

Grade 9 Exploration of Welding Technology

Course Code

8377

Course Credit

1.0 or
0.5

Senior Years Technology Education Program

Discipline Overview

An approved technical-vocational education (TVE) program cluster comprises departmentally developed and/or approved courses in one specific trade or trained occupation that facilitates the transition from school to either post-secondary training (such as the training provided through Apprenticeship Manitoba) or entry into the workforce (often at an entry-level position).

When learners pursue their studies in an environment modelled after the workplace, they will acquire not only trade-related skills, but will also develop

- employability skills required to make an effective transition from school to work
- an understanding of career development and planning
- an understanding of the importance of becoming an autonomous, lifelong learner in order to adapt to the skills and knowledge needed in the future
- an awareness of safety in school, in the workplace, and at home
- an awareness of sustainability as it relates to the specific skilled trade area and society

Course Overview

This is an optional course intended for learners wanting to explore welding technology. It may be delivered as a half-credit or full-credit course. Learners will be introduced to welding safety, tools, and equipment, as well as materials and consumables. They will begin developing essential skills for working in the welding trade.

The learning outcomes in this course may not follow a fixed sequence, as they are organized to align with Apprenticeship Manitoba standards. Only the outcomes relevant to this course are included. A complete list of learning outcomes can be found in the primary learning outcomes resource.

Global Competencies in Welding Technology



Critical Thinking

Critical thinking in welding technology involves the intentional process of synthesizing and analyzing ideas using criteria and evidence, making reasoned judgments, and reflecting on the outcomes and implications of those judgments.

When critical thinking as a competency is applied in welding technology, learners

- find and use sources strategically, efficiently, and effectively for the design and management of projects
- evaluate sources for bias, relevance, and reliability for use in training and occupations
- analyze and synthesize ideas using criteria and evidence that demonstrate awareness of emerging trends
- reflect on sources and experiences from multiple perspectives
- enhance comprehension, clarify meaning, make connections, and expand experiences through questioning
- make judgments based on observation, experience, and evidence
- weigh criteria to apply safe practices and make ethical decisions



Creativity

Creativity in welding technology involves exploring and playing with ideas and concepts in order to represent thinking, solve problems, explore opportunities, and innovate in unique ways. It is the interaction between intuition and thinking.

When creativity as a competency is applied in welding technology, learners

- demonstrate initiative, open-mindedness, inventiveness, flexibility, and a willingness to take prudent risks in thinking through projects/processes and recognizing safety protocols
- demonstrate curiosity by exploring new ideas, possibilities, and emerging trends, as well as by asking relevant questions
- use theoretical and applied strategies by making adaptations and adjustments to solve a problem and generate innovative ideas
- enhance innovative ideas by building on the ideas of others
- create a plan for a project and adjust it as needed to achieve the goal of successfully meeting a learning outcome
- research, develop, test, and adapt designs and ideas, as well as build on prior knowledge to persevere through obstacles
- reflect by welcoming feedback from others to enhance the process



Citizenship

Citizenship in welding technology involves engaging and working toward a more equitable, compassionate, and sustainable world by developing and valuing relationships to self, others, and the natural world.

When citizenship as a competency is applied in welding technology, learners

- understand their own perspective on issues related to economies on a global, regional, and local level
- recognize discrimination, principles of equity, and human rights in their world
- explore the interconnectedness of self, the workplace, and the natural world
- welcome diverse viewpoints, experiences, and world views and how they contribute to building relationships and practices
- empathize with multiple viewpoints to better understand consumers, markets, workplaces, teams, and co-workers
- connect with others in responsible, respectful, and inclusive ways, both in person and in digital contexts
- realize their potential in contributing to the betterment of community near and far
- evaluate factors such as the impact of diversity, equity, and inclusion in the workplace, and propose solutions to support well-being
- make ethical choices to promote healthy and sustainable outcomes



Connection to Self

Connection to self in welding technology involves awareness of the related nature of emotional, intellectual, physical, social, cultural, and spiritual aspects of living and learning, and the responsibility for personal growth, well-being, and well-becoming.

When connection to self as a competency is applied in welding technology, learners

- recognize personal strengths, gifts, and challenges to support their learning and well-being
- come to know the factors that shape their identity through exploration
- use workplace skills and practices to enhance self-regulation, personal comfort, sense of well-being, and efficiency
- reflect on own decisions, effort, and experiences, and others' feedback for improvement
- set goals to strengthen their career and personal aspirations
- create a personal plan that reflects their career goals, encompassing their strengths and interests
- value and practise resilience as they work through mistakes and overcome obstacles

- adapt and modify their planning when presented with obstacles or new information
- recognize and embrace their role in lifelong learning, well-being, and well-becoming



Collaboration

Collaboration in welding technology involves learning with and from others and working together with a shared commitment to a common goal.

