Australian Government

Department of Education, Employment and Workplace Relations

ICPPR413C Set up for complex flexographic printing

Revision Number: 1

ICPPR413C Set up for complex flexographic printing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to set up machines for non-routine flexographic printing.

Application of the Unit

Application of the unit	This unit requires the individual to set up flexographic printing machines either wide or narrow web. The individual will conduct a proof run and adjust settings to ensure production speeds are attained. Mounting and demounting plates is covered in ICPPR411C Mount and demount flexographic plates for complex printing.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm non-routine job specifications	1.1. Job requirements are read and interpreted from job documentation or production control system 1.2. Set up is planned and carried out correctly in minimum time with minimum wastage 1.3. Availability of all job related components is checked 1.4. Proofed job is checked for conformance with job specifications
2. Set up reel transportation and delivery system on web-fed machine	2.1. Reels are checked for treatment levels, coatings and printing side and age of product 2.2. Unwind reels are secured on reel shaft 2.3. Reels are correctly positioned on unwind stand 2.4. Press is webbed for surface or reverse or perfecting printing according to ***non-routine*** job specifications 2.5. Edge guide is centred and set to non-routine job specifications 2.6. Unwind tension is set to suit ***substrate*** 2.7. Rewind tension is set to suit substrate 2.8. Rewind tension is set to suit substrate 2.9. PIV (Positively Infinitely Variable) drive is set for appropriate tensioning of substrate
3. Select and prepare inks and solvents	3.1. ***Inks*** and solvents are selected according to job specifications and end-user requirements 3.2. Quality and suitability of inks and solvents are checked and appropriate action is taken 3.3. Inks and solvents are prepared according to OHS requirements, and manufacturer's/supplier's instructions with suitable precautions to minimise waste 3.4. Correct colour and weight/volume of ink are mixed and viscosities checked and modified according to the press requirements and non-routine job specifications 3.5. Ink formula and approved colour draw downs are appropriately recorded 3.6. Inks and solvents are appropriately labelled, handled and stored according to manufacturer's/supplier's instructions and the relevant hazardous liquids storage regulations
4. Set up machine for	4.1. Flexographic plate cylinders are installed and

ELEMENT	PERFORMANCE CRITERIA
complex flexographic printing	register adjustments centred OR 4.2. Sleeves are installed in press and register adjustments made OR 4.3. Plate mounting sheets are mounted on cylinders in press and register adjustments made 4.4. Plate cylinders are gauged up or pre-set to impression 4.5. Anilox rollers are selected to suit individual colour and plate reproduction requirements for each unit 4.6. Appropriate ink metering system is selected for each unit 4.7. Inking system is set up and roller nips/blades are set correctly 4.8. Ink circulation is maintained at correct level and flow for ***machine*** 4.9. Viscosities are adjusted according to job specifications 4.10. Air volume and drier temperatures curing units are selected to suit inks, ***substrate***, solvents and according to job specifications 4.11. Air volume is adjusted between colours to maximise drying and minimise air overspill
5. Set up in-line units for basic process(es)	5.1. Minor ***in-line*** printing/converting/binding units are set up for basic process(es) and adjusted according to machine requirements and job specifications 5.2. Assistance is given in set up of major in-line printing/converting/binding units
6. Conduct proof run	6.1. Material to be used for proof is organised correctly 6.2. Press is set up and operated according to OHS guidelines 6.3. Print impressions are set to minimum kiss impression 6.4. Web tensions are correctly set at unwind, between stations and rewind 6.5. Drying is checked as sufficient to key ink to the substrate 6.6. The viscosities are adjusted to obtain the correct colour at proof speed and checked against colour matching system 6.7. The substrate is checked against job specifications
7. Organise proof	7.1. Proof is visually inspected and/or tested or laboratory

ELEMENT	PERFORMANCE CRITERIA
inspection and/or testing	testing is organised according to enterprise procedures 7.2. Production does not commence without client approval or authority where appropriate
8. Readjust settings to production speed	8.1. Production speed print results are interpreted and appropriate adjustments are made to press, ink and substrate settings 8.2. Adjustments are made according to product specifications and press performance 8.3. Web is spliced at production speed and further samples are obtained for quality inspections at appropriate intervals 8.4. Press settings are documented and samples are retained

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- OHS in relation to operating machinery such as safely switching off machinery before cleaning is started
- communication of ideas and information by interpreting the job brief and advising the client (internal or external) about options and limitations
- collecting, analysing and organising information by collecting and analysing data about printing process, machine specifications and performance to calculate appropriate adjustments for the job
- planning and organising activities by providing information about time and materials requirements for production scheduling
- teamwork when cooperating with other workers and coordinating the production unit to ensure efficient operation
- mathematical ideas and techniques by calculating substrate requirements and pressures
- problem-solving skills by recognising proofing faults and calculating adjustments necessary to meet job specifications
- use of technology by using monitoring equipment and computerised production records

Required knowledge

- interpreting complex job specifications
- production problems that could eventuate by not reading and understanding the job specifications
- mounting and proofing flexographic plates
- OHS factors needing to be considered when mounting and proofing flexographic plates
- most common cause of photopolymer plates crazing on the image side
- resiliency of the printing plate
- main advantage of using thin photopolymer plates in process printing
- faults that may be detected on new plates
- types of solvents that should be used on photopolymer plates
- benefits of optical mounting
- purpose of binding plates after mounting
- possible print faults that could be eliminated by using cushion mount
- installation of printing cylinders or sleeves
- OHS factors that need to be considered when installing printing cylinders or sleeves
- precautions that should be undertaken to ensure that the plates and cylinders or

