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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
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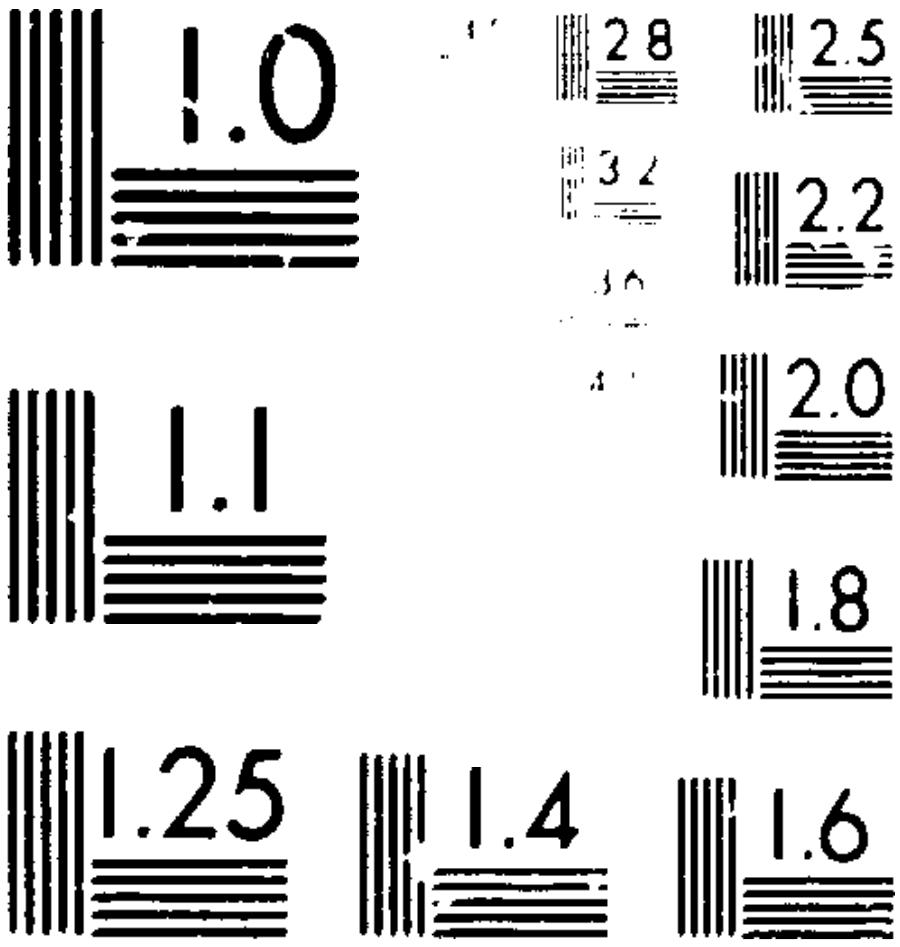

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A BASIC TECHNOLOGICAL DISAGGREGATION MODEL:

(I) The Petrochemical Industry

by

The Secretariat of the Board of the Cartagena Agreement*

*This is the advance edition of a UNIDO publication to appear in the Development and Transfer of Technology series. The study has been translated from an unedited original.

Preface

The disaggregation of technology - sometimes known as the "unbundling" of the technology package - is central to the choice of technology, the negotiation and its acquisition on suitable terms, and the development and utilization of local manufacturing and human capabilities. The capacity for disaggregation promotes and is in turn promoted by the growth of technological capabilities in general. It is thus a key element in the technological self-reliance of developing countries. Though the concept by now is well recognized its translation into concrete tasks and practical guidelines suitable for application to specific industries has not so far been attempted widely.

The importance of such practical guidelines and a methodology for disaggregation cannot be over-emphasized in the case of the petrochemical industry. The Board of the Cartagena Agreement took the initiative to prepare a Basic Technological Disaggregation Model (BTDM) in this industry, with the International Development Research Centre, Canada, and UNIDO contributing to it. The model was compiled and published in Spanish. With a view to making such a model available to a large number of developing countries, the UNIDO Secretariat has, with the consent of the Board of Cartagena Agreement, translated and brought out this language edition which will appear later in edited form in the Development and Transfer of Technology (DTT) series.

Apart from concepts and broad guidelines which may be relevant to different types of industrial projects, the model provides a detailed inventory of not only the hardware but also the human resources required. The model, as developed, can also serve as a planning and management tool for the construction of petrochemical projects. It is hoped that this model will be of practical use to the decision makers and the technical and managerial cadres of developing countries.

The UNIDO Secretariat wishes to thank the Board of the Cartagena Agreement for agreeing to the translation and publication of the document in the DTT series.

The Technology Programme of UNIDO intends to develop and publish similar guidelines for disaggregation in other important industrial sectors.

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NOTES FOR THE USER*

Within the framework of Decision 84 of the Cartagena Agreement, technological disaggregation (or unbundling) is one of the main instruments of the subregional strategy for technological development.

The purpose of this instrument is to strengthen member countries' capacity for managing, negotiating and handling industrial projects. It is also hoped that one of the main results of using this instrument will be to generate a greater demand for the Subregion's production capacity for capital goods and technological services, thereby contributing to the positive development of that capacity.

As a start in implementing Decision 84 a Basic Technological Disaggregation Model (BTDM) has been prepared for the use of the different types of undertakings existing in the countries of the Subregion. It has been designed in particular as a practical working method for the disaggregation of the implementation phase of petrochemical projects.

In keeping with the principles of the Cartagena Agreement and Decision 84, the preparation of this Model was entrusted to a group of the Subregion's engineers with highly varied and extensive experience in the direct handling of industrial projects. Recourse was also had to various regional bibliographical sources and to similar works. Of special importance in this respect was the project carried out by

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* Prepared by the Secretariat of the Board of the Cartagena Agreement.

COLCIENCIAS 1/ - OAS: "Desagregación Tecnológica Valorada de Proyectos. Sector Estatal de Refinación y Petroquímica de Colombia. Documento DTV (1978)". (Evaluated Technical Disaggregation of Projects. State Refining and Petrochemical Sector of Colombia. Document DTV (1978)).

In addition to being prepared by experts from the Subregion, one of the methods used in constructing the Model was to apply it to industrial projects already completed or being carried out in the Petrochemical Sector.

In constructing the Model, industrial projects and technological disaggregation were considered as a single dynamic whole. Starting from the definition of a project as the combination of studies and activities which lead to the materialization of an idea, by conceiving it as a whole an attempt was made to understand fully the management and administration (in all aspects - labour, financial, technological, operational and commercial) needed to make possible the materialization of the original idea.

Under this important concept the project must be the subject of a continuing global analysis of each and every one of its parts in order to ensure that the decisions taken at each step are the best. Its parts must never be considered as isolated events because, although it is possible to differentiate clearly between them and even to find them a supposedly logical sequence in time, the treatment must be of the whole

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1/ COLCIENCIAS. Fondo Colombiano de Investigación Científica y Proyectos Especiales, Francisco José de Caldas. The authors of this work are Ingenieros Raúl Barnett H., Julio de la Roche V., Henry Echeverry and Luis Gustavo Florez E.

and its progress analysed permanently so that new considerations and modifications to decisions already taken can be introduced in good time. For it must not be forgotten that there are usually considerable differences between a project as originally conceived and as finally materialized, including even substantial differences in the over-all conception.

Similarly technological disaggregation has been conceived as a whole to be applied in full throughout the life of the project, from its genesis as an idea up to its final materialization as a factory operating and supplying its products for marketing in regular form. In its final conception disaggregation must cover all the technical aspects of every single facet of the industrial project. In this way management has an instrument that will really enable it to know in detail the human, economic and physical requirements of the project and hence to know also the demand for goods and services. Finally, it will have a sufficiently realistic idea of its possibilities of undertaking the project successfully, whether directly or through third parties.

The main purpose of this edition of the BTDM for the implementation phase of petrochemical projects is to provide the Subregion's management engineers responsible for the development of this important industrial sector with an instrument which will enable them to improve working methods in the planning, control, evaluation and development of the projects in the form which will be of greatest benefit to the technological development of our countries.

It should also be noted that the model is envisaged as a carefully structured and flexible general working tool which can be adapted to the different operational methods used by firms in the Subregion. At the same time, it can be processed and handled by computer technicians, thus

facilitating the accumulation and recording of information and experience of great value to the firms.

Further action programmed by the Board includes supplementing the Model with an analysis of the administrative, financial and commercial management of petrochemical projects and extending its use to other priority industrial sectors in the Subregion, so that eventually there will be available a complete and fully-tested instrument for disaggregation.

Finally, it should be noted that the stated goals cannot be achieved unless it is understood that disaggregation is not the product of one man in one organization, let alone in one country. Its practical application is the work of multidisciplinary teams. At the same time its results will only match expectations when its objectives and principles form an integral part of the conception and structure of the national industrial organization, and even governmental organization.

Consequently, the formation of teams for the administration and management of all parts and phases of projects should be given decisive support and the teams made responsible for directing and carrying out the activities involved in implementing the project, including its technological disaggregation.

Lima, April 1979

ACKNOWLEDGEMENTS

This Basic Technological Disaggregation Model (BTDM) for Petrochemical Projects was prepared by a Working Party made up of professional experts from the member countries, co-ordinated by the Board of the Cartagena Agreement through its Technological Policy Group. Its members were as follows:

Member countries:

Ing. Alfonso Burgoa Terán - Bolivia - (YPFB)

Ing. Marco Tulio Restrepo - Colombia - (ECOPETROL)

Ing. Edmundo Rojas Ruiz - Ecuador - (CEPE)

Ing. Gilberto García G. - Peru - (PETROPERU)

Ing. Getulio Alvarez U. - Venezuela - (PEQUIVEN S.A.)

Board:

Ing. Luis Soto Krebs - Technological Policy Group

Ing. Raúl Vázquez Rodríguez - Chief of Project

Ing. Julio de la Roche V. - Adviser

Ing. Diego Ortiz Villa - Adviser

The original structure of the Model underwent various revisions, finally taking the form of this first edition, which was adopted by the Group of Subregional Experts meeting at the headquarters of the Board of the Cartagena Agreement in Lima between 26 February and 2 March 1979.

DECISION 84: BASES FOR A SUBREGIONAL TECHNOLOGICAL POLICY

A. Background

A characteristic of the contemporary world is the decisive influence which the possession of knowledge and the capacity to use it have on the economic and social development of countries. It is, too, the possession of knowledge that enables countries to act independently within the international community.

Much has been said regarding the importance of foreign capital in creating dependence among countries, and Governments have taken practical steps to regulate its activity. When it comes to technology, however, very little has so far been done, as is apparent from the lack of effective measures for handling this factor of production.

Yet technology is as important a factor as capital in creating dependence. At the same time it can be said that technology is a generator of capital, as can be seen from the fact that most of the industrialized countries are basically so because they possess and sell technology. Japan, Germany, the United States and others provide excellent examples of this.

Consequently, what is needed is to accord technology its rightful importance and, at the very least, treat it like capital when it comes to studies of industrial projects.

On the other hand our countries, in their eagerness to meet their technological development needs, have mainly had recourse to foreign sources, with such undesirable results as the following:

- Solutions inappropriate to the characteristics of their economic development;
- Extremely high costs;
- Limited possibilities of choosing between different solutions and alternatives;
- The supplanting of local activities and production;
- The underemployment of local scientific and technological resources;
- Political and economic decisions conditioned by technological solutions imposed from the outside;
- Many unsatisfied needs because of the inadequacy of the imported technological solutions;
- An accentuation of their technological dependence.

The main cause of this has been the systematic recourse to "turn-key" packages for obtaining the necessary technology transfers. As a result our professionals have not been involved to the extent which they needed for their own development, i.e. they have to a large extent been spectators of the technological development of their countries.

This has led to the paradoxical situation that our professionals have not been employed more extensively and thoroughly because they were not regarded as sufficiently qualified, while at the same time they have not developed their capacities to the full because of the lack of effective opportunities for doing so.

Similar considerations can be put forward regarding the Subregion's capacity to produce capital goods and provide technological services.

Aware that the sole result of all these imperfections and undesirable results has been to relegate them to their present situation of technological underdevelopment (which they recognized openly in the Bogotá Declaration of 16 August 1966), the Andean countries decided to change things radically.

To that end the Andean Governments provided themselves with three fundamental tools: Decision 24 (Common Rules for the treatment of foreign capital and concerning trade marks and patents, licences and royalties), Decision 84 (Bases for a technological development policy) and Decision 85 (Industrial property).

B. Objectives and fields of action of Decision 84

Determined to give a firm and continuing impetus to the task of overcoming their age-old technical and scientific underdevelopment, the countries of the Cartagena Agreement adopted a clearly defined subregional technological development policy in order to:

1. Promote the application of knowledge which, in the economic and social conditions prevailing in the Subregion, would be the most appropriate for meeting the specific needs of subregional development and for the attainment of their national objectives;

2. Overcome progressively those internal and external limitations which in this field might detract from the independence of decisions relating to their development processes; and

3. Eliminate progressively the existing inequalities in this field among member countries through the adoption of mechanisms to foster the advance of the relatively less developed ones.

The subregional policy adopted will bear upon the following main areas or fields of action:

- The importation, assimilation and generation of technology;
- The retrieval of knowledge existing within the Subregion, and the adaptation and creation of technology;
- The application and utilization of technology in productive activities;
- Subregional technological information systems.

This last will support and form part of the corresponding actions of the other three areas.

C. Instruments of Decision 84

It is not enough to establish the bases for a subregional technological development policy if the instruments needed to attain the agreed objectives are not also identified. In this respect five important instruments can be identified from Decision 84:

- Technological disaggregation of projects;
- Inventories of the technological capacities existing in the Subregion;
- Subregional technological information system;
- International search for technology;
- Andean Technological Development Programmes (ATDP).

The importance of these instruments is underlined by the efforts being made jointly by the countries and the Board to implement them properly. These efforts find expression in the various work programmes and specific projects which are now in full development or which have been submitted for the consideration of the Cartagena Agreement Commission.

A practical result of one of those programmes is the Basic Technolcgical Disaggregation Model (BTDM) for Petrochemical Projects which is part of this publication.

On the technological disaggregation of projects, Decision 84 proposes that applications for the importation of technology must be accompanied by information which makes it possible to identify in disaggregated form the core (medullar) and peripheral technologies included in the importation. Such a disaggregation of the technological component will make it possible, among other things, to correct the traditional practice of buying technology in sealed packages containing elements of varying value, many of which can be supplied locally.

The fundamental objectives of technological disaggregation may be summed up as follows:

- To strengthen the capacity for planning, administrating, evaluating and negotiating industrial projects;
- To generate a bigger work-load for the technological capacities existing in the Subregion;
- To promote the assimilation, development and generation of technology;
- To know, well ahead of time, the amount of the capital needed to finance the goods and technological services which can be produced and developed at subregional level.

Finally, the instruments provided for in Decision 84, and more particularly the technological disaggregation of projects, are above all designed to generate and strengthen the management capacity of the Andean countries for the administration, execution and negotiation of projects and to foster a better utilization of the Subregion's technological capacities.

BASIC TECHNOLOGICAL DISAGGREGATION MODEL (BTDM)

FOR PETROCHEMICAL PROJECTS

GENERAL ASPECTS

The Model proposed is a practical method of work which is the result of:

- A general analysis of the development of industrial projects in the petrochemical sector, from their gestation as an idea until their completion;
- A detailed analysis of all the activities and elements which form part and make possible the technological materialization of petrochemical projects;
- The recuperation and systematization of isolated personal efforts undertaken in the Subregion in the field of technological disaggregation.

It must be emphasized that disaggregation, as here proposed, is conceived as a whole to be applied in full and continuously to the whole of the project, from its very gestation as an idea up to its culmination when the factory or plant is started up and handed over for normal operations.

Since the petrochemical industry is one of great technological complexity as regards both the processes and the equipment used, the Model can be extended by analogy to the chemical industry in general. The feasibility of such an extension of the use of the Model is further strengthened when it is remembered that in preparing it specific projects covering various industrial aspects, such as fertilizers, petrochemicals and refining, were taken as points of reference. The projects contributed by the member countries were the following:

- Fertilizer complex: (ammoniac - urea) 300 MT/day urea (Petroperú) - Talara, Perú;
- Ethylene plant: 100,000 MT/year (POLICOLSA) - Barrancabermeja, Colombia;
- Esmeraldas refinery: 50,000 Bbls/day (CEPE) - Esmeraldas, Ecuador;
- Chlorine - fluorine - methane plant: 9,000 MT/year (PRODUVEN) - Valencia, Venezuela;
- Phenol plant: being planned (YPFB) - Bolivia.

In order to familiarize the Subregion's professional technologists with the BTDM method of technological disaggregation, one chapter comprises a manual for the technological disaggregation of the implementation phase. The manual contains explanations and instructions that make it easier for the users to understand and apply the method. In addition to general and specific instructions for each of the disaggregation criteria used, this chapter includes model forms in which are presented the activities, subactivities, systems and subsystems identified in the BTDM.

In the last resort those responsible for projects and users of the Model must be convinced of the benefits of disaggregation and of course must have the necessary personnel resources to encourage implementation of the Model.

1. General objectives

There are two general objectives, one of a subregional nature, the other industrial. The first is to contribute to the technological development of the Subregion in accordance with the terms of Decision 84.

The second objective, which stems from the first, is to provide enterprises with a working instrument in the field of planning, programming, implementation, control and evaluation of industrial petrochemical projects at the different stages: before, during and after their realization.

2. Specific objectives

The specific objectives aimed at are as follows:

- To provide a working tool for strengthening the administrative and negotiating capacity of enterprises by encouraging the conscious utilization of the technological capacities existing in the Subregion;
- To provide a working instrument to facilitate the programming and follow-up of the project at its different phases and stages;
- To determine and plan the manpower and material resources needed for the proper implementation of the project;
- To know sufficiently in advance the amount of untied capital needed to finance possible activities or equipment which could be developed or produced at subregional level;
- To promote and support the development of the existing subregional technological capacity;
- To reduce gradually the importation of industrial plants in sealed packages;
- To promote subregional technological assimilation, adaptation and research through better knowledge of industrial projects.

3. Disaggregation analysis procedures and methods

The structure of the Model and of each and every one of its parts has been built up by using certain analysis procedures based on different criteria, making it possible to break down a petrochemical project using guidelines of a qualitative, quantitative, descriptive and ordering nature. The first three procedures make possible the detailed disaggregation, while the last has served as guideline for the over-all structuring of the disaggregation. 1/

The analysis procedures used in structuring the Model were as follows:

- Qualitative Disaggregation Procedure;
- Quantitative Disaggregation Procedure;
- Descriptive Disaggregation Procedure.

These procedures can be defined as follows:

The Qualitative Disaggregation criteria are so named because the disaggregated parts only cover an action, work or occurrence to be carried out and/or considered in connection with the one carrying them out, who may be the owner himself and/or a contractor.

The Quantitative Disaggregation criteria are so called because the purpose of the disaggregation is to place a valuation on the disaggregated parts. This valuation is based on the amount of the national, subregional and foreign costs represented by each activity and also by the quantity of man-hours involved, a distinction being drawn between national and subregional manpower and foreign manpower.

1/ To help the user understand the Model's terminology definitions are given in annex I (Definitions of terms for the Basic Technological Disaggregation Model).

By means of the Descriptive Disaggregation analysis criteria all the parts making up the project are disaggregated and characterized according to how they participate in it.

To ensure the permanent control and evaluation of the petrochemical project being analysed the Model provides for three methods to be followed, namely assessment, valuation (quantification) and characterization, which are applied directly to the disaggregation criteria mentioned above. The relationship between those criteria and the follow-up methods is as follows:

Criterion (procedure)		Method
Qualitative Disaggregation	⟶	By assessment
Quantitative Disaggregation	⟶	By valuation
Descriptive Disaggregation	⟶	By characterization

A. METHODOLOGY OF THE MODEL

A. METHODOLOGY OF THE MODEL

The proposed model is based on a practical, flexible and general plan that makes it possible to identify and disaggregate clearly the phases, activities or events that take place throughout the life of a project. 2/

1. Over-all structure

To facilitate and determine the scope of the work a global analysis was made of the industrial project, from which it was found possible to distinguish phases, stages and fundamental components - parts which are dealt with below - thus providing a starting point in the preparation and structuring of the Model. 2/

a. Phases of an industrial project

In considering an industrial project it is generally possible to visualize phases of work through which it passes and which are clearly distinguishable from each other but have inter-connecting activities.

To clarify this idea it may be said that "phase" in the Model means the major grouping of actions, activities and events occurring during the development of an industrial project. The Model has identified the following five work phases:

Generation phase;

Financing phase;

Implementation phase;

Operation phase;

Marketing phase.

2/ In order to make clear the scope of some of the technical terms used a working glossary has been incorporated in the Model as annex II (Glossary of technical terms).

It may be noted that the order in which they are listed above does not necessarily imply a sequence for carrying out the activities, since many of them, in keeping with the method of handling the project, should and can be carried out simultaneously.

The Disaggregation Model here proposed is specifically designed to be used in the implementation phase. The main reasons for this choice are as follows:

- It is one of the most intensive phases in the development of a project; in it the human and technical efforts, as well as the investments required - which, because of their importance, demand that the best knowledge and skill be applied in handling all the activities which affect them - must be consolidated;
- It is the phase in which the greatest use is made of technology, in the usual sense of the term which is the one accepted in this work.

It must be emphasized that what has just been said in no way detracts from the importance of the remaining phases, which must be analysed equally thoroughly with a view to including them in an expanded Disaggregation Model.

Following analysis of the different activities and events which take place during the implementation phase, which is the subject of this BTDM, these have been broken down into "stages" and "fundamental components".

i. Stages

Stages are those activities and events which take place in this phase of the project and which can be grouped together as clearly distinguishable parts of its development. Disaggregation of the implementation phase produces the following stages:

- Studies for the implementation phase;
- Choice of process technology;
- Basic engineering;
- Detailed engineering;
- Purchasing services;
- Construction and assembly;
- Acceptance and start-up.

Normally these stages succeed each other in the order listed above. However, certain measures can or should be carried out simultaneously for all or some of these stages.

The disaggregation criterion for each of these stages is to enable the owner to visualize and decide which activities he can undertake directly and which should be done through contractors. Hence certain actions or sub-activities are included in more than one stage. It is then for the owner to decide the stage in which they are to be considered definitively.

ii. Basic components

These are the components which identify, characterize or serve to give material form to the project being analysed and which simultaneously support or supplement the activities or actions grouped together in each stage. The following are some of the basic components: processes, equipment, technical services, requisite technical personnel, instrumentation, electrical system, etc.

In view of their vital importance in the project the following are disaggregated in the Model:

- Basic component, processes;
- Basic component, equipment.

The processes component is of outstanding importance because it represents the core of an industrial project. The equipment component gives material form to the process selected and, in addition, is closely tied in with the capital inventories which constitute the other part of this work.

Figure 1 shows in schematic form the over-all structure of an industrial project as described above.

2. Detailed disaggregation of the implementation phase

In conformity with what has been said earlier this has been done for the Implementation Phase for each and every one of the parts identified in the global disaggregation. It will be noted that of all the analysis criteria applied in breaking down each of those parts the disaggregation criterion with which we are now confronted predominates.

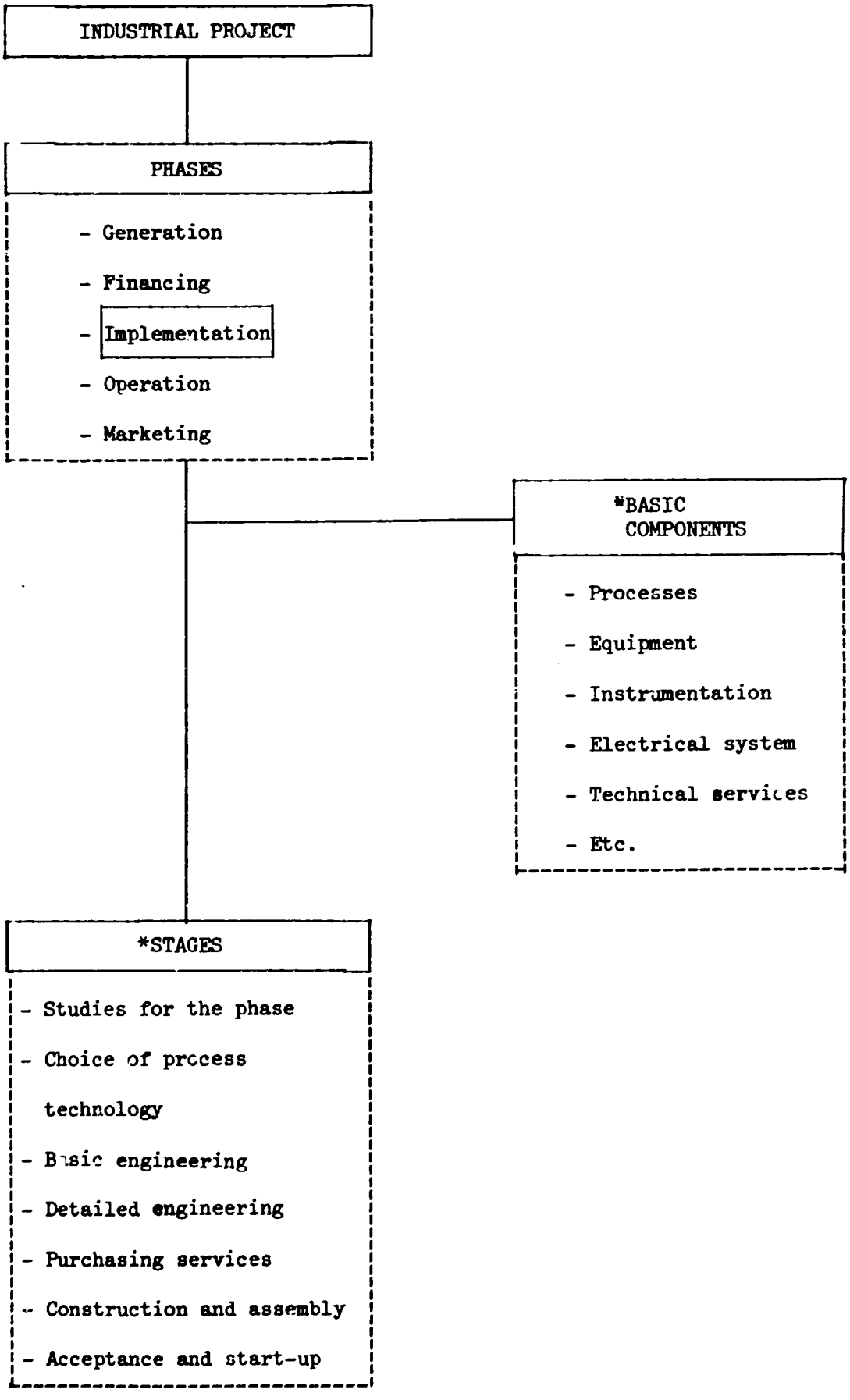
a. Disaggregation of the stages

The stages are disaggregated by applying qualitative and quantitative criteria.

i. Qualitative Disaggregation

Disaggregation of the stages into activities and subactivities is based on a qualitative criterion because they all include actions, works or events to be carried out and/or considered to the full extent of their participation in the development of an industrial project. This disaggregation is shown in diagrammatic form in figure 2.

TECHNOLOGICAL DISAGGREGATION
OF AN INDUSTRIAL PROJECT



*Disaggregation valid for the implementation phase.

Figure 1

QUALITATIVE DISAGGREGATION

STAGE

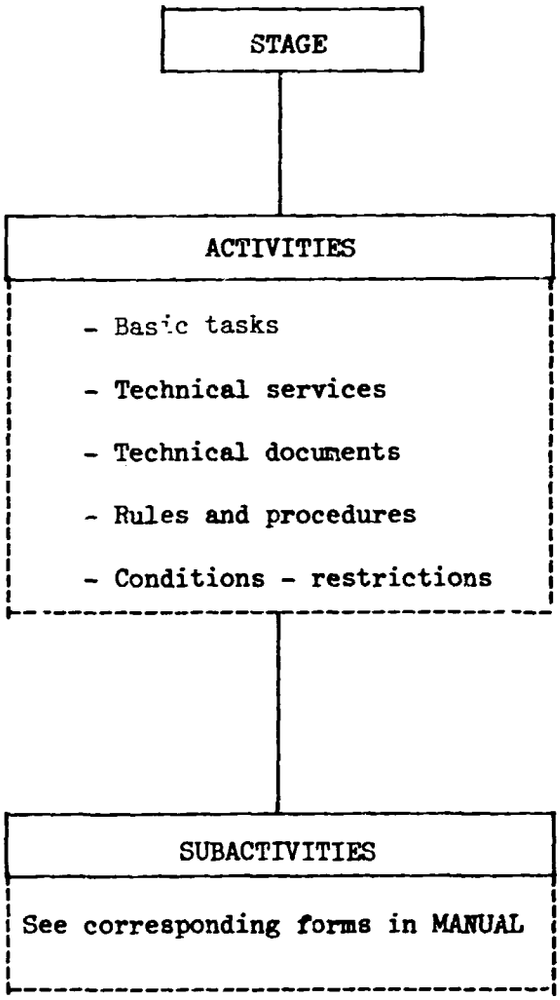


Figure 2

Activities - Five groups of activities, based on their common characteristics, have been identified for each of these stages:

Basic tasks;

Technical services;

Technical documents;

Rules and procedures;

Conditions - restrictions.

Subactivities - Each group of activities has been broken down into a series of successive subactivities. The appropriate form with the subactivities disaggregated for each stage is given in the corresponding chapter of the Manual.

The method established for qualitative disaggregation is assessment.

ii. Quantitative Disaggregation

The quantitative disaggregation of the stages is based on the same structure as the qualitative disaggregation, i.e. the parts have been classified into activities and subactivities, as shown in figure 3.

Activities - Three groups of quantifiable activities have been identified for the stages:

Basic tasks;

Technical services;

Technical documents.

QUANTITATIVE DISAGGREGATION

STAGE

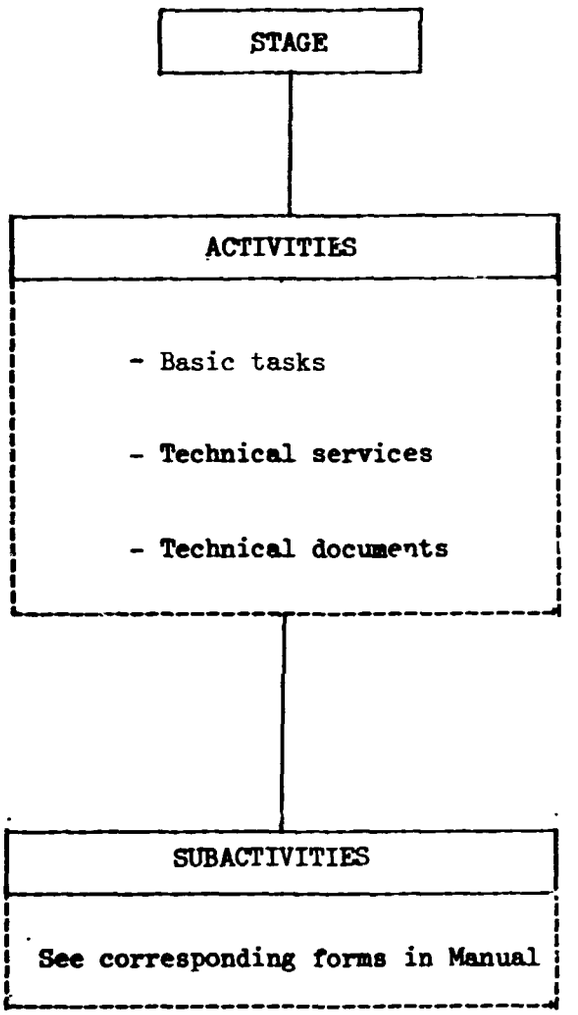


Figure 3

A general block diagram of the processes used will be found in annex III.

The structure established for the descriptive disaggregation of the basic component, processes, comprises groups, systems and subsystems, as will be seen from figure 4.

Group. - This is determined by everything that contributes to, occurs in and derives from a process, these actions and events being classified as:

Requirements group;

Main operations and equipment group;

Products group.

Group and stage are equivalent in their respective descriptive and qualitative disaggregation diagrams, which is why the group will be taken as the basis for determining the degree of disaggregation attained in the descriptive disaggregation criteria.

System. - Covers the parts which occur in or are obtained from the process. Since every group has its own specific characteristics a descriptive disaggregation has been made of each one, which has produced the systems shown in figure 4.

The operations involved in the processes and the equipment used most in each of the systems are brought together in the Model with a view to identifying that equipment and thus facilitating its disaggregation.

BASIC COMPONENT, PROCESSES
DESCRIPTIVE DISAGGREGATION

BASIC COMPONENT, PROCESSES

GROUP

REQUIREMENTS	OPERATIONS	PRODUCTS
SYSTEM		
- Raw materials - Catalysts - Chemical products - Ingredients and additives - Basic services	- Transport of raw materials - Unloading of raw materials - Storage of raw materials - Charging of raw materials - Transport of catalysts - Unloading of catalysts - Storage of catalysts - Charging of catalysts - Transport of chemical products - Unloading of chemical products - Storage of chemical products - Charging of chemical products - Transport of ingredients and additives - Unloading of ingredients and additives - Storage of ingredients and additives - Charging of ingredients and additives - Conditioning of raw materials - Pre-treatment of raw materials - Final conditioning of load - Transformation - Recovery and regeneration - Treatment of transformation discharges - Conditioning of products - Finishing of products - Packaging of products - Transport of products - Storage of products - Dispatch of products	- Main - By-products - Waste products

SUBSYSTEM

See corresponding forms in Manual

Figure 4

Subactivities - Quantitative disaggregation applies to the subactivities identified in the Qualitative Disaggregation which lend themselves to evaluation in terms of money and man-hours. The quantifiable subactivities identified for the present model are given in the Manual.

The method established for the quantitative disaggregation is valuation (quantification).

b. Disaggregation of the basic components

The importance of disaggregating these components is emphasized by their effects on, their participation in and their connection with the different stages into which the implementation phase of the project has been divided, which confirms the necessity for them to be identified clearly.

Descriptive Disaggregation

As in the case of the stages, the basic components have a common disaggregation structure, as will be seen below:

i. Basic component, processes

The order established for the Descriptive Disaggregation of this component is based on a typical block diagram of production in industrial chemical plants. It takes into account everything that happens from the arrival of the raw material, following step by step its transformation and culminating with the delivery of products, by-products and waste products. In short it is the qualitative, quantitative and descriptive identification of the activities and elements that make up the process, in conformity with their main characteristics.

Subsystem. - The descriptive disaggregation for each system has been prepared in a very general form since the processes differ from each other because of the variety and characteristics of the raw materials and operations involved and the products to be obtained. It is for the user of the Model to adapt it as necessary to the process under study.

The subsystems proposed in the Model will be found in the chapter containing the Disaggregation Manual.

The method established for the Descriptive Aggregation of the basic component, processes, is characterization.

ii. Basic component, equipment

For the disaggregation of this element a study based on the specific projects contributed by the countries was made in order to identify all the equipment and some of the materials needed to implement an industrial chemical plant. From this list the capital goods required to carry out the process were selected and grouped together. 3/

Disaggregation of this basic component is highly specialized but more easily understood, since it is something which is more widely spread and better known among professional engineers.

Groups. - These are properly speaking the capital goods involved in the erection of an industrial plant. The Model takes into consideration fourteen groups of main equipment, the nomenclature used being that generally accepted in the industry.

3/ The auxiliary and support equipment (laboratories, machinery, tools, etc.) and all the non-disaggregated materials are equally important and will have to be disaggregated and analysed in subsequent studies. This can be done by the user of the model as the need arises and in conformity with the general structure of the method.

The groups identified in the Model are as follows:

- Furnaces and boilers;
- Pressure vessels;
- Heat transfer;
- Storage tanks;
- Pumps;
- Compressors;
- Turbines and internal combustion engines;
- Tubing and accessories;
- Electrical equipment;
- Instruments;
- Valves;
- Metal structures and ducts;
- Miscellaneous vessels;
- Miscellaneous equipment.

Systems. - The systems disaggregation structure is applicable to all equipment. The following systems have been identified:

- Codes, norms and standards;
- Requirements of the process;
- Design, manufacture and assembly conditions;
- Accessories and minor equipment;
- Main materials used;
- Classification.

Subsystems. - This is the descriptive disaggregation of the systems mentioned previously. The subsystems which the Model identified are shown in the Manual.

Figure 5 shows in schematic form the disaggregation structure of the basic component, equipment.

The method established for the descriptive disaggregation of this component is characterization.

3. Means of expression and arrangement of the Basic Model

Specific means of graphic expression and ordering have been designed for the working method described above. These form an integral part of the Basic Model which has been prepared for the consideration and use of those responsible for the management of industrial projects in the Andean Subregion.

For the graphic expression of the Model special sets of forms have been designed for each disaggregation procedure in order to facilitate the handling of the Model in the form of fiches or cards.

To maintain the correct order a coding system has been prepared as a means of listing numerically each and every part of the Model.

The criteria used to prepare the coding system and the forms are explained in greater detail in the Manual, which is the subject of the next chapter of the Model.

BASIC COMPONENT, EQUIPMENT
DESCRIPTIVE DISAGGREGATION

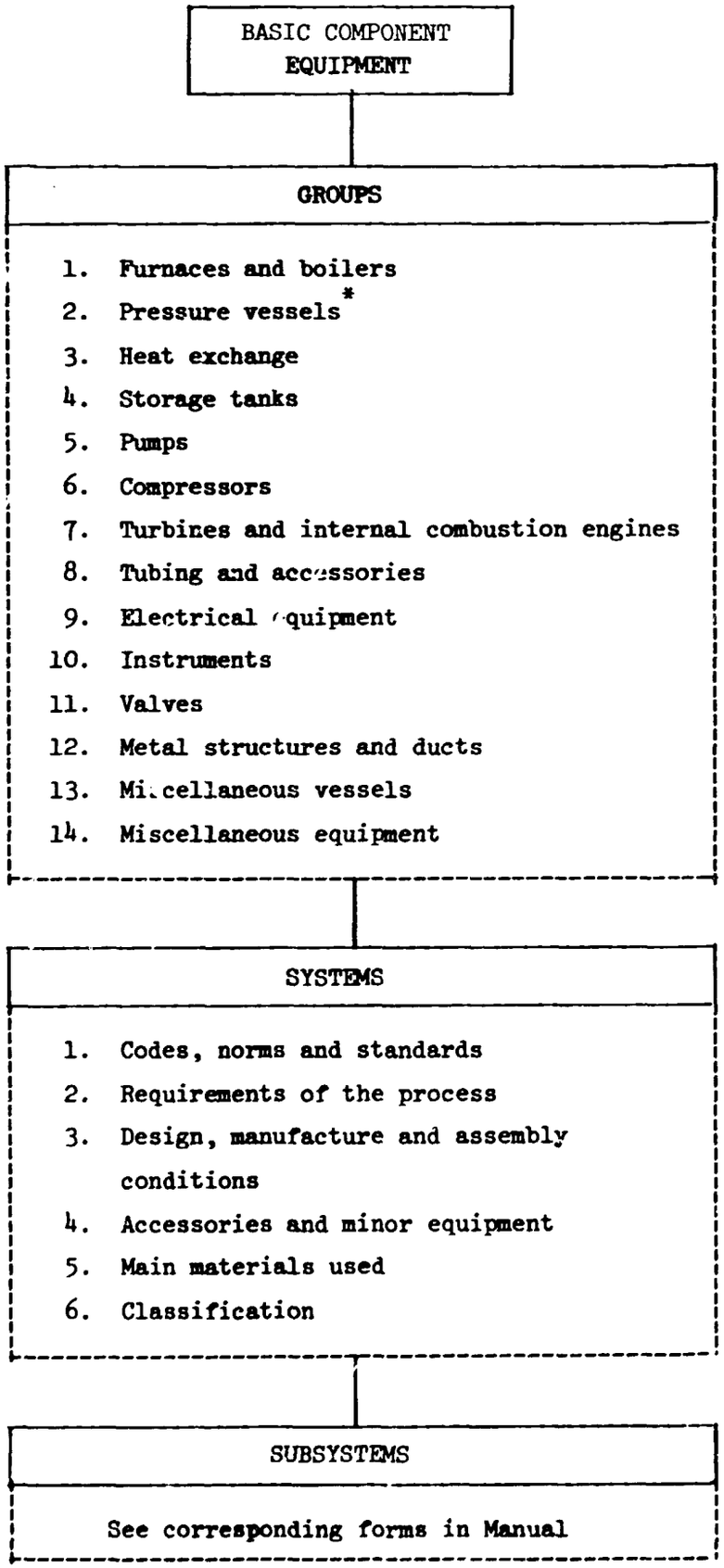


Figure 5

* Including reactors.

GENERAL PLAN OF THE TECHNOLOGICAL DISAGGREGATION
OF THE IMPLEMENTATION PHASE

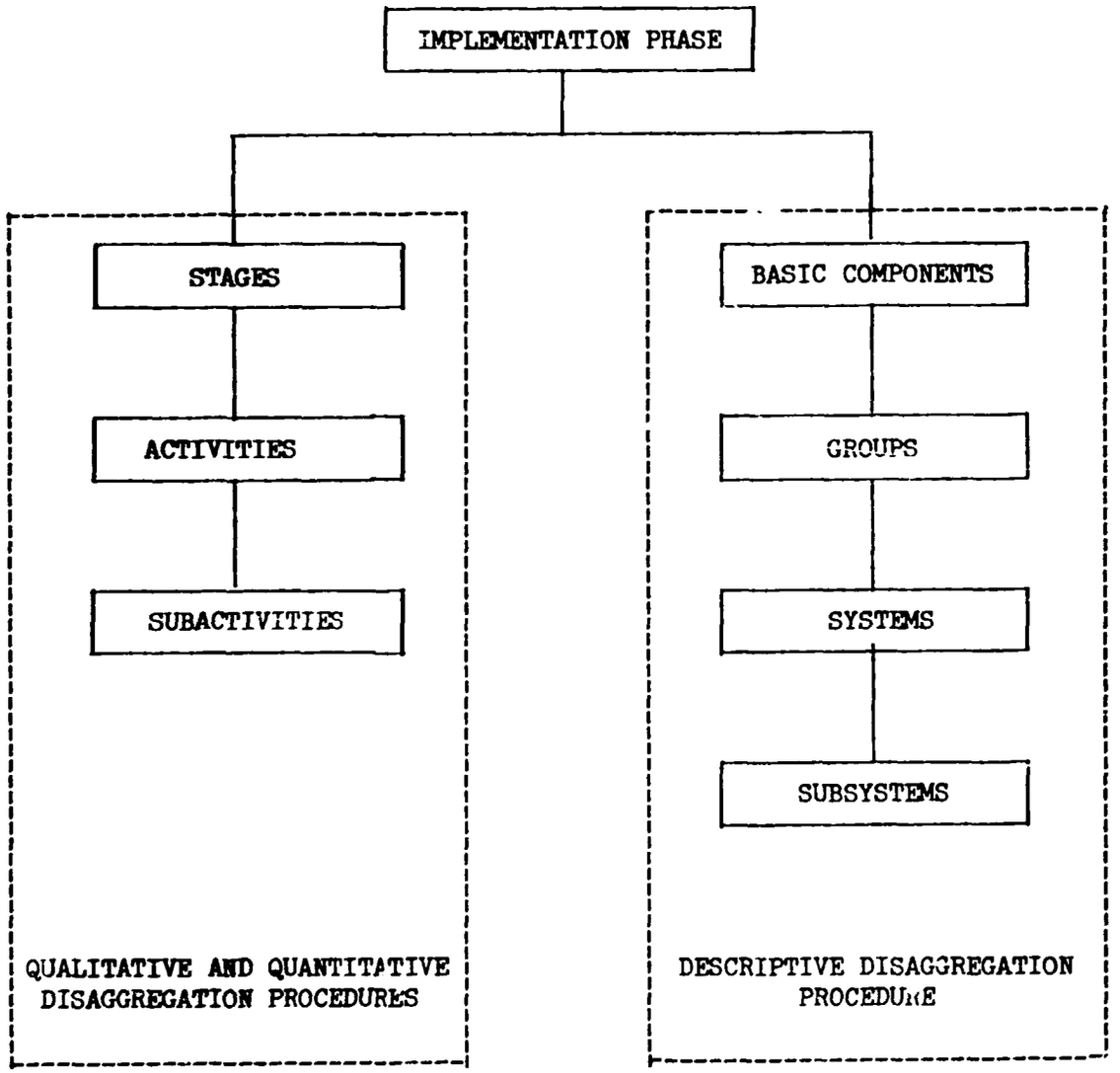


Figure 6

B. BTDM MANUAL FOR THE IMPLEMENTATION PHASE

BTDM MANUAL FOR THE IMPLEMENTATION PHASE

The Manual represents a guide for the practical application of the Basic Technological Disaggregation Model (BTDM) for Petrochemical Projects, which is specifically addressed to all those undertakings in the Subregion which are responsible for the development of this very important industrial sector.

