



TECHNICAL DESCRIPTION

Offset Printing



world **skills**
international

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WorldSkills International, by a resolution of the Technical Committee and in accordance with the Constitution, the Standing Orders and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

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Technical Committee Chair

1. INTRODUCTION

1.1 Name and description of skill

1.1.1 The name of the skill is [Offset Printing](#).

1.1.2 Description of skill

[Offset printing involves the production of printed material using an offset sheet-fed press and other equipment to create finished, printed products. Press operators are responsible for producing all printed material at a printing operation.](#)

[The skill requires an in-depth knowledge of handling, troubleshooting, and maintaining printing factors such as ink, paper, and equipment. Generally, production of the printed product will use a traditional ink-on-paper process, but increasingly operators are using toner-on-paper technology for shorter runs and variable data.](#)

[Operators also have to be able to mix custom ink colours, operate cutting equipment to produce a job to a customer's specifications. Quality control equipment like densitometers and photospectrometers are used to verify and adjust the print quality.](#)

1.2 Scope of application

1.2.1 Every Expert and Competitor must know this Technical Description.

1.2.2 In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

1.3 Associated documents

1.3.1 As this Technical Description contains only skill-specific information it must be used in association with the following:

- WSI - Competition Rules
- WSI - Competition Manual
- WSI - Online resources as indicated in this document
- Host Country - Health and Safety regulations

2. COMPETENCY AND SCOPE OF WORK

The Competition is a demonstration and assessment of the competencies associated with this skill. The Test Project consists of practical work only.

2.1 Competency specification

Press Run

Competitors shall be able to:

- [Print a specified amount of printed products on the sheet-fed offset press according to the quality and technical criteria set and accepted by a customer and according to standards in the industry](#)
- [Perform make-ready, operation and adjustments on 2 and/or 4-colour sheet-fed offset press with or without remote control consoles.](#)
- [Use presses with either semi-automatic or automatic plate mounting.](#)

Cleanup

Competitors shall be able to:

- Clean the equipment and premises after the offset printing process
- Cleaning must be done in a specified time
- Perform common maintenance activities on offset presses.

Finishing

Competitors shall be able to:

- Finishing the printed work by trimming it with a paper cutter to specified dimensions
- Use a programmable paper cutter.
- Use a simple folding machine.

Other Related Skills

Competitors shall be able to:

- Solve the problems in the SHOTS print simulation program. The actual version of the SHOTS program that is available 6 months before the competition is to be the version in the competition.
- Use the SHOTS print simulation program in one of the official languages (English, French or German) or when available, in the competitor's mother tongue.
- Operate a digital printing press.
- Demonstrate knowledge and management of offset printing materials – paper, ink, etc.
- Operate measuring and quality control devices.
- Use different measuring devices like densitometer, spectrophotometer, micrometer etc.
- Demonstrate an understanding of safety and environmental regulations.

2.2 Theoretical knowledge

2.2.1 Theoretical knowledge is required but not tested explicitly.

- The Competitor should have a general understanding of the process. He/she is acquainted with different environmental factors influencing the Offset-Printing process.
- The Competitor needs a good comprehension of the characteristics of the Offset-Printing materials– paper, inks, dampening solution – and their interaction. Knowledge of the correct handling of chemicals and cleaning agents is also needed.
- Basic knowledge of the theory of colours is required to be able to adequately interpret the colour imprint on the printed sheet during make-ready and production, and to translate this into appropriate action on the press.

2.2.2 Knowledge of rules and regulations is not examined.

2.3 Practical work

- Offset-Printing a specified number of different printed products on the sheet-fed offset presses according to the quality and technical criteria set and accepted by a customer and known as standards in the industries, (for example ISO 12647-2)
- Printing must be done in a specified time
- Finishing the printed work by trimming it with a paper cutter to specified dimensions
- Controlling the quality throughout the production process and carrying out required quality measurements and reporting tasks
- Cleaning the equipment and the premises after the Offset-Printing process
- Cleaning must be done in a specified time
- Print different jobs with a print simulation program within a specified time and/or cost.

3. THE TEST PROJECT

3.1 Format / structure of the Test Project

The format of the Test Project is a series of standalone modules.

The modules consist of at least one live print job and some simulated print jobs.

3.2 Test Project design requirements

The TP must be designed so that it will test the Competitors' skills in printing according to the general requirements of that profession in the printing industry. The key areas of competence are:

- Meeting the quality requirement
- Completing the jobs in time
- Avoiding excessive waste
- Handling the equipment and the materials in a professional way
- Observing the safety and environmental regulations

The structure of the Test Project depends on (a) quantity and type of equipment supplied by the host country, (b) the number of participating countries. TP must be designed with those limitations in mind.

