WE ARE SCREEN PRINTING
IN THE FRAME
PROCESS AUTOMATION I4.0

The correct frame choice and the optimised tension process are crucial to achieving the best printing results!

PRODUCING A MESH that meets the high-quality requirements for screen printing is a continuous challenge in a constantly changing environment for the manufacturer of screen meshes. The correct choice of the print frame and the optimised tensioning process are crucial to achieving the best printing results! Screen Printing Technology is nowadays one of the growing graphics technologies, notably in high-demand applications as are the cases of diversified industrial applications: Graphic, Textile or Functional.

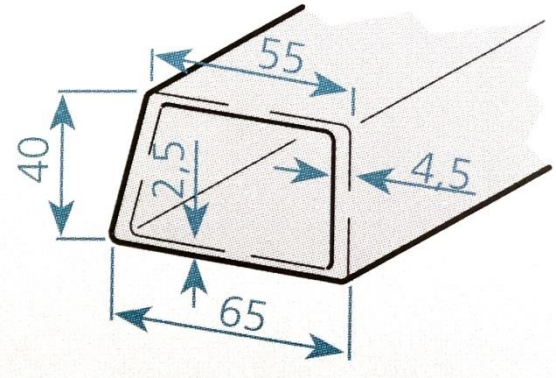
Alongside new market demands on innovative factors, differentiation, exemplary quality or fast supply services, process steps should be re-examined in a logic to monitor the benefits of Industry 4.0, by implementing solutions in "automation" thus providing guarantees of standardization, increased productivity and decreased production costs!

Prepress is usually "forgotten" when analyzing investment needs, which is deprecated by printing or finishing. If the requirements grow the entire investment plan has to be harmonious and according to the entire industrial flowchart!

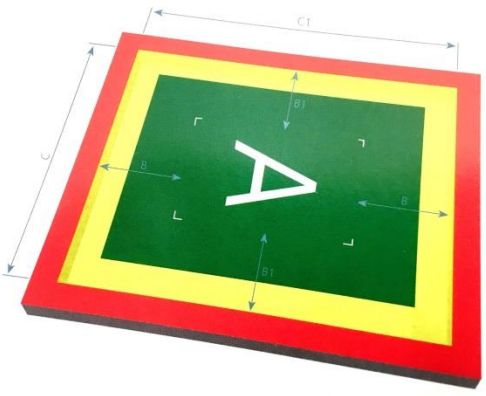
Thus the principle of Screen Printing Technology resides In The Frame (Stencil) and where the most attention should be placed:

FRAMES;
Material: preferably aluminum with normalized profile and in the correct dimensions it is possible to maintain high mesh tension values, being maneuverable and less sensitive to corrosion.

Profiles:
The correct profile selection depends on the frame size and the desired tension value. Today the market offers profiles with resistance to high screen tension values with less use of material. Aluminum profiles called "slope" have proven to be very effective in screen printing applications, with less distortion tendency, even at high mesh tension. The "slope" is ideal for "automation" in the process of developing and washing in-line! Unfortunately, in the practice, many frames in use are very weak making a high and constant tension level impossible. As an example: in the automotive industry, in instrumentation applications, an aluminum frame with a profile of 40x30mm and 2mm thickness, in a format of 110x125cm, will not be able to maintain a constant tension value of 22N/cm. The inconsistency in dimensional stability is inevitable when printing multicolor jobs with repeating steps, on a polycarbonate sheet that has subsequent process steps such as stamping, cutting, thermoforming and plastic injection molding!



Alu profil "slope"



Frame / image size

Formats:
The "snap-off" (the distance between the base of the frame and the substrate to be printed) has to be taken into account in order to obtain a correct transfer of the ink. The "snap-off" results in an additional load on the screen because an increased distance between the screen and the substrate will have to be compensated with a higher squeegee pressure during the printing process. To reduce this additional load, we recommend that you consider the ratio of the distance between the internal edge of the frame and the image to be printed, for the ideal choice of the picture format. Taking into account the various stages of process and the bet on the logic of Industry 4.0 in "automation" it is important to reduce the number of stencils sizes in use!

Preparation:
The surface of the aluminium frame should always be clean with the surface rough and absolutely leveled, before the tensioning of screen mesh! To avoid tearing the mesh during stretching process it is important to check that there is no residue of hardened glue on the edges of the frame and/or remove them. For a perfect adhesion of the mesh to the frame the adhesive layer must be constant. Check or remove any irregular layer of old adhesive beforehand, through water jet or sandpaper, and in this case it is important to clean all waste (contamination) before tensioning!

Frames handling:
ATTENTION! The screen printing frame is an important "tool" and in its handling should be avoided shocks, since this can lead to immediate small losses of tension! Even if a distortion does not occur immediately there is always the risk of the frame being subjected to aggressions as hits during the transit of tension, emulsion or printing steps! The stencil preparation is a "Key Process Tool" so the Screen Lab must be spotless clean and free of dust and other possible contaminant materials!

Tensioning:
I4.0 and automation: there are many stretching equipment's for tensioning screen mesh, mechanical, pneumatic, manual, semiautomatic, automatic, in various formats, but nowadays, for an ever increasing degree of demand and taking into account the applications of choice in industrial and functional areas, the bet is believed to be in an stretching equipment that ensure, by "automation", the quality and repeatability for which the screen printing technology has been elected! Equipment´s such as the example of the manufacture Grünig-Interscreen AG being the most representative models in Portugal, G-STRETCH 215A or G-STRETCH 218A, with programming, registration and control of the tensioning steps in Automatic mode!

Final note:
Screen Printing prepress must have the same working conditions (cleaning control, light, space and acclimatization), as for Offset, Flexo, Digital, etc.! Incidentally, it is usually well visible in companies that follow the modern logic of being "multi printing processes" suppliers, but it will no longer be a rule for most screen printers with the exception of companies that have bet on CtS (Computer-To-Screen) technology as many examples in Portugal, and globally, of companies linked to Graphic, Textile Printing, Ceramic Decals, Textile Transfers and in Functional applications, using the STM-TEX lines from SignTronic AG for direct digital imaging (filmless) and in total "automation"!

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