



## IMPLEMENTATION OF 5S IN PHARMACEUTICAL LABORATORY



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### Abstract

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**Aim:** Implementation of the 5S technology in pharmaceutical laboratory. **Materials and Method:** This process includes the five words: Seiri, Seiton, Seiso, Seiketsu and Shitsuke. In English they are termed as Sort, Straighten, Shine, Standardize and Sustain respectively. To perform the 5S in laboratory at first we have to discard the unwanted materials from laboratory. It has to set everything in order such as equipments, chemicals and documents in the laboratory. Maintenance of cleanliness, standardization of chemicals and calibration of equipments are its parts. Lastly the personnel required to have responsibility to maintain those. **Result:** The 5S technology implemented effectively in pharmaceutical laboratory. **Conclusion:** It develops a well organized laboratory. After performing 5S in pharmaceutical laboratory, the facilities to find the instruments, chemicals and documents become very easy. The guideline for chemicals provided good information for handling them. It improves the safety of personnel during handling of a chemical or performing a testing procedure.

## INTRODUCTION

5S is a technique originated from Japan and it was first developed by Hiroyuki Hirano. It includes five words Seiri, Seiton, Seiso, Seiketsu and Shitsuke, which means Sort, Straighten, Shine, Standardize and Sustain respectively. The 5S technique is included within 'Kaizen' which means 'change for the better'. It allows the enhancement of efficiency and productivity. The 5S methodology is being followed in automobile factories, offices and any work place. But now-a-days this technique is followed in the pharmaceutical laboratories also. The 5S technique is a structured program to systematically achieve total organization, cleanliness, and standardization in the workplace. A well-organized workplace results in a safer, more efficient, and more productive operation. It boosts the effortness of the workers, promoting a sense of pride in their work and ownership of their responsibilities. So the benefit of 5S technique is improvement in productivity, quality, health and safety.<sup>1,2</sup>

## MATERIALS AND METHODS

### **Seiri (Sorting):**

This first step refers to the removal of all unwanted, unnecessary, and unrelated materials in the workplace. The idea is to ensure that everything left in the workplace is related to work. Even the number of necessary items in the workplace must be kept to its absolute minimum. Keep only essential items and eliminate what is not required, prioritizing things per requirements and keeping them in easily-accessible places. Everything else is stored or discarded.<sup>2,3,4,5</sup>

### **Seiton (Orderliness or Straightening Out):**

This is all about efficiency. This step consists of putting everything in an assigned place so that it can be accessed or retrieved quickly as well as returned in that same place quickly. If everyone has quick access to an item or materials, work flow becomes efficient, and the worker becomes productive. Every single item must be allocated its own place for safekeeping, and each location must be labelled for easy identification of what it is for.<sup>[2,3,4,5]</sup>

### **Seiso (Shining):**

This third step says that 'everyone is a janitor.' Seiso consists of cleaning up the workplace and giving it a 'shine'. Everyone

should see the 'workplace' through the eyes of a visitor - always thinking if it is clean enough to make a good impression.<sup>[2, 3, 4, 5]</sup>

**Seiketsu (Standardizing):**

The fourth step more or less translates to 'standardized clean-up'. It consists of defining the standards by which personnel must measure and maintain 'cleanliness'. Seiketsu encompasses both personal and environmental cleanliness. Personnel are trained to detect abnormalities using their five senses and to correct such abnormalities immediately.<sup>[2, 3, 4, 5]</sup>

**Shitsuke (Sustaining the practice):**

This last step is about 'Discipline.' It denotes commitment to maintain orderliness and to practice the first 4 S as a way of life. The emphasis of shitsuke is elimination of bad habits and constant practice of good ones. When an issue arises such as a suggested improvement, a new way of working, a new tool or a new output requirement, review the first 4 S's and make changes as appropriate. It should be made as a habit and be frequently improved.<sup>[2, 3, 4, 5]</sup>

**RESULT AND DISCUSSION**

**Sort:** All of the items were sorted in a given location and marked all unnecessary items with a red tag or sticker. The red tagged items were moved into a temporary holding area where management can determine how to dispose of them. The old files and recent documents were kept orderly in separate location (Fig.1, 2). Then a list was prepared for all documents and their locations were documented, so that it becomes easy to find the item later on. All the chemicals (Fig. 3), instruments, containers and documents were sorted and kept in correct places.