REQUIRED SKILLS AND KNOWLEDGE

sleeves are not damaged during installation
- checking to ensure plates and cylinders or sleeves have been installed correctly
- reel transportation system
- OHS precautions to be observed when webbing up the machine
- position of the reel
- how the substrate pulled into the machine
- result of insufficient unwind tension
- result of excessive unwind tens
- function of the "Dancer" roller on a web machine
- function of the PIV unit
- adjustments to the PIV
- function of the lay-on roller
- what will be the effect of excessive lay-on roller pressure
- what can happen if the web is not spliced correctly
- how does the particular web viewing device work
- delivery system
- OHS precautions that must be observed when setting up the delivery
- how web controlled in the rewind unit
- result of incorrect rewind tension
- remedial steps that can be taken if there is a possibility of the ink marking in the rewind
- function the use of air blast plays in the delivery of sheets
- preparing inks and additives
- OHS precautions that must be observed when preparing inks and additives
- necessary checks to test an ink's suitability for the printing process
- special end-use requirements that may be necessary
- main functions of a pigmented extender used in flexographic printing
- purpose of plasticisers added to flexographic inks
- additives used in flexographic inks
- range in seconds for zahn cup measurements
- effect foaming has in a zahn cup when measuring the ink viscosity
- recommended pH range when printing with aqueous inks
- precautions to observe to minimise waste when preparing the ink
- shelf life of most inks
- conditions are that relevant to the storage of inks and additives
- conventions that should be adhered to when labelling mixed ink
- complex machine set up
- OHS factors that need to be considered when setting up the machine
- advantage of centring all machine controls
- checks that should be made on cylinders and gears

REQUIRED SKILLS AND KNOWLEDGE

- checks that should be performed prior to cylinder or sleeve installation
- angle that should the chamber blades be set at
- main advantage of gauging up and dry register prior to printing a job
- cell count of the anilox roller is used when printing solids
- water treatment additives used in a central impression drum and chill roller coolant system
- advantages of laser engraved ceramic anilox rollers
- things relating to the anilox roller that a roller scope will measure
- reasons for anilox wear
- type of job would be printed using a hexagonal cell configuration
- recommended web temperature when printing polypropylene film
- method of drying used when printing on polythene by the flexographic process
- factors affecting the drying rate of liquid inks
- factors affecting the drying of aqueous inks
- operating range of UV lamps
- in-line processes
- OHS precaution to be observed when slitting on the machine
- how is a cold seal formed
- reasons for a printed product to be punched
- setting hole punching in relation to repeat length
- result of excessive pressure on the slitters
- problem solving proofing and adjustment
- why is it necessary to graduate the drying speeds of each progressive colour, so that first-down colours dry faster the subsequent colours
- why is it that in flexographic printing as the press speed increases so does the colour strength
- decrease in web tension
- increasing rewind tension after the roll has been partially rewound
- major cause of a telescopic roll
- print characteristics related to excessive printing pressure
- causes of picking when printing multicoloured work
- print faults from using an over-reduced ink
- problems that can cause lateral streaks showing up in uneven printing
- causes of moire patterns when printing by the flexographic process
- result of air being trapped under mounted plates
- instrument used to identify retained solvent trapped in the print
- purpose of taking Dyne readings
- purpose of the crinkle test when testing an ink
- result if an excessive final drying temperature was used when printing polypropylene film
- property of ink that can be adjusted to reduce dot gain

REQUIRED SKILLS AND KNOWLEDGE
• when checking the viscosity for ink whilst using ink pumps, why should the ink returning from the ink fountain not be used • problems resulting from the excessive use of slow solvents • why do laminating inks once printed appear dull and easy to scratch • result of excessive print area tension • problems that the printer may associate with cold seals • machine manuals, safety and other documentation are relevant to this task and where are they kept and information is included in these documents

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • set up flexographic printing machines for non-routine print jobs. The individual will conduct a proof run and adjust settings to ensure production speeds are attained • demonstrate use of computerised control, monitoring and data entry systems if available and appropriate • demonstrate an ability to find and use information relevant to the task from a variety of information sources • set up a flexographic printing machine for a complex job on TWO occasions (if possible using different substrates and if possible including at least TWO in-line processes) according to manufacturer's and job specifications, enterprise procedures and the Performance Criteria • evidence for assessment may be gathered from assessment of the unit of competency alone or through an integrated assessment activity.
Context of and specific resources for assessment	Assessment must ensure: • assessment may take place on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment • a wide or narrow flexographic press.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

EVIDENCE GUIDE	
	• ICPPR314C Produce complex flexographic printed product • ICPPR411C Mount and demount flexographic plates for complex printing.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Non-routine may include:	• non-routine within this context relates to the set up and production of print runs. The set up of equipment and production involves a significant amount of deviation from using standard equipment settings. It also involves significant problem solving and the development of new criteria and procedures for performing current practices. It does not refer to a job that an individual does only occasionally.
Substrate handling may include:	• wide and narrow reel delivery systems.
Inks/coatings may include:	• range of inks commonly used in 4 or more colour printing, including standard and special colours.
Machines may include:	• range of stack, in-line and central impression flexographic printing machines with manual, semi-automated, fully automated or computerised process control.
Substrate types may include:	• range of substrates within the major categories of paper, pressure sensitive material, board, corrugated board, plastics and related films, or metal.
In-line processes may include:	• minor processes that are integral to this competency can include basic in-line operations such as perforating, numbering, date coding, slitting that do not in themselves constitute another defined unit of competency. Where a major in-line process is defined as a separate competency (eg flat-bed cutting, folding) it should be assessed as such.
Design may include:	• 4 or more colours, complex graphics and text. Critical "tight" registration, fit and position, registration should be at least that required for four-colour process work.

Unit Sector(s)

Unit sector	

Competency field

Competency field	Printing

Co-requisite units

Co-requisite units		