Screen Printing Technology Hand Book

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Screen printing is a printing technique that uses a woven mesh to support an ink blocking stencil. The attached stencil forms open areas of mesh that transfer ink or other printable materials which can be pressed through the mesh as a sharp edged image onto a substrate. A roller or squeegee is moved across the screen stencil, forcing or pumping ink past the threads of the woven mesh in the open areas. Screen printing proves to be a good printing process for multi colour printing. Half tone printing is related to screen printing of photographs. Printings of photographs was at one time considered to be very difficult in screen printing, but now screen printed halftone photographs are also effective and economical in certain types of reproduction. Over the time stickers (transfer) have become an important medium of advertising. Now millions of stickers are printed every year through this method. Transfer stickers are of three types; instant transfer, heat transfer and water lade transfer. Gumming is an integral part of sticker production. Screen printing technique make use of and is compatible with a variety of materials, including textiles, ceramics, metal, wood, paper, glass, and plastic. It is this quality that allows this printing technique to be used in different industries, from clothing to product labels, fabric labels to circuit board printing etc. Screen printing industry experiences growth in the 10 to 15% per year rate.
Some fundamentals of this book are basic concept and classification of stencils, basic screen printing process, basic registration techniques, screen printing frames, pre treatment of screen printing fabrics, screen printing press, principal of screen process printing, printing on paper and card, printing on vertical surfaces, printing on shaped objects, cylindrical object printing, printing on uneven surfaces, ceramic and glass printing, printing on plastics etc.
This method of Printing has achieved wide spread popularity since the Second World War, although the basic ideas in this process were used by the Chinese centuries ago. The present book contains latest technologies of screen printing along with machinery photographs, addresses of suppliers of machinery and raw materials. This book will be very helpful to new entrepreneurs, existing units and for those who want to diversify in to this field.

Screen printing is simple
Screen Print Materials
Frames
Screen Mesh
Screen Prep Tape
Stencil Systems
Capillex Film (Pre-Sensitized Photo Stencils
G&S Pigment System
Essential Components
Base
Pigment
Resfix
Anti-bleedScreen
Softener
Ink Retarder
Creating Artwork
Other basic Tools and Supplies
Creating a Positive by Hand
Rubbing Dry Transfer Lettering onto
Clear Acetate (Transtay)
For Straight Type
For Arched Type
Tracing an Image onto Matte Acetate
Assembling Base Art
Putting together all parts of your artwork - images and message
Cutting the Image out of Masking Film
Instant Positives with Velum (Drafting Paper)
For All Multi-Colour Artwork
Labeling Artwork
Mesh Preparation
Roughening the Mesh
Procedure
Degreasing the Mesh
Procedure
Preparing the Stencil
Using Capillary Film
Using Direct Emulsions
Mixing the Emulsion
Coating the Emulsion onto A Screen
Storage and Handling of Stencil Materials
Capillary Films
Direct Emulsions
Exposing the Stencil
Positioning the Artwork: Size and Placement of Image on Substrate
Positioning the Artwork on the Screen
Exposing Units
Table Top Exposing Unit
Features
Building An Exposing Unit
The Fluorescent Tube Unit
To Expose

The Plate Light
To Expose
Exposure Time of Different Stencil Materials
Direct Emulsions
Preparing the Screen For Printing
Washing Out the Stencil
Blocking Out Pinholes
Taping the Screen
Printers
Table Top 4 Colour Printer
Printing on A Table Surface
Off-Contact Printing
Printing
Flood Stroke
Print Stroke
Stencil Removal/Screen Reclaiming
Reclaiming A Screen
Removing Tape And Ink
Removing Stencil Material
Procedure
Removing Stains Or Ghost Images with Autohaze
Procedure
Roughening the Mesh with Autoprep
Degreasing the Mesh with Universal Mesh Prep
Review - Screen Reclaiming
Fault Finding Guide
Capillex Films
Stencil film washes off mesh
Ragged edges
Fine detail filling
Pinholes
Poor adhesion
Patchy stencil
Difficult washout
Direct Emulsions
Sawtoothing
Exposed emulsion washes off mesh
Fine detail filling in
Premature stencil breakdown
Pinholes
Scumming
Image does not wash out at all

2. Screen Printing
Historical Background
Introduction
Section 1
Basic Concept and Classification of Stencils
The Stencil
Types of Stencils
Fabric and Frame Preparation

Screen Fabrics
Screen Frames
Fabric Stretching Techniques
Mechanical Stretching
Hand Stretchig
Fabric Treatment
Photographic Stencil Methods
Direct Process
Direct/Indirect Process
Determining Photographic Stencil Exposures
Indirect Photographic Stencil Process
Exposure
Development and Washing
Application of the Stencil
Drying
Removal of the Base Material
Direct photographic Stencil Process
Preparation
Application
Drying
Exposure
Development
Masking the Stencil
Preparing a Paper Mask
Preparing a Lquid Block-out Mask
Squeegee and Ink Considerations
Selecting the Proper Squeegee
Shape
Chemical Makeup
Flexibility
Length
Squeegee Preparation
Selecting the Proper Ink
Product Characteristics
Production Limitations
Ink Preparation
Basic Screen Printing Process
Basic Registration Techniques
On-Contact and Off-contact Printing
Printing the Stencil
Multicolor Printing
Drying the Image
Cleaning the Screen
Removing the Stencil
Troubleshooting Clogged Screens
Halftone Reproduction in Screen Printing
Methods of Halftone preparation for Screen
Printing
Fabric Selection
Moire Patterns
Printing Considerations
High-Speed Production Presses
Semiautomatic Presses

