.17
ABS, Injection Grade	1.06 - 1.07

*August 1980 through October 1980

TABLE 4-27 JAPANESE PRICES FOR COMMODITY THERMOPLASTICS

Material	1975 March	1975 September	1976 March	1976 September	1977 March	1977 September	1978 March	1978 September	1979 April	1979 September	1980 March
	Price ¥/kg ($/kg)										
LD Polyethylene	160 (0.55)	163	188 (0.63)	196	199 (0.71)	195	176 (0.76)	169 (0.89)			
HD Polyethylene	164 (0.56)	166	188 (0.63)	200	206 (0.74)	203	185 (0.80)	175 (0.92)	195 (0.92)	242 (1.10)	275 (1.15)
Polypropylene	172 (0.59)	171	204 (0.68)	213	213 (0.77)	207	184 (0.80)	175 (0.92)			
Polystyrene (GP and HI)	230 (0.78)	239	259 (1.86)	204	265 (0.96)	263	246 (1.07)	230 (1.21)			
Polyvinyl Chloride Resin	136 (0.46)	137	151 (0.50)	168	157 (0.57)	159	154 (0.67)	149 (0.78)			

Sources: Refs. 4-30 and 4-31

References

4-1 Modern Plastics, 55 (1), 55, January 1978.

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4-28 European Plastics News, October 1979, p. 8

4-29 European Plastics News, January 1980, p. 10.

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APPENDIX

REPORT OF NEW TECHNOLOGY

No innovations, discoveries, or inventions resulted from the work performed under this contract. This report consolidates data from a variety of sources, and presents a comprehensive description of plastics industries in the major industrial countries. The information is useful in assessing the impact of increased automotive demands for plastics on the world plastics industry.

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