The objectives of the Manual are as follows:

- To familiarize the industry's engineers with the technological disaggregation method, which is regarded as an important instrument for administering projects;
- To illustrate as fully as possible the procedures for applying that method.

To that end the Manual provides explanatory guides to facilitate understanding and application of the model to the implementation phase of a petrochemical project. However, since disaggregation represents a new systematized working technique for carrying out industrial projects, the theoretical description of the Model contained in the previous chapter should be read first.

The Manual will be revised as necessary, in regard to both the method itself and the explanatory guides, in light of any changes resulting from the trying out of the BTDM. 4/

4/ The names and addresses of the subregional and national bodies to which may be sent any comments, suggestions and observations arising out of the use of the Manual will be found in the appendix.

1. The forms

The forms have been specially designed to facilitate the operation of the Disaggregation Model in the office through the use of sheets or cards. Their pattern is very simple: the design of each is related to the disaggregation criteria and hence to the follow-up methods envisaged in the Model. To distinguish the different forms physically (qualitative, quantitative or descriptive disaggregation) recourse may be had to such devices as the use of colour cards, clipped corners, etc.

A set of forms, comprising a main card followed by one or more simplified cards, has been designed for each disaggregation criterion.

In addition, there is a special form which has been designed to show in summary form the main characteristics of the project.

As a practical illustration of the designs adopted specimen forms will be found in the pages that follow.

2. Coding

In order to ensure that the order established in the BTDM is maintained each and every one of its parts has been coded numerically - which also makes possible its computerized handling and systematic storage. In this way utilization of the experience acquired in new projects will be facilitated.

Each structural part of the Disaggregation Model has a place in the coding adopted, the order being from left to right and from lesser to higher degree of disaggregation. The four last digits are reserved for coding the detailed disaggregation reached in the present Model.

The Model does not use up all the numbers reserved for each place, which leaves room for expansion in case of need - a possibility facilitated by the fact that the coding is decimal.

The distribution of the coding adopted is presented in tables 1 and 2. From table 1 the equivalent degrees of disaggregation reached in the different procedures envisaged in the Model can be established. For its part, the coding table shows the distribution of the proposed coding.

Qualitative disaggregation

REV. No.	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐	OFFICE OR DEPT. RESPONSIBLE	PAGE ..... OF .....

Code	NAME OF STAGE:	
	NAME OF ACTIVITY:	YES O/C / NO

NOTES

NAME OF PROJECT:	NAME OF STAGE:	PAGE ..... OF	REV. NO. .....

Qualitative disaggregation

Quantitative disaggregation

REV. No.	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐	OFFICE OR DEPT. RESPONSIBLE	PAGE ..... OF .....

Code	NAME OF STAGE:	Reference year 19								
		Cumulative expenditure				Man-hours				
		000 $US*				000 hours			Cost*	
		Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.

NOTES

Quantitative disaggregation

NAME OF PROJECT:	REV. No.	PAGE ..... of ....

						STAGE:	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.

REV. No.	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐	OFFICE OR DEPT. RESPONSIBLE	PAGE ..... OF .....

Code	BASIC COMPONENT: PROCESSES
	GROUP:
	SYSTEM:

Descriptive disaggregation

NOTES

Descriptive disaggregation

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.....	PAGE .... of .....

REV. No.	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐	OFFICE OR DEPT. RESPONSIBLE	PAGE ..... OF .....

Descriptive disaggregation

Code	BASIC COMPONENT: EQUIPMENT	Equipment: 1	2	3	4
	GROUP:				
	SYSTEM: NOMENCLATURE				

NOTES

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE ... of ...

Descriptive disaggregation

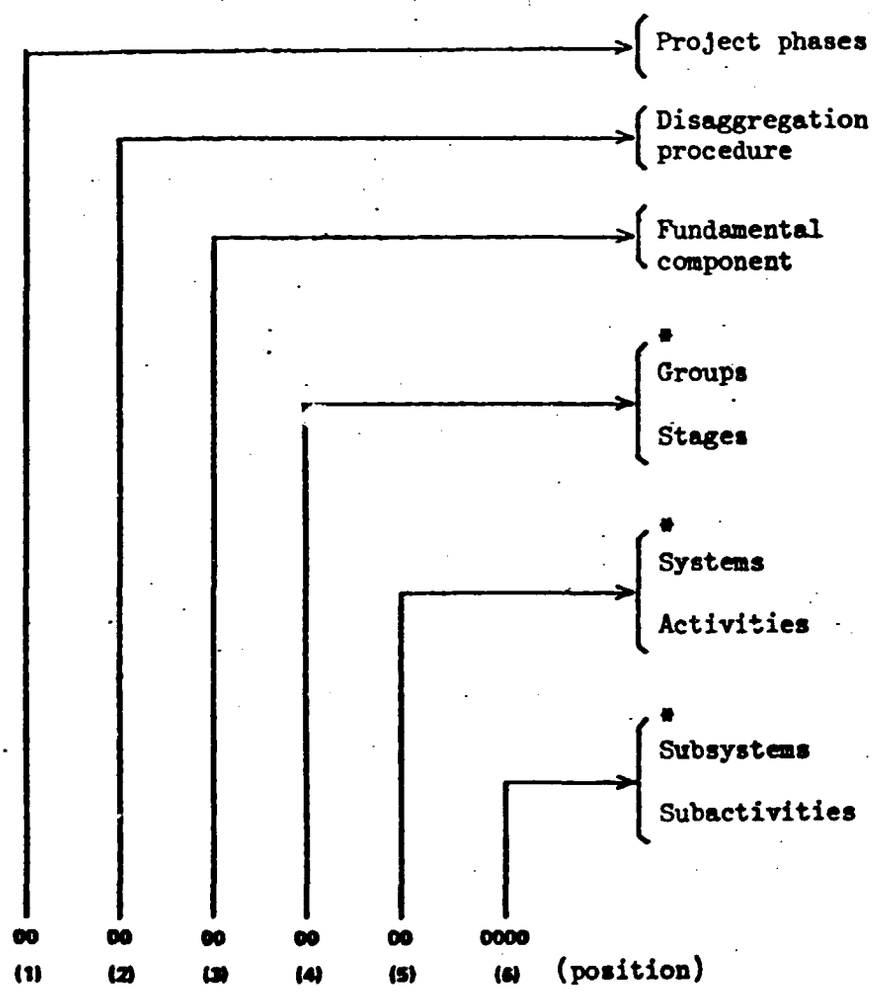
						GROUP: / EQUIPMENT	1	2	3	4
						SYSTEM: / NOMENCLATURE				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No.....	PAGE .... of .....

Descriptive disaggregation

EQUIPMENT										
NOMENCLATURE / CODE										

DISAGGREGATION MODEL
CODING SCHEME



* Nomenclature to be used in accordance with the disaggregation procedure

Table 1

Table 2

CODING TABLE

Subject / Position in scheme	(1)	(2)	(3)	(4)	(5)	(6)
PHASE						
- Generation	01					
- Financing	02					
- Implementation	03					
- Operation	04					
- Marketing	05					
DISAGGREGATION PROCEDURES						
- Qualitative		01				
- Quantitative		02				
- Descriptive		03				
FUNDAMENTAL COMPONENTS						
- Processes			01			
- Equipment			02			
GROUPS (CORRESPONDING TO PROCESSES)						
- Requirements				01		
- Products				02		
- Main operations				03		
GROUPS (CORRESPONDING TO EQUIPMENT)						
- Furnaces and boilers				01		
- Pressure vessels				02		
- Heat exchange				03		
- Storage tanks				04		
- Pumps				05		
- Compressors				06		
- Turbines and internal combustion engines				07		
- Tubing and accessories				08		
- Electrical equipment				09		
- Instruments				10		
- Valves				11		
- Metal structures and ducts				12		
- Miscellaneous vessels				13		
- Miscellaneous equipment				14		
STAGES						
- Studies for the implementation phase				01		
- Choice of process technology				02		
- Basic engineering				03		
- Detailed engineering				04		
- Purchasing services				05		

CODING TABLE (continued)

Subject	Position in scheme	(1)	(2)	(3)	(4)	(5)	(6)
- Construction and assembly					06		
- Acceptance and start-up					07		
SYSTEMS (CORRESPONDING TO THE REQUIREMENTS GROUP)							
- Raw materials						01	
- Catalysts						02	
- Chemical products						03	
- Ingredients and additives						04	
- Basic services						05	
SYSTEMS (CORRESPONDING TO THE OPERATIONS GROUP)							
- Transport of raw materials						01	
- Unloading of raw materials						02	
- Storage of raw materials						03	
- Charging of raw materials						04	
- Transport of catalysts						05	
- Unloading of catalysts						06	
- Storage of catalysts						07	
- Charging of catalysts						08	
- Transport of chemical products						09	
- Unloading of chemical products						10	
- Storage of chemical products						11	
- Charging of chemical products						12	
- Transport of ingredients and additives						13	
- Unloading of ingredients and additives						14	
- Storage of ingredients and additives						15	
- Charging of ingredients and additives						16	
- Conditioning of raw materials						17	
- Pre-treatment of raw materials						18	
- Final conditioning of load						19	
- Transformation						20	
- Recovery and regeneration						21	
- Treatment of transformation discharges						22	
- Conditioning of products						23	
- Finishing of products						24	
- Packaging of products						25	
- Transport of products						26	
- Storage of products						27	
- Dispatch of products						28	
SYSTEMS (CORRESPONDING TO THE PRODUCTS GROUP)							
- Main						01	
- By-products						02	
- Waste products						03	
SYSTEMS (CORRESPONDING TO THE EQUIPMENT GROUP)							
- Codes, norms and standards						01	
- Requirements of process						02	
- Design, manufacture and assembly conditions						03	
- Accessories and minor equipment						04	
- Main materials used						05	
- Classification						06	
ACTIVITIES							
- Areas and tasks						01	
- Technical services						02	
- Technical documents						03	
- Rules and procedures						04	
- Conditions - restrictions						05	

3. Explanatory Notes [1/]

3a. General instructions for all forms

3a.1. The general purpose of the BTDM is to increase the ability of its users to administer, execute and negotiate industrial projects by ensuring that they have a fuller and more detailed knowledge of those projects. It is hoped that one of the main results of applying it will be an increase in the amount of work given to subregional enterprises for the production of capital goods and the provision of technological services.

3a.2. Although the model has been built up on the basis of the implementation phase, the DISAGGREGATION has been designed as a whole to be used in full and repeatedly throughout the development of the project. In the method adopted all its elements and parts are considered of equal importance and incidence in the development of the project, the only distinction between them being the degree or level of disaggregation which they represent.

3a.2.1. Disaggregation is a managerial instrument to serve and be used at all times as a support and foundation for making decisions.

3a.2.2. The model must be applied in full throughout the project, from its gestation as an idea, through its physical materialization in the form of a plant up to its entry into normal operation and production. These time situations are shown in the forms under the terms under study, under way and completed.

1/ The pattern of the explanatory notes is as follows: Brief presentation of the aims and purposes; explanations or instructions regarding the content of the forms; instructions for the use of the forms; coding; explanation regarding the follow-up method.

3a.2.2.1. The project is regarded as being in the under study situation in the periods beginning with the actual gestation of the idea. In this period, the technological disaggregation of the project is based on the technical-economic information available (regardless of whether such information is from the enterprise, accumulated from earlier projects, compiled from known bibliographies, obtained from subregional and international sources and centres of technological information, or gathered during visits to similar plants already in operation).

3a.2.2.2. The phase is under way when official approval has been given for its implementation, whether with the owner's human, technical, physical and financial resources or by means of complete or partial contracts with third parties.

3a.2.2.3. The phase is regarded as completed when the factory or plant has been accepted officially and is in full operation and normal production.

3a.2.3. In keeping with the foregoing definitions, the initial application of the model, during the time the idea is being generated and consolidated, will be based on estimates, budgetary calculations, bibliographical information, information derived from visits made to similar plants, and analysis of the known alternative processes which could be used in the project. From this information the first version of the disaggregation will be prepared.

3a.2.4. The data initially recorded are reviewed repeatedly. At every review the estimates and budget calculations initially recorded are consolidated as development of the project proceeds. It is of fundamental importance that a review should be made prior to the taking of any decision.

3a.2.4.1. In this way the final review will be made when the plant is in normal operation and delivering its products for marketing. The data recorded in the final review constitute the true consolidated information regarding the project as and how it was finally completed.

3a.2.4.2. Each review will be numbered in order and the date when it was started and completed will be noted. It is particularly important to determine this period for the first disaggregation exercise applied to the project and for its final review.

3a.2.5. For the foregoing reasons it is recommended that the group or working party made responsible for carrying out the disaggregation of the project should form an integral part of the managerial group or team responsible for its planning, financing, development and implementation (integral administration management).

3a.3. One general form, entitled Characterization of the project, has been prepared to serve as a kind of title page for the disaggregation of the project. It provides a schematic summary of the most relevant information on the project and enables the user of the Model to have an over-all vision of its progress at all times.

3a.3.1. A special set of forms has been designed for each of the disaggregation procedures used in the Model (qualitative, quantitative and descriptive). Each set consists of various sheets, of which the first one is a main sheet in whose heading are included all the general data needed to identify the project and the disaggregation procedure. The form continues with supplementary sheets of simplified design. The relevant disaggregation procedure is printed in the left-hand margin of each form.

When starting the qualitative disaggregation of a "stage" or the descriptive disaggregation of a "group" the use of the main sheet is required. Accompanying the specific instructions for the application of each disaggregation criterion is the corresponding set of model forms, which help to clarify and illustrate the explanations.

3a.3.2. The qualitative and quantitative disaggregation forms are patterned on the disaggregation structure of the STAGES, which includes "activities" and "subactivities".

3a.3.3. The descriptive disaggregation forms are patterned on the disaggregation structure of the FUNDAMENTAL COMPONENTS, which includes "systems" and "subsystems".

3a.3.4. The subactivities and subsystems represent the final degree or level of disaggregation attained by the Model. Their development and coding are printed on the respective forms, which are included in this Manual as a guide. The additional details needed for a better understanding of certain subactivities and subsystems have been added in brackets after the corresponding literal description.

3a.3.5. The user should have sufficient blank copies of the forms printed in this Manual to be able to fill them in in conformity with the specific requirements of the project which is being disaggregated. For that purpose he will take as a guide the activities, subactivities, systems and subsystems printed on the model forms included in the Manual.

3a.3.6. It should be borne in mind that although the relevant subactivities and subsystems have been identified in great detail, the Model has not exhausted all the possibilities. For some projects it will not be necessary to take into consideration all of those which have been included in the Model forms, whereas for others it may be necessary to introduce additional considerations. It is with this broad and flexible criterion that the breakdown of subactivities and subsystems contained in the Model is submitted to users.

3a.3.7. As a general rule at the top of the main sheet of each form will be noted the name of the project; the code assigned by the user to identify the project; the sequence number and date of the review, as well as the state or situation of the project at the time of making the review (under study, under way or completed). An indication will also be given of the departmental unit of the firm which is responsible for the administration and management of the project; the sheet number; and the code corresponding to the disaggregation criterion. Other data specific to the criterion applied will also be included.

3a.3.8. A space headed "Notes" has been left on this sheet for the inclusion of any abbreviations, notes, observations or comments that the user considers necessary as a result of the disaggregation exercise.

3a.3.9. In preparing this Model every attempt has been made to use the simplest, most straightforward and universally known terminology and drafting. However, it is recommended that users of the Model read carefully the "Definitions of terms" and the "Glossary of technical terms" annexed to the Manual.

3a.4. Each and every part of the Disaggregation Model has been minutely coded in order to ensure that the order is preserved. For that purpose six positions are envisaged (see table No. 1 of the Model). The forms, on the left-hand side, have columns in which to note the coding on the basis of the position (1) in the Coding Scheme. It should be noted that in the Model none of the positions given cover the entire numerical range, which means that more are available for use in expanding the disaggregation in case of necessity, as has already been said.

3a.4.1. The Coding Scheme reserves two places for positions (1) to (5); the series for each runs from 01 to 99, as shown in the Coding Table of the Model. Position (6) has four digits and the series runs from 0001 to 9999. The coding details for this position are given directly on the Model's illustrative forms.

3a.4.2. For each disaggregation procedure there is a method to be followed - assessment, quantification or characterization - which makes it possible to control and evaluate all and every one of the aspects and events disaggregated. For that purpose, the right-hand side of each form has been appropriately designed, or space has been left for the corresponding mechanism to be applied. The relevant explanations accompany each specific case.

Correspondence between the methods and the disaggregation procedures is as follows:

Disaggregation procedure		Method
Qualitative	by	Assessment
Quantitative	by	Quantification
Descriptive	by	Characterization

3b. Specific instructions

3b.1. Form: Qualitative Disaggregation

3b.1.1. The purpose of the qualitative disaggregation is to make possible as broad an analysis as possible of the STAGES of the implementation phase of the project by identifying all the actions, events, work, etc. which have to be considered during the whole period of the phase and which have been classified as Activities and subactivities.

3b.1.2. As established in the Model and in conformity with their particular characteristics, the activities have been grouped together as: Basic tasks; Technical services; Technical documents; Rules and procedures; and Conditions - restrictions, as defined in annex I (Definitions of terms for the Model). At the same time it will be recalled that the subactivities represent the final degree or level of breakdown of the activities thus classified.

3b.1.2.1. A careful breakdown and analysis of the subactivities involved in each stage make it possible to determine which of them must and can be carried out directly by the owner and which must be contracted out to third parties, subregional and/or foreign.

3b.1.3. At the top of the main sheet of the form adopted for this disaggregation criterion, in addition to the information noted in the general instructions (3d.2.2. and 3e.3.1.) are included the name of the stage; the name of the activity and the coding corresponding to this particular disaggregation criterion.

3b.1.3.1. It will be noted that in the qualitative disaggregation for a single case some subactivities are put forward as alternatives. However it should be remembered that the final objective of the disaggregation is to ensure that in the definitive addition of the Model only those subactivities are retained which technically, economically and legally favour the owner, in accordance with the policy guidelines of the Andean Group, in particular its Decisions 24, 84 and 85.

In cases where the Model offers no alternatives, it will be for the owner to identify, from the subactivities proposed, the most favourable alternatives.

3b.1.3.2. The negative unfavourable wording of some of the subactivities, mainly in CONDITIONS - RESTRICTIONS, have been adopted in order to attract the attention of the owners, as those subactivities represent the negotiating clauses over which the contractors usually argue.

3b.1.3.3. Many subactivities are repeated in the disaggregation of the different stages - which represent the reiterative character of the Model. This adds to the implementation and/or negotiating possibilities of the owner who, depending on the way of handling the project, will decide on the most advantageous situation for carrying out those subactivities.

3b.1.3.4. A list of the corresponding subactivities will be included in the body of the main sheet and of the additional sheets.

3b.1.3.5. In the Studies of the implementation phase stage the Model, because of the scope, specialization, extension and heterogeneity of the studies generally involved in the projects, presents them in a general and indicative form. On the basis of the guidelines provided by the method and in conformity with the studies involved in the project, the user will have to identify and disaggregate the specific subactivities corresponding to the activities grouped together as areas and tasks, and technical services. The Model shows in part the subactivities classified as technical documents and, in greater detail, the subactivities corresponding to rules and procedures and conditions - restrictions.

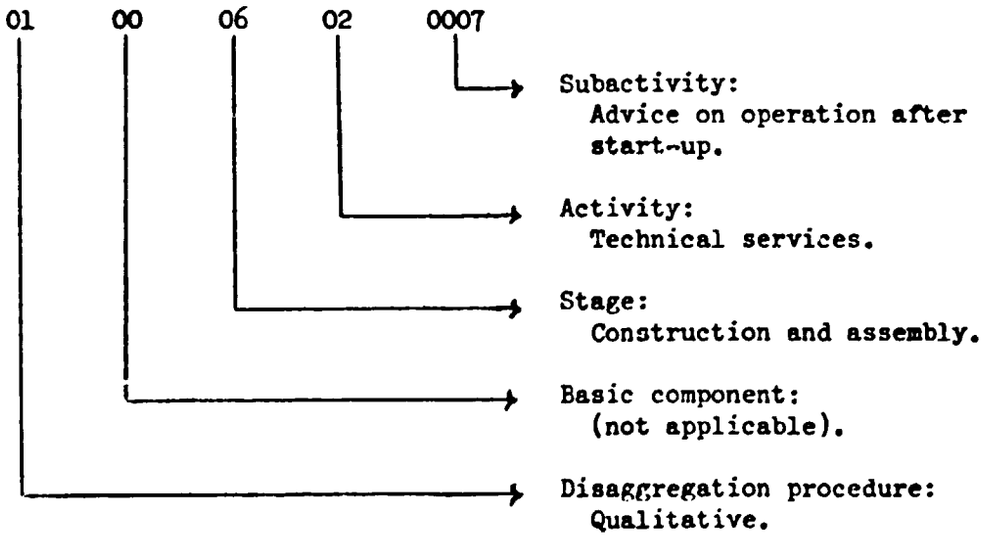
3b.1.3.6. In the Choice of process technology and Basic engineering stages it is explained that it is the owner's sole responsibility to determine the basic design conditions, which are fundamentally related to:

- The characteristics of the raw materials, the end products, the intermediate products, and the by-products;
- The definition of the battery limits of the unit, where the raw materials will be available and where the products, by-products and waste products can be evacuated;
- The characteristics and availability of the basic services as well as of the secondary or auxiliary services.

3b.1.3.7. The Glossary of technical terms outlines the criteria for determining the scope of the participation in the Model of the basic, process, mechanical, electrical, civil, industrial and instrumentation engineering as activities specific to the stages.

3b.1.3.8. The subactivities of administration and co-ordination which are outlined in very general fashion, cover programming, planning, resource assignment, progress control, evaluation of results, tenders, negotiation and contracting, quality control, receipt and final acceptance of equipment, works, tasks, services and documents, etc.

3b.1.4. The coding for qualitative disaggregation is expressed, in its most general form, as follows:
01. 00. 00. 00. 0000. For each of the stages, activities and subactivities there is a specific code. An example of the use of the coding is given below by way of illustration:



3b.1.5. The assessment method which applies to the qualitative disaggregation procedure includes the identification of both the subactivity and the agent (owner, contractor or both) who carries it out, the parameter CONSIDERED and the monosyllables YES and NO being applied for this purpose. Whether the subactivity is carried out by the owner or the contractor, or both, is shown by using the letter O (owner), C (contractor) or O/C as the case may be.

This possibility of control and evaluation, through the method indicated, is clearly shown for the subactivities grouped as "Basic tasks", "Technical services" and "Technical documents". For those subactivities which have been grouped together as "Rules and procedures" and "Conditions - restrictions", the important thing, because of their essentially contractual nature, is to indicate specifically and clearly that they have been considered.

3b.1.5.1. It will be up to the user of the Model to decide whether to add other more specific control and evaluation parameters for such aspects as technology transfer (whether or not there was any), to identify the subregional contractor, etc., which implies modifying the design of the form.

Rev. No.	
Date	
Under study	
Under way	
Completed	

CHARACTERIZATION OF THE PROJECT

(EN: 3a.3)

I. GENERAL DATA

NAME OF UNDERTAKING:	
NAME OF PROJECT:	
LOCATION:	
OFFICE OR DEPARTMENT RESPONSIBLE	CHIEF OF PROJECT: (Names) Chief: Assistant:
PRINCIPAL AIMS OF PROJECT:	

II. SPECIFIC DATA

RAW MATERIALS	T/Y	MAIN INPUTS*	T/Y

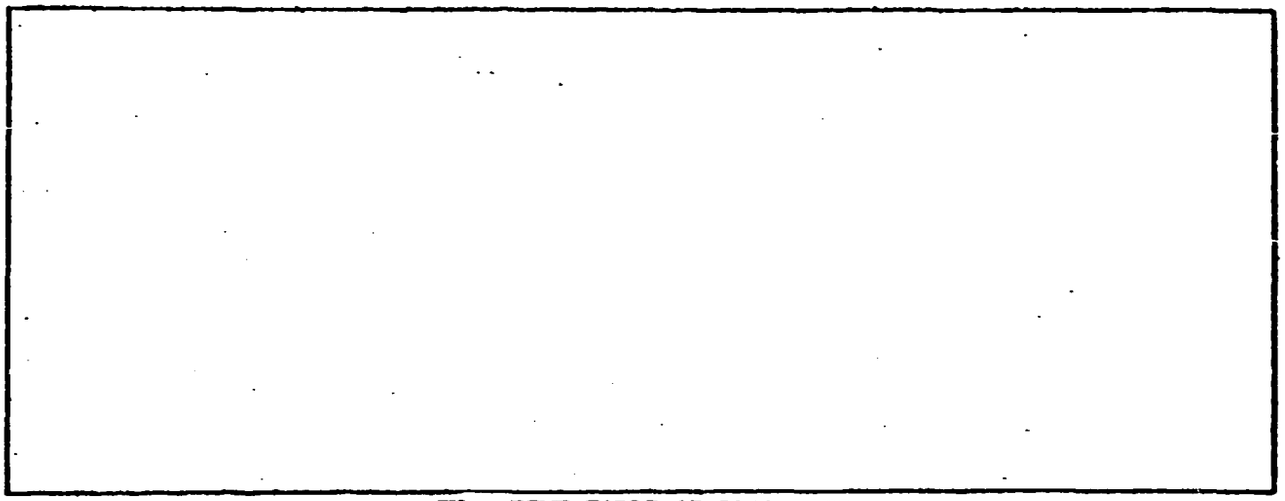
PROCESSES			PRODUCTS**			
NAME OF UNITS	TECHNOLOGY	CAPAC. T/Y	MAIN INTERMEDIATE PRODUCTS	T/Y	END PRODUCTS***	T/Y

HIGHER TECHNICAL PERSONNEL REQUIRED****	1	2
MIDDLE-LEVEL TECHNICAL PERSONNEL REQUIRED****		
UNSKILLED MANPOWER****		

Conventions:	NOTES:
* Chemical products, catalysts, etc. ** Obtained during the process *** Main products and by-products **** 1. For development of the product 2. For operation of the plant	

IER: International exchange rate

III. BLOCK DIAGRAM



IV. TIME-TABLE OF DECISIONS

DATE OF DECISION BY UNDERTAKING	
DATE OF GOVERNMENT DECISION	
DATE COMMENCEMENT IMPLEMENTATION PHASE	
DATE COMMENCEMENT OPERATION PHASE	
TOTAL MONTHS	

V. ECONOMIC DATA

000 US dollars

INITIAL BUDGET (reference year 19)	

SOURCE OF FINANCE - (reference year 19)

NATIONAL - SUBREGIONAL	000 dollars	FOREIGN	000 dollars
TOTAL		TOTAL	

DISTRIBUTION OF CAPITAL (reference year 19)

CAPITAL REQUIRED (000 dollars)				RATIO: CONTRIBUTION DEBT %	DESTINATION OF INVESTMENT PERCENTAGE	
OWN CONTRIBUTION	NATIONAL	SUBREGIONAL	FOREIGN		LOCAL	EXTERNAL

TOTAL DEBT:	CAPITAL DEBT %	INTERNAL EXCHANGE RATE OF PROJECT (IER)
TOTAL CAPITAL:		

VI. MARKET DATA

Units: thousands T/Y

MARKETS / PRODUCTS - BY-PRODUCTS	NATIONAL		SUBREGIONAL		WORLD	
	Total	Unsatisfied	Total	Unsatisfied	Total	Unsatisfied

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 5

Qualitative disaggregation

Code						NAME OF STAGE: STUDIES FOR THE IMPLEMENTATION PHASE (EN: 3b.1.3.5.)	CONSIDERED	
03	01	00	01	00	0000			
03	01	00	01	01	0000	NAME OF ACTIVITY: BASIC TASKS	YES O/C	NO
03	01	00	01	01	0001	Subactivities of administration and co-ordination for the conduct of the studies (EN: 3b.1.3.8.)	(EN: 3b.1.5.)	
03	01	00	01	01	0002	Determination of the organization and procedures required for the project implementation phase		
03	01	00	01	01	0003	Studies of physical-chemical analysis and composition of raw materials		
03	01	00	01	01	0004	Transport and handling of raw materials, products, equipment and materials		
03	01	00	01	01	0005	Determination of social services (hospitals, schools, housing, etc.)		
03	01	00	01	01	0006	Determination of industrial services (workshops, building, assembly, supply companies, etc.)		
03	01	00	01	01	0007	Availability and characteristics of basic services (water, steam, air, electric energy, fuel, etc.)		
03	01	00	01	01	0008	Topographical work and drawing up plans		
03	01	00	01	01	0009	Meteorological studies (prevailing wind speed and direction; rainfall; temperature; humidity; environmental characteristics: salty, tropical, dust particles, corrosion level, etc.)		
03	01	00	01	01	0010	Hydrographic studies (barometric pressure, waves, tides, riverbeds, waterways, maximum and minimum flows in rivers, etc.)		
03	01	00	01	01	0011	Seismographic studies (historical records: epicentral co-ordinates, intensity, duration; seismic map, isoseismic curves, etc.)		
03	01	00	01	01	0012	Geological and soil studies (nature of soil, resistance, phreatic level, etc.)		
03	01	00	01	01	0013	Pilot-plant experiments		
03	01	00	01	01	0014	Determining availability of construction materials (for civil engineering, mechanical, electrical works)		
03	01	00	01	01	0015	Determining the availability of facili es of storing raw materials and products		

NOTES EN: Explanatory Notes

NAME OF PROJECT:	NAME OF STAGE: STUDIES FOR THE IMPLEMENTATION PHASE	REV. No.....	PAGE ..2... of .5..

03	01	00	01	01	0016	Collection and analysis of bibliographical information and visits to plants in operation for the selection of technological alternatives and evaluation processes	
03	01	00	01	01	0017	Ecological studies	
03	01	00	01	02	0000	ACTIVITY: TECHNICAL SERVICES	
03	01	00	01	02	0001	Advice to owner concerning the partial or total implementation of the studies	
03	01	00	01	02	0002	Advice to owner concerning the partial or total supervision of the studies	
03	01	00	01	02	0003	Advice to owner concerning the partial or total contracting for the studies	
03	01	00	01	03	0000	ACTIVITY: TECHNICAL DOCUMENTS	
03	01	00	01	03	0001	Documents containing the studies	
03	01	00	01	03	0002	Procedures used in carrying out the studies	
03	01	00	01	03	0003	Photographs, microfilms, films, etc.	
03	01	00	01	03	0004	Plans, sketches, mnemotechnical diagrams used in the studies	
03	01	00	01	03	0005	Reports on calculations used in the studies	
03	01	00	01	04	0000	ACTIVITY: RULES AND PROCEDURES	
03	01	00	01	04	0001	Periodic reports on progress and variations in the work	
03	01	00	01	04	0002	Use of technical rules and procedures of the owner and the country	
03	01	00	01	04	0003	Use of technical rules and procedures of the contractor	
03	01	00	01	04	0004	Use of technical rules and procedures recognized internationally	
03	01	00	01	04	0005	Use of codes (technical and accounting), nomenclature and numbering system of the owner	
03	01	00	01	04	0006	Use of codes (technical and accounting), nomenclature and numbering system of the contractor	
03	01	00	01	04	0007	Use of decimal metric system (International System: SI)	
03	01	00	01	04	0008	Discretionary use of the system of units proposed by the contractor	
03	01	00	01	04	0009	Use of the owner's industrial safety rules and procedures	
03	01	00	01	04	0010	Use of the contractor's industrial safety rules and procedures	

Qualitative data integration

NAME OF PROJECT:	NAME OF STAGE: STUDIES FOR THE IMPLEMENTATION PHASE	REV. No.....	PAGE ..3.. of ..5..

Qualitative diagnostication

03	01	00	01	04	0011	Determination by the owner of instructions, conditions and specifications for each of the studies		
03	01	00	01	04	0012	Co-ordination procedures for the execution of the contract		
03	01	00	01	04	0013	Procedures for deciding on variations and additional works		
03	01	00	01	04	0014	Rules and procedures for drawing up sub-contracts		
03	01	00	01	04	0015	Procedures for inspecting, checking and approving the studies carried out		
03	01	00	01	04	0016	Procedures for book-keeping, handling of money, cost recording and control.		
03	01	00	01	05	0000	ACTIVITY: CONDITIONS - RESTRICTIONS (EN: 3b.1.3.2.)		
03	01	00	01	05	0001	Insurance policies to cover damage or loss and support guarantees		
03	01	00	01	05	0002	Labour legislation and collective labour agreements in force and applicable		
03	01	00	01	05	0003	Use of the contractor's system for controlling the projects		
03	01	00	01	05	0004	Use of the owner's system for controlling the projects		
03	01	00	01	05	0005	Use of the owner's programmes and procedures, conditional upon payment		
03	01	00	01	05	0006	Restrictions on using techniques and procedures developed by the contractor in the studies		
03	01	00	01	05	0007	Restrictions on using the programmes and mathematical models developed by the contractor in the studies		
03	01	00	01	05	0008	Selection of subcontractors and service enterprises at the contractor's discretion		
03	01	00	01	05	0009	Selection of subcontractors and service enterprises at the owner's discretion		
03	01	00	01	05	0010	Freedom of access by the contractor to the owner's installations and plants		
03	01	00	01	05	0011	Contractor's participation, intervention or veto in the appointment of personnel by the owner		
03	01	00	01	05	0012	Owner's participation, intervention or veto in the appointment of personnel by the contractor		
03	01	00	01	05	0013	Conduct of studies in accordance with the contract's aims and specifications		
03	01	00	01	05	0014	Joint liability with regard to subcontractors' guarantees		
03	01	00	01	05	0015	Duration(s) or expiry date(s) of the guarantees given		

NAME OF PROJECT:	NAME OF STAGE: STUDIES FOR THE IMPLEMENTATION PHASE	REV. No.....	PAGE ..4... of ..5..

Qualitative disaggregation

03	01	00	01	05	0016	Obligation to remedy mistakes and defects in studies within a specific period		
03	01	00	01	05	0017	Full responsibility for quality of work and obligation to correct it		
03	01	00	01	05	0018	Penalty for completing and delivering the work after the agreed date		
03	01	00	01	05	0019	Bonus for completing and delivering the work before the agreed date		
03	01	00	01	05	0020	Application of the contract subject to prevailing national legislation.		
03	01	00	01	05	0021	Application of the contract subject to legislation prevailing in the contractor's country		
03	01	00	01	05	0022	Application of the contract subject to a ruling by an international court in case of dispute		
03	01	00	01	05	0023	Acceptance of an arbitrator or a court of arbitration designated by mutual agreement		
03	01	00	01	05	0024	Designation of the chamber of commerce or other national institution as court of arbitration		
03	01	00	01	05	0025	Designation of a foreign body as court of arbitration		
03	01	00	01	05	0026	Waiver by both parties of claims through the diplomatic channel		
03	01	00	01	05	0027	Acceptance of Spanish as official language of the contract		
03	01	00	01	05	0028	Acceptance of a foreign language as official language of the contract		
03	01	00	01	05	0029	Acceptance of two language versions of the contract as equally valid		
03	01	00	01	05	0030	Acceptance of legally recognized translation, the Spanish prevailing in the event of a dispute		
03	01	00	01	05	0031	Acceptance of legally recognized translation, the foreign language prevailing in the event of a dispute		
03	01	00	01	05	0032	Clauses relating to legal validity, contractual duration and normal expiry of the contract		
03	01	00	01	05	0033	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the contractor		
03	01	00	01	05	0034	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the owner		
03	01	00	01	05	0035	Non-transferability of the contract, in whole or in part, without agreement of both parties.		

NAME OF PROJECT:	NAME OF STAGE: STUDIES FOR THE IMPLEMENTATION PHASE	REV. No.....	PAGE ..5.. of ..5..

Qualitative disaggregation

03	01	00	01	05	0036	Suspension of the contract, for limited periods	
03	01	00	01	05	0037	Cancellation of the contract, without compensation by the owner, on justified grounds. Examples: non-performance of obligations, work not carried out as prescribed, financial inability, technical inability, unjustified delay, violation of safety rules, deliberate damage or damage due to negligence, etc.	
03	01	00	01	05	0038	Suspension or cancellation of the contract on grounds of <u>force majeure</u> in the event of: Natural disasters (earthquakes, shipwrecks, etc.); Civil causes (wars, atomic disasters, revolutions, strikes, etc.); Economic causes (inflation, devaluation, etc.)	
03	01	00	01	05	0039	Determination of the deadline for delivery of the documents, or the period for execution of the work.	
03	01	00	01	05	0040	Maximum limit for full liability of the contractor (percentage of total fees; letter of guaranty; guarantee certificate).	
03	01	00	01	05	0041	Waiver by the owner of the right to claim compensation for damage, loss or loss of profit.	

Qualitative disaggregation

REV. No. (EN: 3a.2.3. 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 8

Code	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY (EN: 3b.1.3.6.)	CONSIDERED	
03 01 00 02 00 0002			
03 01 00 02 01 0000	NAME OF ACTIVITY: BASIC TASKS	YES O/C	NO
03 01 00 02 01 0001	Subactivities of administration and co-ordination regarding the Process Technology (EN: 3b.1.3.8.)	(EN: 3b.1.5.)	
03 01 00 02 01 0002	Analysis and evaluation of available information, technical literature, patents, etc. (EN: 3a.2.3.)		
03 01 00 02 01 0003	Establishment of theoretical scheme for the process and possible variants		
03 01 00 02 01 0004	Basic research into kinetics, catalysis, mass and energy transfer, etc.		
03 01 00 02 01 0005	Experimental development of the process at the laboratory, pilot-plant and semi-industrial plant level		
03 01 00 02 01 0006	Consideration of industrial trials; raw materials, equipment, corrosion, etc.		
03 01 00 02 01 0007	Selection of alternative sources of raw materials		
03 01 00 02 01 0008	Selection of alternative sources for basic services (water, steam, electricity, etc.).		
03 01 00 02 01 0009	Selection of alternative sources for main inputs (chemicals, catalysts, ingredients and additives)		
03 01 00 02 01 0010	Technico-economic evaluation and optimization of process design		
03 01 00 02 02 0000	ACTIVITY: TECHNICAL SERVICES		
03 01 00 02 02 0001	Advice to owner concerning development of process technology with his own resources (human, technical and economic)		
03 01 00 02 02 0002	Advice to owner on the selection and acquisition of the process technology		
03 01 00 02 02 0003	Review of some elements of the basic engineering		

NOTES: NOC: Normal Operating Conditions

NAME OF PROJECT:	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY	REV. No.....	PAGE ..2.. of ..8.

Qualitative disaggregation

03	01	00	02	02	0004	Advice on determining the national and/or international quality control and analysis rules to apply (loads, flows and finished products)		
03	01	00	02	02	0005	Advice to owner on setting up an analysis and quality control system (loads, flows and finished products)		
03	01	00	02	02	0006	Technical services for training personnel locally in technological development programmes (EN: 3b.1.3.1.)		
03	01	00	02	02	0007	Technical services for training personnel abroad in technological development programmes		
03	01	00	02	02	0008	Advice and/or technical services for initial operation and start-up of plants		
03	01	00	02	02	0009	Advice and/or technical services for operation after start-up		
03	01	00	02	03	0000	ACTIVITY: TECHNICAL DOCUMENTS		
03	01	00	02	03	0001	Delivery of books with basic specifications of processes, inputs, products and operating conditions (see annex II)		
03	01	00	02	03	0002	Delivery of plans, drawings and diagrams, including flows of material and energy for the process		
03	01	00	02	03	0003	Delivery of basic scientific information, information on kinetics, physico-chemistry, mass and energy transference, etc.		
03	01	00	02	03	0004	Delivery of information about experimental results at the laboratory, pilot-plant and industrial unit level		
03	01	00	02	03	0005	Delivery of reports on calculations and material and energy balance-sheets		
03	01	00	02	03	0006	Delivery of copies of programmes of process calculations for normal and critical conditions		
03	01	00	02	03	0007	Delivery of photographs, films, microfilms, etc.		
03	01	00	02	03	0008	Delivery of guides to the operation of plants, including methods of analysis and quality control		

NAME OF PROJECT:	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY	REV. No.....	PAGE ..3... of ...8

Qualitative disaggregation

03	01	00	02	04	0000	ACTIVITY: RULES AND PROCEDURES
03	01	00	02	04	0001	Periodic reports on progress and variations in the work
03	01	00	02	04	0002	Co-ordination procedures for the execution of the contract
03	01	00	02	04	0003	Procedures for book-keeping, handling of money, cost recording and control
03	01	00	02	04	0004	Procedure for reviewing, modifying if necessary and approving process technology
03	01	00	02	04	0005	Use of technical rules and procedures of the owner and the country
03	01	00	02	04	0006	Use of technical rules and procedures of the contractor
03	01	00	02	04	0007	Use of technical rules and procedures recognized internationally
03	01	00	02	04	0008	Use of codes (technical and accounting), nomenclatures and numbering system of the owner
03	01	00	02	04	0009	Use of codes (technical and accounting), nomenclatures and numbering system of the contractor
03	01	00	02	04	0010	Use of decimal metric system (International System: SI)
03	01	00	02	04	0011	Discretionary use of the system of units proposed by the contractor
03	01	00	02	05	0000	ACTIVITY: CONDITIONS - RESTRICTIONS (EN: 3b.1.3.2.)
03	01	00	02	05	0001	Inclusion in the technology contract of other negotiable elements which are the subject of trade (patents, trade marks, catalysts, technical assistance, etc.)
03	01	00	02	05	0002	Clause concerning non-patented know-how (content, type and scope) (see annex II)
03	01	00	02	05	0003	Clauses concerning licences for processes (content, type and scope) (see annex II)
03	01	00	02	05	0004	Clauses concerning patents (content, type and scope) (see annex II)
03	01	00	02	05	0005	Clauses concerning registered trade marks (content, type and scope) (see annex II)
03	01	00	02	05	0006	Clauses concerning technical assistance (content, type and scope) (see annex II)
03	01	00	02	05	0007	Inclusion or the most-favoured-licensee clause (obtaining of best conditions)
03	01	00	02	05	0008	Authorization for the entrepreneur to sublicense and transfer technology to third parties

NAME OF PROJECT:	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY	REV. No.....	PAGE .4... of .8..

