GCSC

Graphic Communications Skills Competencies

Screen Printing

The most versatile of all printing processes, screen printing can be used to print on a wide variety of substrates, including paper, plastics, glass, metal and fabrics. Some common products produced from screen printing include posters, labels, decals, signage, textiles and electronic circuit boards.

A significant characteristic of screen printing is that a greater thickness of the ink can be applied to the substrate. Because of the simplicity of the application process, a wider range of inks and dyes are available for use with screen printing than for use in any other printing process.

The competencies provided will teach the student the types of screen printing equipment technologies that are commonly used, typical workflows to print a project and maintenance procedures.

There are seven subject areas for Screen Printing:

A. Technology
B. Design and Prepress
C. Frame and Mesh Preparation
D. Stencil and Screen Preparation
E. Print Production
F. Clean up Process
G. Math and Measurement

A. Technology

Screen printing consists of three elements: the screen which is the image carrier; the squeegee; and ink. There are three types of screen printing presses. The flat-bed (the most widely used), cylinder, and rotary. In the past, all screen printing presses were manually operated. Now, however, most commercial and industrial screen printing is done on single and multicolor automated presses.

The following competencies introduce the types of equipment used and products produced by the screen printing process

1) Describe the screen printing process
2) List advantages of screen printing process versus offset lithography or digital printing
    a. Size of image
    b. Type of substrate
    c. Ink density (Four Color Process vs. Spot PMS colors
    d. Special inks

    e. Cost of equipment
3) Describe the components of a screen printing press
    a. Frame
    b. Mesh
    c. Squeegee blade
4) Define direct-to-screen
5) Compare features and specifications of 3 different types of automated screen printing presses
6) Describe the workflow steps of screen printing process (Single color/Inline or Rotary press)
    a. File creation
    b. Film output
    c. Screen creation
    d. Mounting screen on press
    e. Print production
    f. Clean up
7) List common products produced by screen printing
8) Collect samples of projects printed by screen printing
    a. T-shirt
    b. Signage
    c. Glassware
9) Assess the purpose and quality of each sample collected

B. Design and Prepress

Since screen printing can apply an unlimited number of color ink layers, specific design and prepress techniques are required when creating a project for screen printing versus traditional print. Output can either be in the form of positive films for producing a screen, or a file for direct to screen printing.

The following competencies define the special considerations required when creating and outputting a project for reproduction by the screen printing process.

10) Review features and capabilities of professional Page Layout software applications
    a. Adobe Illustrator
11) Demonstrate use of computer menus, shortcut keys, and panels in illustration software
12) Describe different types of graphics used in screen printing
    a. Line art
    b. Continuous tone
    c. Raster
    d. Vector
13) Define Pixels Per Inch Resolution (Screen Display)
14) Define Dots Per Inch
15) Define Lines Per Inch Resolution (Printing Press)

16) Describe an Encapsulated PostScript (EPS) file
17) Explain the use of a EPS file
18) Demonstrate the proper setup of a document using an instructor specified page size
19) Describe the use of paths in an illustration software program
20) Define trapping
21) Define knockout
22) Define overprint
23) Discuss the use of layers in an illustration software program
24) Define registration
25) Describe a frame, stencil and mesh
26) Demonstrate the proper setup of a document using instructor specified frame, stencil, mesh and ink
27) Demonstrate applying trapping in an illustration software program
28) Describe a job ticket/docket
29) Determine job specifications from a job ticket/docket
30) Produce instructor specified art with all design elements, registration targets, color identification, and screen position on press
31) Produce a final proof to match job ticket specifications
32) Produce a positive film for stencil exposure
33) Define direct to screen
34) Produce a file for direct-to-screen

C. Frame and Mesh Preparation

Screen printing can reproduce an image on a wide range of fabrics, papers and other materials. Proper choice of frame and mesh type is critical for satisfactory quality based on of the different types and thicknesses of substrates being printed.

The following competencies define the reasons that specific types of frames and mesh types are used for different substrates.

