

**White Paper written for
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White Paper S88 for Universities

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If you are working at a university teaching a course in automation, and/or process control or if you are a student interested in those subjects – this paper is for you! You might already have heard about the S88 batch control standard – how it tries to define terminology and concepts that makes design and operation of process control plants easier. In this paper, we will try to briefly explain, in understandable words and easy phrases, why it is definitely worthwhile for you to read and understand this standard. So that you, being a teacher, can provide your students with something very interesting that also makes your students extra valuable on the market when graduating, or so that you, being a student, have the knowledge to choose a course that really inspires you and teaches you the stuff that industry looks for.

It is not hard to learn the basics of the standard. It consists of three parts, by which part 1 is definitely the most important one and, at this point in time, the only part that you have to consider. It presents four basic concepts;

1. how to depict what you have in the plant (referred to as the physical model)
2. how to define what you would like to accomplish in the plant (referred to as the recipe)
3. implementation of what you can do in the plant (referred to as the equipment logic)
4. how to put the three pieces mentioned above together in an intelligent way.

The standard is not very long, in the printed version is about 90 pages and it would surprise me if a thorough reading took more than three or four hours.

ISA S88 provides value for you

Before shortly explaining about the basic concepts, let us give some examples of how this standard will provide you or your students with a mind-set highly appreciated and needed in industry today.

First of all, the standard was developed especially for batch processes; however, it can successfully be applied also to continuous and discrete processes that require a certain amount of flexibility. This means that whatever domain you are working in, the standard provides you with a clever and successful way of thinking.

Secondly, S88 offers standard terminology, with the objective of improving communication. This way different people don't use different terms for the same thing, or the same term for different things. Difficulties in communication can cost time and money, or even worse, it can cause failures in control systems.

More over, an important aspect of S88 is modularity. This helps process equipment developed in one application reusable in another application, resulting in savings in time and money.

Many more examples can be listed, and I am sure you will agree after reading and understanding the standard.

ISA S88 basic concepts

So which are the basic concepts presented in ISA S88?

In order to depict what you have available in the plant in terms of equipment, the **Physical Model** should be used. The physical model is hierarchical and serves as the model for equipment control. The highest levels in this model are the Enterprise, Site and Area. However, the levels of importance for S88, start with the process cell. A process cell can be divided into one or many units that in turn can be divided into equipment modules and control modules. Within a process cell, a product is made. A unit might be a reactor or a mixer.

In order to describe what you would like to achieve in the plant a **Recipe** should be created. The most important part of the recipe is the procedure, defining what you would like to do, e.g., first you would like to fill the mixer with a certain substance, then mix it and finally empty what you have in the mixer. The procedure complies with the **procedural model**, i.e., a procedure can be broken down into unit-procedure, a unit-procedures into operations and an operation into phases. A recipe also contains the formula, i.e., parameter values useful in the procedure.

The functions requested in the recipe need to be implemented in the equipment control system. Their implementation is referred to as **equipment logic**.

Well, what is so smart about this? The smart thing is that the recipe can be written without knowing anything about how the equipment logic is implemented. It is enough to know their interfaces. Vice versa is also true, the equipment logic can be implemented without knowing anything about how they will be used in different recipes. The two activities can be completely separated. The equipment logic focuses on implementing a certain function in a good and efficient way, whereas the recipe focuses upon combining the equipment logic in such a way that the desired end product is produced.

More info

The standard can be purchased from ISA ([ww.isa.org](http://www.isa.org)), the organization that sponsored the development of the standard. Technically, it is known as ANSI/ISA88.00.01. The international version is called IEC 61512-1 and is available from the International Electrotechnical Commission (www.iec.ch). World Batch Forum also provides valuable info regarding conferences, web seminars etc related to S88 (www.wbf.org).

If not already available at your university, develop, or ask your teacher to develop, a course, or part of course, that covers the S88 concepts. S88 contains inspiring, challenging, highly useful, and industry-needed knowledge. I am sure you will benefit from such a course!