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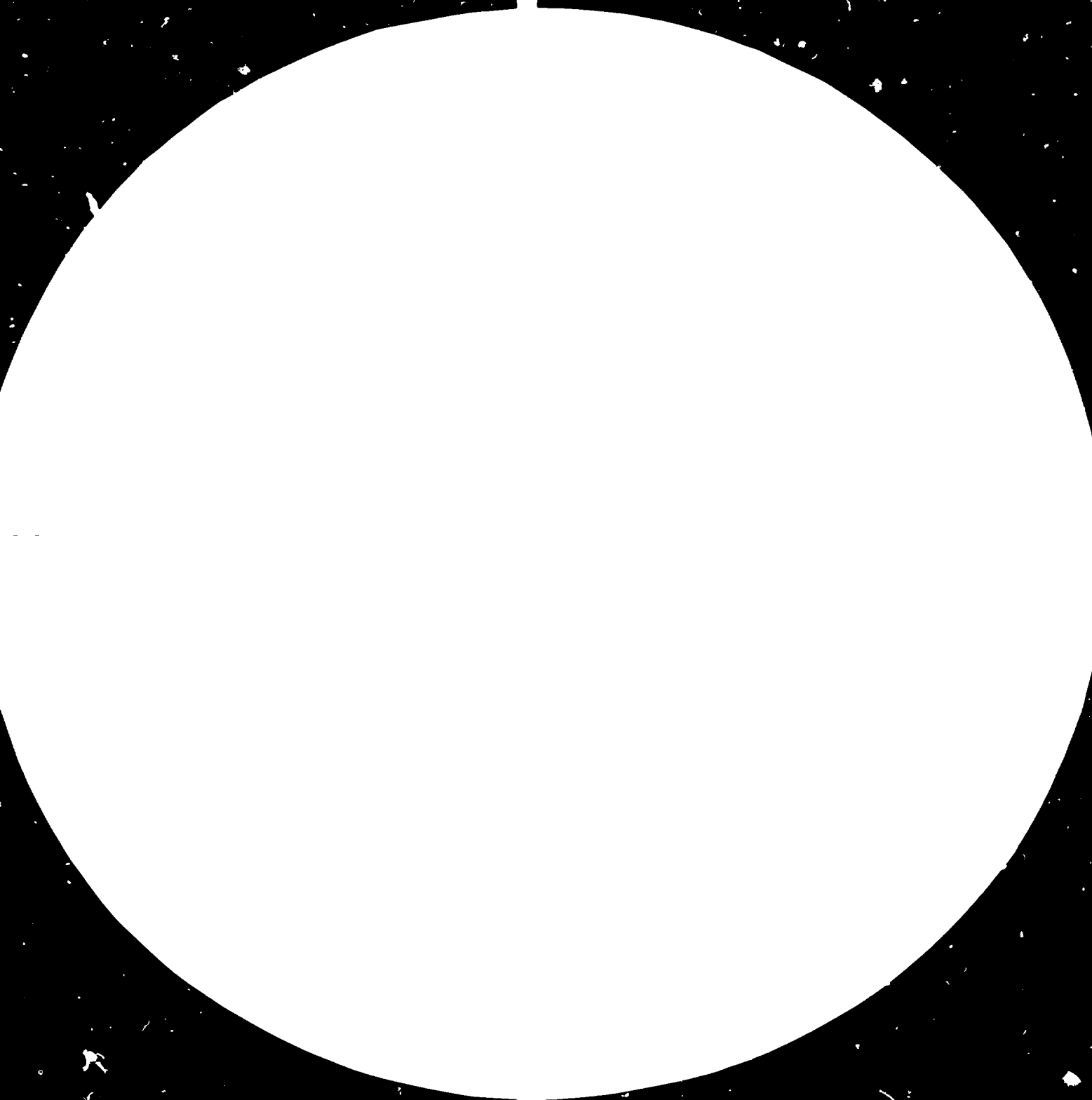
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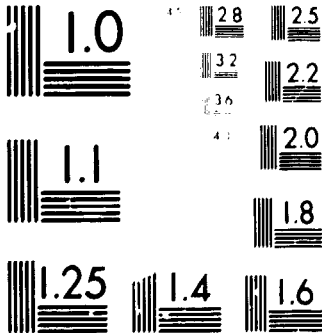
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United Nations Industrial Development Organization

First Meeting of the UNIDO Permanent
Working Group on World Demand for and
Supply of Petrochemicals

Vienna, Austria, 24 - 26 March 1980

DRAFT REPORT *

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INTRODUCTION

1. UNIDO convened the First Meeting of the Working Group in response to a recommendation of the First Consultation on the Petrochemical Industry convened in Mexico D.F. from 12 to 16 March, 1979 (see Report of the Meeting, ID/227, paras. 2(a) to 2(e)).

