Apprenticeship
Training Standard

Schedule of Training

Optics Technician
(Lens and Prism Maker)

225A

2000
PREFACE

This Schedule of Training was developed by the Ministry of Training, Colleges, and Universities (MTCU), in partnership with the Industry Advisory Committee and in consultation with representatives from the industry. This document is intended to be used by apprentice, supervisor/trainer and sponsor/employer as a "blueprint" for training and as a prerequisite for completion and certification.

This training document becomes the apprentice’s only record of workplace training performance.

Supervisor/trainer and apprentice are required to sign off and date the skill following each successful acquisition, unless a skill is marked shaded (optional).

The care and maintenance of this training document are the joint responsibility of the apprentice and the sponsor/employer. By signing off the skill, the supervisor/trainer and the apprentice are indicating that the apprentice has demonstrated competence of the skill. This training standard has been developed specifically for documenting the apprentices’ acquisition of skills of the trade.

Please Note:

Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the Trades Qualification and Apprenticeship Act (TQAA) or the Apprenticeship and Certification Act, 1998 (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the Ontario College of Trades and Apprenticeship Act, 2009 (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College’s website (www.collegeoftrades.ca) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: www.collegeoftrades.ca/about/legislation-and-regulations.
NOTICE OF COLLECTION OF PERSONAL INFORMATION

1. At any time during your apprenticeship training, you may be required to show this training standard to the Ministry of Training, Colleges and Universities (the Ministry). You will be required to disclose the signed Apprenticeship Completion form to the Ministry in order to complete your program. The Ministry will use your personal information to administer and finance Ontario’s apprenticeship training system, including confirming your completion and issuing your certificate of apprenticeship.

2. The Ministry will disclose information about your program completion and your certificate of apprenticeship to the Ontario College of Trades, as it is necessary for the College to carry out its responsibilities.

3. Your personal information is collected, used and disclosed by the Ministry under the authority of the Ontario College of Trades and Apprenticeship Act, 2009.

4. Questions about the collection, use and disclosure of your personal information by the Ministry may be addressed to the:

   Manager, Employment Ontario Contact Centre
   Ministry of Training, Colleges and Universities
   33 Bloor St. E, 2nd floor, Toronto, Ontario M7A 2S3
   Toll-free: 1-800-387-5656; Toronto: 416-326-5656
A. DESCRIPTION/DUTIES:

1. A Precision Lens and Prism Maker (optics):
   - Produces precision spherical and plane optics to specifications.
   - Corrects lens/prisms surfaces to optimum quality.
   - Checks with interferometer and spectrometer.
   - Inspects, cements, and aligns optical components to optical axes.
   - Coats optics with anti-reflecting or high reflecting coats.

Is knowledgeable in:
   - Advanced mathematics
   - Nature an Propagation of light
   - Lens technology
   - Principles of optical instruments
   - OHSA

Benchmark/Guideline Total Training Time Frames:
( Min/Max) On-the-Job and In-School)

8, 000 hours

Sponsor/Company/Sector/IC Name:

<table>
<thead>
<tr>
<th>Originating PDSU/TC/IC</th>
<th>Date</th>
<th>District Manager/PDSU Manager</th>
<th>Date</th>
</tr>
</thead>
</table>

HEAD OFFICE USE

Program Standards Approval

By ______________________

Date ________________

Director's Approval

By ______________________

Date ________________

Assigned Trade Code

225A
### B. ON-THE-JOB TRAINING:

