

 SAMSUNG ENGINEERING	<u>PROCESS</u> DESIGN MANUAL <u>BASIC ENGINEERING</u> DESIGN DATA	SPD00008ERN
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1. SCOPE

This manual describes the preparation of the Basic Engineering Design Data.

The Basic Engineering Design Data is abbreviated to BEDD which name is not fixed in all cases, but such a basic matter must be confirmed in writing before starting the design work.

The Basic Engineering Design Data is a summary of basic points to be followed in the basic and detailed design which range over all specialty fields.

While a Process Design Basis contains information specific to each individual process unit, the Basic Engineering Design Data documents is standardized and applicable to all process units at the plant site.

2. FORMAT

2.1 Blank Form

The BEDD should be prepared in advance with the content headings outlined in Sec.2.2 below. The BEDD should be filled out in detail by reviewing and compiling information for each item prior to starting the design work. This will allow the project to be carried out in the most efficient manner once started.

2.2 Contents of BEDD

The contents of BEDD can be classified as follows:

- (1) General matters: Units of measurement, criteria laws, codes, standards and criteria to be followed
- (2) Numbering system: Rules to be followed in the assignment of equipment item numbers and line numbers.
- (3) Utility conditions: Conditions of utilities that will be used in the plant such as cooling water, steam, fuel and electric power
- (4) Site conditions: Weather conditions and soil conditions.
- (5) Environmental regulations: Limitations on the emission of noise, waste water, waste liquid and waste gas.
- (6) Other matters: Owner's requests, desires and thoughts such as those on entire plants and plant buildings which are to be reflected in the basic design.

3. BEDD PREPARATION

3.1 Timing

As a general rule, all items included within the BEDD should be determined prior to the start of the process design. However, some items may not be fully defined at this stage. These items may continue to be developed as the project work progresses, and should be clearly identified as "Holds" in the BEDD.

Since some details of the detailed design cannot be covered by BEDD, detailed engineering design

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data (abbreviated to BEDD) are prepared in some cases to maintain the unification of equipment detailed design.

3.2 Procedure

The BEDD must be prepared by the project engineer under the cooperation of each specialty engineer, with input, as required, from client.

Many components of the BEDD must be decided from the standpoints of overall plant safety and maintenance rather than from the standpoints of a single unit. Future plans must also be taken into consideration during the preparation of BEDD.

3.3 Explanations on Individual Items of BEDD

(1) General

(a) Standards for design

Standards are used to maintain the performance level of design.

Plant owners' and Contractors' standards fall under this category. Laws and codes are intended chiefly to indicate constructional requirements from the safety standpoint while many private standards are taken to keep equipment performance above a certain level.

Some private standards cover criteria for safety levels and provisions set forth by the companies.

(b) Laws and codes

Various laws, codes and regulations are enforced by the central and local governments to ensure the safety of plant facilities and of surrounding areas in order to prevent public nuisance (air pollution, water contamination, noise, etc.).

In the design of plants, the legal requirements must be satisfied.

(c) Public standards

Public standards (Such as the API standards) differ from laws and codes in that conformity is not legally required, as with government standards.

However when plants need to be constructed to a certain quality level, the implementation of standards can help this purpose more easily be achieved.

Various standards exist, some established by public organizations and some by private organizations.

Deciding which standards are applicable to the project is an important task and should be given careful consideration when developing the BEDD.

(2) Numbering system

A numbering system is an effective means since each individual item of equipment can be easily identified at any stages (design, construction, operation and maintenance) by referring to the item number assigned to the equipment.

The numbering system should be specified in BEDD, since plant administration is usually

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executed on the whole plant basis.

Symbols usually used is as follows:

Equipment Symbols	
Columns (Towers)	T
Vessels (Drums)	D
Reactors	R
Exchangers	E
Fired Heaters	H
Pumps	P
Compressors	C

These letter symbols are suffixed by numbers (digits) which are assigned on such bases as the sequence of flow.

In cases where two or more pieces of equipment are placed in parallel and one is used as service equipment and the other as stand-by, usually the same item number is used for both, being suffixed by such auxiliary letter symbols as A and B: for instance, P-1A and P-1B in the case of pumps.

For instruments, the most effective means of documentation is to show their location on the P & I diagrams and to assign them with their own distinct instrument numbers.

Electrical equipment and piping are also given identifying numbers and symbol letters.

(3) Utility conditions

To proceed with the design of process units, it is necessary to decide the plant-wide utility conditions in order to standardize their specification within the design bases for each process unit. The most important aspects in deciding the utility conditions are the requirements at the end users in each process unit.

In addition to these, they are affected by the approximate consumption, weather conditions, plot plan, waste heat recovery methods, locality conditions, etc.

Generally as many factors remain uncertain at the stage when the utility conditions must be decided, economic studies cannot be conducted precisely at that stage.

Hence, when the basic plan is marked out, the utility conditions are preliminarily determined by studying the economics fully,, and subsequently the utility conditions are finally decided, so that the efficiency of each equipment can be maximized.

Sufficient studies are required especially to decide the conditions of steam, cooling water and electric power.

Even if the utility conditions have been decided by conducting studies from various standpoints, good care must be taken also when they are entered on BEDD.

Since such utility conditions as temperatures and pressures vary, depending on the

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consumption and atmospheric conditions, they must be carefully shown on BEDD, with consideration given to the service conditions and locations after each condition has been confirmed, so that the design can be provided without mistaking their applications (such as process and mechanical services).

(4) Natural conditions

Weather conditions such as the directions of prevailing wind, wind velocities, temperatures, rainfall and snowfall, other natural conditions such as earthquake intensities, sea water levels and underground water levels and site conditions such as types of land, soil conditions and ground levels are shown in BEDD.

These are basic data required for the following purposes:

- Calculate the wind load and snow load.
- Calculate the strengths required to withstand earthquakes.
- Plan rain water drainage systems
- Provide measures against, inadequate temperatures

(5) Measures against public nuisances

Noise, waste water, waste liquid and waste gas are major sources for public nuisances and legal restrictions are imposed on their emissions. In some cases, equipment designs, disposal systems and equipment layouts are limited by law.

(6) Miscellaneous

Conditions desired by the owner for buildings, platforms, steel structures, firefighting facilities, pavement, painting, insulation, etc. should be included the BEDD.

Plant operating companies have different views on the basis for these details and requirements. This difference is large and varies, depending on industries such as the petroleum refining, petrochemical, coal chemical, general chemical and inorganic chemical industries. Large differences are found between petrochemical companies separated from petroleum refining companies and those separated from general chemical companies and those engaged also in coal chemical plant operation. Their superiority and inferiority cannot be judged by a simple means since their technical backgrounds historically built up are different. In the case of projects in foreign countries, BEDD is specially important for this reason.

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4. REVISION HISTORY

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