2. The Terms of Reference for the Working Group suggested by the Consultation were as follows:

- (i) To prepare and regularly update a 10-year forecast of demand for petrochemicals, expressed in terms of demand for basic petrochemicals, in major consuming countries and at regional and world levels;
- (ii) To prepare and regularly update a 10-year forecast of feedstocks available for the production of basic petrochemicals at regional and world levels;
- (iii) To prepare and regularly update estimates of capacities in operation, under construction and planned, and their effective capacity to supply basic petrochemicals in major producing countries and at regional and world levels;
- (iv) To extend the demand/supply exercise described above to selected intermediate and end-products as appropriate;
- (v) To invite countries to supply to UNIDO updated information required by the Working Group.

3. The Working Group on World Supply of and Demand for Petrochemicals should assemble information on 10 basic petrochemical products: ethylene, propylene, butadiene, benzene, paraxylene, orthoxylene, toluene, methanol, ammonia, acetylene; and on the following intermediate and final petrochemical products: acrylonitrile, caprolactam, dimethyl terephthalate (DMT), terephthalic acid (TPA), styrene, vinyl chloride, polyvinyl chloride (PVC), high and low density polyethylene, polypropylene, polystyrene, styrene butadiene rubber (SBR), acrylic, polyamide and polyester fibre; and other products as deemed appropriate by the Working Group.

4. The participants that the Consultation suggested UNIDO invite to be members of the Working Group were as follows:

- (i) CMEA, OECD and OPEC;
- (ii) Groups of countries such as the Andean Group, ASEAN, the Gulf Organization for Industrial Consulting (GOIC), the Industrial Development Centre for Arab States (IDCAS) and OAPEC;
- (iii) Industrial associations or federations formed by groups of countries such as CEFIC and the ASEAN Chemical Industry Club;
- (iv) Individual countries that either are, or have the potential to become, large consumers or producers of petrochemicals;
- (v) Organizations of the United Nations system such as ECE and UNCTAD.

5. Representatives of 7 countries, 6 regional Organizations, 3 United Nations organizations and the World Bank participated in the First Meeting of the Working Group; representatives of OPEC and CMEA participated as Observers in the First Meeting (see Annex A, List of Participants). OECD was unable to participate but indicated to the UNIDO Secretariat that it would be interested in participating in the Second Meeting.

I. ORGANIZATION OF THE MEETING

6. The First Meeting of the Working Group was convened in Vienna from 24-26 March 1980.

7. The Meeting was opened by Mr. E. Becker-Boost, Chairman of the UNIDO Internal Task Force responsible for preparations for Consultations on the Petrochemical Industry and Director of Investment -operative Programme Office. The Meeting was chaired by the UNIDO Secretariat.

8. The Meeting adopted the following Agenda:

1. The approach to be adopted by the Working Group
2. The preparation of preliminary estimates of world demand for and supply of some basic petrochemical products and some final products.
3. Further work of the Working Group
4. Adoption of the Report of the Meeting

9. It was agreed that the UNIDO Secretariat should act as the secretariat of the Working Group, as proposed by the Consultation.

II. APPROACH TO BE ADOPTED BY THE WORKING GROUP

10. The Working Group discussed the approach suggested by the UNIDO Secretariat in document ID/WG.316/7 and reached the following conclusions:

Regions

11. The Working Groups estimates should be published for 9 regions namely:

Western Europe	Developed countries
USSR and Eastern Europe	
North America	
Japan + other industrialized countries	
Latin America	Developing countries
Middle East	
Africa	
Asia	
China	

12. The grouping of countries suggested by UNIDO would be followed, except that the "Middle East" would cover all Arab States plus Turkey and Iran and the coverage of developing countries in "Africa" and "Asia" would be reduced accordingly.