When collaboration as a competency is applied in welding technology, learners

- welcome diverse viewpoints, experiences, and world views, and appreciate how they contribute to building relationships and practices
- build on each other's ideas through discussion, sharing stories, models, and simulations, and incorporate this learning into practical applications
- value and put trust in others' contributions when working together to ensure safe practices
- formulate questions of themselves and others to generate new ideas and deepen understanding
- work through differences and show a willingness to compromise or change perspective by demonstrating effective conflict resolution practices/strategies and appropriate workplace etiquette and protocols
- co-construct understanding of current practices and emerging technologies
- commit to their roles to co-construct, design, and manage projects




Communication

Communication in welding technology involves interacting with others and allowing for a message to be received, expressed, and understood in multiple ways and for a variety of purposes.

When communication as a competency is applied in welding technology, learners

- express ideas while using workplace conventions and professionalism
- understand context, adapting to different audiences, and conveying information clearly and concisely
- understand how their words and actions shape their identity or have an impact
- understand protocols and practices and use them to understand and interpret messages
- seek to understand others' ideas and instructions through active listening and questioning
- recognize that diverse perspectives (of language, culture, age, etc.) can influence understanding

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- make meaning and deepen understanding through their language and the languages of clients and colleagues
 - build relationships through meaningful interactions using inclusive and respectful language, and correct terminology, both in person and in digital contexts
 - recognize the benefits of communication to build community

Enduring Understandings

Explore career opportunities.

Technical-vocational education supports learners to understand the unique characteristics, scope, working conditions, and career opportunities of various occupations to make informed choices.

Create safe, healthy, and effective workspaces.

Technical-vocational education provides learners with safe, healthy, and effective work practices and protocols that meet industry standards for technical competence and professionalism.

Navigate the world.

Technical-vocational education prepares learners with attitudes, skills, and knowledge to successfully navigate complex, competitive, and collaborative environments to develop an awareness of regulations, cultural competence, and ethical practices.

Experience connected and innovative learning.

Technical-vocational education readies learners to be entrepreneurial and innovative thinkers while making cross-curricular connections and transdisciplinary experiences (STEAM), utilizing industry standard digital tools and technologies, and fostering awareness of industry trends.

Promote inclusive and responsive systems.

Technical-vocational education promotes equity, diversity, and inclusion, is responsive to global challenges, and promotes environmental stewardship to prepare learners for an interconnected world.

Prepare for evolving economies.

Technical-vocational education equips learners with relevant and adaptable skills to become lifelong learners in an ever-changing world.



Learning Outcomes

With teacher guidance, learners can achieve the following learning outcomes.

Strand A: Trade Safety (A2)

WEL-9-A1 Define Manitoba safety and health requirements.

WEL-9-A1-1 **Define Manitoba safety and health requirements** under The Workplace Safety and Health Act and Regulations for **workers' rights**, including

- the right to know
- the right to participate
- the right to refuse
- the right to protection from reprisal

WEL-9-A1-2 Define Manitoba safety and health requirements under The Workplace Safety and Health Act and Regulations for **workers' responsibilities**, including

- taking reasonable care to protect themselves and others
- using safety equipment properly
- following safety rules and procedures
- cooperating with safety representatives and supervisors

WEL-9-A2 Identify, describe, and demonstrate personal protective equipment (PPE) requirements and standards in the workplace.

WEL-9-A2-1 Identify various **personal protective equipment** (PPE), including

- eye protection
- face protection
- hearing protection
- foot protection
- head protection
- hand protection
- skin protection
- respiratory protection
- protective clothing
- fall protection (trade-specific)



WEL-9-A2-2 Describe various **personal protective equipment** (PPE), including

- selection of the appropriate PPE
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

WEL-9-A2-3 Demonstrate how to use the **required personal protective equipment** (PPE), ensuring

- a proper fit
- a proper seal
- it is worn properly
- an understanding of the procedures for reporting any damage or malfunctions

WEL-9-A3 Identify and describe the Workplace Hazardous Material Information System (WHMIS) and procedures.

WEL-9-A3-1 Describe how various hazardous materials are **identified**, including

- classification
- safety data sheets (SDS)
- labelling
- training
- access to information

WEL-9-A3-2 Describe what **suppliers and workplaces** must do when labelling hazardous products, including


- using safety symbols
- classifying chemicals

WEL-9-A3-3 Identify various **safety data sheets** (SDS).

WEL-9-A3-4 Identify various **chemical and biological hazards**.