Qualitative disaggregation

03	01	00	02	05	0009	Validity of patents negotiated (number of years) (see Decision 85 - JUNAC)	
03	01	00	02	05	0010	Prohibition, or limitation by omission, of changes in the contractual location of plant(s)	
03	01	00	02	05	0011	Non-transferability of process technology to subsidiaries of the enterprise and prohibition of its use by them	
03	01	00	02	05	0012	Bargaining open for the indefinite use of the technology or its use for any other plant	
03	01	00	02	05	0013	Limitation on the maximum time for which the process technology can be used by the owner	
03	01	00	02	05	0014	Obligation on the part of the owner to observe secrecy concerning technological information while the contract is in force	
03	01	00	02	05	0015	Obligation on the part of the owner to observe secrecy concerning technological information after termination of the contract	
03	01	00	02	05	0016	Duration of the contract limited to a specific period of time (number of years)	
03	01	00	02	05	0017	Prohibition of enlistment and/or use of alternative sources of peripheral technology (sole supplier)	
03	01	00	02	05	0018	Prohibition of the use of the process technology to build other similar plants	
03	01	00	02	05	0019	Prohibition of the use of the process technology to expand the plant(s)	
03	01	00	02	05	0020	Prohibition of the partial use of the process technology to modify other plants	
03	01	00	02	05	0021	Prohibition of the use of the process technology for other purposes, different from those in the contract	
03	01	00	02	05	0022	Transfer to the licenser free of charge of improvements to the technology made by the owner	
03	01	00	02	05	0023	Transfer to the owner free of charge of improvements to the technology made by the licenser	
03	01	00	02	05	0024	Obligation to purchase equipment through the licenser	
03	01	00	02	05	0025	Obligation to acquire specific equipment from suppliers selected by the licenser	
03	01	00	02	05	0026	Obligation to acquire some special equipment and materials directly from the licenser	
03	01	00	02	05	0027	Obligation to acquire certain raw materials directly from the licenser	

NAME OF PROJECT:	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY	REV. No.....	PAGE 5 of 8

Qualitative disaggregation

03	01	00	02	05	0028	Obligation to acquire certain specific inputs, catalysts and chemicals from the licenser	
03	01	00	02	05	0029	Selection of enterprises supplying goods and services at the licenser's discretion	
03	01	00	02	05	0030	Total or partial prohibition against buying some equipment in specific countries	
03	01	00	02	05	0031	Obligation to contract for basic engineering work only with enterprises authorized by the licenser	
03	01	00	02	05	0032	Limitation on the maximum quantity of products to be made with the acquired technology	
03	01	00	02	05	0033	Geographical limitation of the market by the licenser for the sale of products, by areas or regions	
03	01	00	02	05	0034	Prohibition against exporting products made by the owner to certain countries	
03	01	00	02	05	0035	Prohibition against exporting products made by the owner without the licenser's permission	
03	01	00	02	05	0036	Price level of products to be determined and controlled by the licenser	
03	01	00	02	05	0037	Quality level of products to be determined and controlled by the licenser	
03	01	00	02	05	0038	Obligation to use specific names or trade marks belonging to the licenser	
03	01	00	02	05	0039	Prohibition against using certain names or trade marks of the licenser	
03	01	00	02	05	0040	Total or partial obligation to sell products made by the owner to the licenser	
03	01	00	02	05	0041	Obligation to assign the marketing of products made by the owner to the licenser	
03	01	00	02	05	0042	Freedom of access by the licenser to the owner's book-keeping information	
03	01	00	02	05	0043	Freedom of access by the licenser to the owner's installations and plants	
03	01	00	02	05	0044	Licenser's participation, intervention or veto in the appointment of personnel by the owner	
03	01	00	02	05	0045	Owner's participation, intervention or veto in the appointment of personnel by the licenser	
03	01	00	02	05	0046	Owner's obligation to furnish technical operating information to the licenser	
03	01	00	02	05	0047	Licenser's guarantee of the yield of the processes, in relation to raw materials and other inputs	

NAME OF PROJECT:	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY	REV. No.....	PAGE ...6. of .2..

Qualitative disaggregation

03	01	00	02	05	0048	Licenser's guarantee concerning quality of products, minimum specifications and acceptable level of impurities		
03	01	00	02	05	0049	Guaranteed level of unit inputs of basic services		
03	01	00	02	05	0050	Guaranteed working life of catalysts and unit consumption of chemicals		
03	01	00	02	05	0051	Guaranteed level of final products, intermediate products and by-products, operating under normal working conditions		
03	01	00	02	05	0052	Guaranteed level of selectivity of the process operating under standard conditions		
03	01	00	02	05	0053	Duration(s) and expiry date(s) of the guarantees given		
03	01	00	02	05	0054	Penalty for each point or fraction of yield below the guaranteed level		
03	01	00	02	05	0055	Penalty for end product and by-product exceeding specifications or impurity level		
03	01	00	02	05	0056	Penalty for each point or fraction of industrial input above the guaranteed level		
03	01	00	02	05	0057	Replacement of equipment by the licenser because of process faults (months after start-up)		
03	01	00	02	05	0058	Responsibility for production losses and obligation to remedy technological defects		
03	01	00	02	05	0060	Penalty for completing and delivering the process technology after the agreed date		
03	01	00	02	05	0061	Bonus for completing and delivering the process technology before the agreed date		
03	01	00	02	05	0062	Application of the contract subject to prevailing national legislation		
03	01	00	02	05	0063	Application of the contract subject to legislation prevailing in the licenser's country		
03	01	00	02	05	0064	Application of the contract subject to the jurisdiction of an international court		
03	01	00	02	05	0065	Acceptance of an arbitrator or a court of arbitration designated by mutual agreement		
03	01	00	02	05	0066	Designation of the chamber of commerce or other national institution as court of arbitration		
03	01	00	02	05	0067	Designation of a foreign body as court of arbitration		
03	01	00	02	05	0068	Waiver by both parties of claims through the diplomatic channel		
03	01	00	02	05	0069	Acceptance of Spanish as official language of the contract		
03	01	00	02	05	0070	Acceptance of a foreign language as official language of the contract		

NAME OF PROJECT:	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY	REV. No.....	PAGE ..7.. of ..8..

03	01	00	02	05	0071	Acceptance of two language versions of the contract as equally valid	
03	01	00	02	05	0072	Acceptance of legally recognized translation, the Spanish prevailing in the event of a dispute	
03	01	00	02	05	0073	Acceptance of legally recognized translation, the foreign language prevailing in the event of a dispute	
03	01	00	02	05	0074	Clauses relating to legal validity, contractual duration and normal expiry of the contract	
03	01	00	02	05	0075	Clauses relating to premature termination of the contract, denunciation and compensation to be sought by the licenser	
03	01	00	02	05	0076	Clauses relating to premature termination of the contract, denunciation and compensation to be sought by the owner	
03	01	00	02	05	0077	Non-transferability of the contract, in whole or in part, without agreement of both parties	
03	01	00	02	05	0078	Suspension of the contract, for periods, by the owner	
03	01	00	02	05	0079	Suspension of the contract, for periods, by the licenser	
03	01	00	02	05	0080	Cancellation of the contract, without compensation by the owner, on justified grounds (see code 03.01.00.01.05.0037)	
03	01	00	02	05	0081	Suspension or cancellation of the contract on grounds of <u>force majeure</u> in the event of: Natural disasters (earthquakes, shipwrecks, etc.); Civil causes (wars, atomic disasters, revolutions, strikes, etc.); Economic causes (inflation, devaluation, etc.)	
03	01	00	02	05	0082	Determination of the date of validity of the contract	
03	01	00	02	05	0083	Determination of the period for execution of the work or the deadline for delivery of the documents	
03	01	00	02	05	0084	Maximum limit for full liability of the contractor (percentage of total fees; letter of guaranty; guarantee certificate)	
03	01	00	02	05	0085	Waiver by the owner of the right to claim compensation for damage, loss or loss of profit	
03	01	00	02	05	0086	Limited liability of the licenser, except in the event of wilful damage or negligence	
03	01	00	02	05	0087	Payment for infringing third-party patents in any design, by the licenser	

Qualitative disaggregation

NAME OF PROJECT:	NAME OF STAGE: CHOICE OF PROCESS TECHNOLOGY	REV. No.....	PAGE ..8.. of ..8..

03	11	00	02	05	0088	Payment of damages to third parties covered by insurance policy at owner's expense
03	11	00	02	05	0089	Payment of damages to third parties covered by insurance policy at licenser's expense
03	11	00	02	05	0090	Payment for own loss or damage covered by insurance policy at owner's expense
03	11	00	02	05	0091	Payment for own loss or damage covered by insurance policy at licenser's expense
03	11	00	02	05	0092	Disclaimer by the licenser of any liability not covered by insurance policies
03	11	00	02	05	0093	Licenser's obligation to keep information obtained from the owner secret
03	11	00	02	05	0094	Owner's obligation to keep information obtained from the licenser secret

Qualitative disaggregation

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 6

Qualitative disaggregation

Code						NAME OF STAGE: BASIC ENGINEERING (EN: 3b.1.3.6.)	CONSIDERED	
03	01	00	03	00	0000			
03	01	00	03	01	0000	NAME OF ACTIVITY: BASIC TASKS	YES O/C	NO
03	01	00	03	01	0001	Subactivities of administration and co-ordination for execution of basic engineering (EN: 3b.1.3.8.)		
03	01	00	03	01	0002	Conceptual engineering, design activities and technico-economic evaluation (EN: 3b.1.3.7.)		
03	01	00	03	01	0003	Process engineering, basic design activities (EN: 3b.1.3.7.)		
03	01	00	03	01	0004	Mechanical engineering, basic design activities (EN: 3b.1.3.7.)		
03	01	00	03	01	0005	Electrical engineering, basic design activities (EN: 3b.1.3.7.)		
03	01	00	03	01	0006	Instrumentation engineering, basic design activities (EN: 3b.1.3.7.)		
03	01	00	03	01	0007	Civil engineering, basic design activities (EN: 3b.1.3.7.)		
03	01	00	03	01	0008	Industrial engineering, basic design activities (EN: 3b.1.3.7.)		
03	01	00	03	01	0009	Active participation by owner's specialists in the basic design process, if contracted out		
03	01	00	03	01	0011	**Determination of number of technical personnel for plant management and operation**	(EN: 3b.1.5.)	
03	01	00	03	02	0000	ACTIVITY: TECHNICAL SERVICES		
03	01	00	03	02	0001	Advice to owner on carrying out basic engineering with his own resources (human, technical and economic)		
03	01	00	03	02	0002	Advice to owner on review of some elements in the detailed engineering and checking with the basic engineering		
03	01	00	03	02	0003	Advice to owner on determining the national and/or international quality control and analysis rules to apply (loads, flows and finished products)		
03	01	00	03	02	0004	Advice to owner on setting up an analysis and quality control system (loads, flows and finished products)		

EN: Explanatory Notes

NAME OF PROJECT:	NAME OF STAGE: BASIC ENGINEERING	REV. No.....	PAGE ..2.. of ..6..

Qualitative disaggregation

03	01	00	03	02	0005	Technical services for training personnel locally in systems, procedures and techniques of basic engineering (EN: 3b.1.3.1.)	
03	01	00	03	02	0006	Technical services for training personnel abroad in systems, procedures and techniques of basic engineering	
03	01	00	03	02	0007	Advice and/or technical services to owner on plant start-up and initial operation	
03	01	00	03	02	0008	Advice and/or technical services to owner on operation after start-up	
03	01	00	03	02	0009	Advice to owner on awarding contracts for the detailed engineering, purchasing services and construction and assembly	
03	01	00	03	02	0010	Advice to owner on supervision and inspection (auditing) of purchasing, construction and assembly services	
03	01	00	03	02	0011	Advice to owner on drawing up a programme for training the staff necessary to manage and run the plant	
03	01	00	03	03	0000	ACTIVITY: TECHNICAL DOCUMENTS	
03	01	00	03	03	0001	Delivery of specification books for basic design and materials (see annex II)	
03	01	00	03	03	0002	Delivery of plans, drawings and diagrams, including piping and instrumentation diagrams	
03	01	00	03	03	0003	Delivery of reports on calculations and material and energy balance-sheets	
03	01	00	03	03	0004	Delivery of copies of calculation programmes systematized by computer	
03	01	00	03	03	0005	Delivery of photographs, films, microfilms, etc.	
03	01	00	03	03	0006	Delivery of guides to the operation of plants (for use in the plant operating manuals to be drawn up at the detailed engineering stage)	
03	01	00	03	04	0000	ACTIVITY: RULES AND PROCEDURES	
03	01	00	03	04	0001	Work programme with estimated man-hours for specialities and areas	
03	01	00	03	04	0002	Periodic reports on the progress of the work, variations and cost control	
03	01	00	03	04	0003	Use of the rules and standards of the licenser	
03	01	00	03	04	0004	Use of the rules and standards of the owner and/or the country	
03	01	00	03	04	0005	Use of other internationally recognized rules and standards	
03	01	00	03	04	0006	Choice of basic design conditions by the owner (EN: 3b.1.3.6.)	

NAME OF PROJECT:	NAME OF STAGE: BASIC ENGINEERING	REV. No.....	PAGE 3 of 6

Qualitative disaggregation

03	01	00	03	04	0007	Use of codes (technical and accounting), nomenclatures and numbering system of the owner
03	01	00	03	04	0008	Use of codes (technical and accounting), nomenclatures and numbering system of the licenser
03	01	00	03	04	0009	Use of decimal metric system (International System: SI)
03	01	00	03	04	0010	Use at his discretion of system of units of measure selected by the licenser
03	01	00	03	04	0011	Use of safety rules of the owner (for design)
03	01	00	03	04	0012	Use of safety rules of the licenser (for design)
03	01	00	03	04	0013	Co-ordination procedures for the execution of the contract
03	01	00	03	04	0014	Procedures for deciding on variations and additions to the contract
03	01	00	03	04	0015	Procedures for drawing up subcontracts
03	01	00	03	04	0016	Procedures for book-keeping, handling of money, cost recording and control
03	01	00	03	04	0017	Procedures for reviewing, modifying and approving engineering work done
03	01	00	03	05	0000	ACTIVITY: CONDITIONS - RESTRICTIONS (EN: 3b.1.3.2.)
03	01	00	03	05	0001	Prohibition, or limitation by omission, of changes in the contractual location of plant(s)
03	01	00	03	05	0002	Non-transferability of basic engineering to subsidiaries of the enterprise and prohibition of its use by them
03	01	00	03	05	0003	Prohibition of enlistment and/or use of alternative sources of engineering for parts of the basic engineering or modifications to it (sole supplier)
03	01	00	03	05	0004	Prohibition of the use of the basic engineering to build other similar plants
03	01	00	03	05	0005	Prohibition of the use of the basic engineering to expand the plant(s)
03	01	00	03	05	0006	Prohibition of the partial use of the basic engineering to modify other plants
03	01	00	03	05	0007	Prohibition of the use of the basic engineering for other purposes, different from those in the contract
03	01	00	03	05	0008	Obligation to purchase equipment through the contractor (tied purchases)
03	01	00	03	05	0009	Obligation to acquire specific equipment from suppliers selected by the contractor

NAME OF PROJECT:	NAME OF STAGE: BASIC ENGINEERING	REV. No.....	PAGE ..4... of ..6..

03	01	00	03	05	0010	Obligation to acquire specific equipment from suppliers or regions determined by financial commitments
03	01	00	03	05	0011	Limitation on the maximum quantity of products to be made with the engineering acquired
03	01	00	03	05	0012	Limitations on the contractor's access to the owner's installations and plants
03	01	00	03	05	0013	Contractor's participation, intervention or veto in the owner's appointment of personnel for the project
03	01	00	03	05	0014	Owner's participation, intervention or veto in the contractor's appointment of personnel
03	01	00	03	05	0015	Active participation by the owner's specialists in the design process
03	01	00	03	05	0016	Guarantees of yield from processes in relation to inputs and raw materials
03	01	00	03	05	0017	Guarantee of product quality (minimum specifications and acceptable levels of impurities)
03	01	00	03	05	0018	Guaranteed level of unit inputs for basic services
		00	03	05	0019	Guaranteed rated working capacity under normal conditions
03	01	00	03	05	0020	Guaranteed minimum working capacity or minimum load factor
03	01	00	03	05	0021	Guaranteed volume of output of finished goods, intermediate goods and by-products under normal operating conditions
03	01	00	03	05	0022	Guaranteed working life of catalysts and unit consumption of chemicals
03	01	00	03	05	0023	Duration(s) or expiry date(s) of the guarantees given
03	01	00	03	05	0024	Penalty for each point or fraction of output below the guaranteed level
03	01	00	03	05	0025	Penalty for end-product or by-product exceeding specifications or level of impurities higher than guaranteed
03	01	00	03	05	0026	Penalty for each point or fraction of industrial input higher than the guaranteed levels
03	01	00	03	05	0027	Penalty for each point or fraction of capacity below the guaranteed level
03	01	00	03	05	0028	Replacement of equipment with operating faults due to errors in the basic engineering design (months after the date of delivery of the equipment or date of mechanical acceptance)
03	01	00	03	05	0029	Liability for production losses limited to remedying defects in basic engineering
03	01	00	03	05	0030	Full responsibility for quality of work and obligation to remedy defective work

NAME OF PROJECT:	NAME OF STAGE: BASIC ENGINEERING	REV. No.....	PAGE .5... of .6..

Qualitative disaggregation

03	01	00	03	05	0031	Obligation to make modifications and replace equipment
03	01	00	03	05	0032	Penalty for completing and delivering the work after the agreed date
03	01	00	03	05	0033	Bonus for completing and delivering the work before the agreed date
03	01	00	03	05	0034	Performance of the contract subject to prevailing national legislation
03	01	00	03	05	0035	Performance of the contract subject to prevailing legislation in the contractor's country
03	01	00	03	05	0036	Performance of the contract subject to the jurisdiction of an international court
03	01	00	03	05	0037	Acceptance of an arbitrator or a court of arbitration designated by agreement
03	01	00	03	05	0038	Designation of the chamber of commerce or other national institution as court of arbitration
03	01	00	03	05	0039	Designation of a foreign body as court of arbitration
03	01	00	03	05	0040	Waiver by both parties of claims through the diplomatic channel
03	01	00	03	05	0041	Acceptance of Spanish as official language of the contract
03	01	00	03	05	0042	Acceptance of a foreign language as official language of the contract
03	01	00	03	05	0043	Acceptance of two language versions of the contract as equally valid
03	01	00	03	05	0044	Acceptance of legally recognized translation, the Spanish prevailing in the event of a dispute
03	01	00	03	05	0045	Acceptance of legally recognized translation, the foreign language prevailing in the event of a dispute
03	01	00	03	05	0046	Clause relating to legal validity, contractual duration and normal expiry of the contract
03	01	00	03	05	0047	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the contractor
03	01	00	03	05	0048	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the owner
03	01	00	03	05	0049	Non-transferability of the contract, in whole or in part, without agreement of both parties
03	01	00	03	05	0050	Suspension of the contract, for periods, by the owner

NAME OF PROJECT:	NAME OF STAGE: BASIC ENGINEERING	REV. No.....	PAGE ..6.. of ..6..

Qualitative disaggregation

03	01	00	03	05	0051	Cancellation of the contract, without compensation by the owner, on justified grounds (see code 03.01.00.01.05.0037)
03	01	00	03	05	0052	Suspension or cancellation of the contract on grounds of <u>force majeure</u> in the event of: Natural disasters (earthquakes, shipwrecks, etc.); Civil causes (wars, atomic disasters, revolutions, strikes, etc.) Economic causes (inflation, devaluation, etc.)
03	01	00	03	05	0053	Determination of the date of validity of the contract
03	01	00	03	05	0054	Determination of the period for execution of the work or the deadline for delivery of the documents
03	01	00	03	05	0055	Maximum limit for full liability of the contractor (percentage of total fees; letter of guaranty; guarantee certificate)
03	01	00	03	05	0056	Waiver by the owner of the right to claim compensation for damage, loss or loss of profit
03	01	00	03	05	0057	Limited liability of the contractor, except in the event of wilful damage or negligence
03	01	00	03	05	0058	Payment for use of third-party patents in any design, by the contractor
03	01	00	03	05	0059	Payment of damages to third parties covered by insurance policy at owner's expense
03	01	00	03	05	0060	Payment of damages to third parties covered by insurance policy at contractor's expense
03	01	00	03	05	0061	Payment for own loss or damage covered by insurance policy at owner's expense
03	01	00	03	05	0062	Payment for own loss or damage covered by insurance policy at contractor's expense
03	01	00	03	05	0063	Disclaimer by the licenser of any liability not covered by insurance policies
03	01	00	03	05	0064	Contractor's obligation to keep information obtained from the owner secret
03	01	00	03	05	0065	Owner's obligation to keep information obtained from the licenser secret

REV. No. (EN: 3a.2.3. and 3.1.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 6

Code						NAME OF STAGE: DETAILED ENGINEERING	CONSIDERED	
03	01	00	04	00	0000			
03	01	00	04	01	0000	NAME OF ACTIVITY: BASIC TASKS	YES O/C	NO
03	01	00	04	01	0001	Subactivities of administration and co-ordination of detailed engineering (EN: 3b.1.3.8.)		
03	01	00	04	01	0002	Review of basic engineering		
03	01	00	04	01	0003	Mechanical engineering, detailed design activities (EN: 3b.1.3.7.)		
03	01	00	04	01	0004	Electrical engineering, detailed design activities (EN: 3b.1.3.7.)		
03	01	00	04	01	0005	Instrumentation engineering, detailed design activities (EN: 3b.1.3.7.)		
03	01	00	04	01	0006	Civil engineering, detailed design activities (EN: 3b.1.3.7.)		
03	01	00	04	01	0007	Industrial engineering, detailed design activities (EN: 3b.1.3.7.)		
03	01	00	04	01	0008	Active participation by the owner's specialist in the design process, if contracted out	(EN: 3b.1.5.)	
03	01	00	04	01	0009	Review, modification and acceptance by the owner of the detailed engineering		
03	01	00	04	01	0010	Design and construction of the scale model (see annex II)		
03	01	00	04	01	0011	Preliminary selection of manufacturers		
03	01	00	04	02	0000	ACTIVITY: TECHNICAL SERVICES		
03	01	00	04	02	0001	Advice to owner on carrying out detailed engineering with his own resources (human, technical and economic)		
03	01	00	04	02	0002	Advice to owner on review, adaptation and possible modification of the basic engineering		
03	01	00	04	02	0003	Advice to owner on determining the national and/or international quality control and analysis standards to apply (loads, flows and finished products)		
03	01	00	04	02	0004	Technical services for training personnel locally in systems, procedures and techniques of detailed engineering		

Qualitative data aggregation

NAME OF PROJECT:	NAME OF STAGE: DETAILED ENGINEERING	REV. No.....	PAGE 2 of 6

01	01	00	04	02	0005	Technical services for training personnel abroad in systems, procedures and techniques of detailed engineering (EN: 3b.1.3.1.)
02	01	00	04	02	0006	Advice and/or technical services to owner on plant start-up and initial operation
03	01	00	04	02	0007	Advice and/or technical services to owner on operation after start-up
04	01	00	04	02	0008	Advice and/or technical services to owner on the purchasing services and construction and assembly, when done directly by the owner or by third parties
05	01	00	04	02	0009	Technical assistance in the preliminary selection of manufacturers
06	01	00	04	02	0010	Advice to owner on drawing up a programme for training staff
01	01	00	04	03	0000	ACTIVITY: TECHNICAL DOCUMENTS
02	01	00	04	03	0001	Delivery of specification books for equipment and materials (see annex II)
03	01	00	04	03	0002	Delivery of plans, drawings and diagrams, including piping and instrumentation diagrams
04	01	00	04	03	0003	Delivery of reports on calculations and hydraulic tests on the process
05	01	00	04	03	0004	Delivery of copies of calculation programmes systematized by computer
06	01	00	04	03	0005	Delivery of photographs, films, microfilms, etc.
07	01	00	04	03	0006	Delivery of mechanical and electrical equipment catalogues
08	01	00	04	03	0007	Delivery of manuals for the operation of plants, including start-up and emergency stops
09	01	00	04	03	0008	Delivery of scale model of plants
10	01	00	04	03	0009	Delivery of work programme with estimated man-hours for specialities and areas
01	01	00	04	04	0000	ACTIVITY: RULES AND PROCEDURES
02	01	00	04	04	0001	Periodic reports on the progress of the work, variations and cost control
03	01	00	04	04	0002	Use of the rules and standards of the contractor
04	01	00	04	04	0003	Use of the rules and standards of the owner and the country
05	01	00	04	04	0004	Use of other internationally recognized rules
06	01	00	04	04	0005	Establishment of detailed engineering instructions, conditions and specifications by the owner (soil studies, basic engineering)

Qualitative diagnostication

NAME OF PROJECT:	NAME OF STAGE: DETAILED ENGINEERING	REV. No.....	PAGE ..3... of ..6..

Qualitative disaggregation

03	01	00	04	04	C006	Use of codes (technical and acccunting), nomenclatures and numberirg system of the owner	
03	01	00	04	04	0007	Use of codes (technical and accounting), nomenclatures and numbering system of the contractor	
03	01	00	04	04	0008	Use of decimal metric system (International System: SI)	
03	01	00	04	04	0009	Use at his discretion of system of units selected by the contractor	
03	01	00	04	04	0010	Use of safety rules of the owner (for detailed engineering design) (EN: 3b.1.3.1.)	
03	01	00	04	04	0011	Use of safety rules of the contractor (for detailed engineering design)	
03	01	00	04	04	0012	Co-ordination procedures for the execution of the contract	
03	01	00	04	04	0013	Procedures for deciding on variations and additions to the contract	
03	01	00	04	04	C014	Procedures for drawing up sub-contracts	
03	01	00	04	04	0015	Procedures for book-keeping, handling of money and cost control	
03	01	00	04	04	0016	Procedures for reviewing, modifying and approving engineering work done	
03	01	00	04	05	0000	ACTIVITY: CONDITIONS - RESTRICTIONS (EN: 3b.1.3.2.)	
03	01	00	04	05	0001	Prohibition, or limitation by omission, of changes in the contractual location of plant(s)	
03	01	00	04	05	0002	Non-transferability of detailed engineering to subsidiaries of the enterprise and prohibition of its use by them	
03	01	00	04	05	0003	Prohibition of enlistment and/or use of alternative sources of engineering for parts of the detailed engineering or modifications to it (sole supplier)	
03	01	00	04	05	0004	Prohibition of the use of detailed engineering to build other similar plants	
03	01	00	04	05	0005	Prohibition of the use of the detailed engineering to expand the plant(s)	
03	01	00	04	05	0006	Prohibition of the partial use of the detailed engineering to modify other plants	
03	01	00	04	05	0007	Prohibition of the use of the detailed engineering for other purposes, different from those in the contract	
03	01	00	04	05	0008	Obligation to purchase equipment through the contractor (tied purchases)	
03	01	00	04	05	0009	Obligation to acquire specific equipment from suppliers selected by the contractor	

NAME OF PROJECT:	NAME OF STAGE: DETAILED ENGINEERING	REV. No.....	PAGE ..4.. of ..6.

Qualitative disaggregation

03	01	00	04	05	0010	Obligation to acquire specific equipment from suppliers or regions determined by financial commitments		
03	01	00	04	05	0011	Limitation on the maximum quantity of products to be made with the engineering acquired		
03	01	00	04	05	0012	Limitation on the contractor's freedom of access to the owner's installations and plants		
03	01	00	04	05	0013	Contractor's participation, intervention or veto in the owner's appointment of personnel for the project		
03	01	00	04	05	0014	Owner's participation, intervention or veto in the contractor's appointment of personnel		
03	01	00	04	05	0015	Guarantee of product quality, minimum specifications and acceptable levels of impurities		
03	01	00	04	05	0016	Guaranteed level of unit inputs for basic services		
03	01	00	04	05	0017	Guaranteed rated working capacity under standard conditions		
03	01	00	04	05	0018	Guaranteed minimum working capacity or minimum load factor		
03	01	00	04	05	0019	Duration(s) or expiry date(s) of the guarantees given		
03	01	00	04	05	0020	Penalties for end-product or by-product exceeding specifications or level of impurities higher than guaranteed		
03	01	00	04	05	0021	Penalties for each point or fraction of industrial inputs higher than the guaranteed level		
03	01	00	04	05	0022	Guaranteed level of finished goods, intermediate goods and by-products under normal operating conditions		
03	01	00	04	05	0023	Penalties for each point or fraction of capacity below the guaranteed level		
03	01	00	04	05	0024	Replacement of equipment with operating faults due to errors in the detailed engineering design (months after start-up)		
03	01	00	04	05	0025	Liability for production losses limited to remedying defects in detailed engineering		
03	01	00	04	05	0026	Full liability for quality of work and obligation to remedy defective work		
03	01	00	04	05	0027	Penalties for completing and delivering the work after the agreed date		
03	01	00	04	05	0028	Obligation to make modifications and replace equipment		

NAME OF PROJECT:	NAME OF STAGE: DETAILED ENGINEERING	REV. No.....	PAGE 5 of 6

03	01	00	04	05	0029	Bonus for completing and delivering the work before the agreed date
03	01	00	04	05	0030	Performance of the contract subject to prevailing national legislation
03	01	00	04	05	0031	Performance of the contract subject to prevailing legislation in the contractor's country
03	01	00	04	05	0032	Performance of the contract subject to the jurisdiction of an international court
03	01	00	04	05	0033	Acceptance of an arbitrator or a court of arbitration designated by agreement
03	01	00	04	05	0034	Designation of the chamber of commerce or other national institution as court of arbitration
03	01	00	04	05	0035	Designation of a foreign body as court of arbitration
03	01	00	04	05	0036	Waiver by both parties of claims through the diplomatic channel
03	01	00	04	05	0037	Acceptance of Spanish as official language of the contract
03	01	00	04	05	0038	Acceptance of a foreign language as official language of the contract
03	01	00	04	05	0039	Acceptance of two language versions of the contract as equally valid
03	01	00	04	05	0040	Acceptance of legally recognized translation, the Spanish prevailing in the event of a dispute
03	01	00	04	05	0041	Acceptance of legally recognized translation, the foreign language prevailing in the event of a dispute
03	01	00	04	05	0042	Clause relating to legal validity, contractual duration and normal expiry of the contract
03	01	00	04	05	0043	Clauses relating to premature termination of the contract, denunciation and compensation to be sought by the contractor
03	01	00	04	05	0044	Clauses relating to premature termination of the contract, denunciation and compensation to be sought by the owner
03	01	00	04	05	0045	Non-transferability of the contract, in whole or in part, without agreement of both parties
03	01	00	04	05	0046	Suspension of the contract, for periods, by the owner
03	01	00	04	05	0047	Cancellation of the contract, without compensation by the owner, on justified grounds (see code 03.01.00.01.05.0037)

Qualitative dimension

NAME OF PROJECT:	NAME OF STAGE: DETAILED ENGINEERING	REV. No.....	PAGE ...6.. of ...6...

Qualitative disaggregation

03	01	00	04	05	0048	Suspension or cancellation of the contract on grounds of force majeure in the event of: Natural disasters (earthquakes, shipwrecks, etc.); Civil causes (wars, atomic disasters, revolutions, strikes, etc.); Economic causes (inflation, devaluation, etc.)
03	01	00	04	05	0049	Determination of the date of validity of the contract
03	01	00	04	05	0050	Determination of the period for execution of the work and the deadline for delivery of the documents
03	01	00	04	05	0051	Maximum limit for full liability of the contractor (percentage of total fees; letter of guaranty; guarantee certificates)
03	01	00	04	05	0052	Waiver by the owner of the right to claim compensation for damage, loss or loss of profit
03	01	00	04	05	0053	Limited liability of the contractor, except in the event of wilful damage or negligence
03	01	00	04	05	0054	Payment for use of third-party patents in any design, by the contractor
03	01	00	04	05	0055	Payment of damages to third parties covered by insurance policy at owner's expense
03	01	00	04	05	0056	Payment of damages to third parties covered by insurance policy at contractor's expense
03	01	00	04	05	0057	Payment for own loss or damage covered by insurance policy at owner's expense
03	01	00	04	05	0058	Payment for own loss or damage covered by insurance policy at contractor's expense
03	01	00	04	05	0059	Disclaimer by the contractor of any liability not covered by insurance policies
03	01	00	04	05	0060	Contractor's obligation to keep information obtained from the owner secret
03	01	00	04	05	0061	Owner's obligation to keep information obtained from the contractor secret

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 7

Qualitative disaggregation

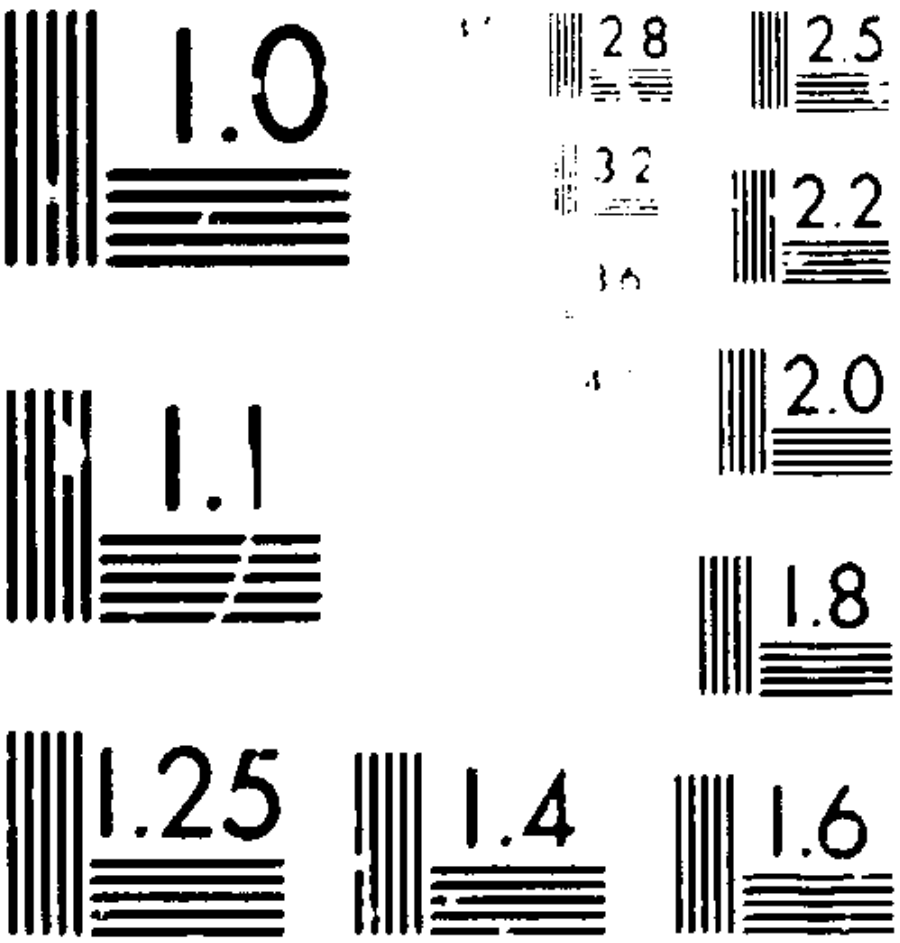
Code						NAME OF STAGE: PURCHASING SERVICES	CONSIDERED	
03	01	00	05	00	0000			
03	01	00	05	01	0000	**NAME OF ACTIVITY:** BASIC TASKS	YES O/C	NO
03	01	00	05	01	0001	Subactivities of administration and co-ordination for purchase of equipment, materials and spare parts (EN: 3b.1.3.8.)	(EN: 3b.1.5.)	
03	01	00	05	01	0002	Evaluation and selection of sellers or manufacturers		
03	01	00	05	01	0003	Preparation of invitations to tender and obtaining of quotations		
03	01	00	05	01	0004	Analysis and evaluation of quotations for equipment and materials		
03	01	00	05	01	0005	Selection and recommendation for consideration by the owner		
03	01	00	05	01	0006	Obtaining of approval of the purchase by the owner		
03	01	00	05	01	0007	Negotiation and purchase through purchase order or contract		
03	01	00	05	01	0008	Inspection of manufacture and testing of equipment and materials		
03	01	00	05	01	0009	Dispatching, handling, export formalities, warehousing and storage of equipment and materials (port of departure)		
03	01	00	05	01	0010	Transport of equipment and materials, including placing of insurance contracts		
03	01	00	05	01	0011	Reception, handling, import formalities and customs clearance of equipment and materials		
03	01	00	05	01	0012	Lists of final specifications for equipment and materials, in accordance with purchases		
03	01	00	05	01	0013	Reception, handling and storage at the work site of equipment and material for plants (custody)		
03	01	00	05	02	0000	ACTIVITY: TECHNICAL SERVICES		
03	01	00	05	02	0001	Advice to owner on the partial or total operation of the purchasing service with his own resources (human, technical and economic)		
03	01	00	05	02	0002	Advice to the owner on the evaluation, adaptation, organization or establishment of the purchasing system		

NOTES

NAME OF PROJECT:	NAME OF STAGE: PURCHASING SERVICES	REV. No.....	PAGE ..2.. of ..7.

[illegible]	01	00	05	02	0003	Advice to the owner on the organization of a system for coding and storing equipment and materials
[illegible]	01	00	05	02	0004	Advice and/or technical services to the owner for the inspection of equipment during manufacture or transport
[illegible]	01	00	05	02	0005	Technical assistance services to sellers in installing, assembling and starting up equipment
[illegible]	01	00	05	02	0006	Technical assistance services to sellers in repairing and maintaining equipment in operation
[illegible]	01	00	05	02	0007	Advice and/or technical services for training personnel locally in purchasing systems, procedures and techniques
[illegible]	01	00	05	02	0008	Advice and/or technical services for training personnel abroad in purchasing systems, procedures and techniques
[illegible]	01	00	05	03	0000	ACTIVITY: TECHNICAL DOCUMENTS
[illegible]	01	00	05	03	0001	Delivery of plans, drawings and diagrams of equipment supplied by sellers
[illegible]	01	00	05	03	0002	Delivery of mechanical and electrical equipment catalogues
[illegible]	01	00	05	03	0003	Delivery of photographs, films, microfilms, etc.
[illegible]	01	00	05	03	0004	Delivery of purchasing documentation (quotations, appraisals, purchase orders, guarantees, etc.)
[illegible]	01	00	05	03	0005	Delivery of handling documentation (consular dues, insurance policies, bills of lading, certificates of origin, packing lists, sellers' invoices, etc.)
[illegible]	01	00	05	03	0006	Delivery of manuals for operation of equipment, including start up and emergency stops
[illegible]	01	00	05	04	0000	ACTIVITY: RULES AND PROCEDURES
[illegible]	01	00	05	04	0001	Periodic progress reports on purchases, variations, cancellations and cost control
[illegible]	01	00	05	04	0002	Use of the contractor's rules for the purchasing service (inspection, shipments, etc.)
[illegible]	01	00	05	04	0003	Use of the owner's rules for the purchasing service (inspection, shipments, etc.)
[illegible]	01	00	05	04	0004	Use of other internationally recognized rules
[illegible]	01	00	05	04	0005	Use of the owner's codes (technical and accounting), nomenclatures and numbering syste...

Qualitative dimension



NAME OF PROJECT:	NAME OF STAGE: PURCHASING SERVICES	REV. No.....	PAGE ..3.. of ..7..

Qualitative disaggregation

03	01	00	05	04	0006	Use of the contractor's codes (technical and accounting), nomenclatures and numbering system		
03	01	00	05	04	0007	Use of the decimal metric system (International System: SI)		
03	01	00	05	04	0008	Use at his discretion of the system of units selected by the contractor		
03	01	00	05	04	0009	Use of the owner's safety rules (EN: 3b.1.3.1.)		
03	01	00	05	04	0010	Use of the contractor's safety rules		
03	01	00	05	04	0011	Co-ordination procedures for the execution of the contract		
03	01	00	05	04	0012	Procedures for book-keeping, handling of money, cost recording and control		
03	01	00	05	04	0013	Procedures for drawing up subcontracts		
03	01	00	05	04	0014	Procedures for obtaining and appraising quotations, getting the owner's approval and making purchases		
03	01	00	05	04	0015	Procedures for inspecting equipment and materials during manufacture, testing and finishing		
03	01	00	05	04	0016	Procedures for taking out insurance for damage and loss of equipment and materials		
03	01	00	05	04	0017	Procedures for dispatching and shipping equipment, materials and spare parts		
03	01	00	05	04	0018	Procedures for cancelling purchase orders and departing from the terms of the contract		
03	01	00	05	05	0000	ACTIVITY: CONDITIONS - RESTRICTIONS (EN: 3b.1.3.2.)		
03	01	00	05	05	0001	Sellers' and/or manufacturers' guarantees for all equipment, materials and spare parts acquired (for design, materials, manufacture and operation)		
03	01	00	05	05	0002	Insurance policies, particularly for loss or damage of supplies in transit		
03	01	00	05	05	0003	Establishment of instructions, conditions and specifications for purchases		
03	01	00	05	05	0004	Drawing up of "List of manufacturers and sellers authorized by the owner"		
03	01	00	05	05	0005	Determination by the owner of the maximum value of orders to be placed freely by the contractor without obtaining quotations		
03	01	00	05	05	0006	Prohibition on the use of alternative sources for purchasing services (sole supplier)		
03	01	00	05	05	0007	Obligation to use the contractor's purchase control system		
03	01	00	05	05	0008	Obligation to use the owner's purchase control system		

NAME OF PROJECT:	NAME OF STAGE: PURCHASING SERVICES	REV. No.....	PAGE ...4.. of ..7..