The Test Project consists of offset print jobs, 1 or more digital print job, and some additional tasks. Print jobs should be different from each other in terms of product type, paper grade and print run. Additional tasks should be connected to the print jobs. The Competition timetable specifies the order and timing of the different tasks over the four Competition days.

If it is practically possible, the last of the print jobs could be a product designed earlier at the Competition by Competitor(s) of Skill 40 Graphic Design Technology.

Specification of the Test Project

- The specification for the Test project will be developed within 12 months of the Competition on the Discussion Forum.
- Number of colours: 4 colours and/or mixed spot colours
- Offset printing plates will be supplied or made by Competitor
- Paper for modules will be supplied either cut to printing size, or the Competitor may need to trim the feedstock
- Number of copies to be produced for each module will range from 500 – 5000
- Up to 6 kinds of paper may be specified
- Quality target for printing jobs: Approved Proof, (later called AP offset-printed sheet) approved by customer (which can be either Experts or Competitors), a specified numerical density target, specified time and costs (for the print simulator)

Make ready according to the job ticket (also for print simulator jobs)

Instructions to Competitors are provided in the form of a job ticket. The job ticket is finalised after the number of Competitors and presses are known.

- Loading the paper sheets, filling the ink ducts
- Mounting the Offset-Printing plates
- Adjusting the feeder, sheet transfer and delivery
- Adjusting Offset-Printing pressure
- Mixing necessary (PMS) ink colours
- Adjusting ink feed and ink profiles
- Adjusting colour register
- Producing proof prints, comparing them to the specified targets and making necessary adjustments.
- Make ready is completed when the Competitor produces an OK sheet which corresponds to the AP visually, or the solid ink densities are within specified tolerances of the proof

Offset-Printing according to the job ticket (also for print simulator jobs)

- Operating the press to produce the required number of copies within the quality tolerances and specified time
- Making adequate quality assessments and measurements and adjusting the press accordingly
- Making additional adjustments to the press as required.
- Cleaning the Offset-Printing press and carrying out basic maintenance work
- Set back the adjustments of the offset press to 0

Finishing according to the job tickets (also for print simulator jobs)

- Preparing a cutting plan and programming the paper cutter
- Cutting the printed product(s) to the required dimensions

Quality control and adjustments (also for print simulator jobs)

- Checking the quality of materials, the correct operation of the press and the quality of the print throughout make ready and Offset-Printing
- Maintaining correct colour registration and correct density during the whole process
- Checking the mixed colours with spectrophotometer
- Checking the accuracy of trimming
- Checking the number of good copies and waste
- Measuring density of the four colours of the saved sheets from specified jobs, and producing density graphs

Knowledge and using of the safety and environmental regulations

- Working in a safe manner throughout the process
- Using adequate protective devices and materials
- Maintaining cleanliness
- Handling chemicals and waste material in an appropriate way

3.3 Test Project development

The Test Project MUST be submitted using the templates provided by WorldSkills International (<http://www.worldskills.org/competitionpreparation>). Use the Word template for text documents and DWG template for drawings.

3.3.1 Who develops the Test Project / modules

The Test Project/modules will be designed on the Discussion Forum by different groups of Experts.

The Test Project/modules for the print simulator jobs are developed by Sinapseprint – France.

A design team is open to any Member to provide suggestions. The team includes the Expert from the Netherlands involved in the previous Competition.

3.3.2 How and where is the Test Project / modules developed

The Test Project / modules are developed independently by an Expert committee on the forum and by Sinapseprint – France prior to the Competition and presented by one Expert.

3.3.3 When is the Test Project developed

The Test Project is developed 12 months before the competition, with changes after infrastructure and the number of competitors are finalized.

The sponsor providing the press equipment will prepare the technical realisation of the Test Project.

3.4 Test Project marking scheme

Each Test Project must be accompanied by a marking scheme proposal based on the assessment criteria defined in Section 5.

Following the selection of a Test Project for the next Competition, the Expert who prepared the chosen Test Project will prepare the detailed marking scheme (Subjective and Objective Marking Forms), with assistance from other Experts where necessary. It will be submitted to the WorldSkills Secretariat 6 months prior to the next Competition.

3.4.1 The marking scheme proposal is developed by the person(s) developing the Test Project. The detailed and final marking scheme is developed and agreed by all Experts on the forum.