<table>
<thead>
<tr>
<th>Unit No</th>
<th>GENERAL PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>225A-1</td>
<td><strong>Demonstrate Safe Working Practices and Techniques</strong></td>
</tr>
<tr>
<td></td>
<td>Recognize and handle potential health and safety hazards and hazardous materials; comply with government safety standards, regulations, policies and procedures; wear personal protective equipment and clothing; operate emergency safety equipment; maintain good housekeeping; use and maintain tools and equipment; assure protection from fire hazards; and in accordance with OHSA and company procedures. Follow environmental procedures and regulations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date Completed</th>
<th>Sponsor’s Signature</th>
<th>Apprentice’s Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>225A-2</th>
<th><strong>Spherical Precision Optics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Set up and operate optic machinery including spherical grinders, drills, fine grinders polishers, and center and edge grinders. Perform milling and blocking machining procedures. Perform bevelling by hand or machine.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date Completed</th>
<th>Sponsor’s Signature</th>
<th>Apprentice’s Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>225-3</th>
<th><strong>Plane Precision Optics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Set up and operation required machines or equipment to produce plane surfaces for filters, windows, prisms, and mirrors. Troubleshoot and make corrects to surfaces by hand so that surfaces are of optimum quality. Perform measuring and checking using interferometer and spectrometer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date Completed</th>
<th>Sponsor’s Signature</th>
<th>Apprentice’s Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### B. ON-THE-JOB TRAINING (cont’d):

<table>
<thead>
<tr>
<th>Unit No</th>
<th>GENERAL PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>225A-4</td>
<td><strong>Inspection and Cementing of Precision Optical Components</strong>&lt;br&gt;Check and inspect optical components so that precision optical components are to specifications. Cement and align lenses and prisms to optical axes. Introduction for manufacture of reticles.</td>
</tr>
<tr>
<td></td>
<td>Date Completed Sponsor’s Signature Apprentice’s Signature</td>
</tr>
<tr>
<td></td>
<td>____________ ________________ __________________________</td>
</tr>
<tr>
<td>225A-5</td>
<td><strong>Coating of Glass Surfaces</strong>&lt;br&gt;Coat optics with anti-reflecting or high-reflecting coats.</td>
</tr>
<tr>
<td></td>
<td>Date Completed Sponsor’s Signature Apprentice’s Signature</td>
</tr>
<tr>
<td></td>
<td>____________ ________________ __________________________</td>
</tr>
</tbody>
</table>
SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Precision Lens and Prism Maker (optics) - 225A

C. OFF-THE-JOB LEARNING OUTCOMES:

CONTENT: (To be written in learning outcomes and benchmark timeframes). On successful completion of off-the-job (in-school) training, the apprentice will demonstrate the ability to:

- Mathematics - arithmetic, geometry, algebra, trigonometry
- Drafting and layout
- Blueprint and schematic reading and interpretation
- Knowledge of metric system
- Nature and propagation of light
  - sources
  - transmission
  - velocity
- Theories of light
  - interference of light wages
- Reflection of light-mirrors
  - laws
  - regular and diffuse reflection
  - images in plane mirrors
  - curved mirrors
  - concave mirrors
  - convex mirrors
  - mirror formulae
  - applications
- Refraction of light - lenses
  - index of refraction
  - refraction through glass plate
  - prisms
- Compositions of white light
  - spectrum
  - dispersion
  - recomposition
  - total reflection
  - spectrum analysis
- Lenses
  - converging or convex
  - diverging or concave
  - characteristics
  - reference points
- Images in convex
- Concave lenses
C. OFF-THE-JOB LEARNING OUTCOMES (cont’d):

CONTENT: (To be written in learning outcomes and benchmark timeframes). On successful completion of off-the-job (in-school) training, the apprentice will demonstrate the ability to:

- Lens formulae
- Applications
- Principle of optical instruments
  - camera
  - slide projector
  - human eye
  - simple and compound microscope
- telescope prism binocular
- Precision Measurement
- Principles and operation of optical manufacturing machines.

Source & Type (Specify in detail: e.g. block or day release; night school; correspondence)

In-Plant

Benchmark/Guideline Time-frames of Off-the-Job/In-School Learning Outcomes:

100 hours

Funding

Performance Objectives and Learning Outcomes reached:

Date:

Sponsor/Trainer/Employer signature:

Apprentice signature:

You will be required to disclose this signed form to the Ministry of Training, Colleges and Universities in order to complete your program. The Ministry will use your personal information to administer and finance Ontario’s apprenticeship training system. For further information please see the notice/declaration for collection of personal information that is referenced in the table of contents of this training standard.