03	01	00	05	05	0009	Use of the owner's procedures for purchases of equipment and materials, conditional upon additional payments	
03	01	00	05	05	0010	Obligation to buy all equipment and materials through the contractor (tied purchases)	
03	01	00	05	05	0011	Obligation to acquire specific equipment and materials from suppliers selected by the contractor	
03	01	00	05	05	0012	Obligation to acquire specific equipment and materials produced domestically, in accordance with prevailing legislation	
03	01	00	05	05	0013	Obligation to acquire some special equipment and materials directly from the contractor	
03	01	00	05	05	0014	Limitations on the direct supply of goods and services by the owner	
03	01	00	05	05	0015	Limitation on the selection of firms by the contractor to supply goods and services	
03	01	00	05	05	0016	Prohibition, total or partial, on purchases of some equipment and materials from certain countries	
03	01	00	05	05	0017	Obligation to give preference to domestic vessels for the transport of equipment and materials	
03	01	00	05	05	0018	Obligation to give preference to foreign vessels for the transport of equipment and materials	
03	01	00	05	05	0019	Prohibition on re-exports of some equipment and materials to certain countries without the contractor's authorization	
03	01	00	05	05	0020	Obligation, total or partial, to sell products made by the owner to the contractor	
03	01	00	05	05	0021	Obligation to entrust the marketing of products produced by the firm to the contractor	
03	01	00	05	05	0022	Freedom of access by the contractor to the owner's installations and plants	
03	01	00	05	05	0023	Contractor's participation, intervention or veto in the appointment of personnel by the owner	
03	01	00	05	05	0024	Owner's participation, intervention or veto in the appointment of personnel by the contractor	
03	01	00	05	05	0025	Guarantee of quality, minimum specifications and tolerances for equipment and materials	
03	01	00	05	05	0026	Guaranteed rated capacity of equipment working under standard conditions	
03	01	00	05	05	0027	Guaranteed minimum working capacity of equipment or minimum load factor	
03	01	00	05	05	0028	Guaranteed level of minimum yield of equipment operating under standard conditions	

Qualitative discrimination

NAME OF PROJECT:	NAME OF STAGE: PURCHASING SERVICES	REV. No.....	PAGE ..5.. of ..7..

Qualitative disaggregation

03	01	00	05	05	0029	Recognition of contractor as "purchasing agent without joint liability"		
03	01	00	05	05	0030	Transfer of guarantees of equipment and materials obtained by the contractor from the sellers to the owner		
03	01	00	05	05	0031	Duration(s) or expiry date(s) of the guarantees given		
03	01	00	05	05	0032	Penalty for equipment and materials exceeding the specifications, whether replaced or not		
03	01	00	05	05	0033	Replacement of equipment and materials exceeding the specifications, at no extra cost		
03	01	00	05	05	0034	Replacement of equipment with capacity below the guaranteed level (minimum guarantee periods to be 18 months from the date of shipping and 12 months from the final engineering acceptance)		
03	01	00	05	05	0035	Replacement of equipment with performance below the guaranteed level (minimum guarantee periods to be 18 months from the date of shipping and 12 months from the date of final engineering acceptance)		
03	01	00	05	05	0036	Replacement of equipment with operating defects (minimum guarantee periods to be 18 months from the date of shipping and 12 months from the final engineering acceptance)		
03	01	00	05	05	0037	Liability for production losses limited to replacement of defective equipment		
03	01	00	05	05	0038	Full liability for quality of equipment and obligation to remedy defective work		
03	01	00	05	05	0039	Penalty for completing purchases and supplying equipment and materials after the agreed date		
03	01	00	05	05	0040	Bonus for completing delivery of the equipment and materials before the agreed date		
03	01	00	05	05	0041	Performance of the contract subject to prevailing national legislation		
03	01	00	05	05	0042	Performance of the contract subject to prevailing legislation in the contractor's country		
03	01	00	05	05	0043	Performance of the contract subject to the jurisdiction of an international court		
03	01	00	05	05	0044	Acceptance of an arbitrator or a court of arbitration designated by agreement		
03	01	00	05	05	0045	Designation of the chamber of commerce or other national institution as court of arbitration		
03	01	00	05	05	0046	Designation of a foreign body as court of arbitration		
03	01	00	05	05	0047	Waiver by both parties of claims through the diplomatic channel		

NAME OF PROJECT:	NAME OF STAGE: PURCHASING SERVICES	REV. No.....	PAGE ..6... of .7..

Qualitative dimensionation

03	01	00	05	05	0048	Acceptance of Spanish as official language of the contract		
03	01	00	05	05	0049	Acceptance of a foreign language as official language of the contract		
03	01	00	05	05	0050	Acceptance of two language versions of the contract as equally valid		
03	01	00	05	05	0051	Acceptance of legally recognized translation, the Spanish prevailing in the event of a dispute		
03	01	00	05	05	0052	Acceptance of legally recognized translation, the foreign language prevailing in the event of a dispute		
03	01	00	05	05	0053	Clause relating to legal validity, contractual duration and normal expiry of the contract		
03	01	00	05	05	0054	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the contractor		
03	01	00	05	05	0055	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the owner		
03	01	00	05	05	0056	Non-transferability of the contract, in whole or in part, without agreement of both parties		
03	01	00	05	05	0057	Suspension of the contract, for limited periods, by the owner		
03	01	00	05	05	0058	Cancellation of the contract, without compensation by the owner, on justified grounds (see code 03.01.00.01.05.0037)		
03	01	00	05	05	0059	Suspension or cancellation of the contract on grounds of <u>force majeure</u> in the event of: Natural disasters (earthquakes, shipwrecks, etc.); Civil causes (wars, atomic disasters, revolutions, strikes, etc.); Economic causes (inflation, devaluation, etc.)		
03	01	00	05	05	0060	Determination of the date of validity of the contract		
03	01	00	05	05	0061	Determination of the period for execution of the work and the deadline for delivery of the documents		
03	01	00	05	05	0062	Maximum limit for full liability of the contractor (percentage of total fees; letter of guaranty; guarantee certificate)		
03	01	00	05	05	0063	Waiver by the owner of the right to claim compensation for damage, loss or loss of profit		
03	01	00	05	05	0064	Limited liability of the contractor, except in the event of wilful damage or negligence		

NAME OF PROJECT:	NAME OF STAGE: PURCHASING SERVICES ?	REV. No.....	PAGE 7 of 7

Qualitative disaggregation

03	01	00	05	05	0065	Payment of cost of using third-party patents in any design, by the sellers or manufacturers
03	01	00	05	05	0066	Payment of damages to third parties covered by insurance policies at owner's expense
03	01	00	05	05	0067	Payment of damages to third parties covered by insurance policies at contractor's expense
03	01	00	05	05	0068	Payment for own loss or damage covered by insurance policies at owner's expense
03	01	00	05	05	0069	Payment for own loss or damage covered by insurance policies at contractor's expense
03	01	00	05	05	0070	Disclaimer by the contractor of any liability not covered by insurance policies
03	01	00	05	05	0071	Contractor's obligation to keep information obtained from the owner secret
03	01	00	05	05	0072	Owner's obligation to keep information obtained from the contractor secret

REV. No. (EN: 3a.2.2.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ..1.... OF ....6....

Qualitative disaggregation

Code						NAME OF STAGE: CONSTRUCTION AND ASSEMBLY	CONSIDERED	
03	01	00	06	00	0000			
03	01	00	06	01	0000	NAME OF ACTIVITY: BASIC TASKS	YES O/C	NO
03	01	00	06	01	0001	Subactivities of administration and co-ordination for construction and assembly (EN: 3b.1.3.8.)		
03	01	00	06	01	0002	Activities of supervision (supervision and inspection, auditing) and control of construction and assembly carried out for the owner		
03	01	00	06	01	0003	Activities of review and updating of the detailed engineering (assembly plans, etc.)		
03	01	00	06	01	0004	Mechanical engineering, construction and assembly activities		
03	01	00	06	01	0005	Electrical engineering, construction and assembly activities		
03	01	00	06	01	0006	Instrumentation engineering, construction and assembly activities		
03	01	00	06	01	0007	Civil engineering, construction and assembly activities		
03	01	00	06	01	0008	Industrial engineering, construction and assembly activities		
03	01	00	06	01	0009	Active participation by the owner's specialists in construction and assembly		
03	01	00	06	01	0010	Participation by the constructor in the acceptance and start-up activities		
03	01	00	06	01	0011	Purchase and handling of equipment, tools and materials for construction		
03	01	00	06	01	0012	Recruitment and selection of personnel for plant construction and assembly		
03	01	00	06	02	0000	ACTIVITY: TECHNICAL SERVICES		
03	01	00	06	02	0001	Advice to owner on execution of construction and assembly		
03	01	00	06	02	0002	Advice to owner on review and checking of some specialized construction and assembly activities		
03	01	00	06	02	0003	Advice to owner on setting up a work control and supervision system (supervision and inspection, auditing)		
03	01	00	06	02	0004	Advice to the owner on training personnel locally in systems, procedures and techniques of construction and assembly		

NOTES

NAME OF PROJECT:	NAME OF STAGE: CONSTRUCTION AND ASSEMBLY	REV. No.....	PAGE ..2... of ..6..

Qualitative disaggregation

03	01	00	06	02	0005	Advice to the owner on training personnel abroad in systems, procedures and techniques for construction and assembly		
03	01	00	06	02	0006	Advice to owner on plant start-up and initial operation		
03	01	00	06	02	0007	Advice to owner on operation after start-up		
03	01	00	06	03	0000	ACTIVITY: TECHNICAL DOCUMENTS		
03	01	00	06	03	0001	Delivery of specification books for materials and certificates of inspection, quality control and testing in situ (see annex II)		
03	01	00	06	03	0002	Delivery of plans, drawings and diagrams, modified and updated in accordance with the progress of construction		
03	01	00	06	03	0003	Delivery of copies of updated construction programmes systematized by computer		
03	01	00	06	03	0004	Delivery of work programmes with estimated man-hours for specialties and areas		
03	01	00	06	03	0005	Delivery of photographs, films, microfilms, etc.		
03	01	00	06	03	0006	Delivery of updated operating manual for process and service plants (when contracted for with detailed engineering)		
03	01	00	06	03	0007	Delivery of updated safety manual for process and service plants (when contracted for with detailed engineering)		
03	01	00	06	04	0000	ACTIVITY: RULES AND PROCEDURES		
03	01	00	06	04	0001	Periodic reports on the progress of the work, variations, cost control and staff changes		
03	01	00	06	04	0002	Use of the contractor's rules		
03	01	00	06	04	0003	Use of the owner's rules		
03	01	00	06	04	0004	Use of other internationally recognized rules		
03	01	00	06	04	0005	Use of codes (technical and accounting), nomenclatures and numbering systems of the owner		
03	01	00	06	04	0006	Use of codes (technical and accounting), nomenclatures and numbering systems of the contractor		
03	01	00	06	04	0007	Use of decimal metric system (International System: SI)		
03	01	00	06	04	0008	Use at his discretion of system of units selected by the contractor		

NAME OF PROJECT:	NAME OF STAGE: CONSTRUCTION AND ASSEMBLY	REV. No.....	PAGE ..3.. of ..6..

C	1	00	06	04	0009	Use of safety rules of the owner (EN: 3b.1.3.1.)		
C	1	00	06	04	0010	Use of safety rules of the contractor		
C	1	00	06	04	0011	Co-ordination procedures for the execution of the contract		
C	1	00	06	04	0012	Procedures for book-keeping, handling of money, cost recording and control		
C	1	00	06	04	0013	Procedures for financial administration and dealing with loan documents		
C	1	00	06	04	0014	Procedures for deciding on variations and additions to the contract		
C	1	00	06	04	0015	Procedures for drawing up subcontracts		
C	1	00	06	04	0016	Procedures for inspecting, auditing, checking and approving the work done		
C	1	00	06	04	0017	Procedure for engaging personnel to be employed by the contractor		
C	1	00	06	04	0018	Owner's rules for the selection and appointment of temporary personnel		
C	1	00	06	04	0019	Procedures for the reception and partial or total delivery of equipment (custody)		
C	1	00	06	04	0020	Procedure for mechanical, hydrostatic, pneumatic and other tests and acceptance of equipment		
C	1	00	06	04	0021	Work programme with estimate of man-hours		
C	1	00	06	05	0000	ACTIVITY: CONDITIONS - RESTRICTIONS (EN: 3b.1.3.2.)		
C	1	00	06	05	0001	Insurance policies to cover damage or loss and support guarantees		
C	1	00	06	05	0002	Labour legislation and collective labour agreements in force and applicable		
C	1	00	06	05	0003	Clause on owner's "right to veto" skilled personnel		
C	1	00	06	05	0004	Prohibition on the use of alternative sources of construction and assembly services		
C	1	00	06	05	0005	Obligation to use the contractor's project control system		
C	1	00	06	05	0006	Obligation to use the owner's project control system		
C	1	00	06	05	0007	Use of the owner's programmes and procedures for construction and assembly (conditional upon extra payment)		
C	1	00	06	05	0008	Restrictions on the use of construction and assembly techniques and practices developed by the contractor		
C	1	00	06	05	0009	Restrictions on the use of construction and assembly programmes and systems developed by the contractor		

Qualitative disaggregation

NAME OF PROJECT:	NAME OF STAGE: CONSTRUCTION AND ASSEMBLY	REV. No.....	PAGE ..4.. of ..6..

Qualitative disaggregation

03	01	00	06	05	0010	Obligation to purchase equipment through the contractor (tied purchases)	
03	01	00	06	05	0011	Obligation to acquire certain equipment from suppliers selected by the contractor	
03	01	00	06	05	0012	Acquisition of construction and assembly equipment and materials at the contractor's discretion	
03	01	00	06	05	0013	Selection of subcontractors and service enterprises at the contractor's discretion	
03	01	00	06	05	0014	Freedom of access by the contractor to the owner's installations and plants	
03	01	00	06	05	0015	Contractor's participation, intervention or veto in the appointment of personnel by the owner	
03	01	00	06	05	0016	Owner's participation, intervention or veto in the appointment of personnel by the contractor	
03	01	00	06	05	0017	General guarantee of construction and assembly in accordance with the aims and specifications in the contract	
03	01	00	06	05	0018	Joint liability with regard to subcontractors' guarantees for construction and assembly	
03	01	00	06	05	0019	Guarantee of correct assembly and efficient and safe operation of the equipment	
03	01	00	06	05	0020	Guaranteed rated working capacity of equipment constructed at the site	
03	01	00	06	05	0021	Guaranteed level of minimum working capacity of equipment constructed at the site	
03	01	00	06	05	0022	Duration(s) or expiry date(s) of the guarantees given	
03	01	00	06	05	0023	Obligation to remedy defects in equipment or workmanship up to one year after initial (provisional) acceptance of the work	
03	01	00	06	05	0024	Replacement of equipment with operating faults due to assembly errors (months after start-up)	
03	01	00	06	05	0025	Liability for production losses limited to reconditioning installations	
03	01	00	06	05	0026	Full responsibility for quality of work and obligation to remedy defective work	
03	01	00	06	05	0027	Penalties for completing and delivering the work after the agreed date	
03	01	00	06	05	0028	Bonus for completing and delivering the work before the agreed date	
03	01	00	06	05	0029	Performance of the contract subject to prevailing national legislation	
03	01	00	06	05	0030	Performance of the contract subject to prevailing legislation in the contractor's country	

NAME OF PROJECT:	NAME OF S .E: CONSTRUCTION AND ASSEMBLY	REV. No.....	PAGE ...3. of ..6..

Qualitative disaggregation

03	01	00	06	05	0031	Performance of the contract subject to the jurisdiction of an international court
03	01	00	06	05	0032	Acceptance of an arbitrator or a court of arbitration designated by agreement
03	01	00	06	05	0033	Designation of the chamber of commerce or other national institution as court of arbitration
03	01	00	06	05	0034	Designation of a foreign body as court of arbitration
03	01	00	06	05	0035	Waiver by both parties of claims through the diplomatic channel
03	01	00	06	05	0036	Acceptance of Spanish as official language of the contract
03	01	00	06	05	0037	Acceptance of a foreign language as official language of the contract
03	01	00	06	05	0038	Acceptance of two language versions of the contract as equally valid
03	01	00	06	05	0039	Acceptance of legally recognized translation, the Spanish prevailing in the event of a dispute
03	01	00	06	05	0040	Acceptance of legally recognized translation, the foreign language prevailing in the event of a dispute
03	01	00	06	05	0041	Clause relating to legal validity, contractual duration and normal expiry of the contract
03	01	00	06	05	0042	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the contractor
03	01	00	06	05	0043	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the owner
03	01	00	06	05	0044	Non-transferability of the contract, in whole or in part, without agreement of both parties
03	01	00	06	05	0045	Suspension of the contract, for a limited period, by the owner
03	01	00	06	05	0046	Cancellation of the contract, without compensation by the owner, on justified grounds (see code 03.01.00.01.05.0037)
03	01	00	06	05	0047	Suspension or cancellation of the contract on grounds of force majeure in the event of: Natural disasters (earthquakes, shipwrecks, etc.); Civil causes (wars, atomic disasters, revolutions, strikes, etc.); Economic causes (inflation, devaluation, etc.)

NAME OF PROJECT:	NAME OF STAGE: CONSTRUCTION AND ASSEMBLY	REV. No.....	PAGE ..6.. of ..6..

Qualitative disaggregation

03	01	00	06	05	0048	Determination of the date of validity of the contract
03	01	00	06	05	0049	Determination of the deadline for delivery of the documents or the period for exeuction of the work
03	01	00	06	05	0050	Maximum limit for full liability of the contractor (percentage of total fees; letter of guaranty; guarantee certificate)
03	01	00	06	05	0051	Waiver by the owner of the right to claim compensation for damage, loss or loss of profit
03	01	00	06	05	0052	Priority for sale of construction machinery to the owner

REV. No. (EN: 3a.2.3 and 3.1.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ...1... OF ....5....

Qualitative disaggregation

Code						NAME OF STAGE: ACCEPTANCE AND START-UP	CONSIDERED	
03	01	00	07	00	0000			
03	01	00	07	01	0000	NAME OF ACTIVITY: BASIC TASKS	YES O/C	NO
03	01	00	07	01	0001	Subactivities of administration for acceptance and start-up (EN: 3b.1.3.8.)	(EN: 3b.1.5.)	
03	01	00	07	01	0002	Alignment, levelling, adjustment and calibration of equipment		
03	01	00	07	01	0003	Preparation of equipment, units and services for tests		
03	01	00	07	01	0004	Mechanical, hydrostatic, pneumatic and other tests		
03	01	00	07	01	0005	Checking of correct functioning of instrumentation, measurement and control system		
03	01	00	07	01	0006	Checking of circuit connections in relation to piping and instrumentation diagrams		
03	01	00	07	01	0007	Checking of electrical installations, including insulation and polarity		
03	01	00	07	01	0008	Repair, replacement or modification of equipment		
03	01	00	07	01	0009	Checking of minimum stocks of spare parts and materials		
03	01	00	07	01	0010	Supplies and checking of levels of inputs and catalysts for start-up		
03	01	00	07	01	0011	Start-up and adjustment of plant		
03	01	00	07	01	0012	Standardization and guarantee tests		
03	01	00	07	01	0013	Integration with the operation of existing units		
03	01	00	07	01	0014	Final acceptance		
03	01	00	07	01	0015	Recruitment and selection of personnel for plant management and operation		
03	01	00	07	02	0000	ACTIVITY: TECHNICAL SERVICES		
03	01	00	07	02	0001	Advice and technical assistance to the owner on checking and inspecting equipment, units and systems		
03	01	00	07	02	0002	Advice and technical assistance to the owner on the start-up and initial operation of plants		
03	01	00	07	02	0003	Advice and technical assistance to the owner on guarantee tests		

NOTES:

NAME OF PROJECT:	NAME OF STAGE: ACCEPTANCE AND START-UP	REV. No.....	PAGE ..2.. of ..5..

Qualitative disaggregation

03	01	00	07	02	0004	Advice and technical assistance to the owner on operation after start-up		
03	01	00	07	02	0005	Advice and technical assistance to the owner on finalization of operating manuals		
03	01	00	07	02	0006	Advice and technical assistance to the owner on the training of personnel locally in systems, procedures and techniques for acceptance		
03	01	00	07	02	0007	Advice and technical assistance to the owner on the training of personnel abroad in systems, procedures and techniques for acceptance and start-up		
03	01	00	07	03	0000	ACTIVITY: TECHNICAL DOCUMENTS		
03	01	00	07	03	0001	Delivery of photographs, films, microfilms, etc.		
03	01	00	07	03	0002	Delivery of safety manual for plant and services		
03	01	00	07	03	0003	Delivery of specifications for inputs, raw materials and products for guarantee tests		
03	01	00	07	03	0004	Delivery of copies of updated start-up programmes systematized by computer		
03	01	00	07	04	0000	ACTIVITY: RULES AND PROCEDURES		
03	01	00	07	04	0001	Procedures for auditing, inspecting, checking, approving and notifying acceptances, checks and start-up		
03	01	00	07	04	0002	Time-table for inspecting, auditing, checking, approving and notifying acceptance and start-up tasks and activities		
03	01	00	07	04	0003	Procedures for co-ordination in execution of the contract and co-ordination between the owner and contractor		
03	01	00	07	04	0004	Procedures for book-keeping, handling of money, cost recording and control		
03	01	00	07	04	0005	Procedures for deciding on variations and additional work		
03	01	00	07	04	0006	Procedures for verifying guaranteed capacities, outputs and rates of consumption		
03	01	00	07	04	0007	Insurance policies to cover damage or loss and support guarantees		
03	01	00	07	04	0008	Owner's rules and procedures for acceptance and start-up		
03	01	00	07	04	0009	Contractor's rules and procedures for acceptance and start-up		
03	01	00	07	04	0010	Other internationally recognized rules and procedures		
03	01	00	07	04	0011	Owner's codes and numbering systems (EN: 3b.1.3.1.)		

NAME OF PROJECT:	NAME OF STAGE: ACCEPTANCE AND START-UP	REV. No.....	PAGE .3.. of .2..

Qualitative disaggregation

03	01	00	07	04	0012	Contractor's codes and numbering systems	
03	01	00	07	04	0013	Decimal metric system (International System: SI)	
03	01	00	07	04	0014	Use at his discretion of the system of units proposed by the contractor	
03	01	00	07	04	0015	Owner's safety standards	
03	01	00	07	04	0016	Contractor's safety standards	
03	01	00	07	04	0017	Procedures for the recruitment of personnel to be employed by the contractor	
03	01	00	07	04	0018	Owner's standards for the selection and appointment of temporary staff	
03	01	00	07	05	0000	ACTIVITY: CONDITIONS - RESTRICTIONS (EN: 3b.1.3.2.)	
03	01	00	07	05	0001	Clause on owner's "right to veto" skilled personnel	
03	01	00	07	05	0002	Obligation to use owner's control systems for start-up	
03	01	00	07	05	0003	Obligation to use contractor's control systems for start-up	
03	01	00	07	05	0004	Use of the owner's programmes and procedures for acceptance and start-up, conditional upon extra payment	
03	01	00	07	05	0005	Restrictions on the use of acceptance and start-up practices and techniques developed by the contractor	
03	01	00	07	05	0006	Restriction on use of acceptance and start-up programmes and systems developed by the contractor	
03	01	00	07	05	0007	Selection of subcontractors and service enterprises at the contractor's discretion	
03	01	00	07	05	0008	Contractor's freedom of access to the owner's installations and plants	
03	01	00	07	05	0009	Owner's participation, intervention or veto in the contractor's appointment of personnel	
03	01	00	07	05	0010	Contractor's participation, intervention or veto in the owner's appointment of personnel for the project	
03	01	00	07	05	0011	Joint liability with regard to the subcontractor's guarantees concerning acceptance and start-up	
03	01	00	07	05	0012	Duration(s) and expiry date(s) of the guarantees given	
03	01	00	07	05	0013	Penalties for completing and delivering the work after the agreed date	

NAME OF PROJECT:	NAME OF STAGE: ACCEPTANCE AND START-UP	REV. No.....	PAGE 4 of 5

Qualitative disaggregation

03	01	00	07	05	0014	Performance of the contract subject to prevailing national legislation
03	01	00	07	05	0015	Performance of the contract subject to prevailing legislation in the contractor's country
03	01	00	07	05	0016	Performance of the contract subject to the jurisdiction of an international court
03	01	00	07	05	0017	Acceptance of an abitrator or a court of arbitration designated by agreement
03	01	00	07	05	0018	Designation of the chamber of commerce or other national institution as court of arbitration
03	01	00	07	05	0019	Designation of a foreign body as court of arbitration
03	01	00	07	05	0020	Waiver by both parties of claims through the diplomatic channel
03	01	00	07	05	0021	Acceptance of Spanish as official language of the contract
03	01	00	07	05	0022	Acceptance of a foreign language as official language of the contract
03	01	00	07	05	0023	Acceptance of two language versions of the contract as equally valid
03	01	00	07	05	0024	Acceptance of legally recognized translation, the Spanish prevailing in the event of a dispute
03	01	00	07	05	0025	Acceptance of legally recognized translation, the foreign language prevailing in the event of a dispute
03	01	00	07	05	0026	Clause relating to legal validity, contractual duration and normal expiry of the contract
03	01	00	07	05	0027	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the contractor
03	01	00	07	05	0028	Clause relating to premature termination of the contract, denunciation and compensation to be sought by the owner
03	01	00	07	05	0029	Non-transferability of the contract, in whole or in part, without agreement of both parties
03	01	00	07	05	0030	Suspension of the contract, for limited periods, by the owner
03	01	00	07	05	0031	Cancellation of the contract, without compensation by the owner, on justified grounds (See code 03.01.00.01.05.0037)

NAME OF PROJECT:	NAME OF STAGE: ACCEPTANCE AND START-UP	REV. No.....	PAGE .5... of .8..

Qualitative disaggregation

03	01	00	07	05	0032	Suspension or cancellation of the contract on grounds of <u>force majeure</u> in the event of: Natural disasters (earthquakes, shipwrecks, etc.); Civil causes (wars, atomic disasters, revolutions, strikes, etc.); Economic causes (inflation, devaluation, etc.)	
03	01	00	07	05	0033	Determination of the date of validity of the contract	
03	01	00	07	05	0034	Maximum limit for full liability of the contractor (percentage of total fees; letter of guaranty; guarantee certificate)	
03	01	00	07	05	0035	Waiver by the owner of the right to claim compensation for damage, loss or loss of profit	
03	01	00	07	05	0036	Owner's participation in start-up	
03	01	00	07	05	0037	Repair and/or replacement of equipment and materials damaged by misuse or mishandling	
03	01	00	07	05	0038	Time-limit for the issue of final acceptance certificates	

3b.2. Form: Quantitative Disaggregation

3b.2.1. The purpose of the quantitative disaggregation procedure is to quantify the subactivities identified during qualitative disaggregation which can be expressed in terms of money and/or man-hours.

3b.2.1.1. This disaggregation procedure will enable the owner to find out in good time what expenditure or disbursements the project requires in local and foreign currency.* Through successive reviews he will be able to assess the financial progress of the project and national participation in it.

3b.2.2. In the Model the amount of disbursements in local and/or foreign currency* is expressed with refer[illegible]o a suitable base year selected by the owner, which normally does not vary throughout the life of the project. Recording expenditure in terms of present value enables the owner to get a realistic view of the economic progress of the project.

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* Note: Expenditure or disbursements made in the subregion can be shown on the form separately.

3b.2.2.1. Under the heading of administration and co-ordination subactivities for each stage should be included all the costs incurred for this purpose during the execution of the complete stage.

3b.2.2.2. The following definitions will be helpful in applying the descriptive disaggregation procedure:

Reference year: The values entered on the quantitative disaggregation form will be discounted to net present value, with reference to the base year selected by the owner.

Local expenses: These are expenses made in the country where the plant is to be set up, regardless of the source of finance.

Expenses in the subregion and/or abroad: These are expenses made outside the country. They also include foreign travel allowances for national personnel.

National man-hours: This figure measures work of national origin (contracted for locally), expressed in terms of time per man,

Foreign man-hours: This measures work contracted for abroad.

Total man-hours: This is the sum of national and foreign labour.

Cost: This column shows the actual cost of the man-hours.

The column showing the cost of the man-hours worked (national and foreign) has been kept although the authors are aware of the difficulty in many cases of getting reliable unit costs to make the calculations with. Despite that problem, they want to encourage discipline and attention to the matter, so that with time firms will be able to accumulate reliable actual data for the firm, the country and the subregion.

3b.2.3. The headings on the first page of the forms will include, in addition to the items listed in the general notes (3a.2.2. and 3a.3.1.), the following information: name of the first stage considered under this disaggregation procedure; reference year; amount of local and/or foreign expenditure or disbursements expressed in thousands of US$ at constant base-year values. They will also include the number of man-hours worked, expressed in thousands of hours national and/or foreign and total.

3b.2.4. In the quantitative disaggregation procedure the method used is quantification. The idea is to monitor and evaluate the progress of subactivities quantifiable in terms of disbursements or expenditure and the man-hours required for their execution. In the Model these figures are shown both for the local contribution and for the foreign contribution, expressed in constant values by discounting to a given base-year. The right-hand side of the form has been laid out in such a way as to provide for this method.

REV. No. (EN: 3a.2.3 and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ..1..... OF ....8.....

Quantitative disaggregation

Code	NAME OF STAGE: STUDIES FOR THE IMPLEMENTATION PHASE (EN: 3b.2.)	(EN: 3b.2.2.2.) Reference year 19								
		Cumulative expenditure 000 $US*				Man-hours 000 hours			Cost*	
		Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03 02 00 01 00 0000	STUDIES FOR THE IMPLEMENTATION PHASE (EN: 3b.2.)									
03 02 00 01 00 0001	Subactivities of administration and co-ordination for the conduct of studies									
03 02 00 01 00 0002	Geological and soil studies									
03 02 00 01 00 0003	Seismic studies									
03 02 00 01 00 0004	Meteorological (climatological) and ecological studies									
03 02 00 01 00 0005	Topographical and hydrographical studies									
03 02 00 01 00 0006	Determination of social, industrial and basic services									
03 02 00 01 00 0007	Raw material studies (analysis)									
03 02 00 01 00 0008	Studies on transport and handling of raw materials, products, equipment and other materials									
03 02 00 01 00 0009	Studies on storage available for raw materials and products									
03 02 00 01 00 0010	Studies on pilot plants									
03 02 00 01 00 0011	Studies on technological alternatives and process evaluations (updating of data)									
03 02 00 01 00 0012	Inventories of construction materials (to hand)									
03 02 00 01 00 0013	Determination of the organization and systems required for the project implementation phase									

NOTES

NAME OF PROJECT:							REV. No.				PAGE 2 of 8				
03	02	00	01	00	0000	STAGE: STUDIES FOR THE IMPLEMENTATION PHASE	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03	02	00	01	00	0014	Studies to determine the provisional services and facilities needed for implementation of the project									
03	02	00	01	00	0015	Other studies									
03	02	00	01	00	0016	Technical assistance services									
03	02	00	01	00	0017	Collection and analysis of bibliographical information and visits to plants in operation for the selection of technological alternatives and evaluation of processes									
03	02	00	01	00	0018	Guarantee and insurance policies									
						TOTAL FOR STAGE									
03	02	00	02	00	0000	CHOICE OF PROCESS TECHNOLOGY									
03	02	00	02	00	0001	Subactivities of administration and co-ordination for choice of process technology (EN: 3b.2.2.1.) (EN: 3b.1.3.8.)									
03	02	00	02	00	0002	Analysis and evaluation of available information, technical literature, patents, etc.									
03	02	00	02	00	0003	Establishment of theoretical scheme for the process and possible variants									
03	02	00	02	00	0004	Basic research into kinetics, catalysis, mass and energy transfer etc.									
03	02	00	02	00	0005	Experimental development of the process at the laboratory, pilot-plant and semi-industrial plant level									
03	02	00	02	00	0006	Consideration of industrial trials, raw materials, equipment, corrosion, etc.									

Quantitative disaggregation

NAME OF PROJECT:							REV. No.				PAGE .3... of .4.				
03	02	00	02	00	0000	STAGE: CHOICE OF PROCESS TECHNOLOGY	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03	02	00	02	00	0007	Selection of alternative sources of raw materials, energy and other inputs									
03	02	00	02	00	0008	Technico-economic evaluation and optimization of process design									
03	02	00	02	00	0009	Establishment of a system for quality control and analysis									
03	02	00	02	00	0010	Training of personnel at home or abroad in technological development systems and procedures									
03	02	00	02	00	0011	Advice on start-up and initial operation of the plants									
03	02	00	02	00	0012	Invitation and appraisal of tenders and selection of processes and licensing firms									
03	02	00	02	00	0013	Payment for know-how									
03	02	00	02	00	0014	Payment for licences on a fixed-sum basis									
03	02	00	02	00	0015	Payment for licences on a royalty basis									
03	02	00	02	00	0016	Advice to the owner on the development of the process technology with his own resources (human, technical and economic)									
03	02	00	02	00	0017	Advice on review of some elements of the basic engineering and checking of the process technology									
03	02	00	02	00	0018	Advice for the establishment of a quality control and analysis system									
03	02	00	02	00	0019	Advice to the owner on the selection and acquisition of the process technology									
03	02	00	02	00	0020	Guarantee and insurance policies									
						TOTAL FOR STAGE:									

Quantitative disaggregation

NAME OF PROJECT:							REV. No.				PAGE ..4... of .8..				
03	02	00	03	00	0000	STAGE: BASIC ENGINEERING	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03	02	00	03	00	0001	Subactivities of administration and co-ordination for basic engineering (EN: 3b.2.2.1.) (EN: 3b.1.3.8.)									
03	02	00	03	00	0002	Theoretical engineering, design activities and technico-economic evaluation									
03	02	00	03	00	0003	Process engineering, basic design activities									
03	02	00	03	00	0004	Mechanical engineering, basic design activities									
03	02	00	03	00	0005	Electrical engineering, basic design activities									
03	02	00	03	00	0006	Instrumentation engineering, basic design activities									
03	02	00	03	00	0007	Civil engineering, basic design activities									
03	02	00	03	00	0008	Industrial engineering, basic design activities									
03	02	00	03	00	0009	Additional basic engineering									
03	02	00	03	00	0010	Basic engineering carried out by owner									
03	02	00	03	00	0011	Participation of owner's specialists in basic design									
03	02	00	03	00	0012	Training of personnel at home or abroad in basic engineering procedures									
03	02	00	03	00	0013	Technical assistance for basic engineering									
03	02	00	03	00	0014	Invitation and appraisal of tenders and selection of firms for basic engineering									
03	02	00	03	00	0015	Advice and technical services for start-up and initial operation									
03	02	00	03	00	0016	Guarantee and insurance policies									
						TOTAL FOR STAGE:									

Quantitative disaggregation

NAME OF PROJECT:							REV. No.						PAGE ..5.. of .8..		
03	02	00	04	00	0000	STAGE: DETAILED ENGINEERING	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03	02	00	04	00	0001	Subactivities of administration and co-ordination for detailed engineering (EN: 3b.2.2.1.) (EN: 3b.1.3.8.)									
03	02	00	04	00	0002	Review of basic engineering									
03	02	00	04	00	0003	Mechanical engineering, detailed design activities									
03	02	00	04	00	0004	Electrical engineering, detailed design activities									
03	02	00	04	00	0005	Instrumentation engineering, detailed design activities									
03	02	00	04	00	0006	Civil engineering, detailed design activities									
03	02	00	04	00	0007	Industrial engineering, detailed design activities									
03	02	00	04	00	0008	Scale model of plant									
03	02	00	04	00	0009	Technical assistance from third parties for detailed engineering									
03	02	00	04	00	0010	Training of personnel at home or abroad in detailed engineering procedures									
03	02	00	04	00	0011	Invitation and appraisal of tenders and selection of firms for detailed engineering									
03	02	00	04	00	0012	Additional detailed engineering (design activities)									
03	02	00	04	00	0013	Detailed engineering carried out by owner									
03	02	00	04	00	0014	Active participation by owner's specialists in detailed design process, when contracted out									
03	02	00	04	00	0015	Review, modification and acceptance by the owner of the detailed engineering, when contracted out									
03	02	00	04	00	0016	Preliminary selection of manufacturers									
03	02	00	04	00	0017	Guarantee and insurance policies									
						TOTAL FOR STAGE:									

Quantitative disaggregation

NAME OF PROJECT:							REV. No.				PAGE ...5... of 8...				
03	02	00	05	00	0000	STAGE: PURCHASING SERVICES	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03	02	00	05	00	0001	Subactivities of administration and co-ordination for the purchase of equipment, materials, spare parts, tools and supplies (EN: 3b.2.2.1.) (EN: 3b.1.3.8.)									
03	02	00	05	00	0002	Preliminary selection of manufacturers, evaluation and selection of sellers									
03	02	00	05	00	0003	Appraisal and selection of quotations for equipment and materials, etc.									
03	02	00	05	00	0004	Negotiation and purchase, through purchase order or contract									
03	02	00	05	00	0005	Inspection of manufacture and testing of equipment and materials									
03	02	00	05	00	0006	Dispatch, handling, export procedures, warehousing, storage and coding of equipment and materials (port of dispatch)									
03	02	00	05	00	0007	Transport and insurance for equipment and materials									
03	02	00	05	00	0008	Reception, handling, import procedures and customs clearance of equipment and materials									
03	02	00	05	00	0009	Technical assistance for the acquisition of equipment and material purchasing services									
03	02	00	05	00	0010	Evaluation, adaptation, organization or establishment of the owner's purchasing system									
03	02	00	05	00	0011	Training of personnel at home or abroad in purchasing service procedures									
03	02	00	05	00	0012	Guarantee and insurance policies									
						TOTAL FOR STAGE:									

Quantitative disaggregation

NAME OF PROJECT:							REV. No.				PAGE ..7.. of .8..				
03	02	00	06	00	0000	STAGE: CONSTRUCTION AND ASSEMBLEY	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03	02	00	06	00	0001	Activities of administration and co-ordination for construction and assembly (EN: 3b.2.2.1.) (EN: 3b.1.3.8.)									
03	02	00	06	00	0002	Appointment, co-ordination and supervision of contractors									
03	02	00	06	00	0003	Detailed engineering, updating activities									
03	02	00	06	00	0004	Supervision (supervision and inspection, auditing)									
03	02	00	06	00	0005	Training of personnel at home and abroad in construction and assembly procedures									
03	02	00	06	00	0006	Technical assistance for start-up and operation of the plant									
03	02	00	06	00	0007	Technical assistance for construction and assembly									
03	02	00	06	00	0008	Purchase and handling of construction equipment, tools and materials									
03	02	00	06	00	0009	Mechanical engineering, construction and assembly activities									
03	02	00	06	00	0010	Electrical engineering, construction and assembly activities									
03	02	00	06	00	0011	Instrumentation engineering, construction and assembly activities									
03	02	00	06	00	0012	Civil engineering, construction and assembly activities									
03	02	00	06	00	0013	Industrial engineering, construction and assembly activities									
03	02	00	06	00	0014	Guarantee and insurance policies									
						TOTAL FOR STAGE:									

Quantitative disaggregation

NAME OF PROJECT:							REV. No.						PAGE 8 of 8			
03	02	00	07	00	0000	STAGE: ACCEPTANCE AND START-UP	Loc.	Subr.	For.	Tot.	Nat.	For.	Tot.	Nat.	For.
03	02	00	07	00	0001	Activities of administration and co-ordination for acceptance and start-up (EN: 3b.2.2.1.) (EN: 3b.1.3.8.)									
03	02	00	07	00	0002	Technical services by the contractors for acceptance and start-up									
03	02	00	07	00	0003	Losses of raw materials and products									
03	02	00	07	00	0004	Inputs and basic services									
03	02	00	07	00	0005	Materials and spare parts									
03	02	00	07	00	0006	Acceptance test and laboratory analysis									
03	02	00	07	00	0007	Repairs and maintenance									
03	02	00	07	00	0008	Replacement of equipment									
03	02	00	07	00	0009	Insurance and guarantee policies for acceptance and start-up									
03	02	00	07	00	0010	Personnel training									
03	02	00	07	00	0011	Advice and technical services for acceptance, start-up and subsequent operation of the plant									
						TOTAL FOR STAGE:									

Quantitative disaggregation

3b.3. Form: Descriptive Disaggregation

3b.3.1. Basic component: Processes

3b.3.1.1. Processes are the essence and foundation of chemical industry projects.

3b.3.1.1.1. The basic purpose of descriptive disaggregation of processes is to provide the owner with a tool for taking the most appropriate decision regarding the various alternative processes available.

3b.3.1.2. This disaggregation procedure makes it possible to identify the requirements of petrochemical processes, of the different operations used to process raw materials into products and the nature of the products. The model analyses such aspects on a qualitative, quantitative and/or descriptive basis, because of the diversity and heterogeneity of the characteristics of the systems and subsystems involved in the processes.

3b.3.1.2.1. Through study and analysis of all these characteristics, the user of the model will be able to identify the core and peripheral operations and evaluate their technological complexity. Combining this with an economic evaluation, the owner will have a better basis on which to select the most suitable process for the purposes of the project.

3b.3.1.2.2. The proposed scheme gives the various operations making up petrochemical processes in conjunction with the most important equipment used in each of the operational systems. The aim is to get users to note the equipment and to facilitate its identification and subsequent disaggregation.

3b.3.1.2.3. In descriptive disaggregation of processes, the following groups are distinguished: requirements, main operations and equipment involved, and products. It is in this order that they are shown on the simplified industrial-process flow-sheets. However, for the practical purpose of making the forms easier to design and handle, they are given in the model in the following order: requirements, products, and main operations and equipment.

3b.3.1.2.4. Under "Requirements" are classified the raw materials, chemicals, industrial services and other inputs involved in the manufacture of the products. Industrial services are merely listed, with an indication of the needs of the process, no attempt being made to define the actual systems of operation constituting them.

3b.3.1.2.5. Under "Products" are listed the main products, by-products and waste products resulting from the processing of the raw materials under the conditions of the project process.

3b.3.1.2.6. Under "Operations" are listed the physico-chemical treatments to which the raw materials are submitted during the processes. The operations are classified as core and peripheral.

3b.3.1.2.7. The core operations are the processing operations and characterize the process. The peripheral operations are auxiliary activities which are necessary in order to carry out the core operations.

3b.3.1.3. The headings on the first page of a set of forms for process disaggregation include, in addition to the items given under "General instructions" (3a.2.2. and 3a.3.1.), the name of the group and system being disaggregated.

3b.3.1.3.1. In the tables on the first and following pages of the set of forms are given all the itemized subsystems.

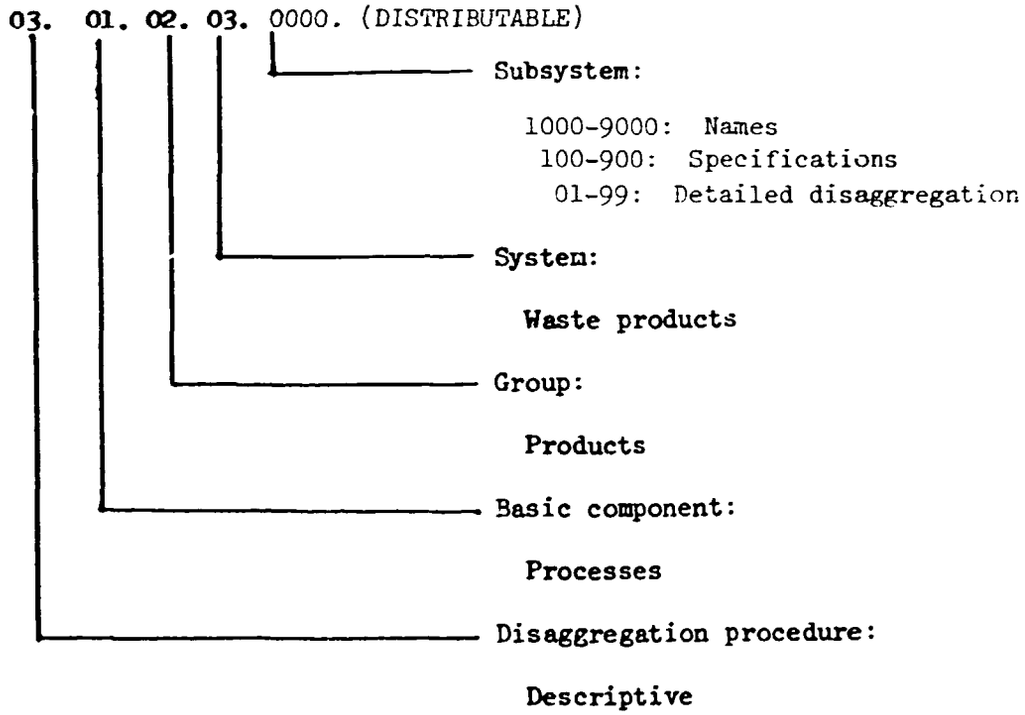
3b.3.1.3.2. The corresponding forms show all the factors making up the systems and subsystems, given in sequence one after the other, so that opposite them can be shown the thermodynamic and kinetic characteristics and/or operating variables that are most important for characterizing them, the necessary relations between them being established and the equipment identified. The model forms reflect that principle and also include some comments and suggestions and the units of measurement to be used.