35) List different mesh counts and thread diameters and mesh type (Calendared, Steel, Fabric)
36) Determine the appropriate choice of mesh count and thread diameter for an instructor specified substrate/image
37) List different frame types/construction
38) Choose an appropriate frame for an instructor specified job
39) Describe the process of attaching mesh onto a fixed and/or retensionable frame system
40) Demonstrate the proper attachment of mesh to frame (Stretch and Glue or Roller Frame)
41) Determine how to properly tension mesh
42) Describe the use of a tension meter
43) Demonstrate proper use of a tension meter

44) Inspect the quality of a frame and mesh preparation

D. Stencil and Screen Preparation

The screen printing process uses a porous mesh stretched tightly over a frame. During the manufacturing process of the screen, the image area and non-image areas are defined manually or by using a photochemical process.

The following competencies discuss the workflow steps of manufacturing a screen.

45) Specify the workflow steps used to make a screen
46) Describe emulsion used to make a screen (capillary, liquid and film)
47) Explain the use of emulsion when making a screen
48) Choose appropriate type of emulsion for an instructor specified job
49) Describe requirements to prepare the screen for a stencil application
50) Demonstrate the proper application of emulsion to the screen
51) Demonstrate the proper drying requirements of the screen
52) Demonstrate the proper steps of exposing the screen while maintaining screen to screen registration
53) Demonstrate the proper steps of washing image area of a screen and allowing to dry
54) Specify the possible defects that will affect the quality of print
55) Evaluate a stencil for quality defects
56) Demonstrate the proper step of masking a stencil for production use

E. Print Production

Production using the screen printing process begins with mounting the screen and making adjustments to obtain satisfactory printing. Considerations are given to the type of substrate that is being printed, number of colors being printed, quality and type of image being reproduced.

The following competencies define the workflow steps to set up, print and monitor quality of a project using the screen printing process.

57) List workflow steps used during printing
58) Demonstrate proper loading of screen onto press
59) Describe characteristics of squeegees used
    a. Durometer
    b. Shape
    c. Width
60) Demonstrate the proper choice of squeegee for a specific job
61) List the types of ink used in screen printing
62) Choose the proper choice of ink for a specific job
63) Demonstrate confirmation of correct ink specifications from a job ticket

64) Describe the alignment of screens for proper registration
65) Demonstrate the proper alignment of screens for a specific job
66) Define flood stroke
67) Define print stroke
68) Define off contact and peel
69) Demonstrate the proper setting of off contact to control image quality
70) Demonstrate the proper application of ink to screen
71) Demonstrate the proper loading and alignment of substrate on press
72) Demonstrate the proper adjustment of squeegee pressure for an instructor specified job
73) Demonstrate the proper operation of press
74) Determine quality control procedures to ensure print quality
75) Determine corrective actions required to maintain quality
76) Describe drying systems
    a. Flash
    b. Conveyor
77) Evaluate an instructor specified finished product
78) Demonstrate organization or packaging of a finished product according to job ticket
79) Organize or package a finished product according to job specs

F. Clean-up Process

After the production of a printed project, the press is cleaned and maintenance is performed. The screen may be reused for additional projects after being cleaned.

The following competencies define the workflow steps of cleaning the press and the screen.

80) Describe a Safety Data Sheet
81) Explain the use of a Safety Data Sheet
82) Demonstrate proper procedures when handling cleaning chemicals
83) List workflow steps used during cleaning
84) Demonstrate the proper removal, cleaning and storing of squeegee(s)
85) Demonstrate the proper removal of remaining ink from screen
86) Demonstrate the proper cleansing of screen
87) Demonstrate the proper storage or disposal of ink as specified by local regulations
88) Demonstrate the proper removal of frame from a press
89) Demonstrate the proper preparation of screen for reuse or reclamation
90) Demonstrate the proper selection and use of appropriate chemistry and washout equipment to remove stencil
91) List possible defects in a screen
92) Describe strategies for reuse of screen
93) Demonstrate the proper chemical or mechanical adjustments to screen for reuse
94) Demonstrate the proper storage of screen

95) Demonstrate proper cleaning of additional auxiliary equipment
96) Assess the cleanup activities completed within shop

G. Math and Measurement

The use of math and measurement skills is critical in a wide range of job functions within the graphic communications. Because of the many units of measurement only used in the graphic communications, it is important to be able to work with them.

The math and measurement application competencies were designed to reinforce math skills necessary for successful employment within the graphic communications industry.

97) Solve subtraction of fraction problems
    - *Calculate amount of ink remaining if 1.75 pounds are used from a three pound can*
98) Solve addition of fraction problems
    - *Calculate total length of three 11 x 17 sheets of paper*