Country Information

13. It was felt that information relating to individual countries and sub-regional groups should be collected by the Working Group on the understanding that only regional totals will be published in the Group's report.

Responsibility for preparing information

14. It was agreed that the individual members of the Working Group would assist the UNIDO Secretariat to collect the required information on a regular basis. The UNIDO Secretariat would collect information from individual countries to cover the gaps left by sub-regions and countries not represented in the Working Group.

15. Information would be sent to the UNIDO Secretariat in advance of each meeting of the Working Group so that it could be combined to prepare regional and world totals. Thus, the main task of the Working Group at future meetings would be to assess the estimates presented by the UNIDO Secretariat and ensure that they were soundly based, up-to-date and consistent.

Petrochemical products to be covered

16. The Working Group felt the exercise should be kept simple at the initial stage; instead of 25 products as recommended by the Consultation, only 7 basic petrochemicals and 9 final products should be covered as follows:

Basic Petrochemicals

Ethylene, Propylene, Butadiene, Benzene, Ortho-xylene, Para-xylene, Methanol, Ammonia

Final Products

L-D Polyethylene, H-D Polyethylene, Polypropylene, PVC, Polystyrene; Polyamide, Polyester and Acrylic Fibres; all general purpose Synthetic Rubbers

17. The Working Group felt it would be useful to collect information on intermediates at a much later stage; it was agreed the list of major intermediates for synthetic fibres and plastics suggested by the Consultation should not be expanded so as keep the exercise as simple as possible.

Estimating Demand

18. It was agreed demand should be defined as follows:

"For the basic and intermediate petrochemicals, demand shall be measured as the quantity required for all downstream production uses in the country. For final products, demand shall be measured as the quantity required for use in the country".

19. For the next meeting of the Working Group, demand forecasts should be prepared up to 1984 plus a guesstimate for 1989. When preparing forecasts of demand for the Working Group, members would transmit to UNIDO the basis on which the forecasts were prepared.

20. Examples of the basis might be one or more of the following approaches:

- (a) Official and private planning forecasts;
- (b) A compilation of forecasts made by individual countries and/or companies on a subjective basis;
- (c) A simple extrapolation of past trends;
- (d) An assumed relationship between demand, population and income levels;
- (e) The estimates of buyers taking into account competition with natural products.

21. The UNIDO Secretariat pointed out that it would be very helpful in making future projections if the demand figures which members prepared started in 1970 instead of 1974. Many members considered this would be difficult but agreed in principle to try to implement the suggestion.

Estimating Nameplate capacity

22. The UNIDO Secretariat proposed that additions to capacity after 1979 be prepared in the form of a plant list, of which an example was discussed. Nameplate capacity should be based on 330 operating days per annum. It was agreed that each member of the Working Group would revise and try to prepare a complete plant list for his region/country and subsequently up-date it as required. The form of the plant list is attached as Annex B.

23. It was agreed that the status of projects included in the list should be recorded as one of the following five categories:

- Under Study: feasibility study being made.
- Planned: feasibility study completed and construction of the plant has been announced by the owner and/or contractor but the plant has not yet reached the stage of "under design" as defined below.
- Under design: when the main contract has been signed, design work has started but site work has not commenced.
- Under construction: when site work has commenced until the plant is "in operation".
- Completed: when the plant is on stream.

Effective Capacity

24. Group members did not agree with the UNIDO proposals for estimating "capability to supply". It was agreed to use the term "effective capacity" defined as follows:

Effective Capacity is the annual production capacity of each plant (verified by experience or in a test run) after allowing for maintenance shutdown, production and storage bottlenecks and allowing for operational limitations due to the statutory regulations, environmental considerations and the rate of production build-up for new plants and final shutdown for old plants. For a new plant that is commissioned during the course of a year, effective capacity is calculated in proportion to the length of time during that year the plant is operational.

25. It was further agreed that each member would make his own best estimate of the output that all new plants in his region/country could produce and report it to UNIDO in the form of a Table as shown in Annex C.