3b.3.1.3.3. In the "Requirements" group, the specifications and physical condition of the raw materials to be entered in the forms are those of the raw materials when available for use in the process.

3b.3.1.3.4. Since the specifications and physical condition of the raw materials and products may involve a great number of different factors, it is suggested that in using the model those which are most relevant and characteristic should be entered in the forms.

3b.3.1.3.5. In the "Main operations and equipment" group the subsystems have been given a code consisting of a digit followed by three zeros. The position of the zeros will enable the user to codify the characteristics of each sub-system, broken down according to the process under study, in accordance with the guidelines given by the model forms in the Manual.

3b.3.1.4. The most general form of the code used in the procedure for the descriptive disaggregation of processes is as follows: 03. 01. 00. 00. 0000. The use of the code may be illustrated by the following example:



3b.3.1.4.1. In the "Main operations" group, the sub-system with the code 999 is used to designate the technical staff necessary for the system in question.

3b.3.1.5. The method of treatment of the systems and subsystems identified according to the descriptive disaggregation procedure for processes is characterization. For the purposes of the control and evaluation variables, and in the light of the diversity and heterogeneity of the characteristics to be considered, the form is left open so that the user himself can determine the most appropriate layout in accordance with his own needs and the requirements of each process.

3b.3.1.5.1. Despite the foregoing, it happens that for the systems and subsystems grouped under "Requirements" and "Products", the qualitative and quantitative characteristics are such that generally speaking a column layout can be proposed for the right-hand side of the respective forms, which makes it easier to handle the characteristics in an orderly fashion.

		OFFICE OR DEPARTMENT RESPONSIBLE	SHEET NO. OF .....
OWNER'S ALTERNATIVE	ALTERNATIVE NO. ...	ALTERNATIVE NO. ...	CHOICE OF PROCESS

There can be as many columns as necessary, headed as convenient. These columns should only show the data that most clearly define the subsystem being analysed.

The form can then be used at some of the review stages to compare different alternatives of processes available to meet the needs of the project.

In general terms, the form design proposed above is considered valid when the project is under study or under way, depending mainly on the way the project is being carried out by the owner.

REV. No.	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐	OFFICE OR DEPT. RESPONSIBLE	PAGE ..1.... OF ....4....

Descriptive disaggregation

Code						
03	03	01	00	00	0000	BASIC COMPONENT: PROCESSES (EN: 3b.3.1.)
03	03	01	01	00	0000	GROUP: REQUIREMENTS (EN: 3b.3.1.5.)
03	03	01	01	01	0000	SYSTEM: RAW MATERIALS
					1000	Names
					9000	
					.100	Specifications and physical condition in storage (EN: 3b.3.1.3.3. and 3b.3.1.3.4.)
					.01	
					.99	
					.200	Standardized specifications (EN: 3b.3.1.3.5.)
					.01	
					.99	
					300	Physical condition in relation to the process
					.01	
					.99	
					400	Rates of consumption (in relation to main product)
					.01	
					.99	
					500	Yields
					.01	
					.99	

NOTES

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.....	PAGE .2. of 4....

Descriptive disaggregation

03 03 01 00 00 0600	Place of origin
.01	
.99	
0700	Purchase prices
.01	
.99	
800	
.01	
.99	
03 03 01 01 02 0000	SYSTEM: CATALYSTS
1000	Names and/or industrial nomenclature
9000	
.100	Types (in relation to the reaction)
.01	
.99	
.200	Specifications (EN: 3b.3.1.3.4.)
.01	
.99	
.300	Rates of consumption (in relation to the charge and/or main product or by-product)
.01	
.99	

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.....	PAGE .3.. of .4...

Descriptive disaggregation

03 03 01 01 02 .400	Conditions of operation (selectivity)
.01	
.99	
.500	Other data
.01	(Contaminants and pollutants, regeneration period, licensers, sales prices, place of origin, etc.)
.99	
03 03 01 01 03 0000	SYSTEM: CHEMICAL PRODUCTS
1000	Names
9000	
.100	Specifications (EN: 3b.3.1.3.4.)
.01	
.99	
.200	Rates of consumption (in relation to main raw material and/or main product or by-product)
.01	
.99	
.300	Other data
.01	(Recovery, de-activating elements, minimum stock for start-up, storage conditions, etc.)
.99	

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.	PAGE .4.. of .4...

Descriptive disaggregation

03 03 01 01 04	0000	SYSTEM: INGREDIENTS AND ADDITIVES
	1000	Names
	9000	
	.100	Specifications
	.01	
	.99	
	.200	Rates of consumption (in relation to main raw material and/or main product or by-product)
	.01	
	.99	
	.300	Other data
	.01	(Suppliers, place of origin, sales prices, minimum stock for start-up, storage conditions, etc.)
	.99	
03 03 01 01 05	0000	SYSTEM: BASIC SERVICES (EN: 3b.3.1.2.4.)
	1000	Names (Electricity; types of fuel, steam, water, air, gases, vacuum; etc.)
	9000	
	.100	Process demands
	.01	Rates of consumption, state, calorific power, pressure, temperature, viscosity, impurities,
	.99	humidity, etc.
	.200	Other data
	.01	(Sources of service, prices, etc.)
	.99	

Descriptive disaggregation

REV. No.	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF ....2....

Code						
03	03	01	00	00	0000	BASIC COMPONENT: PROCESSES
03	03	01	02	00	0000	GROUP: PRODUCTS
03	03	01	02	01	0000	SYSTEM: MAIN PRODUCTS
					1000	Names and physical state
					9000	
					.100	Specifications and physical condition in storage (EN: 3b.3.1.3.4.)
					.01	
					.99	
					.200	Standardized specifications (EN: 3b.3.1.3.5.)
					.01	
					.99	
					.300	Other data
					.01	(Output t/day, yield t/t raw material, main physico-chemical characteristics, etc.)
					.99	
03	03	01	02	02	0000	SYSTEM: BY-PRODUCTS
					1000	Names and physical state
					9000	
					.100	Specifications and physical condition in storage (EN: 3b.3.1.3.4.)
					.01	
					.99	

NOTES

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.	PAGE .2.. of .2...

Descriptive disaggregation

03	03	01	02	02	.200	Standardized specifications (EN: 3b.3.1.3.5.)
					.01	
					.99	
					.300	Other data
					.01	(Output t/day, yield t/t raw material, main physico-chemical characteristics, etc.)
					.99	
03	03	01	02	03	0000	SYSTEM: WASTE PRODUCTS
					1000	Names and physical state
					9000	
					.100	Maximum permissible specifications (laid down by the bodies concerned with environmental pollution)
					.01	
					.99	
					.200	Maximum specifications for (untreated) effluents
					.01	
					.99	
					.300	Other data
					.01	(Output t/day, need for treatment, main physico-chemical characteristics, etc.)
					.99	

REV. No.	DATE Start ..... End	NAME OF PPOJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐	OFFICE OR DEPT. RESPONSIBLE	PAGE .1.... OF ....7....

Descriptive disaggregation

Code						
03	03	01	00	00	0000	BASIC COMPONENT: PROCESSES
03	03	01	03	00	0000	GROUP: MAIN OPERATIONS AND EQUIPMENT INVOLVED (EN: 3b.3.1.2.2. and 3b.3.1.5.)
03	03	01	03	01	0000	SYSTEM: TRANSPORT OF RAW MATERIALS
					1000	Name of raw material and physical state
					9000	
					.100	Means or system of transport (lorry, rail, pipeline, tanker, etc.)
					.900	
					.01	Description of means or system of transport (operating variables, distance to be covered,
					.98	equipment involved*, safety standards, other special characteristics, shifts, etc.)
					.99	Staff needed to handle transport operations (technical staff and workers per shift)
03	03	01	03	02	0000	SYSTEM: UNI ADING OF RAW MATERIAL
					1000	Name of raw material and physical state
					9000	
					.100	Means or systems of unloading (pumping, pneumatic, mechanical, etc.)
					.900	
					.01	Description of unloading system (operating variables, equipment involved*, area required,
					.98	safety standards, shifts, other special characteristics, etc.)
					.99	Staff needed to handle unloading operations (technical staff and workers per shift)

NOTES * Relates to boiler, mechanical, electrical/electronic and instrumentation equipment.

NAME OF PROJECT:	COMPONENT: PROCESSES	REV. No.	PAGE .2. of .7..

Descriptive disaggregation

03 03 01 03 03 0000	SYSTEM: STORAGE OF RAW MATERIALS
1000	Name of raw material and physical state
9000	
.100	Means or system of storage (warehouses, containers, etc.)
.900	
.01	Description of storage system (conditions of storage, area required, safety standards, equipment
.98	involved - hoppers, silos, pressure vessels, cylindrical tanks, measuring or control system, other characteristics, etc.)
.99	Staff needed to handle storage operations
03 03 01 03 04 0000	SYSTEM: CHARGING OF RAW MATERIALS
1000	Name of raw material and physical state
9000	
.100	Means or system of charging (pumping, pneumatic drive, belts, scoops, etc.)
.900	
.01	Description of charging system (operating variables, equipment involved, distance to be covered,
.98	means of control or measuring, safety standards, other special characteristics, etc.)
.99	Staff needed to handle charging operations (technical staff and workers per shift)

NOTE: THE DISAGGREGATION SCHEME DEVELOPED FOR TRANSPORT, UNLOADING, STORAGE AND CHARGING WILL BE APPLIED FOR THE SYSTEMS RELATING TO CATALYSTS, CHEMICAL PRODUCTS, AND INGREDIENTS AND ADDITIVES, FOR WHICH CODING FROM 05 TO 16 WILL BE RESERVED.

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.	PAGE 3 of 7

Descriptive disaggregation

03 03 01 03 17 0000	SYSTEM: CONDITIONING OF RAW MATERIALS
1000	Name of raw material and physical state
9000	
.100	Name of conditioning operations (systems for compression, decompression, washing, separation, pre-
.900	heating, cooling, crushing and the adding of other inputs, etc.)
.01	Description of conditioning operations (operating variables, equipment involved, means of control,
.98	safety standards, other physical and/or chemical characteristics of the operation, shifts, etc.)
.99	Staff needed to handle conditioning operations (technical staff and workers per shift)
03 03 01 03 18 0000	SYSTEM: PRE-TREATMENT OF RAW MATERIALS
1000	Name of raw material and physical state
9000	
.100	Name of pre-treatment operations (chemical, adsorption, absorption and catalytic operations, etc.)
.900	
.01	Description of pre-treatment operations (main physical and chemical characteristics of the process,
.98	operating variables, thermodynamic and kinetic mechanisms, characteristics of the treated product, recycled substances and effluents, main equipment involved, means of control, safety standards, shifts, etc.)
.99	Staff needed to handle pre-treatment operations (technical staff and workers per shift)

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.	PAGE .4. of .7...

Descriptive disaggregation

03	03	01	00	19	0000	SYSTEM: FINAL CONDITIONING OF THE LOAD
					1000	Name of raw material and physical state
					9000	
					.100	Name of conditioning operations (systems for compression, decompression, heating, cooling, separation,
					.900	blending and the adding of other inputs, etc.)
					.01	Description of conditioning operations (operating variables, equipment involved, means of control,
					.98	safety standards, other physical and/or chemical characteristics of the operation, shifts, etc.)
					.99	Staff needed to handle operations for final conditioning of the load (technical staff and workers per shift)
03	03	01	03	20	0000	SYSTEM: PROCESSING OPERATIONS
					1000	Name of processes according to commercial classification (thermal decomposition and catalytic de-
					9000	composition processes, thermal synthesis, catalytic synthesis, other chemical reactions, etc.)
					.100	Designation of the process (steam cracking, isomerization, alkylation, etc.)
					.900	
					.01	Description of processing operations (commencement of process, operating variables, main
					.98	physical and chemical characteristics, activating agents and reagents, thermodynamic and kinetic mechanisms, processing products, recycled products, flexibility in relation to raw material, licensers' returns, main equipment involved, means of control, safety standards, shifts, etc.)
					.99	Staff needed to handle processing operations

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.	PAGE .5.. of ..7..

Descriptive disaggregation

03	03	01	03	21	0000	SYSTEM: RECOVERY AND REGENERATION OPERATIONS
					1000	Names of products recovered and regenerated (catalysts, chemical products, absorbent and adsorbent
					9000	agents, other inputs, etc.)
					.100	Name of recovery and regeneration operations (oxidation, distillation, settling, washing, etc.
					.01	Description of recovery and regeneration operations (operating variables, physical and/or chemical characteristics of the operation, means of control, safety standards, equipment involved, characteristics of the recovered and/or regenerated products, yields, shifts, etc.)
					.99	Staff needed to handle recovery and regeneration operations
03	03	01	03	22	0000	SYSTEM: TREATMENT OF FLOWS FROM PROCESSING OPERATIONS
					1000	Names of products (main products, by-products and waste products) and physical state
					9000	
					.100	Names of treatment operations (purification, separation, heating, cooling, compression,
					.900	decompression, input addition, chemical treatment, catalytic treatment, absorption, adsorption, distillation, extraction, crystallization, cryogenic separation, settling, etc.)
					.01	Description of operations (purpose of operation, operating variables, main physical and chemical
					.98	characteristics, activating agents and reagents, thermodynamic and kinetic mechanisms, flexibility of operation, yields, main characteristics of products treated, main equipment involved, means of control, safety standards, recycling, shifts, etc.)
03	03	01	03	23	0000	SYSTEM: PRODUCT CONDITIONING
					1000	Names of products (main products and by-products) and physical state
					9000	
					.100	Names of conditioning operations (cooling, heating, compression, decompression, physical and/or chemical treatment - [illegible], filtration, sterilization, etc.
					.01	Description of conditioning operations (operating variables, physical and/or chemical characteristics
					.98	of the operation, means of control, equipment involved, safety standards, shifts, etc.)
					.99	Staff needed to handle conditioning operations

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.	PAGE 6 of 7

Descriptive disaggregation

03	03	01	03	24	0000	SYSTEM: PRODUCT FINISHING OPERATIONS
					1000	Names of products (main products and by-products) and physical state
					9000	
					.100	Names of finishing operations (extrusion, ingredient and additive addition, blending, recovery,
					.900	drying, sorting, etc.)
					.01	Description of finishing operations (operating variables, physical and/or chemical characteristics,
					.98	means of control, equipment involved, safety standards, shifts, etc.)
					.99	Staff needed to handle product finishing operations
03	03	01	03	25	0000	SYSTEM: PRODUCT PACKAGING OPERATIONS
					1000	Names of products (main products and by-products) and physical state
					9000	
					.100	Names of packaging systems (machines for filling bags, cylinders, packets, bottles, etc.)
					.900	
					.01	Description of packaging systems (operating method, means of control, safety standards, equipment
					.98	involved, location and area required, shifts, etc.)
					.99	Staff needed to handle packaging operations
03	03	01	03	26	0000	SYSTEM: PRODUCT TRANSPORT AND STORAGE OPERATIONS
					1000	Name of products (main products and by-products) and physical state
					9000	
					.100	Names of means of transport (pumping, pneumatic, mechanical, etc.)
					.900	
					.01	Description of means of transport (operating method, control measures, safety standards, equipment
					.98	involved (pumps, motors, blowers, ducts), distance to be covered, shifts, etc.)
					.99	Staff needed to handle transport operations

NAME OF PROJECT:	BASIC COMPONENT: PROCESSES	REV. No.	PAGE .7.. of .7...

Descriptive disaggregation

03	03	01	03	27	0000	SYSTEM: PRODUCT STORAGE
					1000	Names of products (main products and by-products) and physical state
					9000	
					.100	Names of means of storage (tanks, containers, warehouses, stores, silos, etc.)
					.900	
					.01	Description of means of storage (operating method, means of control, equipment involved,
					.98	environmental conditioning, ducts, compressors, cranes, etc.; area required, safety standards, etc.)
					.99	Staff needed to handle storage operations
03	03	01	03	28	0000	SYSTEM: PRODUCT DISPATCH
					1000	Names of products (main products and by-products) and physical state
					9000	
					.100	Names of means of dispatch (mechanical, pneumatic, pumping, etc.)
					.900	
					.01	Description of means of dispatch (operating method, means of control, equipment involved (ducts,
					.98	blowers, conveyers, trucks with power shovel, cranes, etc.), safety standards, area required, shift)
					.99	Staff needed to handle dispatch operations

3b.3. Form: Descriptive Disaggregation

3b.3.2. Basic component: Equipment

3b.3.2.1. With respect to equipment, the descriptive disaggregation procedure has been designed with the clear purpose of analysing in detail the equipment items used in the project in order to favour their supply by subregional capital equipment manufacturers.

3b.3.2.2. Attention has been given to the high degree of specialization involved in the detailed breakdown of this basic component. Accordingly, the disaggregation in this case is based on the characteristics, conditions and variables which apply in the area of basic engineering.

3b.3.2.2.1. The evaluation of the technical information furnished in the Model provides a sufficient basis for determining the technological complexity inherent in the manufacture of the disaggregated equipment items, regardless of whether they are series-produced or not.

3b.3.2.2.2. It is important to make clear that the technological disaggregation of this basic component is not contingent on the disaggregation of any of the stages, as might be supposed. As established for the entire Model, this component must be broken down for the three critical periods in the life of the project (under study, under way, and completed).

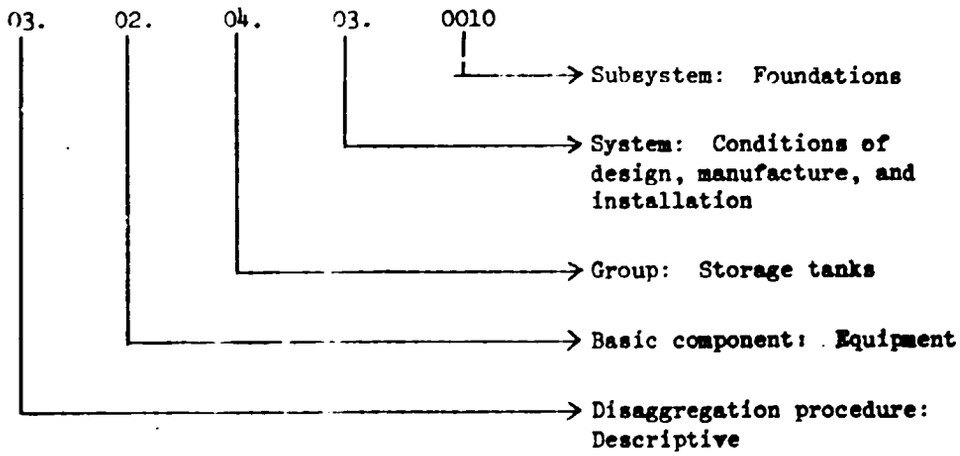
3b.3.2.2.3. The Model illustrates the disaggregation of a number of items selected because of their importance, their extensive use in, and/or their economic impact on, the project. In actual practice, however, it will be necessary

for project officials to prepare a detailed breakdown of the less important (minor) equipment, laboratory instruments, other materials, tools, etc. (which have not been reflected in the Model), in accordance with the general guidelines of the Model.

3b.3.2.3. In addition to the information indicated in the general instructions (3a.2.2. and 3a.3.1.), the following data must appear at the top of the cover page accompanying the set of forms: the name of the group and system to which the disaggregation applies plus the nomenclature used by the firm for purposes of equipment identification.

3b.3.2.3.1. The body of the text of the cover page and the additional pages comprising the set of forms must include, in substantial detail, a subsystem breakdown for each equipment group.

3b.3.2.4. In its most general coding, the descriptive disaggregation procedure for equipment has the following form: 03.02.00.00.000. The following example shows how the code is used:



3b.3.2.4.1. As one of the conclusions of the descriptive disaggregation of each equipment group, the Model proposes a classification system (code designation 06 0000), by means of which the disaggregated equipment items can be grouped together according to a system of ranking. The industrial rankings selected correspond to the most representative manufacturing characteristics. The classification system, together with the information provided by the system of principal materials used, should enable the owner to ascertain the number of equipment items and determine which of them may be acquired within the subregion.

3b.3.2.4.2. When the time comes to apply the descriptive disaggreation procedure to equipment, it will be found that a detailed breakdown will be required for certain of the subsystems, with these to be classified according to code rankings, dimensions, or any other design feature through which the subsystem can be easily identified and its use in the project described in quantitative terms. These specification rankings must be established by the user in line with the rankings generally accepted by the industry, preferentially within the subregion.

This situation arises very clearly in the case of the system designated accessories and minor equipment items, being indicated in the manual guide-forms by means of an asterisk preceding the subsystems for which this kind of treatment is required. Example:

Code		Equipment items			
02.00.0000	Group: Pressure vessels	1	2	3	
02.03.0000	System: Design conditions/ nomenclature	RP-02	RP-4	RP-n	Totals
02.03.0014	(*) Flanges:				
	Diameter 5 to 30 cm	8	-	15	23
	35 to 90 cm	1	3	1	5
	100 cm and above	-	-	-	-

Note: In this example, grouping and classification on the basis of the flange diameter is sufficient since it is assumed that the specifications of the material and the range of pressures coincide with those of the vessel in question. The user is expected to adapt the suggested form to his particular needs and to use any device required for its modification, including the arrangement of the subsystem code.

3b.3.2.5. The operating procedure for the descriptive disaggregation of the equipment may be described as one of characterization and consists in entering the parameter corresponding to the subsystem identified in the breakdown in one of the columns on the right-hand side of the form. These columns are headed equipment and indicate the nomenclature used at the owner's plant for the identification of each equipment item.

The sheets making up this form provide room for four such columns for the recording of an equal number of models corresponding to a particular equipment group. For situations when there are more models than can be entered on the form, a supplementary sheet has been prepared which merely reproduces the columnar portion of the form. This supplementary sheet may be used as many times as required.

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ..2.... OF ....5....

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment: (EN: 3b.3.2.5.)			
03	03	02	00	00	0000					
03	03	02	01	00	0000	GROUP: FURNACES AND BOILERS	1	2	3	4
03	03	02	01	01	0000	SYSTEM: APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	01	01	1000	United States agencies				
03	03	02	01	01	2000	Subregional countries				
03	03	02	01	01	3000	Third countries				
03	03	02	01	01	4000	Owner				
03	03	02	01	01	5000	Contractor				
03	03	02	01	01	6000	Other international standards				
03	03	02	01	01 to	1100 1900	(The most important are: ASME (Section I), ASA (B31.3, A58.1), ISO, ASTM, AISC, AWS, COPANT.)				
03	03	02	01	01 to	2100 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	01	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, ANSI, GOST, etc.)				
03	03	02	01	01 to	6100 6900	(Example: COPANT, ISO, etc.)				
03	03	02	01	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	01	02	0001	Type of equipment (boiler, furnace, etc.)				
03	03	02	01	02	0002*	Fluid(s)				
03	03	02	01	02	0003	Quantity				
03	03	02	01	02	0004	Mode of operation (steam production, heating, etc.)				
03	03	02	01	02	0005	Temperatures (input, output) (°C)				

NOTES (EN: 3b.3.2.4.2.)

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 2. of 3.

Descriptive disaggregation

03	03	02	01	00	0000	GROUP: FURNACES AND BOILERS	EQUIPMENT	1	2	3	4
03	03	02	01	02	0000	SYSTEM: PROCESS REQUIREMENTS	NOMENCLATURE				
03	03	02	01	02	0006	Pressures (input, output) (kg/cm^2)					
03	03	02	01	02	0007	Flow rates (kg/h)					
03	03	02	01	02	0008	Specific gravity					
03	03	02	01	02	0009	Viscosity (Stokes factor)					
03	03	02	01	02	0010	Molecular weight (g/mol)					
03	03	02	01	02	0011	Enthalpy (input, output) (kcal/kg)					
03	03	02	01	02	0012	Specific heat ($kcal/kg^oC$)					
03	03	02	01	02	0013	Caloric value (of the fuel) ($kcal/m^3$)					
03	03	02	01	02	0014	Corrosion index (mm/year)					
03	03	02	01	02	0015	Special characteristics					
03	03	02	01	02	0016	Quantity of dissolved solids (ppm)					
03	03	02	01	02	0017	Quantity of total solids (ppm)					
03	03	02	01	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION					
03	03	02	01	03	0001	Type of equipment (convection, radiation)					
03	03	02	01	03	0002	Type of installation (in-plant, on-site)					
03	03	02	01	03	0003	Maximum rated fluid temperatures (^oC)					
03	03	02	01	03	0004	Combustion gas output temperature (^oC)					
03	03	02	01	03	0005	Rated pressures (kg/cm^2)					
03	03	02	01	03	0006	Design flow rate (kg/h)					
03	03	02	01	03	0007	Efficiency (%)					
03	03	02	01	03	0008	Soiling factor ($h/^oC/m^2/kcal$)					
03	03	02	01	03	0009	Corrosion tolerance (mm)					
03	03	02	01	03	0010	Manufacturing tolerance (mm)					
03	03	02	01	03	0011	Dimensions, diameter, thickness, and length of tubes (mm)					
03	03	02	01	03	0012	Dimensions, diameter, and length of shell (mm)					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 3 of 5

Descriptive disaggregation

							EQUIPMENT	1	2	3	4
03	03	02	01	00	0000	GROUP: FURNACES AND BOILERS	NOMENCLATURE				
03	03	02	01	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION					
03	03	02	01	03	0013	Weights (kg) (tonnes)					
03	03	02	01	03	0014	Test pressure (kg/cm^2)					
03	03	02	01	03	0015	Environmental conditions (humidity, salinity, tropical, corrosive, etc.)					
03	03	02	01	03	0016	Area hazard classification (according to standards and codes)					
03	03	02	01	03	0017	Type of fuel					
03	03	02	01	03	0018	Inspection tests (destructive and/or non-destructive)					
03	03	02	01	03	0019	Heat transfer rate ($kcal/h/m^2$)					
03	03	02	01	03	0020	Caloric flow (moles/kcal/h)					
03	03	02	01	04	0000*	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)					
03	03	02	01	04	0001	Burners (position and type of injection)					
03	03	02	01	04	0002	Flues (draught: motor or turbine)					
03	03	02	01	04	0003	Soot-catchers					
03	03	02	01	04	0004*	Instruments (monometers, levels, thermocouples, recording devices, etc.)					
03	03	02	01	04	0005*	Stairs, platforms, supports, etc.					
03	03	02	01	04	0006	Filters					
03	03	02	01	04	0007	Blowers (fans, etc.)					
03	03	02	01	04	0008	Special accessories (valves, pressure regulators, packing, seals, etc.)					
03	03	02	01	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate in the columns the part of the equipment to which the material pertains)					
03	03	02	01	05	0001	Carbon steel					
03	03	02	01	05	0002	Steel, carbon, 1/2% molybdenum					
03	03	02	01	05	0003	Steel, 1 1/4 to 9% chrome-molybdenum					
03	03	02	01	05	0004	Steel, chrome-nickel					
03	03	02	01	05	0005	Other alloyed steels (e.g., supports)					
03	03	02	01	05	0006	Special alloys					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 4 of 5

Descriptive disaggregation

						GROUP: FURNACES AND BOILERS / EQUIPMENT	1	2	3	4
03	03	02	01	00	0000					
03	03	02	01	05	0000	SYSTEM: PRINCIPAL MATERIALS USED / NOMENCLATURE				
03	03	02	01	05	0007	REFRACTORIES				
03	03	02	01	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)				
03	03	02	01	06	1000	Box ovens with vertical tubes				
03	03	02	01	06	2000	Box ovens with horizontal tubes				
03	03	02	01	06	3000	Circular ovens with vertical tubes				
03	03	02	01	06	4000	Special ovens				
03	03	02	01	06	5000	Boilers, water-tube				
03	03	02	01	06	6000	Boilers, fire-tube				
03	03	02	01	06	7000	Boilers, special				
						Capacity (kcal/hr):				
03	03	02	01	06	0100	0 to 100				
03	03	02	01	06	0200	101 to 500				
03	03	02	01	06	0300	501 to 1,000				
03	03	02	01	06	0400	1,001 to 5,000				
03	03	02	01	06	0500	5,001 to 10,000				
03	03	02	01	06	0600	10,001 to 20,000				
03	03	02	01	06	0700	20,001 to 40,000				
03	03	02	01	06	0800	40,001 and above				
						Capacity (kg/hr):				
03	03	02	01	06	0010	0 to 1,000				
03	03	02	01	06	0020	1,001 to 2,000				
03	03	02	01	06	0030	2,001 to 5,000				
03	03	02	01	06	0040	5,001 to 10,000				
03	03	02	01	06	0050	10,001 to 20,000				
03	03	02	01	06	0060	20,001 to 40,000				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No (EN: 3a.2.3. and 2.4.)	PAGE 5. of 5.

Descriptive disaggregation

						EQUIPMENT / NOMENCLATURE	1	2	3	4
03	03	02	01	00	0000	GROUP: FURNACES AND BOILERS				
03	03	02	01	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)				
03	03	02	01	06	0070	40,001 to 80,000				
03	03	02	01	06	0080	80,001 to 160,000				
03	03	02	01	06	0090	160,001 and above				
						Pressure (kg/cm^2):				
03	03	02	01	06	0001	0 to 1.0				
03	03	02	01	06	0002	1.1 to 2				
03	03	02	01	06	0003	2.1 to 4.0				
03	03	02	01	06	0004	4.1 to 8.0				
03	03	02	01	06	0005	8.1 to 15.0				
03	03	02	01	06	0006	16 to 30				
03	03	02	01	06	0007	31 to 60				
03	03	02	01	06	0008	61 to 120				
03	03	02	01	06	0009	121 and above				

REV. No. (EN: 3a.2.3 and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT RESPONSIBLE	PAGE 1 ..... OF ..5.....

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	02	00	0000	GROUP PRESSURE VESSELS	1	2	3	4
03	03	02	02	01	0000	SYSTEM APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	02	01	1000	United States agencies				
03	03	02	02	01	2000	Subregional countries				
03	03	02	02	01	3000	Third countries				
03	03	02	02	01	4000	Owner				
03	03	02	02	01	5000	Contractor				
03	03	02	02	01	6000	Other international standards				
03	03	02	02	01 to	1100 1900	(The most important are: ASME (Section I, Section II, Section VIII - Divisions I and II), ASA, API, ASTM)				
03	03	02	02	01 to	2100 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	02	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, ANSI, GOST, etc.)				
03	03	02	02	01 to	6100 6900	(Example: COPANT, ISO, etc.)				
03	03	02	02	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	02	02	0001	Type of equipment: drums (D), towers (T), reactors (R)				
03	03	02	02	02	0002*	Fluid(s) (water, gas, hydrocarbons, etc.)				
03	03	02	02	02	0003	Quantity				
03	03	02	02	02	0004	Mode of operation: hydrocarbons (H), water (W), steam (S), acid (H+), chemicals (C), hydrogen (H_2).				
03	03	02	02	02	0005	Temperatures (input, output, maximum) (^oC)				
03	03	02	02	02	0006	Pressures (kg/cm^2)				
03	03	02	02	02	0007	Flow rates (kh/h, m^3/h)				
03	03	02	02	02	0008	Levels (elevation (m))				

Descriptive disaggregation

NOTES:

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No. [EN: 3.2.3 and 2.4.]	PAGE 2 of 5

Descriptive disaggregation

03	03	02	00	00	0000	GROUP: PRESSURE VESSELS / EQUIPMENT	1	2	3	4
03	03	02	02	02	0000	SYSTEM: PROCESS REQUIREMENTS / NOMENCLATURE				
03	03	02	02	02	0009	Specific gravity				
03	03	02	02	02	0010	Density (gr/cm^3)				
03	03	02	02	02	0011	Viscosity (Stokes factor)				
03	03	02	02	02	0012	Molecular weight (gr/mol)				
03	03	02	02	02	0013	Characterization factor				
03	03	02	02	02	0014	Corrosion index (mm)				
03	03	02	02	02	0015	Wind velocity (mph)				
03	03	02	02	02	0016	Seismic factor				
03	03	02	02	02	0017	Special conditions				
03	03	02	02	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION				
03	03	02	02	03	0001	Type of equipment: drums (D), towers (T), reactors (R), etc.				
03	03	02	02	03	0002	Rated temperature (°C)				
03	03	02	02	03	0003	Rated pressures (kg/cm^2)				
03	03	02	02	03	0004	Design flow rates (kg/h, m^3/h)				
03	03	02	02	03	0005	Corrosion tolerance (shell, headers) (mm)				
03	03	02	02	03	0006	Manufacturing tolerance (mm)				
03	03	02	02	03	0007	Dimensions (diameter, length) (mm)				
03	03	02	02	03	0008	Other dimensions (mm)				
03	03	02	02	03	0009	Thickness of the container (mm)				
03	03	02	02	03	0010	Special linings (material, thickness, area covered)				
03	03	02	02	03	0011	Type of drumhead (elliptical, hemispherical, toroidal)				
03	03	02	02	03	0012	Insulation (type, thickness, area)				
03	03	02	02	03	0013*	Nozzles (dimensions, rank, ANSI No.)				
03	03	02	02	03	0014*	Flanges (rank, type, ANSI No.)				
03	03	02	02	03	0015*	Inspection manholes (size and number)				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No (EN: 3b.3.2.3. and 2.4.)	PAGE 3. of 5.

Descriptive disaggregation

						GROUP: PRESSURE VESSELS / SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION	EQUIPMENT NOMENCLATURE	1	2	3	4
03	03	02	02	00	0000						
03	03	02	02	03	0000						
03	03	02	02	03	0016	Number of plates					
03	03	02	02	03	0017	Spacing of the plates					
03	03	02	02	03	0018	Water leg (dimensions, material, rank)					
03	03	02	02	03	0019	Weight (empty and filled with water) (kg)					
03	03	02	02	03	0020	Test pressure (kg/cm^2)					
03	03	02	02	03	0021	Inspection tests (destructive and/or non-destructive)					
03	03	02	02	03	0022	Heat treatment (required: yes or no)					
03	03	02	02	03	0023	Permissible material stress (kg/cm^2)					
03	03	02	02	03	0024	Fluid velocities (m/sec)					
03	03	02	02	03	0025	Abrasiveness					
03	03	02	02	04	0000*	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)					
03	03	02	02	04	0001	Bolts (for securing the flanges) (number, dimensions, material)					
03	03	02	02	04	0002	Packings (rank, dimensions, material)					
03	03	02	02	04	0003	Base supports (number, dimensions, material)					
03	03	02	02	04	0004	Covers (dimensions, rank, material)					
03	03	02	02	04	0005	Plates (type: bubble, perforated, filler, etc.)					
03	03	02	02	04	0006	Internal tubes (length, diameter, material)					
03	03	02	02	04	0007	Overflow openings (number, dimensions)					
03	03	02	02	04	0008	Stairs and platforms (dimensions, material)					
03	03	02	02	04	0009	Insulation (type, material, and area)					
03	03	02	02	04	0010	Instruments (gauges for measuring pressure, temperature, level, etc.)					
03	03	02	02	04	0011	Internal mesh (thickness, material)					
03	03	02	02	04	0012	Safety valves (dimensions, number, material)					
03	03	02	02	04	0013	Special accessories					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No (EN: 3a.2.3. and 2.4.)	PAGE .4. of .5.

Descriptive disaggregation

						EQUIPMENT / NOMENCLATURE	1	2	3	4
03	03	02	02	00	0000	GROUP: PRESSURE VESSELS				
03	03	02	02	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate in the columns the equipment part to which the materials pertains)				
03	03	02	02	05	0001	Carbon steel				
03	03	02	02	05	0002	Steel, carbon - 1/2% molybdenum				
03	03	02	02	05	0003	Steel, 1% chrome - 1/2% molybdenum				
03	03	02	02	05	0004	Steel, 1 1/4% chrome - 1/2 molybdenum				
03	03	02	02	05	0005	Steel, 2 1/4% chrome - 1% molybdenum				
03	03	02	02	05	0006	Steel, 3% chrome - 1% molybdenum				
03	03	02	02	05	0007	Steel, 5% chrome - 1/2% molybdenum				
03	03	02	02	05	0008	Steels, stainless ferrite				
03	03	02	02	05	0009	Steels, stainless austenitic (Cr-Ni)				
03	03	02	02	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)				
						Width (mm):				
03	03	02	02	06	1000	0 - 3				
03	03	02	02	06	2000	3.1 - 6				
03	03	02	02	06	3000	6.1 - 12				
03	03	02	02	06	4000	12.1 - 24				
03	03	02	02	06	5000	24.1 - 50				
03	03	02	02	06	6000	50.1 - 1000				
03	03	02	02	06	7000	1000.1 mm and above				
						Diameter (m):				
03	03	02	03	06	0100	0 - 0.5				
03	03	02	03	06	0200	0.6 - 2.0				
03	03	02	02	06	0300	2.1 - 3.0				
03	03	02	02	06	0400	3.1 - 4.0				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No(EN: 3b.2.3. and 2.4.)	PAGE 5 of 5.

Descriptive disaggregation

						GROUP: PRESSURE VESSELS / EQUIPMENT	1	2	3	4
03	03	02	02	00	0000					
03	03	02	02	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.2.4.1.) / NOMENCLATURE				
03	03	02	02	06	0500	4.1 - 5.0				
03	03	02	02	06	0600	5.1 m and above				
						Length (m):				
03	03	02	02	06	0010	0 - 2				
03	03	02	02	06	0020	2.1 - 4				
03	03	02	02	06	0030	4.1 - 8				
03	03	02	02	06	0040	8.1 - 12 (m)				
03	03	02	02	06	0050	12.1 - 24				
03	03	02	02	06	0060	24.1 - 40				
03	03	02	02	06	0070	40.1 m and above				
						Weight (tonnes):				
03	03	02	02	06	0001	0 - 1				
03	03	02	02	06	0002	1.1 - 2				
03	03	02	02	06	0003	2.1 - 5				
03	03	02	02	06	0004	5.1 - 10				
03	03	02	02	06	0005	11 - 20				
03	03	02	02	06	0006	21 - 50				
03	03	02	02	06	0007	51 - 100				
03	03	02	02	06	0008	101 - 200				
03	03	02	02	06	0009	201 tonnes and above				

REV. No. (EN: 3a.2.3. and 2,4,)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ...1... OF .....6...

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	03	00	0000	GROUP HEAT EXCHANGE	1	2	3	4
03	03	02	03	01	0000	SYSTEM APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.2.3.) / NOMENCLATURE				
03	03	02	03	01	1000	United States agencies				
03	03	02	03	01	2000	Subregional countries				
03	03	02	03	01	3000	Third countries				
03	03	02	03	01	4000	Owner				
03	03	02	03	01	5000	Contractor				
03	03	02	03	01	6000	Other international standards				
03	03	02	03	01	1100 to 1900	(The most important are: ASME (Section I, Section VIII), API (660, 661), TEMA, ASTM.)				
03	03	02	03	01	2100 to 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Perú), COVENIN (Venezuela)).				
03	03	02	03	01	3100 to 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, ANSI, GOST, etc.)				
03	03	02	03	01	6100	(Example: COPANT, ISO)				
03	03	02	03	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	03	02	0001	Type of equipment: exchanger (1), heater (2), cooler (3), condensers (4), reboilers (5), evaporators (6)				
03	03	02	03	02	0002*	Fluid(s)				
03	03	02	03	02	0003	Quantity				
03	03	02	03	02	0004	Mode of operation: hydrocarbons (H), water (W), steam (S), chemicals (C), gases (G), hydrogen (H_2), acid (H+)				
03	03	02	03	02	0005	Temperatures (^{o}C)				
03	03	02	03	02	0006	Pressures (kg/cm^2)				

NOTES

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	(EN: 3a.2.3. REV. No.. and 2.4.)	PAGE .2. of .9..

						GROUP: HEAT EXCHANGE / EQUIPMENT	1	2	3	4
03	03	02	03	02	0000	SYSTEM: PROCESS REQUIREMENTS / NOMENCLATURE				
03	03	02	03	02	0007	Flow rates (kg/h, m^3/h)				
03	03	02	03	02	0008	Density (gr/m^3)				
03	03	02	03	02	0009	Specific gravity				
03	03	02	03	02	0010	Viscosity (Stokes factor)				
03	03	02	03	02	0011	Molecular weight (gr/mol)				
03	03	02	03	02	0012	Characterization factor				
03	03	02	03	02	0013	Specific heat (kcal/m^3)				
03	03	02	03	02	0014	Caloric value (kcal/m^3)				
03	03	02	03	02	0015	Enthalpy (kcal/kg/$^\circ$C)				
03	03	02	03	02	0016	Chemical composition (%)				
03	03	02	03	02	0017	Corrosion index				
03	03	02	03	02	0018	Soiling index (h/$^\circ$C/m^2/kcal)				
03	03	02	03	02	0019	Special conditions				
03	03	02	03	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION				
03	03	02	03	03	0001	Type of equipment: double-tube (DT), shell-tube (ST), air-operating coolers (AC)				
03	03	02	03	03	0002	Rated input and output temperature in both tubes and shells ($^\circ$C)				
03	03	02	03	03	0003	Rated pressure in tubes and shells (kg/cm^2)				
03	03	02	03	03	0004	Design flow rates in tubes and shells (kg/h, m^3/h)				
03	03	02	03	03	0005	Permissible velocities (fluids in tubes) (m/sec)				
03	03	02	03	03	0006	Soiling factor (h/$^\circ$C/m^2/kcal)				
03	03	02	03	03	0007	Corrosion tolerance (mm)				
03	03	02	03	03	0008	Other manufacturing tolerances (mm)				
03	03	02	03	03	0009	Head type (floating or fixed)				
03	03	02	03	03	0010	Pitch of tube bundle (triangular, square)				

Descriptive disaggregation

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 3 of 6

Descriptive disaggregation

						GROUP: HEAT EXCHANGE / SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION	EQUIPMENT NOMENCLATURE	1	2	3	4
03	03	02	03	00	0000						
03	03	02	03	03	0000						
03	03	02	03	03	0011	Tube length (m)					
03	03	02	03	03	0012	Tube spacing (mm)					
03	03	02	03	03	0013	Tube thickness (BWG) (mm)					
03	03	02	03	03	0014	Number of tubes					
03	03	02	03	03	0015	External diameter of tubes (mm)					
03	03	02	03	03	0016	External diameter of tube bundle (m)					
03	03	02	03	03	0017	External diameter of shell (m)					
03	03	02	03	03	0018	Shell thickness (mm)					
03	03	02	03	03	0019	Ribs (required: yes or no)					
03	03	02	03	03	0020	Nozzles (size, rank, ANSI No., number)					
03	03	02	03	03	0021	Flanges (range, type, ANSI No.)					
03	03	02	03	03	0022	Transfer area (m^2)					
03	03	02	03	03	0023	Heat exchange (kcal/h)					
03	03	02	03	03	0024	Insulation (type, material, area)					
03	03	02	03	03	0025	Water leg (dimensions) (mm)					
03	03	02	03	03	0026	Weight of the tube bundle (kg)					
03	03	02	03	03	0027	Weight of the exchanger (tube bundle + shell) (kg)					
03	03	02	03	03	0028	Test pressure (kg/cm^2)					
03	03	02	03	03	0029	Environmental conditions (humidity, temperature, salinity, tropical, corrosive, etc.)					
03	03	02	03	03	0030	Inspection tests (destructive and/or non-destructive)					
03	03	02	03	03	0031	Abrasiveness					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE .4. of .6.