**Set in Order:** The best location was determined for the remaining items. Some colour stickers were used to identify the types of solutions or chemical materials (Table 1). For prepared solution containers, colour stickers were placed at neck (Fig. 4) and for the stalk chemical material containers they were placed on the cap of (Fig. 5). The colour of stickers was different for different types of chemicals. Red, yellow and green stickers were used to mark the 'minimum', 'sufficient' and 'maximum' required level of prepared solutions respectively (Fig. 4). All the chemicals were tagged & arranged in alphabetical order and

these were specified as A, B, C, ... Z (Fig. 6). A single yellow coloured border line was drawn around all the instruments to specify its location (Fig. 7), to avoid the risk of displace.

**Shine:** Entire laboratory was cleaned to eliminate the sources of contamination. Cleanliness was used as a forum of inspection to detect equipment abnormalities and impeding failures before they occur (Fig. 8).

**Standardize:** Guidelines and procedures were created for maintaining the first three S's. Visual controls like check sheets and schedules were used to provide daily, monthly or quarterly instructions on how to maintain order. All the chemicals were standardized and glasswares were calibrated. The chemicals were tagged according to their manufacturing date, expiry date and strength of chemical solution. Different chemical lists were prepared according to their zone like 'Hot zone', 'Wet zone', 'Highly inflammable material zone', 'Instrumental zone', etc. These chemical lists contained the details cautions and precautions about the chemicals (Table 2). These were placed at

the wall of the place where the chemicals were kept (Fig. 9). List of materials, apparatus and stationary things were placed in their location. Photograph of each cupboard were set in front of them, so that it can be easily identified about its content, which helps to find out the things.

**Sustain:** Regularly communicated and trained employees to maintain the laboratory's adherence to the 5S standards.

The 5S technique is a very sophisticated method for maintaining a laboratory. The 5S approach emphasizes the importance of maintaining an orderly workplace and using visual cues to reduce the amount of wasted time that is spent searching, looking, waiting and asking. After applying this method the laboratory looks very well organized. The chemicals are tagged along with their manufacturing date and expiry date and marked them according to their category. Alphabetical arrangement of the chemicals helps to find out of them easily. The chemical lists, apparatus lists, instrument lists and document lists were prepared and pasted at their place (zone) which helps to find out the chemical, apparatus, instrument and documents

easily. Each and every chemical list represents the nature of chemicals and precautions for their usage. The latest photographs of arrangement are stick at the door of shelf. The cleanliness of the work place creates better work concentration and work flow of the employees.

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Fig. 1: Old Documents



Fig. 2: Recent Document files in orderliness



Fig. 3: Chemicals



Fig. 4: Tagging according to required level



Fig. 5: Corrosive chemicals kept over sand.



Fig. 6: Alphabetic arrangement



Fig. 7: Area marking of instruments



Fig. 8: Cleanliness of testing area



Fig. 9: Chemical list with precaution for safety

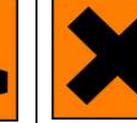
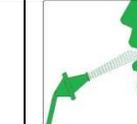
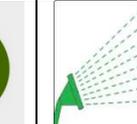
**Table 1**  
**Characterization of chemicals**

Acids	Bases	Solvents	Oxidizing agents	Reducing agents	Salts	Others	Indicators
<b>Red</b>	<b>Green</b>	<b>Yellow</b>	<b>Pink</b>	<b>White</b>	<b>Dark blue</b>	<b>Light blue</b>	<b>Deep green</b>

This colours represents a guideline to identify the category of chemicals.

Table 2

In washing category, the first category is indicating 'Wash hand', not Wash face. Like the table mentioned below.

Nature	 Danger	 Harmful	 Flamable	 Environmental hazard	 Oxidizing	 Corrosive	 Irritant
Need of Protection	 Apron	 Face & Nose Mask	 Face Shield	 Gloves	 Goggles	 Head Caps	 Shoe Cover
Washing category	 Wash hand	 Wash face	 Wash eye	 Body shower	 Wash mouth	 Wash foot	 Wash skin

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