Fully Automatic Presses
Special Machine Configurations
Screening Cylindrical surfaces
Carousel Units

3 Screen printing frames
Pre-treatment of Frames
Stretching equipment
Pneumatic stretching clamps
Advantages
Mounting
Components of the SST system
Correct stretching
Optimum tensioning force for different fabrics
Stability
Control of tension in measuring fabric stretch
Stretching at a fabric angle
Stretching methods
Angled stretching with a prop profile
Adhesive
Adhering screen printing fabrics onto
the frame
Screen Storage
The manufacture of diapositives
Manual diapositives
Photographically prepared diapositives
Important
Stencils
Pre-treatment of Screen Printing Fabrics
Stencil making
Manual stencils
Photo-mechanical stencils
Manual stencil making
The hand-cut stencil
Water soluble hand-cut film
Cellulose hand-cut film
Causes of errors
Bad adherence
Turned-up film edges
The direct stencil with emulsion
General procedure
Sources of errors with direct stencils
lmade only with emulslion
Formation of fish-eyes after coating
Air inclusions during coating
Poor adherence of the photo emulsion after
exposure
Light scatter when copying (loss of detail)
Saw-tooth effect
Half-tone printing
Difficulties in decoating
Stencils for water-based inks
Emulsions (photo emulsions)

Sensitizers
CHROMATE photo emulsion
DIAZO photo emulsions
Printing requirements
Lines
Half-tones
UV-inks
Fineness of fabrics
Examples for coating
The direct stencil with film and emulsion
General procedure
Sources of errors with direct stencils made with film and emulsion
Bad adherence of the film on the fabric
Use of too fine a fabric
Too hard or too sharp a squeegee
Dust inclusions
Too short an exposure time
Error in exposure
General procedure
Source of errors with direct stencil made with film and water
Bad adherence of the film on the fabric
Insufficient treatment of the fabric
Error in exposure
Indirect stencil
General procedure
Sources of errors with indirect stencils
Bad adherence of the film on the fabric
Insufficient treatment of the fabric
Insufficient degreasing of the fabric
Too long an exposure time
Inactive developer
Drying the stencil with warm air
Exposure
Hardening of stencils for printing of water based colours in textile printing
General procedure
The hardening procedure
Attention
Suggestion
The diapositive
The stencil
Steel and light-alloy frames
The linear co-efficient of thermal expansion
Frame distortion by fabric pull
Warping of the frames under various mechanical stresses
Steel versus Aluminium
Recommendations for frame size and profile
Screen printing fabrics
Optimum tightnes of the fabric stretch

Degree of Stretch
Gluing the fabrics to the printing frames
The printing substrate
Stencils for half-tone printing
Types of screen rullings
Printing
Setting a flat bed printing table
SST-measuring wedge
The squeegee
Squeegee System
Flood coat squeegee (Doctor blade)
Printing speed
Printing shaped objects
Single operation multiple colour printing

4. The difference between multi-filament & mono-filament screen printing fabrics
UV-Goldorange

5. Screen Printing Press
The Screen-Printing Press
Types of Fabrics
Construction of Fabrics
Mesh Count, Mesh Strength, and Mesh Opening
Stretching The Screen Fabric
How to Build A Screen-Process Press?
Step 1 :Assemble Needed Materials
Bill of Materials
Step 2 : Construct the Frame
Step 3: Attach the Screen Fabric
Step 4: Tape and Seal the Screen
Step 5: Prepare the Base
Step 6: Hinge the Frame to the Base
Step 7: Add a Frame Support
Print drying equipment
Constructing Specialty Equipment
Screen Printing On: Papers, Textiles and Other Printing Substrates
Type of Paper
Principal of Screen Process Printing
Common Types of Paper
Color of Stock
Textiles
Type of Fabric
Common Types of Fabrics
Printing on T-shirts
Plastics
Types of Plastics
Metals
Woods
Ceramics

Screen-Process Stencils
Hand-cut Paper Stencil
To Prepare a Paper Stencil
Step1: Image the Paper
Step 2: Cut the Stencil
Step 3: Adhere the Stencil
Hand-cut film stencil
To prepare a Film Stencil
Step 1: Prepare for Cutting
Step : Cut the Stencil
Step : Adhere the Stencil
Step 4: Remove the Backing Sheet
Photographic stencils
To Prepare an Indirect Photographic Stencil
Step 1: Prepare for Exposure
Step 2: Load the Frame
Step 3: Expose the Stencil
Step 4: Develop the stencil
Step 5: Wash Out the Stencil
Step 6: Adhere the Stencil
To Prepare a Direct Photographic Stencil
Step 1: Mix the Emulsion
Step 2: Coat the Screen
Step 3: Expose the Screen
Step 4: Process the Stencil
To prepare a Direct/Indirect Photographic Stencil
Step 1: Sensitize the Coating Solution
Step 2: Adhere the Film to the Fabric
Step 3: Expose the Stencil
Step 4: Wash out the Stencil
Screen Printing
Automatic Press
The printing form makes it possible
The screen printing features and their singularity
Choosing A printing Process
Letter Press
Advantage
Limitations
Lithography
Advantage
Limitation
Photo Gravure
Advantage
Limitation
Screen Printing
Advantage
Limitation
Collo Type
Advantage
Limitation
Flexo Graphic

About NIIR

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Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

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