Descriptive disaggregation

						GROUP: HEAT EXCHANGE / EQUIPMENT	1	2	3	4
03	03	02	03	00	0000					
03	03	02	03	04	0000	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.) / NOMENCLATURE				
03	03	02	03	04	0001	Instruments: gauges for the measurement of level (L), temperature (T), and pressure (P)				
03	03	02	03	04	0002	Baffles (number, dimensions, material)				
03	03	02	03	04	0003	Base supports (number, dimensions, material)				
03	03	02	03	04	0004	Bolts for securing the flanges (number, dimensions, material)				
03	03	02	03	04	0005	Spacers (number, dimensions, material)				
03	03	02	03	04	0006	Ribs (number, dimensions, material)				
03	03	02	03	04	0007	Safety valves (number, dimensions, material)				
03	03	02	03	04	0008	Venting devices (number, size, range, material)				
03	03	02	03	04	0009	Drainage devices (number, size, range, material)				
03	03	02	03	04	0010	Special assessories				
03	03	02	03	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate in the columns the part of the equipment to which the material pertains)				
						SHELL AND BAFFLES				
03	03	02	03	05	0001	Carbon steels				
03	03	02	03	05	0002	Steel, carbon - 1/2% molybdenum				
03	03	02	03	05	0003	Steel, 1% chrome - 1/2% molybdenum				
03	03	02	03	05	0004	Steel, 1 1/4 chrome - 1/2% molybdenum				
03	03	02	03	05	0005	Steel, 2 1/4 chrome - 1% molybdenum				
03	03	02	03	05	0006	Steel, 3% chrome - 1% molybdenum				
03	03	02	03	05	0007	Steel, 5% chrome - 1/2% molybdenum				
03	03	02	03	05	0008	Steels, stainless ferrite				
03	03	02	03	05	0009	Steels, stainless austenitic				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	(EN: 3a.2.3. REV. No. and 2.4.)	PAGE .5. of .6.

Descriptive disaggregation

03	03	02	03	00	0000	GRC : HEAT EXCHANGE	EQUIPMENT	1	2	3	4
03	03	02	03	05	0000	SYSTEM: PRINCIPAL MATERIALS USED	NOMENCLATURE				
						TUBES					
03	03	02	03	05	0010	Admiralty					
03	03	02	03	05	0011	Copper alloys					
03	03	02	03	05	0012	Carbon steel					
03	03	02	03	05	0013	Steels, stainless ferrite					
03	03	02	03	05	0014	Steels, stainless austenitic (Cr-Ni)					
03	03	02	03	05	0015	Steel, carbon 1% - 1/2% molybdenum					
03	03	02	03	05	0016	Steel, 1% chrome - 1/2% molybdenum					
03	03	02	03	05	0017	Steel, 2% chrome - 1/2% molybdenum					
03	03	02	03	05	0018	Steel, 2% chrome - 1/2% molybdenum					
03	03	02	03	05	0019	Steel, 2 1/4% chrome - 1% molybdenum					
03	03	02	03	05	0020	Steel, 3% chrome - 1/2% molybdenum					
03	03	02	03	05	0021	Steel, 5% chrome - 1/2% molybdenum					
03	03	02	03	05	0022	Steel, 9% chrome - 1% molybdenum					
03	03	02	03	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)					
						Type of equipment:					
03	03	02	03	06	1000	Double-tube					
03	03	02	03	06	2000	Shell-tube					
03	03	02	03	06	3000	Air-operating coolers					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	(EN: 3a.2.3. REV. No. and 2.4.)	PAGE 6 of 6

Descriptive disaggregation

						GROUP: HEAT EXCHANGE / EQUIPMENT	1	2	3	4
03	03	02	03	00	0000					
						SYSTEM: CLASSIFICATION / NOMENCLATURE				
03	03	02	03	06	0000					
						Transfer area:				
03	03	02	03	06	0100	0 - 25 m^2				
03	03	02	03	06	0200	25 - 50 m^2				
03	03	02	03	06	0300	50 - 75 m^2				
03	03	02	03	06	0400	75 - 100 m^2				
03	03	02	03	06	0500	100 - 200 m^2				
03	03	02	03	06	0600	200 m^2 and above				
						Diameter:				
03	03	02	03	06	0010	0 - 0.20 m				
03	03	02	03	06	0020	0.21 - 0.40 m				
03	03	02	03	06	0030	0.41 - 0.60 m				
03	03	02	03	06	0040	0.61 - 0.80 m				
03	03	02	03	06	0050	0.81 - 1.00 m				
03	03	02	03	06	0060	1.01 - 1.30 m				
03	03	02	03	06	0070	1.31 m and above				
						Standard tube lengths:				
03	03	02	03	06	0001	3.6 m				
03	03	02	03	06	0002	4.3 m				
03	03	02	03	06	0003	5.0 m				
03	03	02	03	06	0004	6.0 m				
03	03	02	03	06	0005	9.0 m				

REV. No. (EN: 3a.2.3 and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ..1.... OF ....5....

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	04	00	0000	GROUP: STORAGE TANKS	1	2	3	4
03	03	02	04	01	0000	SYSTEM: APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) NOMENCLATURE				
03	03	02	04	01	1000	United States agencies				
03	03	02	04	01	2000	Subregional countries				
03	03	02	04	01	3000	Third countries				
03	03	02	04	01	4000	Owner				
03	03	02	04	01	5000	Contractor				
03	03	02	04	01	6000	Other international standards				
03	03	02	04	01 to	1100 1900	(The most important are: API (620, 650), ASME (Section VIII, Appendix V), ASA (A58-1), NBFU (No. 58), AWWA (D-100), NFPA.)				
03	03	02	04	01 to	2100 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	04	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, ANSI, GOST, etc.)				
03	03	02	04	01 to	6100 6900	(Example: COPANT, ISO)				
03	03	02	04	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	04	02	0001	Type (Atmospheric or pressure-type)				
03	03	02	04	02	0002	Fluid(s)				
03	03	02	04	02	0003	Quantity				
03	03	02	04	02	0004	Mode of operation: hydrocarbons (H), water (W), acid (H+), chemicals (C)				
03	03	02	04	02	0005	Temperatures (^{o}C)				
03	03	02	04	02	0006	Pressures (kg/cm^2)				

NOTES

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: ..3a.2.3 and 2.4.)	PAGE .2. of .3.

Descriptive disaggregation

03	03	02	04	00	0000	GROUP: STORAGE TANKS / EQUIPMENT	1	2	3	4
03	03	02	04	02	0000	SYSTEM: PROCESS REQUIREMENTS / NOMENCLATURE				
03	03	02	04	02	0007	Storage quantity (m^3 or tonnes)				
03	03	02	04	02	0008	Specific gravity				
03	03	02	04	02	0009	Density (gr/cm^3)				
03	03	02	04	02	0010	Molecular weight (gr/mol)				
03	03	02	04	02	0011	Liquid vapour pressure (kg/cm^2)				
03	03	02	04	02	0012	Toxicity				
03	03	02	04	02	0013	Corrosivity index (mm)				
03	03	02	04	02	0014	Wind velocity (mph)				
03	03	02	04	02	0015	Seismic factor				
03	03	02	04	02	0016	Velocity (m/sec)				
03	03	02	04	02	0017	Flow rates (m^3/h)				
03	03	02	04	02	0018	Special characteristics				
03	03	02	04	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION				
03	03	02	04	03	0001	Type (floating roof, conical, spherical, etc.)				
03	03	02	04	03	0002	Rated temperature				
03	03	02	04	03	0003	Rated pressure				
03	03	02	04	03	0004	Storage capacity				
03	03	02	04	03	0005	Corrosion tolerance				
03	03	02	04	03	0006	Other manufacturing tolerances				
03	03	02	04	03	0007	Dimensions (diameter, height)				
03	03	02	04	03	0008	Maximum thickness of the plates (bottom, cylinder, roof)				
03	03	02	04	03	0009	Lining (type, thickness, area covered)				
03	03	02	04	03	0010	Foundations (dimensions, material)				
03	03	02	04	03	0011	Foam chamber requirements (number and size)				
03	03	02	04	03	0012	Inspection manholes (number and dimensions)				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No (EN: 3b.2.3. and 2.4.)	PAGE .3. of .5.

Descriptive disaggregation

03	03	02	04	00	0000	GROUP: STORAGE TANKS	EQUIPMENT		
03	03	02	04	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION	NOMENCLATURE		
03	03	02	04	03	0013	Flanges (size, rank, ANSI No.)			
03	03	02	04	03	0014	Weight (empty and filled with water) (tonnes)			
03	03	02	04	03	0015	Test pressure (kg/cm^2)			
03	03	02	04	03	0016	Environmental conditions (humidity, temperature, salinity, corrosiveness)			
03	03	02	04	03	0017	Inspection tests (destructive and/or non-destructive)			
03	03	02	04	04	0000	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2)			
03	03	02	04	04	0001	Instrumentation (automatic level, pressure and temperature gauges)			
03	03	02	04	04	0002	Platforms and stairs (number, dimensions and material)			
03	03	02	04	04	0003	Base supports (number and material)			
03	03	02	04	04	0004	Foundations (number and size)			
03	03	02	04	04	0005	Spray chambers (number and size)			
03	03	02	04	04	0006	Safety valves (type: pressure or empty; number, size and material)			
03	03	02	04	04	0007	Special accessories			
03	03	02	04	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate in the columns the part of the equipment to which the material pertains)			
03	03	02	04	05	0001	Carbon steel, forged			
03	03	02	04	05	0002	Carbon steel, cast			
03	03	02	04	05	0003	Steel, 1% carbon - 1/2% molybdenum			
03	03	02	04	05	0004	Steel, 1% chrome - 1/2% molybdenum			
03	03	02	04	05	0005	Steel, 1 1/4% chrome - 1/2% molybdenum			
03	03	02	04	05	0006	Steel, 2 1/4% chrome - 1% molybdenum			
03	03	02	04	05	0007	Steel, 3% chrome - 1% molybdenum			
03	03	02	04	05	0008	Steel, 5% chrome - 1/2% molybdenum			
03	03	02	04	05	0009	Iron, forged			

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 4 of 5.

Descriptive disaggregation

						GROUP: STORAGE TANKS / EQUIPMENT			
03	03	02	04	00	0000				
03	03	02	04	05	0000	SYSTEM: PRINCIPAL MATERIALS USED / NOMENCLATURE			
03	03	02	04	05	0010	Iron, cast			
03	03	02	04	05	0011	Steels, stainless austenitic			
03	03	02	04	05	0012	Steels, stainless ferrite			
03	03	02	04	05	0013	Plastics: teflon			
03	03	02	04	05	0014	Concrete			
03	03	02	04	06	0000	SYSTEM: CLASSIFICATION			
						Type:			
03	03	02	04	06	1000	Floating roof			
03	03	02	04	06	2000	Conical roof			
03	03	02	04	06	3000	Spherical			
						Storage capacity:			
03	03	02	04	06	0100	0 - 50 m^3			
03	03	02	04	06	0200	51 - 200 m^3			
03	03	02	04	06	0300	201 - 500 m^3			
03	03	02	04	06	0400	501 - 1,000 m^3			
03	03	02	04	06	0500	1,001 - 5,000 m^3			
03	03	02	04	06	0600	5,001 m^3 and above			
						Diameter:			
03	03	02	04	06	0010	0 - 1 m			
03	03	02	04	06	0020	1 - 5 m			
03	03	02	04	06	0030	5 - 10 m			
03	03	02	04	06	0040	10 - 20 m			
03	03	02	04	06	0050	20 - 30 m			
03	03	02	04	06	0060	30 m and above			

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 5 of 5

Descriptive disaggregation

03	03	02	04	00	0000	GROUP: STORAGE TANKS / EQUIPMENT	1	2	3	4
03	03	02	04	06	0000	SYSTEM: CLASSIFICATION / NOMENCLATURE				
						Height:				
03	03	02	04	06	0001	0 - 1 m				
03	03	02	04	06	0002	1.1 - 5 m				
03	03	02	04	06	0003	5.1 - 7 m				
03	03	02	04	06	0004	7.1 - 10 m				
03	03	02	04	06	0005	11 - 12 m				
03	03	02	04	06	0006	13 m and above				

REV. No. (EN: 3a.2.3. and 3a.2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 6

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	05	00	0000	GROUP: PUMPS		2	3	4
03	03	02	05	01	0000	SYSTEM: APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	05	01	1000	United States agencies				
03	03	02	05	01	2000	Subregional countries				
03	03	02	05	01	3000	Third countries				
03	03	02	05	01	4000	Owner				
03	03	02	05	01	5000	Contractor				
03	03	02	05	01	6000	Other international standards				
03	03	02	05	01 to 01	1100 to 1900	(The most important are API (610) and ASTM)				
03	03	02	05	01 to 01	2100 to 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela)				
03	03	02	05	01 to 01	3100 to 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, ANSI, JISC, BSI, GOST, etc.)				
03	03	02	05	01	6100	(Example: COPANT, ISO, etc.)				
03	03	02	05	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	05	02	0001	Type of equipment: centrifugal (C), vertical (V), horizontal (H), rotary (R), positive displacement (PD)				
03	03	02	05	02	0002	Fluid(s)				
03	03	02	05	02	0003	Quantity				
03	03	02	05	02	0004	Mode of operation: hydrocarbons (H), water (W), acid (H+), chemicals (C)				
03	03	02	05	02	0005	Temperatures (^{o}C)				
03	03	02	05	02	0006	Pressures (kg/cm^2)				

Descriptive disaggregation

NOTES

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 2 of 6

							EQUIPMENT	1	2	3	4
03	03	02	05	00	0000	GROUP: PUMPS	NOMENCLATURE				
03	03	02	05	02	0000	SYSTEM: PROCESS REQUIREMENTS					
03	03	02	05	02	0007	Flow rates (kg/h, m^3/h)					
03	03	02	05	02	0008	Braking horse power (hp)					
03	03	02	05	02	0009	Specific liquid gravity					
03	03	02	05	02	0010	Density (gr/m^3)					
03	03	02	05	02	0011	Viscosity (Stokes factor)					
03	03	02	05	02	0012	Molecular weight (gr/mol)					
03	03	02	05	02	0013	Characterization factor					
03	03	02	05	02	0014	Chemical composition (%/volume)					
03	03	02	05	02	0015	Corrosion index (mm)					
03	03	02	05	02	0016	Liquid vapour pressure (kg/cm^2)					
03	03	02	05	02	0017	NPSH available (m)					
03	03	02	05	02	0018	Fluid velocities (m/sec)					
03	03	02	05	02	0019	Special characteristics					
03	03	02	05	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION					
03	03	02	05	03	0001	Type of drive (motor: electric, diesel or turbine)					
03	03	02	05	03	0002	Rated temperature (^oC)					
03	03	02	05	03	0003	Rated pressures (kg/cm^2)					
03	03	02	05	03	0004	Differential pressure (m)					
03	03	02	05	03	0005	Design flow rates (minimum, normal, maximum) (m^3/h)					
03	03	02	05	03	0006	Efficiency (%)					
03	03	02	05	03	0007	Velocity (m/sec)					
03	03	02	05	03	0008	NPSH required (m)					
03	03	02	05	03	0009	Braking horse power (turbine, motor) (hp)					
03	03	02	05	03	0010	Voltage (110, 220, 440, 6,350, 13,000 V)					
03	03	02	05	03	0011	Corrosion tolerance (mm)					

Descriptive disaggregation

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.) -	PAGE 3.. of .6.

Descriptive disaggregation

						GROUP: PUMPS / SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION / NOMENCLATURE	EQUIPMENT 1	2	3	4
03	03	02	05	00	0000					
03	03	02	05	03	0000					
03	03	02	05	03	0012	Manufacturing tolerance (mm)				
03	03	02	05	03	0013	Impeller size (cm)				
03	03	02	05	03	0014	Number of stages				
03	03	02	05	03	0015	Nozzles (size, rank, ANSI No.)				
03	03	02	05	03	0016*	Flanges (type, rank, ANSI No.)				
03	03	02	05	03	0017	Type of bearings (radial or thrust)				
03	03	02	05	03	0018	Lubrication system (oiling ring, splash, flood, pressure lubrication, etc.)				
03	03	02	05	03	0019	Type of coupling				
03	03	02	05	03	0020	Pump weight (kg)				
03	03	02	05	03	0021	Test pressure (kg/cm^2)				
03	03	02	05	03	0022	Equipment classification (weather-resistant, non-explosive, etc.)				
03	03	02	05	03	0023	Inspection testing (destructive and/or non-destructive)				
03	03	02	05	03	0024	Abrasiveness				
03	03	02	05	04	0000*	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)				
03	03	02	05	04	0001	Mechanical seal (manufacturer, model)				
03	03	02	05	04	0002	Coupling (manufacturer, model)				
03	03	02	05	04	0003	Piping (size, rank, material)				
03	03	02	05	04	0004	Cooling system				
03	03	02	05	04	0005	Draining devices (size, rank, material)				
03	03	02	05	04	0006	Venting devices (size, rank, material)				
03	03	02	05	04	0007	Base (dimensions, material)				
03	03	02	05	04	0008	Insulation (type, material, area)				
03	03	02	05	04	0009	Heating jackets				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b..2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 4. of .6.

Descriptive disaggregation

						EQUIPMENT	1	2	3	4
03	03	02	05	00	0000	GROUP: PUMPS				
03	03	02	05	04	0000	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT				
03	03	02	05	04	0010	Special accessories				
03	03	02	05	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate in the columns the part of the equipment to which the material pertains.)				
						Housing:				
03	03	02	05	05	0001	Carbon steel, cast				
03	03	02	05	05	0002	Carbon steel, forged				
03	03	02	05	05	0003	Iron, forged				
03	03	02	05	05	0004	Iron, cast				
						Impeller:				
03	03	02	05	05	0005	Steel, 12% chrome				
03	03	02	05	05	0006	Steel, 11-13% chrome				
03	03	02	05	05	0007	Steels, stainless ferrite				
03	03	02	05	05	0008	Steels, stainless austenitic				
03	03	02	05	05	0009	Iron, cast				
03	03	02	05	05	0010	Carbon iron, cast				
						Wearing rings and other parts:				
03	03	02	05	05	0011	Bronze				
03	03	02	05	05	0012	Carpenter 20				
03	03	02	05	05	0013	Teflon				
03	03	02	05	05	0014	Monel				
03	03	02	05	05	0015	Steel, 12% chrome				
03	03	02	05	05	0016	Steel, 11-13% chrome				
03	03	02	05	05	0017	Steels, stainless ferrite				
03	03	02	05	05	0018	Steels, stainless austenitic				
03	03	02	05	05	0019	Steel, carbon, cast				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4,)	PAGE 5 of 6

Descriptive disaggregation

03	03	02	05	00	0000	GROUP: PUMPS / EQUIPMENT	1	2	3	4
03	03	02	05	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1,) / NOMENCLATURE				
						Type and mode of operation:				
03	03	02	05	06	1000	Pumps, centrifugal, for hydrocarbons				
03	03	02	05	06	2000	Pumps, for water				
03	03	02	05	06	3000	Pumps, centrifugal, for chemicals				
03	03	02	05	06	4000	Pumps, centrifugal, for acids				
03	03	02	05	06	5000	Pumps, rotary, for hydrocarbons				
03	03	02	05	06	6000	Pumps, rotary, for chemicals				
03	03	02	05	06	7000	Pumps, rotary, for acids				
03	03	02	05	06	8000	Pumps, positive displacement, for hydrocarbons				
03	03	02	05	06	9000	Pumps, positive displacement, for chemicals				
						Capacity:				
03	03	02	05	06	0100	0 - 0.5 m^3/min				
03	03	02	05	06	0200	0.5 - 1.0 m^3/min				
03	03	02	05	06	0300	1.0 - 5.0 m^3/min				
03	03	02	05	06	0400	5.0 - 10.0 m^3/min				
03	03	02	05	06	0500	10.0 - 20.0 m^3/min				
03	03	02	05	06	0600	20.0 - 50.0 m^3/min				
03	03	02	05	06	0700	50.0 - 100.0 m^3/min				
03	03	02	05	06	0800	100.0 - 200.0 m^3/min				
03	03	02	05	06	0900	200 m^3/min and above				
						Pressure:				
03	03	02	05	06	0010	0 - 5 kg/cm^2				
03	03	02	05	06	0020	5.1 - 10 kg/cm^2				
03	03	02	05	06	0030	11 - 20 kg/cm^2				
03	03	02	05	06	0040	21 - 50 kg/cm^2				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 6 of 6

Descriptive disaggregation

03	03	02	05	00	0000	GROUP: PUMPS / EQUIPMENT	1	2	3	4
03	03	02	05	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.) / NOMENCLATURE				
03	03	02	05	06	0050	51 - 100 kg/cm^2				
03	03	02	05	06	0060	101 - 200 kg/cm^2				
03	03	02	05	06	0070	201 - 500 kg/cm^2				
03	03	02	05	06	0080	501 kg/cm^2 and above				
						Power:				
03	03	02	05	06	0001	0 - 1 hp				
03	03	02	05	06	0002	1.1 - 3 hp				
03	03	02	05	06	0003	3.1 - 10 hp				
03	03	02	05	06	0004	11 - 30 hp				
03	03	02	05	06	0005	31 - 60 hp				
03	03	02	05	06	0006	61 - 100 hp				
03	03	02	05	06	0007	101 - 200 hp				
03	03	02	05	06	0008	201 - 500 hp				
03	03	02	05	06	0009	501 hp and above				

Descriptive disaggregation

REV. No. (EN: 3a.2.3 and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 4

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment: (EN: 3b.3.2.5.)			
03	03	02	00	00	0000					
03	03	02	06	00	0000	GROUP: COMPRESSORS	1	2	3	4
03	03	02	06	01	0000	SYSTEM: APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	06	01	1000	United States agencies				
03	03	02	06	01	2000	Subregional countries				
03	03	02	06	01	3000	Third countries				
03	03	02	06	01	4000	Owner				
03	03	02	06	01	5000	Contractor				
03	03	02	06	01	6000	Other international standards				
03	03	02	06	01 to	1100 1900	(The most important are: API (Standard 617 and 618), ASA (B.31.3), ASTM, API (Standard RP-550), NEC.)				
03	03	02	06	01 to	2100 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	06	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, ANSI, GOST, etc.)				
03	03	02	06	01 to	6100 6900	(Example: COPANT, ISO, etc.)				
03	03	02	06	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	06	02	0001	Type of equipment (reciprocating, centrifugal, rotary, etc.)				
03	03	02	06	02	0002	Fluid				
03	03	02	06	02	0003	Quantity				
03	03	02	06	02	0004	Mode of operation (delivery of air, compression of gas, etc.)				
03	03	02	06	02	0005	Temperatures (^{o}C)				
03	03	02	06	02	0006	Input and output pressures (kg/cm^2)				
03	03	02	06	02	0007	Flow rate(s) (m^3/sec)				

NOTES

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No (EN: 3a.2.3. and 2.4.)	PAGE 2 of 4

03	03	02	06	00	0000	GROUP: COMPRESSORS	EQUIPMENT	1	2	3	4
03	03	02	06	02	0000	SYSTEM: PROCESS REQUIREMENTS	NOMENCLATURE				
03	03	02	06	02	0008	Power (kW)					
03	03	02	06	02	0009	Voltage (V)					
03	03	02	06	02	0010	Specific gravity					
03	03	02	06	02	0011	Molecular weight (gr/mol)					
03	03	02	06	02	0012	Gas composition (%/volume)					
03	03	02	06	02	0013	Corrosion index (mm/a)					
03	03	02	06	02	0014	Special characteristics					
03	03	02	06	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION					
03	03	02	06	03	0001	Type of compressor (reciprocating, centrifugal, rotary)					
03	03	02	06	03	0002	Type of impeller (motor, turbine, etc.)					
03	03	02	06	03	0003	Rated temperatures (^{o}C)					
03	03	02	06	03	0004	Rated input and output pressures (kg/cm^2)					
03	03	02	06	03	0005	Design flow rate (m/sec)					
03	03	02	06	03	0006	Rated power (kW)					
03	03	02	06	03	0007	Compression ratio					
03	03	02	06	03	0008	Compressibility factor (suction)					
03	03	02	06	03	0009	CP/CV suction					
03	03	02	06	03	0010	Angular velocity (rpm)					
03	03	02	06	03	0011	Piston velocity					
03	03	02	06	03	0012	Efficiency (%)					
03	03	02	06	03	0013	Tolerances (mm)					
03	03	02	06	03	0014	Dimensions (mm)					
03	03	02	06	03	0015	Weight (kg)					
03	03	02	06	03	0016	Test pressure (kg/cm^2)					
03	03	02	06	03	0017	Environmental conditions (tropical, salinity, etc.)					

Descriptive disaggregation

Descriptive disaggregation

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 3. of 4..

03	03	02	06	00	0000	GROUP: COMPRESSORS	EQUIPMENT	1	2	3	4
03	03	02	06	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION	NOMENCLATURE				
03	03	02	06	03	0018	Area hazard classification according to codes and standards					
03	03	02	06	03	0019	Inspection tests (destructive and/or non-destructive)					
03	03	02	06	04	0000	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)					
03	03	02	06	04	0001	Tubes (rank and material)					
03	03	02	06	04	0002	Flanges (type and rank)					
03	03	02	06	04	0003	Valves					
03	03	02	06	04	0004	Base supports					
03	03	02	06	04	0005	Packing					
03	03	02	06	04	0006	Springs					
03	03	02	06	04	0007	Instruments					
03	03	02	06	04	0008	Filters					
03	03	02	06	04	0009	Coolers					
03	03	02	06	04	0010	Special accessories					
03	03	02	06	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate in the columns the part of the equipment to which the material pertains.)					
03	03	02	06	05	0001	Steel, cast					
03	03	02	06	05	0002	Steel, forged					
03	03	02	06	05	0003	Steel, alloyed					
03	03	02	06	05	0004	Steel, stainless					
03	03	02	06	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)					
03	03	02	06	06	1000	Compressors, reciprocating, for air					
03	03	02	06	06	2000	Compressors, reciprocating, for other gases					
03	03	02	06	06	3000	Compressors, centrifugal, for air					
03	03	02	06	06	4000	Compressors, centrifugal, for other gases					
03	03	02	06	06	5000	Compressors, rotary (screw)					

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE .4. of .4.

03	03	02	06	00	0000	GROUP: COMPRESSORS / EQUIPMENT	1	2	3	4
03	03	02	06	06	0000	SYSTEM: CLASSIFICATION / NOMENCLATURE				
						Capacity:				
03	03	02	06	06	0100	0 - 5 m^3/min				
03	03	02	06	06	0200	5.1 - 20 m^3/min				
03	03	02	06	06	0300	21 - 50 m^3/min				
03	03	02	06	06	0400	51 - 100 m^3/min				
03	03	02	06	06	0500	101 - 300 m^3/min				
03	03	02	06	06	0600	301 - 600 m^3/min				
03	03	02	06	06	0700	601 - 1,000 m^3/min				
03	03	02	06	06	0800	1,001 - 2,000 m^3/min				
03	03	02	06	06	0900	2,001 m^3/min and above				
						Pressure:				
03	03	02	06	06	0010	1 - 5 kg/cm^2				
03	03	02	06	06	0020	5.1 - 10 kg/cm^2				
03	03	02	06	06	0030	11 - 20 kg/cm^2				
03	03	02	06	06	0040	21 - 50 kg/cm^2				
03	03	02	06	06	0050	51 - 100 kg/cm^2				
03	03	02	06	06	0060	100 kg/cm^2 and above				
						Power:				
03	03	02	06	06	0001	0 - 5 hp				
03	03	02	06	06	0002	5.1 - 20 hp				
03	03	02	06	06	0003	21 - 50 hp				
03	03	02	06	06	0004	51 - 100 hp				
03	03	02	06	06	0005	100 - 200 hp				
03	03	02	06	06	0006	200 hp and above				

Descriptive disaggregation

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1..... OF ...4.....

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	07	00	0000	GROUP TURBINES AND ENGINES	1	2	3	4
03	03	02	07	01	0000	SYSTEM APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	07	01	1000	United States agencies				
03	03	02	07	01	2000	Subregional countries				
03	03	02	07	01	3000	Third countries				
03	03	02	07	01	4000	Owner				
03	03	02	07	01	5000	Contractor				
03	03	02	07	01	6000	Other international standards				
03	03	02	07	01 to	1100 1900	(The most important are: API (611 and 612), NEMA (SM80 3, 08, SM21), NFPA, AISI (410/416), NEC, etc.)				
03	03	02	07	01 to	2100 2900	(The corresponding abbreviations are: NF (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	07	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	07	01 to	6100 6900	(Example: COPANT, ISO, etc.)				
03	03	02	07	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	07	02	0001	Mode of operation (processes, fluids)				
03	03	02	07	02	0002	Quantity				
03	03	02	07	02	0003	Input and output temperatures (^{o}C)				
03	03	02	07	02	0004	Maximum pressures (kg/cm^2)				
03	03	02	07	02	0005	Flow rates (m^3/sec)				
03	03	02	07	02	0006	Power (kVA/bhp)				
03	03	02	07	02	0007	Environmental conditions				

NOTES

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No 3a.2.3e. and 2.4	PAGE 2 of 4

Descriptive disaggregation

03	03	02	07	00	0000	GROUP: TURBINES AND ENGINES	EQUIPMENT	1	2	3	4
03	03	02	07	02	0000	SYSTEM: PROCESS REQUIREMENTS	NOMENCLATURE				
03	03	02	07	02	0008	Special conditions					
03	03	02	07	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE					
03	03	02	07	03	0001	Type of equipment (generators, reciprocating, gasoline, diesel, etc.)					
03	03	02	07	03	0002	Rated input and output temperature (°C)					
03	03	02	07	03	0003	Rated input and output pressure (kg/cm^2)					
03	03	02	07	03	0004	Design flow rates (m^3/sec)					
03	03	02	07	03	0005	Power (fractional 1, 10, 50, 200, 1000 bhp)					
03	03	02	07	03	0006	Velocities (rpm)					
03	03	02	07	03	0007	Efficiency (%)					
03	03	02	07	03	0008	Fuel consumption (kcal/h)					
03	03	02	07	03	0009	Corrosion tolerance					
03	03	02	07	03	0010	Dimensions (mm)					
03	03	02	07	03	0011	Weight (kg)					
03	03	02	07	03	0012	Area hazard classification					
03	03	02	07	03	0013	Flanges (type, rank and ANSI No.)					
03	03	02	07	03	0014	Inspection tests					
03	03	02	07	04	0000*	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)					
03	03	02	07	04	0001	Electrical controls					
03	03	02	07	04	0002	Pipes, valves and fittings					
03	03	02	07	04	0003	Instruments					
03	03	02	07	04	0004	Governor					
03	03	02	07	04	0005	Monitoring valves					
03	03	02	07	04	0006	Excess-velocity control devices					
03	03	02	07	04	0007	Seals and glands					
03	03	02	07	04	0008	Special accessories					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No. EN: 3b.2.3. and 2.4.	PAGE 3. of 4..

Descriptive disaggregation

03	03	02	07	00	0000	GROUP: TURBINES AND ENGINES	EQUIPMENT	1	2	3	4
03	03	02	07	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate ~~in the columns the part of the~~ equipment to which the material pertains.)	NOMENCLATURE				
03	03	02	07	05	0001	Iron, cast					
03	03	02	07	05	0002	Steel, cast					
03	03	02	07	05	0003	Steel forged					
03	03	02	07	05	0004	Steel, stainless					
03	03	02	07	05	0005	Steels, special					
03	03	02	07	05	0006	Special alloys					
03	03	02	07	05	0007	Non-ferrous metals					
03	03	02	07	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)					
						Type and mode of operation:					
03	03	02	07	06	1000	Gasoline engines					
03	03	02	07	06	2000	Diesel engines					
03	03	02	07	06	3000	Gas turbines (compressors)					
03	03	02	07	06	4000	Gas turbines (driving)					
03	03	02	07	06	5000	Steam turbines					
						Differential pressure (1):					
03	03	02	07	06	0100	0 - 3 kg/cm^2					
03	03	02	07	06	0200	3.1 - 6 kg/cm^2					
03	03	02	07	06	0300	6.1 - 10 kg/cm^2					
03	03	02	07	06	0400	11 - 20 kg/cm^2					
03	03	02	07	06	0500	21 - 40 kg/cm^2					
03	03	02	07	06	0600	41 - 60 kg/cm^2					
03	03	02	07	06	0700	61 - 100 kg/cm^2					
03	03	02	07	06	0800	100 kg/cm^2 and above					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT	REV. No. EN; 3b.2.3. and 2.4.	PAGE 4. of 4.

03	03	02	07	00	0000	GROUP: TURBINES AND ENGINES / EQUIPMENT	1	2	3	4
03	03	02	07	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.) / NOMENCLATURE				
						Power (1):				
03	03	02	06	07	0010	0 - 1 bhp				
03	03	02	06	07	0020	1.1 - 5 bhp				
03	03	02	06	07	0030	5.1 - 15 bhp				
03	03	02	06	07	0040	15.1 - 50 bhp				
03	03	02	06	07	0050	51 - 150 bhp				
03	03	02	06	07	0060	151 - 500 bhp				
03	03	02	06	07	0070	501 - 1000 bhp				
03	03	02	06	07	0080	1001 - 2000 bhp				
03	03	02	06	07	0090	2000 bhp and above				
						Angular velocity:				
03	03	02	06	07	0001	0 - 550 rpm				
03	03	02	06	07	0002	501 - 1000 rpm				
03	03	02	06	07	0003	1001 - 2000 rpm				
03	03	02	06	07	0004	2001 - 5000 rpm				
03	03	02	06	07	0005	5001 - 10,000 rpm				
03	03	02	06	07	0006	10,001 - 20,000 rpm				
03	03	02	06	07	0007	20,001 rpm and above				

Descriptive classification

REV. No. (EN: 3a.2.3 and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ..2..... OF ...5.....

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	08	00	0000	GROUP TUBING AND ACCESSORIES	1	2	3	4
03	03	02	08	01	0000	SYSTEM APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	08	01	1000	United States agencies				
03	03	02	08	01	2000	Subregional countries				
03	03	02	08	01	3000	Third countries				
03	03	02	08	01	4000	Owner				
03	03	02	08	01	5000	Contractor				
03	03	02	08	01	6000	Other international standards				
03	03	02	08	01 to 01	1100 to 1900	(The most important are: API (611 and 612), NEMA (SM80, SM21), NFPA, AISI (410/416), NEC, etc.)				
03	03	02	08	01 to 01	2100 to 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	08	01 to 01	3100 to 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	08	01 to 01	6100 to 6900	(Example: COPANT, ISO, etc.)				
03	03	02	08	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	08	02	0001	Mode of operation: hydrocarbons (H), steam (S), water (W), chemicals (C), auxiliary services (AS)				
03	03	02	08	02	0002	Quantity				
03	03	02	08	02	0003	Temperature (^{o}C)				
03	03	02	08	02	0004	Pressures (kg/cm^{2})				
03	03	02	08	02	0005	Flow rates (m^{3}/h, kg/h)				
03	03	02	08	02	0006	Specific gravity				

NOTES

Descriptive disaggregation

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No.....	PAGE 2 of 5

Descriptive disaggregation

03	03	02	08	00	0000	GROUP: TUBING AND ACCESSORIES (EN: 3b.3.2.) / EQUIPMENT	1	2	3	4
03	03	02	08	02	0000	SYSTEM: PROCESS REQUIREMENTS / NOMENCLATURE				
03	03	02	08	02	0007	Density (gr/cm^3)				
03	03	02	08	02	0008	Viscosity (Stokes factor)				
03	03	02	08	02	0009	Corrosion index (mm)				
03	03	02	08	02	0010	Environmental conditions (salinity, corrosiveness, humidity, temperature, etc.)				
03	03	02	08	02	0011	Special conditions				
03	03	02	08	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION				
03	03	02	08	03	0001	Type of joints: soldered (S), threaded (T), flanged (F)				
03	03	02	08	03	0002	Rated temperature (^oC)				
03	03	02	08	03	0003	Rated pressure (kg/cm^2)				
03	03	02	08	03	0004	Corrosion tolerance (mm)				
03	03	02	08	03	0005	Diameter (6.4; 38, 51 to 254; 305 to 610.6; 660 to 1219)				
03	03	02	08	03	0006	(Schedule) (10, 20, 40, 80, 160)				
03	03	02	08	03	0007	Rank (ANSI: 150, 300, 400, 900, 1500, 2000)				
03	03	02	08	03	0008	Heat treatment requirement				
03	03	02	08	03	0009	Inspection tests (destructive and/or non-destructive)				
03	03	02	08	03	0010	Abrasiveness				
03	03	02	08	04	0000	* SYSTEM: ACCESSORIES (EN: 3b.3.2.4.2.)				
03	03	02	08	04	0001	Standard codes (45 and 90)				
03	03	02	08	04	0002	Blind flanges (rank, type, ANSI No.)				
03	03	02	08	04	0003	Aperture flanges (size and rank)				
03	03	02	08	04	0004	Glands (type, thickness, material, size)				
03	03	02	08	04	0005	Bolts (length, diameter, material)				
03	03	02	08	04	0006	Joints (type, size, rank, material)				

Descriptive disaggregation

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No.....	PAGE 3 of 5

03	03	02	08	00	0000	GROUP: TUBING AND ACCESSORIES (EN: 3b.3.2.)	EQUIPMENT	1	2	3	4
03	03	02	08	04	0000	SYSTEM: ACCESSORIES (EN: 3b.3.2.4.2.)	NOMENCLATURE				
03	03	02	08	04	0007	Plugs (type, size, rank, material)					
03	03	02	08	04	0008	T's (type, size, rank, material)					
03	03	02	08	04	0009	Excentric reducers (size, rank, material)					
03	03	02	08	04	0010	Caps (size, rank, material)					
03	03	02	08	04	0011	Insulation (type, material, area)					
03	03	02	08	04	0012	Special accessories					
03	03	02	08	05	0000	SYSTEM: PRINCIPAL MATERIALS USED					
03	03	02	08	05	0001	Steel, carbon, forged					
03	03	02	08	05	0002	Steel, carbon, cast					
03	03	02	08	05	0003	Steel, carbon - 1/2% molybdenum					
03	03	02	08	05	0004	Steel, 1% chrome - 1/2% molybdenum					
03	03	02	08	05	0005	Steel, 1 1/4% chrome - 1/2% molybdenum					
03	03	02	08	05	0006	Steel, 2% chrome - 1/2% molybdenum					
03	03	02	08	05	0007	Steel, 2 1/4% chrome - 2% molybdenum					
03	03	02	08	05	0008	Steel, 3% chrome - 1% molybdenum					
03	03	02	08	05	0009	Steel, 5% chrome - 1/2% molybdenum					
03	03	02	08	05	0010	Steel, 9% chrome - 1% molybdenum					
03	03	02	08	05	0011	Steels, stainless ferrite					
03	03	02	08	05	0012	Steels, stainless austenitic					
03	03	02	08	05	0013	Reinforced concrete					
03	03	02	08	05	0014	Bronze					
03	03	02	08	05	0015	Teflon					
03	03	02	08	05	0016	Compressed asbestos					
03	03	02	08	05	0017	Iron, galvanized					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN· 3b.3.2,)	REV. No.....	PAGE 4 of 5

Descriptive disaggregation

03	03	02	08	00	0000	GROUP: TUBING AND ACCESSORIES (EN: 3b.3.2.) / EQUIPMENT	1	2	3	4
03	03	02	08	05	0000	SYSTEM: PRINCIPAL MATERIALS USED / NOMENCLATURE				
03	03	02	08	05	0018	Iron, forged				
03	03	02	08	05	0019	Iron, cast				
03	03	02	00	05	0020	Burned clays				
03	03	02	08	05	0021	Copper				
03	03	02	08	05	0022	Asbestos-cement				
03	03	02	08	00	0000	SYSTEM: CLASSIFICATION (EN: 3b.2.4.1.)				
						Material:				
03	03	02	08	06	1000	Steel, carbon				
03	03	02	08	06	2000	Steels, alloyed (Cr-Mo)				
03	03	02	08	06	3000	Steels, stainless				
03	03	02	08	06	4000	Iron, cast				
03	03	02	08	06	5000	Iron, galvanised				
03	03	02	08	06	6000	Asbestos cement				
03	03	02	08	06	7000	Copper				
03	03	02	08	06	8000	Teflon (plastic)				
						Diameter:				
03	03	02	08	06	0100	6 mm				
03	03	02	08	06	0200	38 mm				
03	03	02	08	06	0300	51 - 152 mm				
03	03	02	08	06	0400	203 - 305 mm				
03	03	02	08	06	0500	356 - 508 mm				
03	03	02	08	06	0600	610 - 762 mm				
03	03	02	08	06	0700	914 mm				
03	03	02	08	06	0800	914 mm and above				

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No.....	PAGE .5. of .5.

Descriptive disaggregation

03	03	02	08	00	0000	GROUP: TUBING AND ACCESSORIES (EN: 3b.3.2.) / EQUIPMENT	1	2	3	4
03	03	02	08	00	0000	SYSTEM: CLASSIFICATION (EN: 3b.2.4.1.) / NOMENCLATURE				
						Indicator (Schedule):				
03	03	02	08	06	0010	10				
03	03	02	08	06	0020	20				
03	03	02	08	06	0030	40				
03	03	02	08	06	0040	80				
03	03	02	08	06	0050	160				
						Types:				
03	03	02	08	06	0001	Seamless				
03	03	02	08	06	0002	Seam-welded (submerged electric arc)				
03	03	02	08	06	0003	Spun				

REV. No. (EN: 3a.2.3 and 2.4)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ...1... OF .....5...

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	09	00	0000	GROUP: ELECTRICAL EQUIPMENT	1	2	3	4
03	03	02	09	01	0000	SYSTEM: APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.) / NOMENCLATURE				
03	03	02	09	01	1000	United States agencies				
03	03	02	09	01	2000	Subregional countries				
03	03	02	09	01	3000	Third countries				
03	03	02	09	01	4000	Owner				
03	03	02	09	01	5000	Contractor				
03	03	02	09	01	6000	Other international standards				
03	03	02	09	01 to	1100 1900	(The most important are: API (611 and 612), NEMA (SM80), NFPA, AISI (410/416), NEC, etc.)				
03	03	02	09	01 to	2100 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela))				
03	03	02	09	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	09	01 to	6100 6900	(Example: COPANT, ISO, etc.)				
03	03	02	09	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	09	02	0001	Type of equipment				
03	03	02	09	02	0002	Quantity				
03	03	02	09	02	0003	Mode of operation				
03	03	02	09	02	0004	Temperatures (°C)				
03	03	02	09	02	0005	Power (bhp or cva)				
03	03	02	09	02	0006	Voltage (V)				
03	03	02	09	02	0007	Special characteristics				

NOTES

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 2 of 5.

