IS 3232: 2024 (Recommendations on Graphical Symbols for Process Flow Diagrams, Piping and Instrumentation Diagrams (*Third Revision*))

Process flow diagrams are widely used in chemical industry as an aid to show basic items of major equipment and their relations to one another in the process scheme. The important flow lines are indicated as connecting items of equipment and help to describe how the process operates.

Piping and instrumentation diagrams are used in the chemical industry to indicate all important aspects such as:

a) All equipment items;

b) All instrument items;

c) All pipelines; and

d) Important aspects such as insulations, slopes, equipment elevations, etc.

This standard lays down symbols that are to be used while preparing process flow diagrams as well as piping and instrumentation diagrams in order to represent the major requirements of plant or units in the chemical industry.

IS 5002: 2024 (Method for Determination of Sample Size to Estimate the Average Quality of a Lot or Process (*First Revision*))

The estimation of the average quality of a lot of material or a process is of great importance to the consumer and the manufacturer. The average quality can be found by inspecting either all the items in the lot (100 percent inspection) or a representative sample of the lot (sampling inspection). Hundred percent inspection, unlike the sampling inspection, is generally uneconomical and time consuming, in some cases impracticable or even impossible, like destructive tests.

Therefore, sampling inspection is preferred in most situations. For this purpose, the important issue is determination of the sample size, which depends upon the purpose of sampling inspection. It may either be to estimate, with specified precision, the average for the characteristic of a lot (lot quality) or process (process quality), or to take decision on acceptance or rejection of the lot based on the outcome of the quality based on sample. As the determination of sample sizes in the two cases are for different purposes, the sample sizes are likely to be different.

This standard covers different methods for calculating sample size required to estimate, with a specified precision and probability level, a measure of quality for the lot or process. This measure of quality may be either the average value of the characteristic (variable data) or fraction of nonconforming items produced (attributes data) of a lot or of a process.

IS 18731: 2024 (Fumed Silica — Specification)

Fumed silica is a versatile performance additive that is manufactured from chlorosilane compounds by vapour phase flame hydrolysis reaction at about 1 700 °C to 2 000 °C in an oxy-hydrogen flame. Fumed silica finds usage in wide variety of applications in many industries such as adhesives and sealants, composites, elastomers, gel-acid battery, inks and coatings, lubricants and greases, technical powders and agrochemicals, resins, toners, beauty and personal care, etc. Fumed silica provides rheology control and anti-settling, anti-sag, powder free flow, emulsion stability, oil absorption, moisture barrier, reinforcement, corrosion resistance, etc.

Fumed silica is hydrophilic in nature due to presence of surface hydroxyl groups. It has an amorphous structure based on X-ray diffraction pattern, which is caused by the rapid cooling of the molten silica particles to solid state during manufacturing of the product.

This standard prescribes the requirements and methods of test for hydrophilic, hydrophobic and dispersion products of fumed silica for general applications. This standard does not cover fumed silica for use in food and pharmaceutical applications.

IS 18563: 2024 (Nanomodified Paints and Coatings — Code of Practice)

The words nanoscience and nanotechnology may have different meanings in different fields of science. At nanoscale, phonons dominate the energy conversion, whereas electrons determine the processes at bulk scales. One can fine tune the properties of a material simply by changing the size from macroscale to micro to nanoscale. The interactions considered negligible at macroscopic level manifests significantly at nanoscopic level. High surface-to-volume ratio of nanomaterials results in presence of majority of ions, molecules, or other building blocks on the surface for nanoparticles. Unlike in bulk materials, the electronic structure in small particles is very discrete and non-overlapping due to the confinement of the electromagnetic wavefunctions to certain physical dimensions of the nanoparticles, an effect that is limited to the nanoscale resulting in so called quantum effects. These effects result in nanomaterials demonstrating properties very different from their bulk phase. Nanomaterials like silver, copper, zinc oxide, etc show very different optical, chemical as well as biological properties which can be manipulated and utilized for desired applications.

Nanomaterial based additives are used in paints and coatings for some time to enhance the efficiency and applicability, bringing in new functionalities. From the findings of several research publication's, books and periodicals on nano science and nanotechnology, it is very clear that nano technology is capable of yielding several advanced formulations that can transform the functionalities the new coatings can offer to the society.

This standard provides general guidelines to be practiced for working with nanomodified paints and coatings. It is intended to be referred for information on techniques for nanomaterial characterization, factors affecting the efficacy of nanomaterials in paints and coatings, dosage ranges. Details on specifics on synthesis of nanomaterials, method of incorporation in paints, performance studies have to be retrieved from relevant scientific literature.