WEL-9-A3-5 Describe how to deal with **chemical and biological hazards** safely, including

- how to wash off spills
- moving dangerous materials
- storing them properly




WEL-9-A4 Identify and describe safe work procedures (SWP).

- WEL-9-A4-1** Identify a **safe work procedure** (SWP) that outlines specific steps to safely perform a task, including
- hazard identification
 - risk assessment
 - control measures
- WEL-9-A4-2** Describe a **safe work procedure** (SWP), including
- purpose
 - scope
 - procedure
 - training
- WEL-9-A4-3** Identify a hazard and describe the procedures to follow for managing **uncontrolled risks**, including
- unsecured tools or equipment
 - improper use of machinery
 - electrical hazards
 - chemical exposure
 - lack of personal protective equipment (PPE)
 - poor housekeeping

WEL-9-A5 Identify and describe injury prevention.

- WEL-9-A5-1** Identify, describe, and demonstrate the **SAFE acronym**.
- **S**pot the hazard
 - **A**ssess the risk
 - **F**ind a safer way
 - **E**very day
- WEL-9-A5-2** Identify various **mental health risks** at work and school, such as
- stress
 - bullying
 - violence
- WEL-9-A5-3** Describe how to prevent various **mental health risks**, including
- respectful communication
 - implementation of clear policies
 - access to support systems

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- WEL-9-A5-4** Demonstrate how to reduce various **mental health risks** at work and school, such as by
- promoting respect
 - offering support
 - proactively identifying and managing issues such as stress or bullying
- WEL-9-A5-5** Identify various methods to prevent injuries among **young workers**, such as through
- completion of the Young Worker Readiness Certificate Course
 - mandatory safety orientation and training
 - supervision by experienced workers
 - implementation of SAFE Work Manitoba's young worker injury prevention strategy
 - use of personal protective equipment (PPE)
 - encouraging reporting of unsafe conditions
 - promoting awareness of workers' rights
- WEL-9-A5-6** Describe various methods to prevent injuries among **young workers**, including
- selection of the appropriate method
 - key features and characteristics
 - application (its role or utility in specific scenarios)
 - limitations in scope or performance
- WEL-9-A5-7** Identify various **chemical and biological hazards**, including
- dust
 - fumes
 - gases
- WEL-9-A5-8** Describe how to prevent various **chemical and biological hazards**, such as by
- using proper ventilation
 - using safety gear
 - using personal protective equipment (PPE)
 - implementing safe handling procedures
- WEL-9-A5-9** Identify how to prevent various injuries related to **electrical safety**, including
- using proper tools
 - turning off power before repairs
 - following lockout/tagout steps to make sure machines cannot be turned on accidentally



WEL-9-A5-10 Demonstrate how to safely shut off and lock electrical equipment using a **lockout/tagout** procedure.

WEL-9-A5-11 Identify how to prevent various **fire injuries**, including

- identifying different types of fires
- identifying different kinds of fire extinguishers
- describing how to use fire extinguishers safely

WEL-9-A5-12 Demonstrate knowledge of the **locations of various fire emergency safety equipment** and evacuation safety measures, including

- fire extinguisher
- alarm pull stations
- emergency exits
- muster points

WEL-9-A6 Identify and describe injury response.

WEL-9-A6-1 Describe how to **manage a scene** when responding to an injury, such as by

- staying calm
- keeping the area safe
- providing support until trained help arrives

WEL-9-A6-2 Describe how to **report an injury**, including reporting the injury to a teacher or supervisor.

WEL-9-A6-3 Demonstrate knowledge of the **locations of emergency safety equipment**, including


- first aid kit
- automated external defibrillator (AED)
- eyewash station

Strand B: Career Education (A1)

WEL-9-B1 Describe the structure and scope of the welding trade.

WEL-9-B1-1 Describe opportunities and future **career paths** in a trade, including

- becoming a specialist
- moving into leadership
- working in different locations
- growing with new technology



WEL-9-B2 Describe the levels of workplace competency.

WEL-9-B2-1 Describe **job competencies** workers and learners need to know related to **workplace culture**, including

- understanding tools and materials
- using the right skills to do the job well

WEL-9-B2-2 Describe the **social competencies** workers and learners need to know related to **workplace culture**, including

- working well with others
- using appropriate language
- respecting different beliefs
- understanding workplace rules
- supporting fairness and inclusion

Strand C: Trade-Related Communications (A4)

WEL-9-C1 Describe and demonstrate techniques for effective verbal and non-verbal communication.

WEL-9-C1-1 Describe how to communicate clearly and respectfully with different people at school and/or work, using both **words and body language**.

WEL-9-C1-2 Demonstrate how to communicate clearly and respectfully with different people at school and/or work, using both **words and body language**.