Descriptive disaggregation

						GROUP: ELECTRICAL EQUIPMENT / EQUIPMENT	1	2	3	4
03	03	02	09	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE / NOMENCLATURE				
03	03	02	09	03	1000	Motors and generators				
03	03	02	09	03	1100*	Type (motor, generator, squirrel cage, etc.)				
03	03	02	09	03	1110	Classification (general duty, weather-resistant, explosion-proof, ventilated, cooled, refrigerated)				
03	03	02	09	03	1120	Power (fractional, 10, 50, 200, 1,000 bhp)				
03	03	02	09	03	1130	Voltage (120/208, 440, 2,400, 6,000, 13,000 V)				
03	03	02	09	03	1140	Velocity (rpm)				
03	03	02	09	03	1150	Area hazard classification				
03	03	02	09	03	2000	Transformers				
03	03	02	09	03	2100*	Type (star, delta, etc.)				
03	03	02	09	03	2110	Classification (general duty, weather-resistant, explosion-proof, ventilated, cooled)				
03	03	02	09	03	2120	Filling classes (without solid compounds, oil, refrigerator, etc.)				
03	03	02	09	03	2130	Temperatures (°C)				
03	03	02	09	03	2140	Power (fractional, 10, 50, 200, 1,000 kVA)				
03	03	02	09	03	2150	Voltage (120/208, 440, 2,400, 6,000, 13,000 V)				
03	03	02	09	03	2160	Area hazard classification according to codes and standards				
03	03	02	09	03	3000	Starters				
03	03	02	09	03	3100*	Type (star, delta, etc.)				
03	03	02	09	03	3110	Classification (general duty, weather-resistant, explosion-proof, ventilated, cooled)				
03	03	02	09	03	3120	Power (fractional, 10, 50, 200, 1,000 kVA)				
03	03	02	09	03	3130	Voltage (120/208, 440, 2,400, 6,000, 13,000 V)				
03	03	02	09	03	3140	Area hazard classification according to codes and standards				
03	03	02	09	03	4000	Interrupters				

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 3. of 5.

Descriptive disaggregation

						GROUP: ELECTRICAL EQUIPMENT / EQUIPMENT	1	2	3	4
03	03	02	09	00	0000					
03	03	02	09	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE / NOMENCLATURE				
03	03	02	09	03	4100*	Type (circuit-breakers, switches, isolating switches, relays, cutouts, lightning arresters, connecting and protection devices, non-heating resistors, etc.)				
03	03	02	09	03	4110	Classification				
03	03	02	09	03	4120	Power (fractional, 10, 50, 200, 1,000 kVA)				
03	03	02	09	03	4130	Voltage (120/208, 440, 2,400, 6,000, 13,000 V)				
03	03	02	09	03	4140	Area hazard classification				
03	03	02	09	03	5000	Control boxes, panels, etc.				
03	03	02	09	03	5100*	Type of equipment				
03	03	02	09	03	5110	Classification				
03	03	02	09	03	5120	Size (small, medium, large)				
03	03	02	09	03	5130	Power (fractional, 10, 50, 200, 1,000 kVA)				
03	03	02	09	03	5140	Voltage 120/208, 440, 2,400, 6,000, 13,000 V)				
03	03	02	09	03	6000	Lamps and sockets				
03	03	02	09	03	6100*	Type of equipment				
03	03	02	09	03	6110	Classification				
03	03	02	09	03	6120	Power (fractional, 10, 50, 200, 1,000 kVA)				
03	03	02	09	03	6130	Voltage (120/208, 440 V)				
03	03	02	09	03	6140	Area hazard classification				
03	03	02	09	03	7000	Storage batteries				
03	03	02	09	03	7100*	Type of equipment				
03	03	02	09	03	7110	Classification				
03	03	02	09	03	7120	Power (A)				
03	03	02	09	03	7130	Voltage (1 1/2, 3, 6, 9, 12 V and multiples)				
03	03	02	09	03	7140	Area hazard classification				

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 4. of 5.

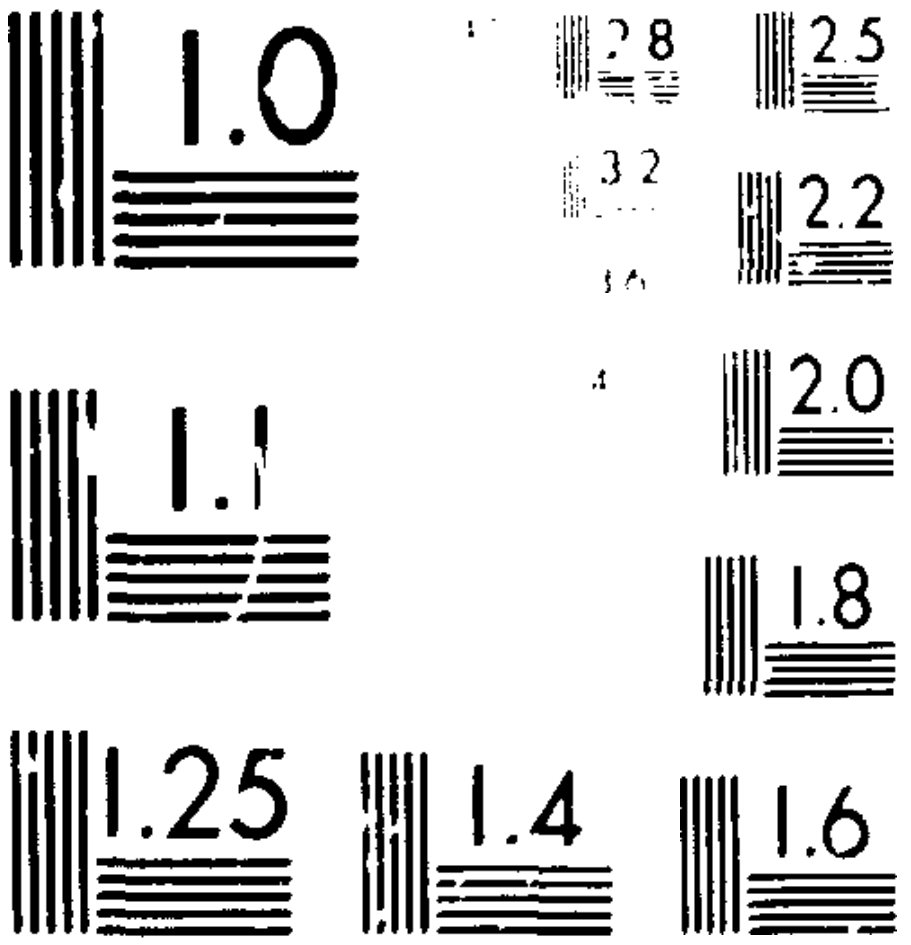
Descriptive disaggregation

							EQUIPMENT	1	2	3	4
03	03	02	09	00	0000	GROUP: ELECTRICAL EQUIPMENT					
03	03	02	09	04	0000*	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)	NOMENCLATURE				
03	03	02	09	04	1000	Cable conductors					
03	03	02	09	04	1100*	Type (conduit, tube, ribbon, overhead)					
03	03	02	09	04	1110	Hazard classification (general duty, weather-resistant, explosion-proof, fire-proof)					
03	03	02	09	04	1120	Voltage (120, 208, 440, 2,400, 6,000, 13,000 V)					
03	03	02	09	04	1130	Power (fractional, 1, 10, 50, 200, 1,000 kVA)					
03	03	02	09	04	2000	Cables					
03	03	02	09	04	2100*	Type (wires, cables, coaxial cables, bars, bare or insulated)					
03	03	02	09	04	2110	Mode of operation (power transmission, telephony, etc.)					
03	03	02	09	04	2120	Voltage (120, 208, 440, 2,400, 6,000, 13,000 V)					
03	03	02	09	04	2130	Power (fractional, 1, 10, 50, 200, 1,000 kVA)					
03	03	02	09	04	2140	Materials (steel, aluminium, copper)					
03	03	02	09	04	3000	Insulators					
03	03	02	09	04	4000	Special accessories					
03	03	02	09	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate specifications)					
03	03	02	09	05	0100	Plates, shapes, tubing					
03	03	02	09	05	0010	Materials (ferrous, non-ferrous, non-metallic)					
03	03	02	09	06	0000	SYSTEM: CLASSIFICATION (EN: 3.2.4.1.)					
						By environment:					
03	03	02	09	06	1000	General duty					
03	03	02	09	06	2000	Weather-resistant					
03	03	02	09	06	3000	Explosion-proof					
03	03	02	09	06	4000	Fully sealed and ventilated					
03	03	02	09	06	5000	Cooled					
03	03	02	09	06	6000	Refrigerated					

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 5.. of .5.

Descriptive disaggregation

						GROUP: ELECTRICAL EQUIPMENT / EQUIPMENT NOMENCLATURE	1	2	3	4
03	03	02	09	00	0000					
03	03	02	09	06	0000	SYSTEM: CLASSIFICATION (EN: 3.2.4.1.)				
						Power:				
03	03	02	09	06	0100	0 - 3/4 bhp (120/208 V)				
03	03	02	09	06	0200	1 - 10 bhp (440/460 V)				
03	03	02	09	06	0300	11 - 50 bhp (440/460 V)				
03	03	02	09	06	0400	51 - 200 bhp (440/460 V)				
03	03	02	09	06	0500	201 - 1,000 bhp (2,400/4,160 V)				
03	03	02	09	06	0600	1,001 bhp and above (6,000/6,600 V)				
03	03	02	09	06	0700	1,001 bhp and above (13,000/13,600 V)				
						Type:				
03	03	02	09	06	0010	Generators, a.c.				
03	03	02	09	06	0020	Generators, d.c.				
03	03	02	09	06	0030	Alternators				
03	03	02	09	06	0040	Others				
03	03	02	09	06	0050	Motors, a.c.				
03	03	02	09	06	0060	Motors, d.c.				
						Rpm rate:				
03	03	02	09	06	0001	0 - 1,000 rpm				
03	03	02	09	06	0002	1,001 - 2,000 rpm				
03	03	02	09	06	0003	2,001 - 3,000 rpm				
03	03	02	09	06	0004	3,001 - 6,000 rpm				
03	03	02	09	06	0005	6,001 - 8,000 rpm				
03	03	02	09	06	0006	8,001 rpm and above				


1.0
2.8
2.5
3.2
2.2
2.0
1.1
1.8
1.25
1.4
1.6

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 4

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	10	00	0000	GROUP : INSTRUMENTS	1	2	3	4
03	03	02	10	01	0000	SYSTEM : APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.) / NOMENCLATURE				
03	03	02	10	01	1000	United States agencies				
03	03	02	10	01	2000	Subregional countries				
03	03	02	10	01	3000	Third countries				
03	03	02	10	01	4000	Owner				
03	03	02	10	01	5000	Contractor				
03	03	02	10	01	6000	Other international standards				
03	03	02	10	01	1100 to 1900	(The most important are: AISI, API (RP 550), ISA, ASA (B31.3) NEC (ASA, CI, NFPA No. 70), ASTM, AIESC (ASA C2, NBS Handbook H 30).)				
03	03	02	10	01	2100	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	10	01	3100 to 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	10	01	6100 to 6900	(Example: COPANT, ISO, etc.)				
03	03	02	10	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	10	02	0001	Type of equipment				
03	03	02	10	02	0002	Quantity				
03	03	02	10	02	0003	Mode of operation				
03	03	02	10	02	0004	Temperatures (^{o}C)				
03	03	02	10	02	0005	Pressures (kg/cm^2)				
03	03	02	10	02	0006	Flow rates (m^3/sec)				
03	03	02	10	02	0007	Voltage (V)				

NOTES

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 2. of 4.

Descriptive disaggregation

							EQUIPMENT	1	2	3	4
03	03	02	10	00	0000	GROUP: INSTRUMENTS	NOMENCLATURE				
03	03	02	10	02	0000	SYSTEM: PROCESS REQUIREMENTS					
03	03	02	10	02	0008	Levels (m)					
03	03	02	10	02	0009	Specific gravity					
03	03	02	10	02	0010	Viscosity (Stokes factor)					
03	03	02	10	02	0011	Corrosion index (mm/A)					
03	03	02	10	02	0012	Special characteristics					
03	03	02	10	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION					
03	03	02	10	03	0001	Rated temperatures (^{o}C)					
03	03	02	10	03	0002	Rated pressures (kg/cm^2)					
03	03	02	10	03	0003	Design flow rates (m^3/sec)					
03	03	02	10	03	0004	Manufacturing tolerances (mm)					
03	03	02	10	03	0005	Dimensions (mm)					
03	03	02	10	03	0006	Environmental conditions (tropical, salty, etc.)					
03	03	02	10	03	0007	Area hazard classification					
03	03	02	10	03	0008	Type of control					
03	03	02	10	03	0009	Type of transmitter					
03	03	02	10	03	0010*	Rank and type of flanges					
03	03	02	10	03	0011	Location of the instrument					
03	03	02	10	03	0012	Measurement factor					
03	03	02	10	03	0013	Inspection tests (destructive or non-destructive)					
03	03	02	10	04	0000*	SYSTEM: ACCESSORIES (EN: 3b.3.2.4.2.)					
03	03	02	10	04	0001	Pushbuttons					
03	03	02	10	04	0002	Regulators					
03	03	02	10	04	0003	Filters					
03	03	02	10	04	0004	Flanges					

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 3 of 4

Descriptive disaggregation

						EQUIPMENT / NOMENCLATURE	1	2	3	4
03	03	02	10	00	0000	GROUP: INSTRUMENTS				
03	03	02	10	04	0000	SYSTEM: ACCESSORIES (EN: 3b.3.2.4.2.)				
03	03	02	10	04	0005	Tubing				
03	03	02	10	04	0006	Packing glands				
03	03	02	10	04	0007	Alarm devices				
03	03	02	10	04	0008	Lights				
03	03	02	10	04	0009	Switches				
03	03	02	10	04	0010	Timers				
03	03	02	10	04	0011	Panels				
03	03	02	10	04	0012	Special accessories				
03	03	02	10	05	0000*	SYSTEM: PRINCIPAL MATERIALS USED				
03	03	02	10	05	0001	Steel, carbon				
03	03	02	10	05	0002	Steel, alloyed				
03	03	02	10	05	0003	Steel, stainless 316, 304				
03	03	02	10	05	0004	Steel, stainless 18-8				
03	03	02	10	05	0005	Monel				
03	03	02	10	05	0006	Iron - constantan				
03	03	02	10	05	0007	Cromel - alumel				
03	03	02	10	05	0008	Bronze - constantan				
03	03	02	10	05	0009	Bronze				
03	03	02	10	05	0010	Teflon				
03	03	02	10	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)				
03	03	02	10	06	1000	Temperature gauges				
03	03	02	10	06	2000	Pressure gauges				
03	03	02	10	06	3000	Flow gauges				
03	03	02	10	06	4000	Level gauges				
03	03	02	10	06	5000	Control valves				

NAME OF PROJECT:	NAME OF STAGE:	REV. No.....	PAGE 4 of 4

Descriptive disaggregation

						EQUIPMENT / NOMENCLATURE	1	2	3	4
03	03	02	10	00	0000	GROUP: INSTRUMENTS				
03	03	02	10	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)				
03	03	02	10	06	6000	Regulators				
03	03	02	10	06	7000	Control panels				
03	03	02	10	06	8000	Analysers				
03	03	02	10	06	9000	Alarms				
						Types:				
03	03	02	10	06	0100	Indicating				
03	03	02	10	06	0200	Recording				
03	03	02	10	06	0300	Monitoring				
						Means of transmission:				
03	03	02	10	06	0010	Pneumatic				
03	03	02	10	06	0020	Electric or electronic				
						Ranking:				
03	03	02	10	06	0001	0 - 5 kg/cm. 0 - 50 °C				
03	03	02	10	06	0002	5.1 - 10 " 0 - 100 "				
03	03	02	10	06	0003	11 - 30 " 0 - 200 "				
03	03	02	10	06	0004	31 - 60 " 0 - 400 "				
03	03	02	10	06	0005	61 - 100 " 0 - 600 "				
03	03	02	10	06	0006	101 - 300 " 0 - 800 "				
03	03	02	10	06	0007	301 - 600 " 0 - 1,000"				
03	03	02	10	06	0008	601 - 1,000 " 0 - 1,500"				
03	03	02	10	06	0009	1,001 and above 0 - 2,000"				

Descriptive disaggregation

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 4

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	11	00	0000	GROUP VALVES	1	2	3	4
03	03	02	11	01	0000	SYSTEM APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) NOMENCLATURE				
03	03	02	11	01	1000	United States agencies				
03	03	02	11	01	2000	Subregional countries				
03	03	02	11	01	3000	Third countries				
03	03	02	11	01	4000	Owner				
03	03	02	11	01	5000	Contractor				
03	03	02	11	01	6000	Other international standards				
03	03	02	11	01 to	1100 1900	(The most important are: AISI, API-RP 550, ASA (B31.3), NEC (ASA, CI, NFPA No. 70), ASTN, AIESC (ASA C2, NBS Handbook H30).)				
03	03	02	11	01	2100	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	11	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	11	01 to	6100 6900	(Example: COPANT, ISO, etc.)				
03	03	02	11	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	11	02	0001	Mode of operation: hydrocarbons (H), water (W), steam (S), acid (H+), chemicals (C), vacuum (O)				
03	03	02	11	02	0002	Vacuum				
03	03	02	11	02	0003	Temperature (^{o}C)				
03	03	02	11	02	0004	Pressures (kg/cm^2)				
03	03	02	11	02	0005	Flow rates (m^3/h, kg/h)				
03	03	02	11	02	0006	Viscosity (Stokes factor)				
03	03	02	11	02	0007	Molecular weight (gr/mol)				

NOTES

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No (EN: 3a.2.3. and 2.4.)	PAGE 2 of 4

Descriptive disaggregation

03	03	02	11	00	0000	GROUP: VALVES	EQUIPMENT	1	2	3	4
03	03	02	11	02	0000	SYSTEM: PROCESS REQUIREMENTS	NOMENCLATURE				
03	03	02	11	02	0008	Specific gravity					
03	03	02	11	02	0009	Density (gr/cm^3)					
03	03	02	11	02	0010	Corrosion level (mm)					
03	03	02	11	02	0011	Special characteristics					
03	03	02	11	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE					
03	03	02	11	03	0001	Type (gate, globe, angle, plug, non-return, pressure-relief)					
03	03	02	11	03	0002	Rated temperature (^oC)					
03	03	02	11	03	0003	Rated pressure (kg/cm^2)					
03	03	02	11	03	0004	Corrosion tolerance (ANSI B16.10) (mm)					
03	03	02	11	03	0005	Dimensions (mm)					
03	03	02	11	03	0006	Flanges: type and rank					
03	03	02	11	03	0007	Type of joint (welded, threaded, flanged)					
03	03	02	11	03	0008	Test pressures (kg/cm^2)					
03	03	02	11	03	0009	Rank (125, 150, 300, 400, 900, 1500, 2000 lb)					
03	03	02	11	03	0010	Packing (compressed asbestos, metallic, etc.)					
03	03	02	11	03	0011	Seat (type, material)					
03	03	02	11	03	0012	Rod (type, material)					
03	03	02	11	03	0013	Manufacturing tolerance (mm)					
03	03	02	11	03	0014	Abrasiveness					
03	03	02	11	04	0000	SYSTEM: ACCESSORIES (EN: 3b.3.2.4.2.)					
03	03	02	11	04	0001	Lubrication attachment					
03	03	02	11	04	0002	Drive system (manual, motor, reducer)					
03	03	02	11	04	0003	Flange: type, rank, dimensions, ANSI No.					
03	03	02	11	04	0004	Special accessories					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No (EN: 3a.2.3. and 2.4.)	PAGE 3 of 4

Descriptive disaggregation

03	03	02	00	00	0000	GROUP: VALVES	EQUIPMENT	1	2	3	4
03	03	02	11	05	0000	SYSTEM: PRINCIPAL MATERIALS USED	NOMENCLATURE				
03	03	02	11	05	0001	Steel, carbon, cast					
03	03	02	11	05	0002	Steel, carbon, forged					
03	03	02	11	05	0003	Steel, stainless (5% Cr - 1/2% Mo)					
03	03	02	11	05	0004	Steel, stainless austenitic (Cr-Ni)					
03	03	02	11	05	0005	Steel, 13% Cr					
03	03	02	11	05	0006	Steel, 17% Cr					
03	03	02	11	05	0007	Iron, cast					
03	03	02	11	05	0008	Iron, malleable					
03	03	02	11	05	0009	Iron, forged					
03	03	02	11	05	0010	Bronze					
03	03	02	11	05	0011	Teflon					
03	03	02	11	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)					
						Type:					
03	03	02	11	06	1000	Gate					
03	03	02	11	06	2000	Globe					
03	03	02	11	06	3000	Angle					
03	03	02	11	06	4000	Plug					
03	03	02	11	06	5000	Non-return					
03	03	02	11	06	6000	Pressure-relief					
03	03	02	11	06	7000	Safety					
03	03	02	11	06	8000	Ball-check					

NAME OF PROJECT:	BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	REV. No (EN: 3a.2.3. and 2.4.)	PAGE .4 of .4.

Descriptive disaggregation

						EQUIPMENT	1	2	3	4
03	03	02	11	00	0000	GROUP: VALVES				
03	03	02	11	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.) / NOMENCLATURE				
						Diameter:				
03	03	02	11	06	0100	6 mm				
03	03	02	11	06	0200	28 mm				
03	03	02	11	06	0300	51 - 152 mm				
03	03	02	11	06	0400	203 - 305 mm				
03	03	02	11	06	0500	356 - 508 mm				
03	03	02	11	06	0600	610 - 762 mm				
03	03	02	11	06	0700	914 mm				
03	03	02	11	06	0800	914 mm and above				
						Rank:				
03	03	02	11	06	0010	125 lb				
03	03	02	11	06	0020	150 lb				
03	03	02	11	06	0030	300 lb				
03	03	02	11	06	0040	400 lb				
03	03	02	11	06	0050	900 lb				
03	03	02	11	06	0060	1500 lb				
03	03	02	11	06	0070	2000 lb				
						Housing material:				
03	03	02	11	06	0001	Iron, cast				
03	03	02	11	06	0002	Steel, cast				
03	03	02	11	06	0003	Steel, forged				
03	03	02	11	06	0004	Steel, special				
03	03	02	11	06	0005	Bronze				
03	03	02	11	06	0006	Aluminium				
03	03	02	11	06	0007	Others				

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE ...1... OF ....3...

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	12	00	0000	GROUP METAL STRUCTURES AND DUCTS (for thin walls)	1	2	3	4
03	03	02	12	01	0000	SYSTEM APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.2.) NOMENCLATURE				
03	03	02	12	01	1000	United States agencies				
03	03	02	12	01	2000	Subregional countries				
03	03	02	12	01	3000	Third countries				
03	03	02	12	01	4000	Owner				
03	03	02	12	01	5000	Contractor				
03	03	02	12	01	6000	Other international standards				
03	03	02	12	01	1100 to 1900	(The most important are: AISI, API-RP 550, ISA B31.3, NEC (ASA, CI, NFPA No. 70).)				
03	03	02	12	01	2100 to 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	12	01	3100 to 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	12	01	6100 to 6900	(Example: ISO, COPANT, etc.)				
03	03	02	12	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	12	02	0001	Type of service (walkways, equipment foundations)				
03	03	02	12	02	0002	Environmental conditions				
03	03	02	12	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE				
03	03	02	12	03	0001	Deadweight and live load (kg)				
03	03	02	12	03	0002	Dimensions (mm)				
03	03	02	12	03	0003	Weight (kg)				
03	03	02	12	03	0004	Environmental conditions				

NOTES

NAME OF PROJECT:	NAME OF STAGE	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 2 of 3

Descriptive disaggregation

03	03	02	12	00	0000	GROUP: METAL STRUCTURES AND DUCTS (for thin walls)	EQUIPMENT	1	2	3	4
03	03	02	12	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE	NOMENCLATURE				
03	03	02	12	03	0005	Corrosion tolerance (mm)					
03	03	02	12	03	0006	Wind and seismic factor					
03	03	02	12	03	0007	Foundation weight (kg)					
03	03	02	12	03	0008	Structural weight (kg)					
03	03	02	12	03	0009	Assembly type					
03	03	02	12	03	0010	Impact					
03	03	02	12	03	0011	Rigidity (AISC)					
03	03	02	12	03	0012	Fire protection					
03	03	02	12	04	0000	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)					
03	03	02	12	04	0001	Bolts and nuts					
03	03	02	12	04	0002	Welding					
03	03	02	12	04	0003	Rivets					
03	03	02	12	05	0000	SYSTEM: PRINCIPAL MATERIALS USED					
03	03	02	12	05	0001	Iron					
03	03	02	12	05	0002	Steel, carbon					
03	03	02	12	05	0003	Steel, forged					
03	03	02	12	05	0004	Steels, special					
03	03	02	12	05	0005	Steels, stainless					
03	03	02	12	05	0006	Special alloys					
03	03	02	12	05	0007	Non-ferrous metals					
03	03	02	12	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)					
						Type:					
03	03	02	12	06	1000	Miscellaneous (on site)					
03	03	02	12	06	2000	Miscellaneous (in the workshop)					

NAME OF PROJECT:	NAME OF STAGE	REV. No. (EN: 3a.2.3. and 2.4)	PAGE 3 of 3.

Descriptive disaggregation

03	03	02	12	00	0000	GROUP: METAL STRUCTURES AND DUCTS (for thin walls)	EQUIPMENT	1	2	3	4
03	03	02	12	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)	NOMENCLATURE				
03	03	02	12	06	3000	Platforms					
03	03	02	12	06	4000	Plant structures					
03	03	02	12	06	5000	Buildings					
						Weight (1):					
03	03	02	12	06	0010	0 - 0.1 tonnes					
03	03	02	12	06	0020	0.1 - 0.5 tonnes					
03	03	02	12	06	0030	0.5 - 1.0 tonnes					
03	03	02	12	06	0040	1.1 - 2.0 tonnes					
03	03	02	12	06	0050	2.1 - 5.0 tonnes					
03	03	02	12	06	0060	5.1 - 10.0 tonnes					
03	03	02	12	06	0070	11.0 - 20.0 tonnes					
03	03	02	12	06	0080	21.0 tonnes and above					

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3a.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1 OF 5

Descriptive disaggregation

Code						BASIC COMPONENT: EQUIPMENT (EN: 3b.3.2.)	Equipment:			
03	03	02	00	00	0000					
03	03	02	13	00	0000	GROUP: MISCELLANEOUS VESSELS	1	2	3	4
03	03	02	13	01	0000	SYSTEM: APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	13	01	1000	United States agencies				
03	03	02	13	01	2000	Subregional countries				
03	03	02	13	01	3000	Third countries				
03	03	02	13	01	4000	Owner				
03	03	02	13	01	5000	Contractor				
03	03	02	13	01	6000	Other international standards				
03	03	02	13	01 to 01	1100 to 1900	(The most important are: ASME, ASTM, etc.)				
03	03	02	13	01 to 01	2100 to 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	13	01 to 01	3100 to 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	13	01 to 01	6100 to 6900	(Example: ISO, COPANT, etc.)				
03	03	02	13	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	13	02	0001	Type of equipment: cyclones (C), separators (S), hoppers (H), filters (F)			...	..
03	03	02	13	02	0002	Quantity				
03	03	02	13	02	0003	Mode of operation: hydrocarbons (H), steam (V), water (H_2O), air (A), chemicals (C), gases (G)				
03	03	02	13	02	0004	Temperature (^oC)				
03	03	02	13	02	0005	Pressure (kg/cm^2)				
03	03	02	13	02	0006	Flow rates (m^3/h, kg/h)				

NOTES

NAME OF PROJECT:	NAME OF STAGE	REV. No(EN: 3a, 2.3, and 2.4)	PAGE 2. of 5.

Descriptive disaggregation

							EQUIPMENT	1	2	3	4
03	03	02	13	00	0000	GROUP: MISCELLANEOUS VESSELS					
03	03	02	13	02	0000	SYSTEM: PROCESS REQUIREMENTS	NOMENCLATURE				
03	03	02	13	02	0007	Separation efficiency					
03	03	02	13	02	0008	Specific gravity					
03	03	02	13	02	0009	Density (gr/cm^3)					
03	03	02	13	02	0010	Mol-cular weight (gr/mol)					
03	03	02	13	02	0011	Viscosity (Stokes factor)					
03	03	02	13	02	0012	Corrosion index (mm)					
03	03	02	13	02	0013	Chemical composition (%)					
03	03	02	13	02	0014	Impurity content (%)					
03	03	02	13	02	0015	Storage quantity (m^3, tonnes)					
03	03	02	13	02	0016	Special characteristics					
03	03	02	13	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION					
03	03	02	13	03	0001	Type of equipment					
03	03	02	13	03	0002	Rated temperature (°C)					
03	03	02	13	03	0003	Rated pressure (kg/cm^2)					
03	03	02	13	03	0004	Design flow rates (m^3/h, kg/h)					
03	03	02	13	03	0005	Permissable velocity (m/sec)					
03	03	02	13	03	0006	Separation efficiency (rated) (%)					
03	03	02	13	03	0007	Corrosion tolerance (mm)					
03	03	02	13	03	0008	Manufacturing tolerances (mm)					
03	03	02	13	03	0009	Dimensions (mm)					
03	03	02	13	03	0010	Plate thickness (mm)					
03	03	02	13	03	0011	Weight (kg)					
03	03	02	13	03	0012	Test pressure (kg/cm^2)					
03	03	02	13	03	0013	Internal lining (thickness, material, area)					
03	03	02	13	03	0014	Inspection manholes (number, dimensions)					

NAME OF PROJECT:	NAME OF STAGE	REV. No. (EN: 3b.2.3. and 2.4.)	PAGE 3. of 5.

Descriptive disaggregation

						GROUP: MISCELLANEOUS VESSELS / EQUIPMENT	1	2	3	4
03	03	02	13	00	0000					
03	03	02	13	03	0000	SYSTEM: CONDITIONS OF DESIGN, MANUFACTURE AND INSTALLATION / NOMENCLATURE				
03	03	02	13	03	0015	Flanges: size, rank, type (ANSI)				
03	03	02	13	03	0016	Inspection tests (destructive and/or non-destructive)				
03	03	02	13	03	0017	Abrasiveness				
03	03	02	13	04	0000	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)				
03	03	02	13	04	0001	Pressure-relief valve (type, size, material)				
03	03	02	13	04	0002	Internal tubing (size, material, thickness)				
03	03	02	13	04	0003	Internal mesh (dimensions, material)				
03	03	02	13	04	0004	Venting devices (dimensions, material, type)				
03	03	02	13	04	0005	Drainage devices (dimensions, material, type)				
03	03	02	13	04	0006	Instruments (gauges for indicating temperature, pressure, level, etc.)				
03	03	02	13	04	0007	Stairs (dimensions, material)				
03	03	02	13	04	0008	Platforms (dimensions, material)				
03	03	02	13	04	0009	Rivets (dimensions materials)				
03	03	02	13	04	0010	Bolts (dimensions, material)				
03	03	02	13	04	0011	Packing glands (dimensions, material, rank)				
03	03	02	13	04	0012	Insulation (type, material, area)				
03	03	02	13	05	0000	SYSTEM: PRINCIPAL MATERIALS USED (Indicate in the columns the part of the equipment to which the material pertains.)				
03	03	02	13	05	0001	Steel, carbon, forged				
03	03	02	13	05	0002	Steel, carbon, cast				
03	03	02	13	05	0003	Steel, carbon - 1/2% Mo				
03	03	02	13	05	0004	Steel, 1% Cr - 1/2% Mo				
03	03	02	13	05	0005	Steel, 1 1/4% Cr - 1/2% Mo				
03	03	02	13	05	0006	Steel, 2 1/4% Cr - 1% Mo				
03	03	02	13	05	0007	Steel, 3% Cr - 1% Mo				

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Descriptive disaggregation

03	03	02	13	00	0000	GROUP: MISCELLANEOUS VESSELS	EQUIPMENT	1	2	3	4
03	03	02	13	05	0000	SYSTEM: PRINCIPAL MATERIALS USED	NOMENCLATURE				
03	03	02	13	05	0008	Steel, 5% Cr - 1/2% Mo					
03	03	02	13	05	0009	Steels, stainless ferrite					
03	03	02	13	05	0010	Steels, stainless austenitic					
03	03	02	13	05	0011	Iron, cast					
03	03	02	13	05	0012	Iron, forged					
03	03	02	13	05	0013	Plastics (teflon)					
03	03	02	13	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)					
						Type of equipment:					
03	03	02	13	06	1000	Cyclones					
03	03	02	13	06	2000	Separators					
03	03	02	13	06	3000	Hoppers					
03	03	02	13	06	4000	Filters					
03	03	02	13	06	5000	Special					
						Plate thickness:					
03	03	02	13	06	0100	0 - 6 mm					
03	03	02	13	06	0200	6 - 16 mm					
03	03	02	13	06	0300	16 - 25 mm					
03	03	02	13	06	0400	25 - 38 mm					
03	03	02	13	06	0500	38 - 64 mm					
03	03	02	13	06	0600	64 mm and above					
						Material:					
03	03	02	13	06	0010	Steel, carbon					
03	03	02	13	06	0020	Steels (Cr-Mo alloys)					
03	03	02	13	06	0030	Steels, stainless ferrite					
03	03	02	13	06	0040	Steels, stainless austenitic					

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Descriptive disaggregation

03	03	02	13	00	0000	GROUP: MISCELLANEOUS VESSELS	EQUIPMENT	1	2	3	4
03	03	02	13	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)	NOMENCLATURE				
03	03	02	13	06	0050	Iron, forged					
03	03	02	13	06	0060	Iron, cast					
						Weight:					
03	03	02	13	06	0001	0 - 0.5 tonnes					
03	03	02	13	06	0002	0.51 - 1.0 tonnes					
03	03	02	13	06	0003	1.1 - 2.0 tonnes					
03	03	02	13	06	0004	2.1 - 5.0 tonnes					
03	03	02	13	06	0005	5.1 tonnes and above					

REV. No. (EN: 3a.2.3. and 2.4.)	DATE Start ..... End	NAME OF PROJECT:	PROJECT CODE	UNDER STUDY ☐ UNDER WAY ☐ COMPLETED ☐ (EN: 3.2.2.)	OFFICE OR DEPT. RESPONSIBLE	PAGE 1..... OF ..10.....

Code						BASIC COMPONENT:	Equipment: (EN: 3b.3.2.5.)			
03	03	02	00	00	0000	EQUIPMENT (EN: 3b.3.2.)				
03	03	02	14	00	0000	GROUP MISCELLANEOUS EQUIPMENT	1	2	3	4
03	03	02	14	01	0000	SYSTEM APPLICABLE CODES, NORMS AND STANDARDS (EN: 3b.3.2.3.) / NOMENCLATURE				
03	03	02	14	01	1000	United States agencies				
03	03	02	14	01	2000	Subregional countries				
03	03	02	14	01	3000	Third countries				
03	03	02	14	01	4000	Owner				
03	03	02	14	01	5000	Contractor				
03	03	02	14	01	6000	Other international standards				
03	03	02	14	01 to	1100 1900	(The most important are: ASTM, AISI, ANSI, AWS, ASHAE, ASA, NEMA, NEC, NEPA, IEEE, NESC, NIEE, ULS, API, and IPCEA)				
03	03	02	14	01 to	2100 2900	(The corresponding abbreviations are: NB (Bolivia), INCONTEC (Colombia), INEN (Ecuador), ITINTEC (Peru), COVENIN (Venezuela).)				
03	03	02	14	01 to	3100 3900	(The most well known in industrial circles are: AFNOR, DIN, UNI, JISC, BSI, AMSI, GOST, etc.)				
03	03	02	14	01 to	6100 6900	(Example: ISO, COPANT, etc.)				
03	03	02	14	02	0000	SYSTEM: PROCESS REQUIREMENTS				
03	03	02	14	02	0100	Type of equipment (Example: screens and sieves, centrifuges, blowers and fans, extruders, packaging and sealing devices, mixers, decanters, weighing devices, driers, screw feeders, batchers, agitators, ejectors, grinding mills, climate conditioners, rollers (calenders), belt conveyors, miscellaneous conveyors, burners, cranes, filters, related accessories and equipment, etc.)				
03	03	02	14	02	0001	Quantity				
03	03	02	14	02	0002	Mode of operation				

NOTES

Descriptive disaggregation

NAME OF PROJECT:	NAME OF STAGE:	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE .2. of 10.

						GROUP: MISCELLANEOUS EQUIPMENT / EQUIPMENT	1	2	3	4
03	03	02	14	00	0000	SYSTEM: PROCESS REQUIREMENTS / NOMENCLATURE				
03	03	02	14	02	0003	Temperature (°C)				
03	03	02	14	02	0004	Pressures (kg/cm^2)				
03	03	02	14	02	0005	Flow rates (m^3/sec)				
03	03	02	14	02	0006	Power (kVA/bhp)				
03	03	02	14	02	0007	Voltage (V)				
03	03	02	14	02	0008	Density (gr/cm^3)				
03	03	02	14	02	0009	Viscosity (Stokes factor)				
03	03	02	14	02	0010	Molecular weight				
03	03	02	14	02	0011	Steam pressure (kg/cm^2)				
03	03	02	14	02	0012	Chemical composition				
03	03	02	14	02	0013	Caloric value (kcal/m^3)				
03	03	02	14	02	0014	Environmental conditions				
03	03	02	14	02	0015	Corrosion index				
03	03	02	14	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE				
03	03	02	14	03	0100	Screens and sieves				
03	03	02	14	03	0200	Centrifuges				
03	03	02	14	03	0210	Types (vibratory, rotary, etc.)				
03	03	02	14	03	0220	Size of particles to be separated				
03	03	02	14	03	0230	Capacity (kg/h)				
03	03	02	14	03	0240	Power (kVA)				
03	03	02	14	03	0250	Voltage (V)				
03	03	02	14	03	0300	Blowers and fans				
03	03	02	14	03	0310	Type (axial-axial, axial-radial, etc.)				
03	03	02	14	03	0320	Pressures (kg/cm^2)				
03	03	02	14	03	0330	Capacity (m^3/h)				

NAME OF PROJECT:	NAME OF STAGE:	REV. No(EN 3a, 2, 3 and 2.4)	PAGE 3 of 10.

Descriptive disaggregation

						GROUP: MISCELLANEOUS EQUIPMENT / EQUIPMENT	1	2	3	4
03	03	02	14	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE / NOMENCLATURE				
03	03	02	14	03	0340	Power (kVA)				
03	03	02	14	03	0350	Voltage (V)				
03	03	02	14	03	0360	Abrasiveness				
03	03	02	14	03	0400	Extruders				
03	03	02	14	03	0410	Type (screw, piston, etc.)				
03	03	02	14	03	0420	Temperature (°C)				
03	03	02	14	03	0430	Pressures (kg/cm^2)				
03	03	02	14	03	0440	Flow rates (m^3/sec)				
03	03	02	14	03	0450	Power (kW/bhp)				
03	03	02	14	03	0460	Voltage (V)				
03	03	02	14	03	0470	Abrasiveness				
03	03	02	14	03	0500	Packaging and sealing devices				
03	03	02	14	03	0510	Type (paper bags, polyethylene, etc.)				
03	03	02	14	03	0520	Products to be packaged				
03	03	02	14	03	0530	Pressures (kg/cm^2)				
03	03	02	14	03	0540	Temperatures (°C)				
03	03	02	14	03	0550	Flow rates (m^3/sec)				
03	03	02	14	03	0560	Units (u/min)				
03	03	02	14	03	0570	Power (kVA)				
03	03	02	14	03	0580	Voltage (V)				
03	03	02	14	03	0590	Capacity (m^3 or kg/unit)				
03	03	02	14	03	0600	Mixers				
03	03	02	14	03	0610	Type (blade, rotary, etc.)				
03	03	02	14	03	0620	Products to be mixed				

NAME OF PROJECT:	NAME OF STAGE:	REV. No. (EN: 3a.2.3. and 2.4.)	PAGE 4. of 10.

						GROUP: MISCELLANEOUS EQUIPMENT / SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE	EQUIPMENT NOMENCLATURE	1	2	3	4
03	03	02	14	00	0000						
03	03	02	14	03	0000						
03	03	02	14	03	0630	Pressures (kg/cm^2)					
03	03	02	14	03	0640	Temperatures (°C)					
03	03	02	14	03	0650	Flow rates (m^3/sec)					
03	03	02	14	03	0660	Capacity (m^3 or kg/charge)					
03	03	02	14	03	0670	Abrasiveness					
03	03	02	14	03	0700	<u>Decanters</u>					
03	03	02	14	03	0710	Type (electrostatic or gravity-type, in metallic or concrete vessels, etc.)					
03	03	02	14	03	0720	Products to be separated					
03	03	02	14	03	0730	Pressures (kg/cm^2)					
03	03	02	14	03	0740	Dimensions (mm)					
03	03	02	14	03	0750	Temperatures (°C)					
03	03	02	14	03	0760	Flow rates (m^3/sec)					
03	03	02	14	03	0770	Vessel capacity (m^3)					
03	03	02	14	03	0780	Abrasiveness					
03	03	02	14	03	0800	<u>Weighing devices</u>					
03	03	02	14	03	0810	Type (motor-driven)					
03	03	02	14	03	0820	Product to be weighed					
03	03	02	14	03	0830	Pressures (kg/cm^2)					
03	03	02	14	03	0840	Temperatures (°C)					
03	03	02	14	03	0850	Flow rates (m^3/sec)					
03	03	02	14	03	0860	Weight (kg)					
03	03	02	14	03	0870	Volume (m^3)					

Descriptive disaggregation

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Descriptive disaggregation

						GROUP: MISCELLANEOUS EQUIPMENT / EQUIPMENT	1	2	3	4
03	03	02	14	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE / NOMENCLATURE				
03	03	02	14	03	0900	Driers				
03	03	02	14	03	0910	Type (scaler)				
03	03	02	14	03	0920	Products				
03	03	02	14	03	0930	Temperatures (°C)				
03	03	02	14	03	0940	Flow rates (m^3/sec)				
03	03	02	14	03	0950	Power (kVA)				
03	03	02	14	03	0960	Voltage (V)				
03	03	02	14	03	0970	Velocities (rpm)				
03	03	02	14	03	0980	Abrasiveness				
03	03	02	14	03	1000	Screw feeders				
03	03	02	14	03	1010	Type				
03	03	02	14	03	1020	Product				
03	03	02	14	03	1030	Temperatures (°C)				
03	03	02	14	03	1040	Pressures (kg/cm^2)				
03	03	02	14	03	1050	Flow rates (m^3/sec)				
03	03	02	14	03	1060	Power (kVA)				
03	03	02	14	03	1070	Voltage (V)				
03	03	02	14	03	1080	Velocities (rpm)				
03	03	02	14	03	1090	Dimensions (mm)				
03	03	02	14	03	1100	Abrasiveness				
03	03	02	14	03	1100	Batchers				
03	03	02	14	03	1110	Type (injection, vibratory, belt, etc.)				
03	03	02	14	03	1120	Products				
03	03	02	14	03	1130	Temperatures (°C)				

NAME OF PROJECT:	NAME OF STAGE:	REV. No. (IN: 3a.2.3. and 2.4.)	PAGE 6. of 10.