3.4.2 Marking schemes should be entered into the CIS prior to the Competition.

3.5 Test Project validation

The Chief Expert will be responsible for ensuring that the Test Project modules can be completed within the constraints of the Competition. These include time, expected skill-level of the Competitors, and materials and equipment provided. The Chief Expert will also ensure that there are no installation requirements that can not be completed.

3.6 Test Project selection

The Test Project is selected as follows:
By vote of Experts on the forum.

3.7 Test Project circulation

The Test Project is circulated via WorldSkills International website as follows:

- The Test Project is circulated five months before the Competition.
- The final parts of the Test Project – including appropriate changes – will be provided to participating Members at least three months prior to the WorldSkills Competition.

The Expert committee on the forum will develop the final version of the Test Project. In concept it is ready, but in detail (like printing form and amount colors) will be done by technicians of the press equipment sponsor.

After this development we need to discuss it with all Experts.

3 months before the Competition the number of presses is confirmed and final decisions about the Test Project can be made. Also the final assessment criteria will be discussed – refer to paragraph 5.3.

3.8 Test Project coordination (preparation for Competition)

Coordination of the Test Project will be undertaken by Experts

- The likely number of participating Members will be known 12 months before the Competition.
- The actual equipment set-up supplied by the Host Member should be known 12 months before the Competition.
- When the above are known, planning of the structure and timing of the Test Project can be started in the Forum.

The Chief Expert will be responsible for ensuring that:

- There are no installation requirements that can not be completed
- The modules can be completed in Competition time
- The Competitor instructions are kept to a minimum of text, and that they do not exceed the available space permitted on the approved instruction sheet for any one module
- The Test Project modules are complete in all aspects. This part of the preparation must be completed six (6) months prior to the WorldSkills Competition.
- All required communication occurs between all Experts and participating Members.

- Any FAQ (Frequently Asked Questions) document/email is developed in the months leading up to the Competition and posted on the Discussion Forum to ensure that the same answers are provided to everyone and that no Member has an unfair advantage.

3.9 Test Project change at the Competition

Additional print modules and tasks can be put forward up to the Competition time, and changes to one or more of the print jobs included in the Test Project can be made prior to the start of the Competition (the 30% rule).

- Experts will present proposals on the forum.
- Different groups of Experts will be created by the Chief Expert to develop the various tasks.
- A concrete proposal for this will be developed 6 months before the Competition.

The parts of the modules that can be changed are as follows:

- The actual printed images (provided that fast CTP plate-making services are available in the Host country)
- Print runs, paper sizes, Pantone ink specifications (within the limitation of the infrastructure list)

The parts of the modules that should not be changed are:

- Paper grades (predetermined in infrastructure list)
- Number of colours in each module (limited by press type and ink supply as per infrastructure list)
- The additional tasks connected to a job.

3.10 Material or manufacturer specifications

Not applicable

4. SKILL MANAGEMENT AND COMMUNICATION

4.1 Discussion Forum

Prior to the Competition, all discussion, communication, collaboration and decision making regarding the skill must take place on the skill-specific Discussion Forum (<http://www.worldskills.org/forums>). All skill-related decisions and communication are only valid if they take place on the forum. The Chief Expert (or an Expert nominated by the Chief Expert) will be moderator for this forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

4.2 Competitor information

All information for registered Competitors is available from the Competitor Centre (<http://www.worldskills.org/competitorcentre>).

This information includes:

- Competition Rules
- Technical Descriptions
- Test Projects
- Other Competition-related information

4.3 Test Projects

Circulated Test Projects will be available from [worldskills.org](http://www.worldskills.org) (<http://www.worldskills.org/testprojects>) and the Competitor Centre (<http://www.worldskills.org/competitorcentre>).

4.4 Day-to-day management

The day-to-day management is defined in the Skill Management Plan that is created by the Skill Management Team led by the Chief Expert. The Skill Management Team comprises the Jury President, Chief Expert and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six months prior to the Competition and finalised at the Competition (agreed by Experts and submitted to the Chair/Vice Chair of the Technical Committee). The Chief Expert is to regularly share updates of the Skill Management Plan via the Forum.

5. ASSESSMENT

This section describes how the Experts will assess the Test Project / modules. It also specifies the assessment specifications and procedures and requirements for marking.

5.1 Assessment criteria

This section defines the assessment criteria and the number of marks (subjective and objective) awarded. The total number of marks for all assessment criteria must be 100.