Feedstock requirements

26. It was felt that an attempt to assess the requirements for feedstocks along the lines suggested by UNIDO would be too difficult. Instead it was agreed to adopt the following approach:

- (a) Members would indicate the type of feedstock for each new plant reported to the UNIDO Secretariat in the Table in Annex B;
- (b) The UNIDO Secretariat would examine the ethylene and benzene^{1/} plants in each region and identify the feedstock they require;
- (c) The following feedstocks would be considered:

Ethane
Methane
LPG
Naphtha
Gas Oil
Coal
Fermentation Alcohol

Production and International Trade

27. It was agreed that each member of the Working Group would prepare production and, as far as possible, trade statistics for the period 1970-1979. UNCTAD was invited, in co-operation with the ITC and ECE, to prepare estimates of inter-regional trade between the 9 regions for the more important basic petrochemicals and final products.

^{1/} For aromatics, it was suggested that a distinction might be made between reformers and ethylene crackers.

Technical Definitions

28. The Technical Definitions proposed by the UNIDO Secretariat were amended to read as shown in Annex E.

Presentation of the Working Group's findings

29. The Working Group agreed to present its findings in the form of five Tables giving regional and world totals relating to:

- (a) Demand
- (b) Nameplate capacity
- (c) Effective capacity
- (d) Production
- (e) Feedstocks used

30. The format of the Table for items (a)-(d) suggested by the UNIDO Secretariat in document ID/WG.316/1 pages 21 to 25 was approved, with the changes mentioned above. The format for the Table for item (e) will be worked out by the UNIDO Secretariat.

III. FUTURE WORK OF THE WORKING GROUP

Membership of the Working Group

31. Bearing in mind the recommendation of the First Consultation on participants it was agreed that in order to obtain complete coverage, the following organizations should be invited to participate in the work of the Working Group on a permanent basis:

Western Europe

Association of Plastics Manufacturers in Europe (AFME)
Conseils Européen des Federations de l'Industrie Chimique (CEFIC)
Comité International de la Rayon et des Fibres Synthetiques (CIRFS)

North America

Canadian Chemical Producers' Association (CCPA)
United States Country representative

USSR and Eastern Europe

USSR Country representative
(CMEA Secretariat as Observer)

Japan and other industrialized countries

Japan Petrochemical Industry Association (JPIA)

Latin America

Instituto Petroquímico Latinoamericano (IPLA)
Andean Group (Acuerdo de Cartagena)
~~Caricom Secretariat~~

Asia

Association of South East Asian Nations (ASEAN), Chemical Industry Club

Middle East

Industrial Development Centre for Arab States (IDCAS)
Gulf Organization for Industrial Consulting (GOIC)
Organization of Arab Petroleum Exporting Countries (OAPEC)

United Nations Organizations

Conference on Trade and Development (UNCTAD)
International Trade Centre (UNCTAD/GATT)
European Economic Commission (ECE)
World Bank

Non-Governmental Organizations

International Institute of Synthetic Rubber Producers (IISRP)

Observers

Council for Mutual Economic Assistance (CMEA)

Organization for Economic Co-operation Development (OECD)

Organization of Petroleum Exporting Countries (OPEC)

32. It was agreed representatives of individual countries selected by UNIDO should also be invited, in particular for regions/countries which are not covered by the above organizations.

33. It was understood that participation in future meetings of the Working Group implied that each participant would compile and submit to UNIDO on a confidential basis the information for his country or group of countries which the Working Group agreed should be compiled.

Timetable for future work

34. The Working Group agreed that each member should compile the information required for each product using the forms attached as Annexes B, C and D and submit it to UNIDO by 30 September 1980.

35. UNIDO would then arrange this information in the form of five Summary Tables (as agreed in para. 29 above) and submit these world-wide estimates to all members of the Working Group for review by 30 November 1980.

36. The Working Group planned to reconvene from 19-21 January 1981. The estimates of world demand, capacity, effective capacity, production and sources of feedstock would be discussed and finalized for presentation to the Second Consultation in June 1981.

37. At its Second Meeting, the Working Group would consider what type of report might be prepared interpreting the estimates made. It was suggested that UNIDO should prepare and circulate a first draft of this report.