Descriptive disaggregation

						GROUP: MISCELLANEOUS EQUIPMENT / EQUIPMENT	1	2	3	4
03	03	02	14	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE / NOMENCLATURE				
03	03	02	14	03	1140	Pressures (kg/cm^2)				
03	03	02	14	03	1150	Flow rates (m^3/sec)				
03	03	02	14	03	1160	Power (kVA/bhp)				
03	03	02	14	03	1170	Voltage (V)				
03	03	02	14	03	1180	Velocities (rpm)				
03	03	02	14	03	1190	Abrasiveness				
03	03	02	14	03	1200	<u>Agitators</u>				
03	03	02	14	03	1210	Type (fixed, removable, etc.)				
03	03	02	14	03	1220	Products				
03	03	02	14	03	1230	Temperatures (°C)				
03	03	02	14	03	1240	Pressures (kg/cm^2)				
03	03	02	14	03	1250	Flow rates (m^3/sec)				
03	03	02	14	03	1260	Power (kVA)				
03	03	02	14	03	1270	Voltage (V)				
03	03	02	14	03	1280	Velocities (rpm)				
03	03	02	14	03	1290	Corrosion				
03	03	02	14	03	1210	Abrasiveness				
03	03	02	14	03	1300	<u>Ejectors</u>				
03	03	02	14	03	1310	Type				
03	03	02	14	03	1320	Product				
03	03	02	14	03	1330	Temperatures (°C)				
03	03	02	14	03	1340	Pressures (kg/cm^2)				
03	03	02	14	03	1350	Flow rates (m^3/sec)				
03	03	02	14	03	1360	Corrosion				

NAME OF PROJECT:	NAME OF STAGE:	REV. No. (EN: 3a.2.3. add 2.4.)	PAGE 7. of 10.

Descriptive disaggregation

						GROUP: MISCELLANEOUS EQUIPMENT / EQUIPMENT	1	2	3	4
03	03	02	14	00	0000					
03	03	02	14	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE / NOMENCLATURE				
03	03	02	14	03	1370	Abrasiveness				
03	03	02	14	03	1400	<u>Grinding mills</u>				
03	03	02	14	03	1410	Type (ball, hammer, etc.)				
03	03	02	14	03	1420	Product				
03	03	02	14	03	1430	Temperature (°C)				
03	03	02	14	03	1440	Flow rate (m^3/sec)				
03	03	02	14	03	1450	Corrosion				
03	03	02	14	03	1460	Weight (kg)				
03	03	02	14	03	1470	Environmental conditions				
03	03	02	14	03	1480	Abrasiveness				
03	03	02	14	03	1500	<u>Environmental conditioners</u>				
03	03	02	14	03	1510	Type (complex, compact, sealed units, refrigeration units, etc.)				
03	03	02	14	03	1520	Temperatures (°C)				
03	03	02	14	03	1530	Pressures (kg/cm^2)				
03	03	02	14	03	1540	Power (kVA/bhp)				
03	03	02	14	03	1550	Voltage (V)				
03	03	02	14	03	1560	Environmental conditions				
03	03	02	14	03	1600	<u>Rollers (calenders)</u>				
03	03	02	14	03	1610	Type (number of rollers, heated, etc.)				
03	03	02	14	03	1620	Products				
03	03	02	14	03	1630	Temperatures (°C)				
03	03	02	14	03	1640	Pressures (kg/cm^2)				
03	03	02	14	03	1650	Flow rates (m^3/sec)				
03	03	02	14	03	1660	Power (bhp)				

NAME OF PROJECT:	NAME OF STAGE:	REV. No. (EN: 3a.2.3. and 2.4)	PAGE 8 of 10.

Descriptive disaggregation

03	03	02	14	00	0000	GROUP: MISCELLANEOUS EQUIPMENT	EQUIPMENT	1	2	3	4
03	03	02	14	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE	NOMENCLATURE				
03	03	02	14	03	1670	Voltage (V)					
03	03	02	14	03	1680	Velocities (m/sec)					
03	03	02	14	03	1690	Weight (kg)					
03	03	02	14	03	1691	Abrasiveness					
03	03	02	14	03	1700	Belt conveyors					
03	03	02	14	03	1710	Type (bearing-mounted, plate-mounted, etc.)					
03	03	02	14	03	1720	Products					
03	03	02	14	03	1730	Flow rates (m^3/sec)					
03	03	02	14	03	1740	Power (bhp)					
03	03	02	14	03	1750	Voltage (V)					
03	03	02	14	03	1760	Dimensions					
03	03	02	14	03	1770	Environmental conditions					
03	03	02	14	03	1800	Miscellaneous conveyors					
03	03	02	14	03	1810	Type (screw, bearing-mounted, etc.)					
03	03	02	14	03	1820	Products					
03	03	02	14	03	1830	Temperatures (°C)					
03	03	02	14	03	1840	Flow rates (m^3/sec)					
03	03	02	14	03	1850	Power (bhp)					
03	03	02	14	03	1860	Voltage (V)					
03	03	02	14	03	1870	Corrosion					
03	03	02	14	03	1880	Abrasiveness					
03	03	02	14	03	1900	Burners					
03	03	02	14	03	1910	Type (gas, liquids, solids)					
03	03	02	14	03	1920	Temperatures (°C)					

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Descriptive disaggregation

03	03	02	14	00	0000	GROUP: MISCELLANEOUS EQUIPMENT	EQUIPMENT	1	2	3	4
03	03	02	14	03	0000	SYSTEM: CONDITIONS OF DESIGN AND MANUFACTURE	NOMENCLATURE				
03	03	02	14	03	1930	Pressures (kg/cm^2)					
03	03	02	14	03	1940	Flow rate (m^3/sec)					
03	03	02	14	03	1950	Power (bhp)					
03	03	02	14	03	1960	Voltage (V)					
03	03	02	14	03	1970	Efficiency					
03	03	02	14	03	1980	Area classification					
03	03	02	14	03	2000	Filters					
03	03	02	14	03	2010	Type (sleeve, press, mesh)					
03	03	02	14	03	2020	Temperatures (°C)					
03	03	02	14	03	2030	Pressures (kg/cm^2)					
03	03	02	14	03	2040	Flow rate (m^3/sec)					
03	03	02	14	03	2050	Manufacturing tolerances					
03	03	02	14	03	2060	Abrasiveness					
03	03	02	14	03	2100	Cranes					
03	03	02	14	03	2110	Type (overhead-travelling, light-weight, gantry, hoist)					
03	03	02	14	03	2120	Capacity (tonnes)					
03	03	02	14	03	2130	Span (m)					
03	03	02	14	03	2140	Arm (m)					
03	03	02	14	03	2150	Turning angle					
03	03	02	14	03	2160	Travelling speeds (m/sec)					
03	03	02	14	04	0000*	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)					
03	03	02	14	04	0010	Bolts					
03	03	02	14	04	0020	Packing glands					
03	03	02	14	04	0030	Supports					

NAME OF PROJECT:	NAME OF STAGE:	REV. No. (EN: 3b.3.2.3. and 2.4.)	PAGE 20 of 20

Descriptive disaggregation

03	03	02	14	00	0000	GROUP: MISCELLANEOUS EQUIPMENT	EQUIPMENT NOMENCLATURE	1	2	3	4
03	03	02	14	04	0000*	SYSTEM: ACCESSORIES AND MINOR EQUIPMENT (EN: 3b.3.2.4.2.)					
03	03	02	14	04	0040	Drums					
03	03	02	14	04	0050	Mesh					
03	03	02	14	05	0000	SYSTEM: PRINCIPAL MATERIALS USED					
03	03	02	14	05	0010	Steel, carbon					
03	03	02	14	05	0020	Steel, C - 1/2% Mo					
03	03	02	14	05	0030	Steel, 1% Cr - 1/2% Mo					
03	03	02	14	05	0040	Steel, 1/4% Cr - 1/2% Mo					
03	03	02	14	05	0050	Steel, 2 1/4% Cr - 1% Mo					
03	03	02	14	05	0060	Steel, 2 1/2% Cr - 1% Mo					
03	03	02	14	05	0070	Steel, 5% Cr - 1/2% Mo					
03	03	02	14	05	0080	Steels, stainless ferrite					
03	03	02	14	05	0090	Steels, stainless austenitic (Cr-Ni)					
03	03	02	14	06	0000	SYSTEM: CLASSIFICATION (EN: 3b.3.2.4.1.)					
03	03	02	14	06	0100	Type of equipment:					
03	03	02	14	06	0010	0 - 1 tonne/min	0 - 20 kg/h	0 - 1 m^3/min,kg,tonne			
03	03	02	14	06	0020	1.1 - 2 tonnes/min	21 - 50 kg/h	1.1 - 3 m^3/min,kg,tonne			
03	03	02	14	06	0030	2.1 - 4 tonnes/min	51 - 100 kg/h	3.1 - 10 m^3/min,kg,tonne			
03	03	02	14	06	0040	4.1 - 8 tonnes/min	101 - 200 kg/h	11 - 30 m^3/min,kg,tonne			
03	03	02	14	06	0050	8.1 - 20 tonnes/min	201 - 500 kg/h	31 - 100 m^3/min,kg,tonne			
03	03	02	14	06	0060	21.0 - 50 tonnes/min	501 - 1000 kg/h	101 - 500 m^3/min,kg,tonne			
03	03	02	14	06	0070	51.0 - 100 tonnes/min	1001 - 2000 kg/h	501 - 2000 m^3/min,kg,tonne			
03	03	02	14	06	0080	101 - 300 tonnes/min	2001 - 5000 kg/h	2001 - 5000 m^3/min,kg,tonne			
03	03	02	14	06	0090	300 tonnes/min and above	5000 kg/h and above	5000 m^3/min,kg,tonne and above			

C. ANNEXES

ANNEX I

DEFINITIONS OF TERMS FOR THE BASIC TECHNOLOGICAL DISAGGREGATION MODEL FOR PETROCHEMICAL PROJECTS

DEFINITIONS OF TERMS FOR THE BASIC TECHNOLOGICAL DISAGGREGATION MODEL

In this annex, definitions are offered for all of the terms adopted in connection with the design of the Basic Technological Disaggregation Model as applied to petrochemical projects. The terms are discussed in the order in which they occur in the model itself.

A. Phases

Generation phase. This is the phase in which the project is formulated, analysed, and refined through a series of technical and economic studies, and which culminates with the approval (authorization) of the project in accordance with each country's particular planning system. The human resources required for the project's proper administration are determined during this phase.

Financing phase. This phase includes all the activities carried out for the purpose of securing financing for the project in the most favourable form and may, depending on the specific requirements of the project, cover all or some of the phases or merely one of them. The sources of financing may be national (state or private) and external. This phase ends with the wiping out of the financial obligations assumed.

Implementation phase. This phase refers to all the activities carried out for the purpose of implementing technologically a project which has already been authorized and financed. It is during this phase that the human resources and investments required for the execution of the project are brought together. The execution phase comes to an end with the acceptance and start-up of the plant.

Operation phase. This phase is concerned with the technical, economic, and personnel aspects of plant administration and production.

Marketing phase. This phase covers the entire range of measures necessary for marketing the products and by-products produced by the project, taking into account the principles and machinery of supply and demand.

B. Implementation phase

B.1 Stages

Stage: Studies for the implementation phase

This term refers to all those studies which because of their detailed nature and their high cost are almost always carried out when the project has already been approved and its execution authorized. Very often their purpose is to bring up to date and further refine previous studies prepared during the generation phase.

The following kinds of studies, among others, are distinguished:

> Geological and soil, seismic, meteorological (climatological), topographical, raw materials, pilot plant; national or sub-regional, technological alternatives and process evaluation, construction materials inventory; determination of the organizational framework required for the successful completion of the execution phase, etc.

In view of the scope, range, degree of specialization, and heterogeneity of the activities making up this stage, the model provides only for a very general and suggested treatment of the disaggregated sub-activities, leaving the detailed structure of each study to be prepared to the best judgment of the user in the light of his particular needs.

Stage: Choice of process technology

As its name indicates, this stage involves the use of theoretical studies and pilot testing to evaluate the previously selected processes and, on the basis of the results, to select the process embodying the engineering concept best suited to the technical-economic requirements of the owner.

Stage: Basic engineering

The activities of this stage are essentially based on the engineering concept and on process engineering. At this stage, attention is given to all the physico-chemical operations which make it possible to transform the raw material in question into the desired end products; in addition, it is the work of this stage to establish the characteristics of each one of the equipment items and other plant facilities needed to perform the required physico-chemical processes.

A significant aspect of this stage is that, as it proceeds, it generates a series of important project activities, such as detailed engineering, the purchase of equipment, and others.

Stage: Detailed engineering

This stage is concerned with the preparation of the basic specifications of the facilities comprising the plant, whereby the characteristics developed as a result of mechanical, electrical, instrumentation, civil, industrial, and other engineering studies are interpreted and rewritten in more specific language.

Stage: Purchasing services

Under this stage fall all the activities and other arrangements involved in acquiring all the equipment, machinery, and materials required for the execution of the project in keeping with the technical specifications, the best conditions of quality, and the established delivery dates and prices. These activities range from the evaluation and selection of suppliers to the actual on-site installation of the equipment and materials within the planned time-table. Because of the considerable technical effort which this stage requires, it is in some cases referred to as "purchase engineering".

Stage: Construction and assembly

Included in this stage is the construction work as such together with the assembly of the equipment and other installations which physically comprise the plant being built under the project. These are exclusively field activities, but their administration and management are of vital importance to the success of the project. Particular attention, in this context, must be given to such aspects as the preparation and monitoring of expense budgets, the meeting of schedules, the timely recruitment of the required personnel, quality control and the inspection of equipment and materials, etc.

Stage: Acceptance and start-up

This stage covers all the work connected with the placing in operation, on a continuous and fully co-ordinated basis, of all the equipment needed to perform the production processes of the plant. Acceptance refers to the activities carried out to analyse and check each of the plant's sections for

conformity with the mechanical and performance guarantees that apply in each case. This implies previous acceptance of each and every one of the equipment items from the point of view of its mechanical suitability.

B.1.1. Activities

Basic tasks. These refer to those activities which define the scope and nature of the project work and which can be carried out by the owner and/or contractor.

Technical services. These refer to all the activities in the way of advisory and technical assistance and support for the "basic tasks", the objective being to carry them out in accordance with sound engineering practices.

Technical documents. This covers all of the data, results, and standards used in support of technical activity. This documentation is usually found in the form of plans, catalogues, manuals, microfilms, publications, and the like.

Rules and procedures. By this is meant those activities which are governed by established rules or regulations (specifically adopted through the common consent of the parties to the project) for the purpose of co-ordinating actions of an administrative, technical and legal nature.

Conditions - restrictions. These refer to the clauses which define the legal, technical, commercial, and other responsibilities arising out of the agreements concluded between the owner and contractor for the successful execution of the project.

B.1.1.1. Parameters used in connection with the quantitative disaggregation procedure

Reference year. The costs which are incurred during the project's execution phase and which are taken into account as part of the quantitative disaggregation procedure are to be identified and discounted in terms of present net value, using as a reference base a year determined by the owner. As far as possible, the reference year should remain unchanged during the life of the project.

Local costs. These refer to outlays in the country in which the plant is to be located, regardless of the source of the financing.

Costs abroad. These refer to outlays made outside the country. They also include daily allowances paid to national personnel travelling abroad.

Man-hours, national. This is the measure of locally contracted work of national origin, expressed in terms of time per man.

Man-hours, foreign. This is the measure of work contracted abroad, expressed in terms of time per man.

B.2 Basic components

B.2.1. Basic component

This may be said to be the basic element of the model. Through its disaggregation an effort is made to identify both the different requirements and products, qualitatively and quantitatively, as well as the various core and peripheral operations along with the operational variables governing them.

2.1.1. Groups

Requirements group. This is the name given to the raw materials, chemical products, and other inputs used in the manufacture of the products. Industrial services are noted here as simple process demands, without defining the operational systems which comprise them.

Operations group. These refer to the physical and chemical treatments which the raw materials undergo as part of the processes. These operations are classified as core and peripheral. The first involve some sort of transformation and essentially describe the process in question, while the second complement the first. The latter are common to virtually all chemical and industrial plants, their use generally requiring no special authorization or licence.

Products group. These refer to all those products which are derived from the transformation of the raw materials as a result of a series of operations typical of chemical and industrial processing.

B.2.2. Basic component: Equipment

This component includes all the elements through which the process is carried out or conducted; in fact, it is fair to say that it is through the equipment component that the process takes place. The equipment in question may be series-produced or not, principal or auxiliary, and may include materials.

2.2.1. Groups

System: Codes, norms and standards. By analysing the equipment, it is possible to identify the standards, codes, etc. observed in their production. The model takes into account those which are most well known and most widely applied in the industrial world.

System: Process requirements. By breaking down these requirements, an effort is made to identify the most important variables which are significant in terms of the process and necessary for the design of the equipment.

System: Conditions of design, manufacture and installation. Through appropriate analysis it is possible, taking into account the conditions under which the equipment is to operate, to determine the factors with a limiting and decisive effect on its design, manufacture, and installation.

System: Accessories and minor equipment. This system includes all items other than the principal equipment, such as bolts, tubing, instruments, etc.

System: Principal materials used. The materials with which the equipment has been manufactured are specified. The model considers the materials most commonly used in the manufacture of equipment employed in the chemical industry.

System: Classification. Under this system the equipment is ranked on the basis of the specifications used for its industrial identification. This information is supplemented by that contained in the Catálogo de Fabricantes de Bienes de Capital /Catalogue of Capital Equipment Manufacturers/ published by the Board of the Cartagena Agreement.

ANNEX II

GLOSSARY OF TECHNICAL TERMS */

This glossary is included as part of the model for the sole purpose of defining the range of the principal terms which are used in the model and which may vary in meaning from one country to another. In certain cases these differences in meaning are the result of a free rendering of a technical term or phrase taken from another language. The aim of the glossary therefore is to promote a common understanding of the terminology employed.

1. Acceptance, final

This refers to the plant owner's acceptance, following verification and analysis, of the mechanical and process-related guarantees offered by the contractor, engineering firm, and/or technology seller. Final acceptance implies the prior "mechanical acceptance" of the facility and entails, in addition, the verification of the quantity, quality, and other performance characteristics of the plant and its products.

2. Acceptance, mechanical

By this term is understood the plant owner's acceptance of the fixed and movable equipment following its manufacture and installation in the plant. Mechanical acceptance is based on a careful on-site review of each of the plant's constituent sections, the comparison of design and building plans, hydraulic and performance testing, and the submission of the related technical documentation. Individual equipment and machinery units are checked and tested in a manner appropriate to their nature.

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*/ Translator's note: In this translation, the terms are listed in the same order as in the original (Spanish alphabetical order) to facilitate comparison of the language versions.

3. Agreement

This refers to a commitment or undertaking between two physical persons or companies (licenser and licensee) in the form of a set of provisions which define the extent of the work to be performed and services rendered. Agreements are normally concluded in the case of licences, patents or basic engineering services.

4. Adaptation of technology

This is the modification of a technological solution for the purpose of rendering it more efficient in the context of particular socio-economic and technical conditions (1).

5. Delegated administration

This is concerned with the arrangement, co-ordination and monitoring, on behalf of the owner, of the contracts concluded with third parties for the performance, by these parties, of activities in support of the project, such as detailed engineering, purchasing, and building supervision.

6. Assimilation of technology

This is the process by which a thorough understanding of the technology is achieved, thereby permitting, in addition to the use of the technology for production purposes, such activities as:

(a) The reproduction, adaptation, and improvement of the technology;

(b) Its extension to new areas of application or problems;

(c) Its thorough explanation and transmission to third parties;

(d) The carrying out of original developments using the technology acquired in this way (1).

The supplementary annotation (*) indicates a thorough understanding of the adapted technology on the basis of an intimate knowledge of the variables involved in the process and whatever modifications and additions may have been made to the technology as originally received (2).

7. Technical assistance

This is activity specifically intended to help enterprises deal with their technical problems through advisory services, training, and support.

8. Changes in the scope of the project

These refer to written adjustments or modifications which, by common consent, are introduced into a project by persons acting under the authority of the owner and contractor.

9. Purchases, dispatching, shipments, etc.

These activities are closely connected with the project's "detailed engineering". When contracts for these activities are awarded, the contractor, acting on behalf of the owner, selects supplier firms, asks for price quotations, analyses them from the economic and technical standpoint, and together with the owner determines the best seller, following which he enters into direct negotiations with the suppliers. Other responsibilities normally included in such contracts have to do with the arrangements for the shipping, transport, and reception of materials and equipment.

10. Grantor (licenser)

Person or company who (which) markets or supplies technology on the basis of a contract to provide know-how, a process licensing arrangement, or through technical assistance (2).

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* As a means of filling out the notion of the technical term being defined, additional concepts are included as complementary elements.

11. Licensee

The person or company receiving the technology on the basis of a contract.

12. Hydraulic system test

The checking out of the hydraulic conditions and/or performance of pipe systems, pumps, turbines, etc., in accordance with the detailed engineering calculations. In some cases this verification process is part of the start-up procedure.

13. Non-patented know-how

This is most often defined as the professional knowledge, experience, and skills required for the production of one or more products; the definition is also considered to include all of a person's or organizations non-patentable knowledge and experience regarding all or any one of the elements comprising a production system. Know-how basically refers to documentation in the form of specific design techniques, formulae and correlations, plans, and manuals. "Since it is not patented, know-how is included in contracts as a means of providing some legal protection. This form of technology is widely employed, among other things, for plant operation and the basic design of auxiliary services" (2).

14. Technical advisory services

Studies perpared by experts in specialized areas.

15. Contractor

The person or company with whom (which) the owner concludes an agreement for the acquisition of goods or services.

16. Turn-key contract

In this kind of contract the technology supplier carries out the full range of technical and administrative operations necessary to establish the enterprise, handing over its direction, in perfect operating condition, to the owner as soon as the latter has acquired the competence to assume the management of the enterprise.

17. Copying of technology

The reproduction, without change, of an already existing technology, process, or product (1).

18. Trial run

Tests conducted after the facility has begun operation, designed to ensure that the process-related guarantees regarding capacity, efficiency, and the quality of the finished products have been met.

19. Cost of technology

This is the cost given in the documentation and does not represent, in the majority of cases, the total cost paid during the transactions. Félix Moreno P. (3) distinguishes between the explicit and implicit cost of technology, defining the implicit cost as "the cost which is disguised and hidden when technology is purchased ... over-billing under the contract for machinery and raw materials is one such implicit cost ...".

20. Estimated equipment cost

The quantification of the total value of the equipment items installed at the work site.

21. Creation of technology

The achievement of an original solution to a problem involving the production of goods or the provision of services (1).

22. Demand for technology

Market factors in the form of requests and needs, such as process licences, technical assistance, advisory services, training, etc., for work on a project (1).

23. Technological disaggregation

Breakdown of the technology employed in the production of a good or the provision of a service, or of the implementation process of a project from its inception to its completion, into its component parts and stages, whereby "core" technologies are distinguished from "peripheral" technologies, the purpose being to improve the negotiating position of the parties acquiring the technology, to generate demand for national and subregional goods and services, to promote the assimilation process, and to contribute to the planning process (1).

Supplementary element: Implies the identification of each of the factors (scientific, technical, economic, and administrative) which play a part in the understanding of a production facility.

24. Experimental evelopment

Activity undertaken for the purpose of using the results obtained in basic and applied research, as well as empirical knowledge, towards the end of introducing new materials, processes, methods, products, devices, equipment, and operational systems or of improving already existing ones (3).

25. Manufacturer

The person who produces capital or consumer goods, or who processes the latter.

26. Generation of technology

The introduction, for its production use in a member country, of technological know-how previously not available in that country, through either the copying, adaptation, or creation of technology (1).

27. Engineering: basic, conceptual, process and detailed engineering (2)

In the preparation of contracts considerable importance should be attached to the meanings of the concepts presented with the aim of defining them and breaking them down as effectively as possible. To these activities in the field of engineering and design there correspond clear-cut stages in the execution of a project. Accordingly, they may be easily quantified in terms both of national and foreign currency and also the number of man-hours expended on them by an engineering consultancy firm. The basic engineering of a project essentially includes both "conceptual" and process engineering. It is obvious that these last two forms of engineering share a common denominator of being basic in that they make possible progress in the remaining areas of a project; namely, detailed engineering, the purchase of equipment, their assembly and installation, and finally the actual start-up of the facility, in line with the production objective that has been set.

Conceptual engineering: objectives

"Defines the group of physico-chemical operations which make it possible to achieve the objective of transforming the raw material into the desired products." It also identifies the liquid and gaseous flows

which make up this group, and quantifies their mass and thermal changes. Similarly:

(a) It determines and confirms the basic design;

(b) It determines and confirms the conditions and characteristics of the soil in the area where the plant is to be erected;

(c) It determines and confirms the safety factors which are to be observed;

(d) It selects the alternative combinations of raw materials;

(e) It selects the alternative combinations of plants and processes;

(f) It establishes the type of process macro-units, selecting and defining the operational layout;

(g) It is involved in the setting up of pilot-plant installations, the carrying out of field tests, and the preparation of laboratory analyses. Its specific products include, among others:

1. The materials and thermal balance of a process;

2. The thermodynamic and empiric correlations, equations, and factors which underly the determination of the dimensions of equipment (e.g., the enthalpy-temperature correlations of a liquid flow);

3. It is occasionally concerned with more fundamental (essential) products; for example, the indication of the quantitative, kinetic behaviour of a chemical reaction when selecting the dimensions of a reactor.

Process engineering: objectives

"Establishes the characteristics of each and every one of the equipment items and facilities of a plant required for the performance of the physico-chemical operations."

The following are among the products of process engineering:

(a) Acquisition of information pertinent to the design of the process;

(b) Specification of raw materials, finished products, and by-products, including their commercial characteristics;

(c) Specification of the auxiliary chemical products required by the process, and also the catalysts and intermediate products;

(d) Design of methods for the elimination of noise;

(e) Description of the interrelationships between different processing units;

(f) Design and dimensioning of the basic equipment units comprising a process system (e.g., furnaces, reactors, vessels, heat-exchangers, etc.);

(g) Determination of the personnel required for the operation of the plant;

(h) Determination of the kinds of control systems and the extent of their automation;

(i) Determination of the laboratory techniques and analyses to be used with raw materials, products of the process, and intermediate products;

(j) Determination, in the light of the particular features of the process, of the safety requirements for personnel and equipment;

(k) Identification of the sources of pollution in the process, and their treatment;

(l) Establishment of operational guidelines, containing a description of the process and its variables, emergency procedures, and procedures for the normal starting and stopping of the unit, to serve as a basis for the preparation in final form, during the "detailed engineering" phase, of the plant operating manuals.

The tools used in process engineering are the following:

1. Block diagram

Block diagrams show the interrelationships between the process macro-units and their principal load and product flows. Occasionally these diagrams also illustrate the basic physico-chemical operations that occur within a particular process unit. They are normally used in integrated production complexes, such as refineries and petrochemical plants. Example: annex III.

2. Flag diagram (operational)

This kind of diagram represents the basic behaviour of the main liquid and gaseous flows within the plant. The flag indicates the numerical value of the flow, the temperature, pressure, or any other important parameter. Flag diagrams are used to record operating conditions in special field tests.

3. Process flow diagram

The process flow diagram presents figures already determined by the principal designer of the process or associated with the contractual guarantees covering the process. It may also give alternative figures for two or more modes of operation (e.g., a higher and lower density level or a more and less thermally demanding operation). The process flow diagram differs from the flag diagram only in operational terms.

4. Tubing and instrumentation diagram

This diagram provides a graphic representation of the principal and secondary process flows associated with the equipment units comprising the plant. Among other things, this diagram:

- Indicates in detail the associated instrumentation;
- Indicates the shut position of the control valves in the event of a malfunction involving the working medium;
- Indicates the insulation requirements for vessels, piping,and other equipment items;
- Identifies the equipment units in alphanumeric form;
- Indicates the diameter and calibre of tubing, valves, and accessories along with their material and any special installation requirements (e.g., minimum required distances);
- Presents operational danger signals;
- Indicates the tubing and equipment used in start-up, shut-down, and emergency procedures.

The purpose of the tubing and instrumentation diagram is to present a graphic view of the elements comprising the process engineering of a plant.

5. Equipment layout diagram

This kind of diagram, which is in effect a floor-plan of the plant, indicates the relative position of the equipment units, the distances and differences in level between them, and the space available for equipment maintenance. In addition, it shows the disposition of the work benches, the pipe runs, and the location of the safety and fire-prevention equipment.

Detailed engineering

The task of detailed engineering is to work up the basic specifications of the elements comprising a plant and to interpret and restate in more specific language the characteristics which are the concern of mechanical, electrical, instrumentation, civil, and industrial engineering. In turn, each of these special areas has the following role within the over-all context of detailed engineering.

(a) Mechanical engineering

- Determines critical flow levels and overload (pressure and temperature) effects;
- Describes the safety features required and specifies in detail (for their purchase) the fire-prevention systems;
- Specifies, on the basis of a service balance-sheet, the consumption and production of basic services in accordance with the equipment to be installed, which it also specifies; shares responsibility for guaranteeing basic services;
- Confirms the basic metallurgical characteristics of the equipment, proposing alternative metallurgical techniques when required; ditto for instrumentation;

- Specifies the internal coatings required to combat corrosion;

- Is substantially involved in the design and dimensioning of all the pipe systems, valves, and instruments of the plant.

(b) Electrical engineering

- Specifies the operating and safety conditions of the electrical equipment;

- Sets the normal and maximum electrical loads and, accordingly, the power to be installed;

- Specifies the power systems for lighting, control, and critical operations.

(c) Instrumentation engineering

- Verifies and determines the operating conditions of the instruments;

- Specifies the characteristics of the instruments to be installed (reset, proportional, pneumatic, electronic, etc.);

- Designs and calculates valves and sensors;

- Specifies the characteristics of cut-off valves (manual and automatic) along with the location of alarm systems;

- Advises on the location of instruments on equipment units or control panels (2).

(d) Civil engineering

- Prepares the preliminary plan for the general location and distribution of the plants, including roads and social infrastructure;

- Determines the acceptable factors of differential settling (subsidence);

- Describes equipment and structures subject to vibration, buckling or special stresses;

- Specifies the hydraulics of the auxiliary services and also drains, sewer systems, and industrial services (2).

28. Research, applied

Activities designed to add to scientific and technical knowledge and directed towards a specific practical end (3).

29. Research, basic (pure)

The search for new scientific knowledge for its own sake, i.e. undertaken without a specific practical objective.

30. Licence

The consent accorded by a grantor or licenser (holder of an exclusive right) to a licensee to use as his own or (as a practical matter) to apply knowledge protected by patents or trade marks.

31. Licenser

The grantor in the specific case of a licence.

32. Battery limits

The geographical delimitation of the contractor's responsibility.

33. Specification manuals (books)

These form part of the technical information turned over by the contractor to the owner and refer to the equipment or materials which comprise the plant or processing unit.

34. Model

The three-dimensional representation of an industrial plant or of each of its elements, prepared to scale and in conformity with the basic design drawings.

35. Trade mark

A visible device, legally reserved for exclusive use, which is used to distinguish the merchandise of one maker from that of another. The territorial protection enjoyed by the holder of a trade mark is, however, not as complete as that enjoyed by the patent-holder, for the reason that this protection applies only to the national markets in which the owner of the trade mark not only registers the trade mark, but also uses it on his own behalf or through third parties (3).

36. Standardization

A discipline concerned with the establishment, application, and adaptation of rules designed to achieve and maintain ordered consistency within a particular area for the purpose of bringing benefits to society in keeping with its economic and social development (4).

37. Technology supply

The range of services, remunerated or not, offered by sources. This supply includes: the information services of technical libraries or assistance centres; the professional services of engineers and technicians; records-keeping on patents lapsed or in force within a country or outside it; research services at universities, institutes, and firms; advisory services and confidential know-how from other companies or institutions; etc. (3).

38. Technology package

An ensemble of well defined and closely linked technological elements (basic and detailed engineering, equipment, purchasing, construction, licences, know-how, etc.) through which a project is brought to conclusion.

39. Patent

A legally conferred exclusive right to the usufruct of an invention.

40. Patented process

The original sequence of physical and chemical operations which results in the production of a project and to the use of which an exclusive right has been legally conferred.

41. Patented product

A particular physical item which exhibits certain specific characteristics and for whose use an exclusive right has been legally conferred.

42. Project

The studies and activities which, taken together, result in the materialization of an initial idea.

43. Start-up

The stage, immediately following the completion of a plant and its mechanical acceptance, in which the plant or a part thereof is placed in operation on a continuous basis and in a way involving the interaction of all the parts comprising the over-all design process.

44. Royalty

The periodic payment made by a licensee to a licenser for the right to use an industrial property which is owned by the latter and which may be simple (e.g. a patent) or complex (e.g. a patent plus know-how). The form and periodicity of the payment are specified in the licensing agreement or contract (2).

45. Selection of technology

The process of selecting, through some form of private or collective evaluation, that technology, from among all the available alternatives, which best satisfies the evaluation criteria adopted. Proper selection requires:

(a) thorough information regarding all the possible options, and

(b) a sound methodology and well-considered system of evaluation criteria (3).

46. Industrial services

These fall into two classes and cover what are known as utilities, off-site, and industrial services.

1. Basic services: all those systems and installations which are indispensable to the process (e.g. water, electric power, steam, etc.);

2. Support services: those systems and services which are necessary but not indispensable to the operation of a plant, where they perform a secondary or contingent role (e.g. maintenance, water for use in fire prevention, etc.).

47. Technology

The related know-how which is indispensable to the performance of the operations required for the processing of inputs into products, the use of such products, or the rendering of services (1).

48. Software

The information contained in books, journals, plans, drawings, specifications, films, magnetic tapes or in any other form, apart from its physical incorporation in machinery or equipment where its cost cannot be separated from that of the machinery or equipment. In cases when, for example, a repair manual is supplied with machinery or equipment, it represents software and could be assigned a price, although this is not normally done as it is included in the price of the machinery. A plant operating manual falls under this concept (3).

49. Hardware

This refers to the technology incorporated in the construction of machinery, equipment, devices, spare parts, etc. Nearly all the technology imported into developing countries is of this type. It is difficult to ascertain the cost of the technology incorporated in a machine, since the raw materials, labour, capital depreciation, cost of technology, and profit are covered by a single price (3).

50. Technology, free

Technology the use of which is subject to no legal restrictions.

51. Technology, core

The related know-how which is specific or inherent to, and which characterize, a production process or the rendering of a service (1).

52. Technology, non-free

Technology owned by an individual or company whose use by third parties is prohibited by patent or by the secrecy surrounding non-patentable know-how. See the definitions of "patent" and "know-how" (3).

53. Technology, peripheral

Interrelated know-how which is not specific to the manufacture of a product, the development of a process, or the rendering of a service, but which is required for the application of the core technology as part of the production of goods or services, or even in the generation of further know-how (1).

54. Transfer of technology

The acquisition of theoretical and practical know-how, which may in turn lead to a change in, or improvement of, existing technical, economic, and social processes.

Bibliography

1. Decision No. 84 of the Cartagena Agreement.

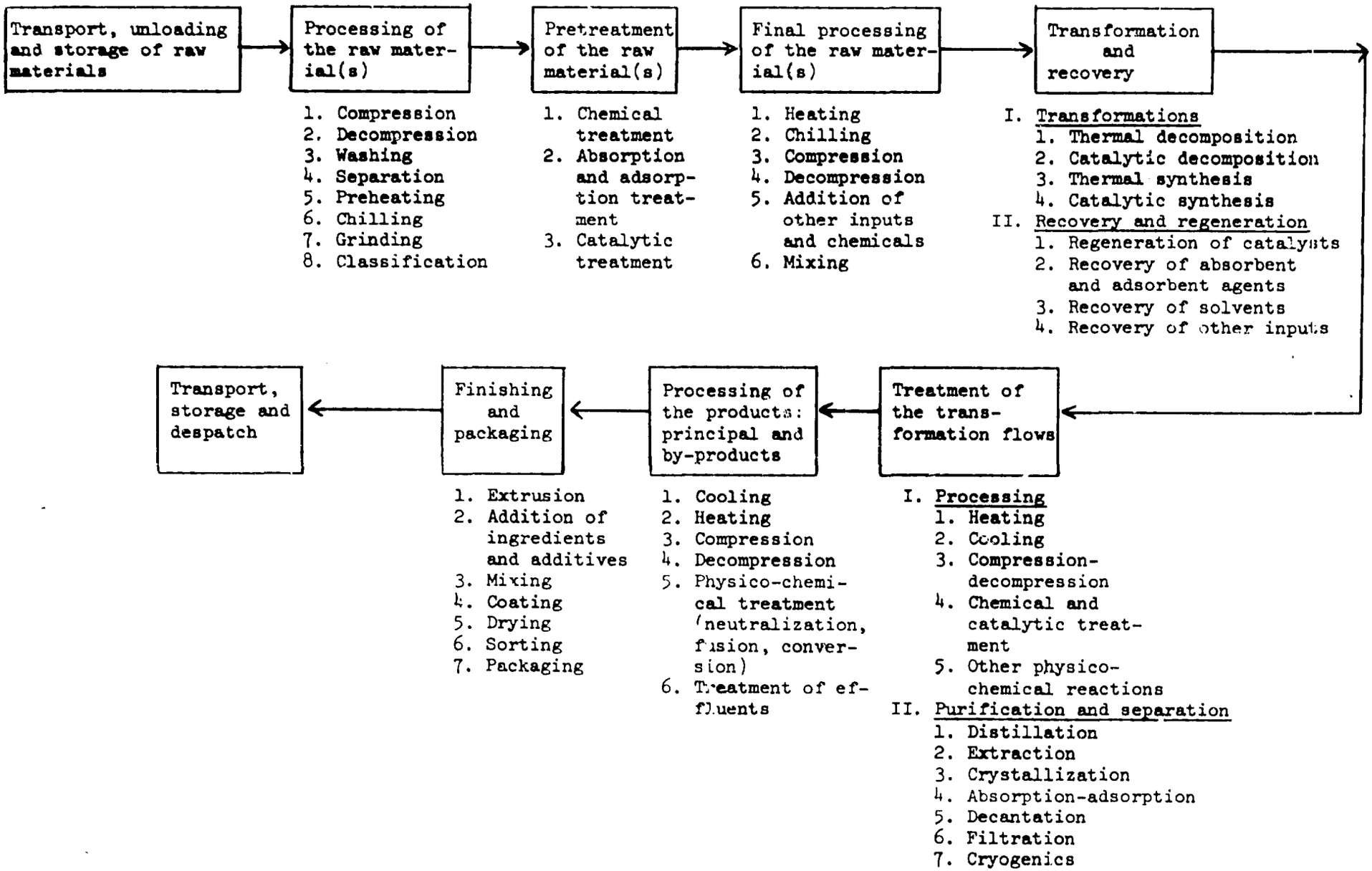
2. Evaluación Integral del Proceso de Adquisición de Tecnología. Sector Estatal de Refinación y Petroquímica de Colombia. Documento FAT (1979) COLCIENCIAS-OAS.

3. Cartilla sobre Adquisición de Tecnología, Félix Moreno Posada.

4. Technical Standards and Manuals. ITINTEC, Peru.

5. Various technical dictionaries.

TYPICAL PRODUCTION BLOCK DIAGRAM AT CHEMICAL PLANTS ANNEX III



APPENDIX

Liaison and Co-ordination Organizations of the Member Countries of the Programme: Technological Disaggregation and Inventory of Capacity

I. Sub-regional liaison and co-ordination

Board of the Cartagena Agreement
Technology Policy Group
Avenida Paseo de la República 3895 (San Isidro)
Casilla de Correo 3237
Lima, Peru

II. Liaison and co-ordination among the Andean countries

Bolivia

Secretaría General de Integración, Presidencia de la República
(Secretariat-General for Integration, Office of the President of the Republic)
Avenida Arce 2915
Casilla de Correo 4317
La Paz, Bolivia

Dirección de Ciencia y Tecnología, Ministerio de Planeamiento y Coordinación (Directorate of Science and Technology, Ministry of Planning and Co-ordination)
Avenida Arce 2147
Casilla de Correo 3116
La Paz, Bolivia

Yacimientos Petrolíferos Fiscales Bolivianos (YPFB)
Dirección de Petroquímica
Avenida Mariscal Sta. Cruz esq. Colón
Casilla de Correo 401
La Paz, Bolivia

Colombia

Instituto Colombiano de Comercio Exterior, Ministerio de Desarrollo
(Colombian Institute of Foreign Trade, Ministry of Development)
Carrera 13 - A No. 27-31, 5to piso
Apartado Aéreo No. 6657
Bogotá D. E., Colombia

Fondo Colombiano de Investigación Científica y Proyectos Especiales
Francisco José de Caldas (COLCIENCIAS)
División de Desarrollo
Transversal 9, No. 133-28
Apartado Aéreo 051580-29828
Bogotá D. E., Colombia

Empresa Colombiana de Petróleos (ECOPETROL)
Vice Presidencia de Ingeniería y Proyectos
Carrera 13, No. 36-24
Apartado Aéreo No. 5938
Bogotá D. E., Colombia

Ecuador

Ministerio de Industria, Comercio e Integración
(Ministry of Industry, Commerce and Integration)
Dirección Central de Integración
Juan León Mera y Roca
Apartado Postal No. 194-A
Quito, Ecuador

Comisión Ecuatoriana de Bienes de Capital (CEBCA)
18 de Septiembre 213, 3er piso
Apartado Postal 1293
Quito, Ecuador

Corporación Estatal Petrolera Ecuatoriana (CEPE)
Dirección Industrial
Eloy Alfaro y 9 de Octubre, Edificio Salazar Barba, 2° piso
Apartado Postal 5007 y 5008
Quito, Ecuador

Peru

Ministerio de Industria, Comercio, Turismo e Integración
(Ministry of Industry, Commerce, Tourism and Integration)
Secretaría de Integración (Secretariat for Integration)
Edificio del Ministerio de Industrias, 2° piso
Lima, Peru

Instituto de Investigación Tecnológica, Industrial y de Normas Técnicas
(ITINTEC)
Dirección de Tecnología
Jirón Morelli, 2da cuadra (esq. Av. Las Artes-San Borja)
Casilla de Correo 145
Lima, Peru

Venezuela

Instituto de Comercio Exterior (Institute of Foreign Trade)
Departamento de Integración Económica
Avenida Libertador, Centro Comercial Los Cedros
Apartado 81852
Caracas 102, Venezuela

Consejo Nacional de Ciencia y Tecnología (CONICIT)
Los Cortijos de Lourdes, Edificio MAPLOCA, Los Ruices
Apartado Aéreo 70617
Caracas, Venezuela

Petroquímica de Venezuela S.A. (PEQUIVEN)
Gerencia de Ingeniería
Avenida Principal Las Mercedes, Edificio ACO
Apartado Aéreo 2066
Caracas 101, Venezuela