Section	Criterion	Marks		
		Subjective (if applicable)	Objective	Total
A	Print quality of specified offset printing jobs		70.0	70.0
B	Print quality of specified digital printing jobs		0.5	0.5
C	Time management of all jobs		10.0	10.0
D	Finishing quality		0.5	0.5
E	Simulation jobs		18.5	18.5
F	Maintenance		0.5	0.5
Total =			100	100

5.2 Subjective marking

Not applicable.

5.3 Skill assessment specification

The skill assessment criteria are clear concise aspect specifications which explain exactly how and why a particular mark is awarded.

[A - Print quality of specified offset printing jobs](#)

- Processing and control of the printing materials
- Adjustment of the feeder
- Adjustment of the delivery
- Adjustment of the pressure
- Making the OK sheet
- Colour registration
- Number of copies
- Colour quality

[B - Print quality of specified digital printing jobs](#)

- Control of the printing process
- Control of the quality of the printed matter

C - Time management of all jobs

- Printing time
- Finishing time
- Colour measurement time
- Ink mixing time
- Time for cutting raw paper

D - Finishing quality

- Press clean after all jobs
- Cleanliness of the working area
- Starting from the correct sidelay corner
- Number of cuts
- Correct product size
- Proper and economical handling of sheets and cards

E – Simulation jobs

- Aspect specifications are to be discussed due to the new inclusion of this module

F - Maintenance

5.4 Skill assessment procedures

- The marking scale must be developed during discussion on the forum. This will give the final assessment marks.
- It is our intention to reduce the number of aspects of criterion to a maximum of 65, in line with the request from WorldSkills International.
- Progressive marking will be used for all sections of the Competition, with daily marking of completed modules and data entry into the CIS.
- Experts are divided into marking teams at the Competition by the Chief Expert. WorldSkills experience, language, culture and continent Member if from are taken into consideration.
- All Experts mark the same aspects for all Competitors.
- All Experts mark the same percentage of marks for the Competition.
- During the Competition three (3) Experts observe one Competitor and write down their marks. The majority of marks will be entered into the CIS.
- After the Competitor has completed the test, Experts will look at the printed jobs and there will be a “blind” marking for each job. The majority of marks will be entered into the CIS.
- For the objective marking, all aspects will be judged at the same time at the end of each Competition day.
- Once the Test Project is established it will be tested on the Competition site (if possible) so the experts can test the marking matrix and establish acceptable measurement standards and tolerances.

6. **SKILL-SPECIFIC SAFETY REQUIREMENTS**

Refer to Host Country Health & Safety documentation for Host Country regulations.

- Long hair must be tied up or covered.
- Use of chains or other hanging objects in clothing is forbidden.
- Work clothing must be a kind of which presents no danger or snagging.
- Work shoes must allow safe working and movement
- Competitors must follow the provided instructions of the machines
- Competitors must follow the provided instructions on the handling of detergents, printing ink and paper.

7. **MATERIALS & EQUIPMENT**

7.1 **Infrastructure List**

The Infrastructure List lists all equipment, materials and facilities provided by the Host Country.

The Infrastructure List is online (<http://www.worldskills.org/infrastructure/>).

The Infrastructure List specifies the items & quantities requested by the Experts for the next Competition. The Host Country will progressively update the Infrastructure List specifying the actual quantity, type, brand/model of the items. Host Country supplied items are shown in a separate column.

At each Competition, the Experts must review and update the Infrastructure List in preparation for the next Competition. Experts must advise the Technical Director of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

7.2 **Materials, equipment and tools supplied by Competitors in their toolbox**

- Working clothes
- Gloves and earplugs are supplied by the Host

7.3 **Materials, equipment and tools supplied by Experts**

All equipment required will be supplied by the Host

7.4 **Materials & equipment prohibited in the skill area**

Tool boxes are not allowed

7.5 **Sample workshop layouts**

Workshop layouts from Calgary are available at:

http://www.worldskills.org/index.php?option=com_halls&Itemid=540

Workshop layout from previous Competition:



8. MARKETING THE SKILL TO VISITORS AND MEDIA

8.1 Maximising visitor and media engagement

To maximise visitor and media engagement the following ideas may be considered:

- Presses should be installed in a way to make it attractive for spectators.
- Try a trade
- Display screens
- Test Project descriptions
- Enhanced understanding of Competitor activity
- Competitor profiles
- Career opportunities
- Daily reporting of competition status

8.2 Sustainability

- Recycling
- Use of 'green' materials
- Use of completed Test Projects after Competition
- Printed copies will be supplied to a not-for-profit organisation