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UNIDO WORKING GROUP ON WORLD DEMAND FOR AND SUPPLY OF PETROCHEMICALS

LIST OF NEW PLANTS PRODUCING BASIC PETROCHEMICALS FOR (COUNTRY/REGION)

(List all plants that are additional to the list of plants in operation in 1979)

Country	Location of plant	Status of implementation ^{1/}	mechanical date of completion	Feedstock	Source of information	Announced Nameplate capacity in 000 tons per annum						
						Ethylene	Propylene	Butadiene	Benzene	O-xylene	P-xylene	Methanol

1/ As defined in para. 23 of the Report of the First Meeting of the Working Group

ANNEX C

UNIDO WORKING GROUP ON WORLD SUPPLY OF AND DEMAND FOR PETROCHEMICALS

TOTAL NAMEPLATE AND EFFECTIVE CAPACITY OF NEW PLANTS COMING ON STREAM 1980-1985
('000 metric tons per annum)

REGION/COUNTRY _____

	1980					1981					1982					1983					1984					1985				
	1. Existing capacity 1979	2. Additions to capacity after 1979	3. Deletions to capacity after 1979	4. Total nameplate capacity 1980	5. Total effective capacity 1980	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5					
ethylene																														
propylene																														
butadiene																														
styrene																														
acrylonitrile																														
vinyl acetate																														
ethyl alcohol																														
methanol																														
acetone																														

UNIDO WORKING GROUP ON DEMAND FOR AND SUPPLY OF PETROCHEMICALS

WORKING TABLE TO BE COMPILED TO SUMMARIZE SUPPLY ESTIMATES

REGION OR COUNTRY _____

('000 metric tons)

PETROCHEMICAL PRODUCT _____

Historical data

Forecasts

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1989
1. Nameplate capacity																
2. Effective capacity																
3. Production ^{1/}																
4. Exports from country/region ^{3/}																
5. Imports to country/region ^{3/}																
6. 3-4+5 (Apparent demand) ^{2/}																
7. Actual forecast demand																
8. (6-7) Adjustment ^{4/}																

1/ In forecasting future production of basic petrochemicals, additional production for new integrated downstream units expected to come on stream should be included.

2/ Demand to be estimated as defined in para. 25 of the Report of the First Meeting of the Working Group.

3/ Where exports and imports figures are not available, a figure representing the balance of trade will be accepted.

4/ Where figures for both actual demand and apparent demand are available, line 8 represents the difference. Many factors may contribute to this including changes in stocks, material in transport, losses, etc.

TECHNICAL DEFINITIONS OF THE PETROCHEMICAL PRODUCTS BEING COVERED

Ethylene: Demand for and capacity to produce ethylene is easily estimated. Care should be taken to include ethylene produced for captive use. Ethylene is usually produced from ethane or from naphtha. The source of ethylene is important in determining the amount of propylene and butadiene produced. Ethylene produced from fermentation alcohol should be included.

Propylene: Propylene should be recorded on a 100 per cent basis. Propylene is a major by-product of ethylene production but it is also produced from cracker gases and a 50 per cent stream.

Butadiene: Butadiene is a by-product of the production of ethylene but the quantities can be increased by the special treatment of other streams, e.g. the dehydrogenation of butane. Butadiene produced ethyl alcohol should be included.

Benzene: Benzene availability should be that produced in 98.7 per cent purity from pyrolysis gas or by working up a catalytic reformat or by the de-alkylation or disproportionation of toluene. The benzene content of an aromatic stream used (a) to upgrade gasoline or (b) for other purposes should not be recorded. Benzene from coal to be included.

O-xylene and p-xylene: These are normally separated from crude xylenes with or without some isomerisation and statistics should be recorded on the basis of the pure chemicals. Crude xylene streams used for other purposes should not be recorded.

Methanol: Methanol should be recorded on a 100 per cent basis. In view of the growing importance of this product as a chemical produced from natural gas, total production should be recorded whatever its final use may be. Methanol used to upgrade gasoline or for other fuel uses should be included. Methanol obtained from wood should be included.

Polyethylenes: Record polyethylene resin including that for captive use.

Polypropylene: As for polyethylene. Include any polypropylene for fibres.

PVC: Record only PVC resin.

Polyamide fibres: Production of filament and staple fibres only should be included.

Polyester fibres: As for polyamides.

Acrylic Fibres: As for polyamides.

Synthetic Rubbers: ALL "general purpose synthetic rubbers" to be included.