WEL-9-C2 Identify workplace behaviours and communication that constitute bullying, as defined by the Canadian Human Rights Act and jurisdictional human rights laws.

WEL-9-C2-1 Identify what **respectful workplace** values look like and what kinds of behaviour are considered bullying, harassment, or discrimination under Canadian law.

WEL-9-C3 Demonstrate effective communication skills, and practise active listening and response.

WEL-9-C3-1 Demonstrate **effective communication and active listening**, including

- listening carefully
- responding clearly
- using appropriate body language
- asking questions
- being open to feedback



WEL-9-C4 Identify types of communication devices, and describe their purpose and operation.

WEL-9-C4-1 Identify various types of **communication devices**, including

- telephones
- two-way radios
- computers
- smartphones
- tablets

WEL-9-C4-2 Describe various purposes and operation of **communication devices**, such as their use for

- speaking
- sending messages
- sharing information

WEL-9-C5 Demonstrate communication techniques using various communication devices.

WEL-9-C5-1 Demonstrate good **communication skills** when using various communication devices to speak, send messages, or share information, including

- keeping the message concise
- articulating ideas precisely to avoid confusion
- remaining polite and professional

Strand D: Trade-Related Mathematics (A5)


WEL-9-D1 Use mathematical properties to solve problems involving whole, fractional, decimal, and percentage numbers, with an emphasis on trade-related problems.

WEL-9-D1-1 Demonstrate how to solve math problems with both **positive and negative numbers**, indicating how the signs (+ or –) affect the answer, when

- adding
- subtracting
- multiplying
- dividing

WEL-9-D1-2 Identify various **types of fractions**, including

- proper fractions
- improper fractions
- mixed fractions



WEL-9-D2 Demonstrate how to communicate measurements.

WEL-9-D2-1 Demonstrate how to **measure**.

WEL-9-D2-2 Demonstrate how to **measure**, using both **metric and customary** (imperial) measurement systems, such as when

- measuring length
- measuring materials

WEL-9-D2-3 Demonstrate how to provide **measurements**, including how much the measurements can vary (e.g., bead width).

Strand E: Tools and Equipment (A3)

WEL-9-E1 Identify, describe, and demonstrate an understanding of terminology associated with tools and equipment.

WEL-9-E1-1 Identify **key terms** and **names** of various tools and equipment.

WEL-9-E1-2 Describe the **names** and **purposes** of various tools and equipment.

WEL-9-E1-3 Demonstrate an understanding of the **names** and **purposes** of various tools and equipment.


WEL-9-E2 Identify the various hazards associated with tools and equipment, and describe and demonstrate the related safe work practices.

WEL-9-E2-1 Identify various tools and equipment **hazards**, including

- harmful noise levels
- lacerations caused by sharp tools or materials
- crush injury hazards
- moving parts on machines that can catch and trap hands or garments
- flying debris hazards

WEL-9-E2-2 Describe various tools and equipment **safe work practices**, including

- wearing appropriate personal protective equipment (PPE)
- inspecting tools and equipment before use
- using the correct tool for the job
- keeping the work area clean and organized
- following manufacturer instructions and safety guidelines
- disconnecting power tools when not in use or during maintenance
- reporting and removing damaged tools from service
- staying alert and avoiding distractions while working

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- using guards and safety devices as intended
 - storing tools properly after use

WEL-9-E2-3 Demonstrate safe work practices related to tools and equipment.

WEL-9-E3 Identify, describe, and demonstrate tools and equipment, including their selection, characteristics, applications, and limitations.

WEL-9-E3-1 Identify various **hand tools**.

WEL-9-E3-2 Describe various **hand tools**, including

- selection of the appropriate hand tool
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-9-E3-3 Demonstrate how to safely and properly use various **hand tools**.

WEL-9-E3-4 Identify various tools used for **layout, measuring, and marking**.

WEL-9-E3-5 Describe various tools used for **layout, measuring, and marking**, including

- selection of the appropriate tool for **layout, measuring, and marking**
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage


WEL-9-E3-6 Demonstrate how to safely and properly use various tools used for **layout, measuring, and marking**.

WEL-9-E3-7 Identify various **portable power tools**, including

- electric power tools
- hydraulic power tools

WEL-9-E3-8 Describe various **portable power tools**, including

- selection of the appropriate portable power tool
- characteristics and key features
- application (i.e., role or utility in specific scenarios)

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- limitations in scope or performance
 - procedures for conducting a thorough inspection
 - procedures for regular maintenance
 - guidelines for proper storage

WEL-9-E3-9 Demonstrate how to safely and properly use various portable power tools.

WEL-9-E3-16 Identify various **non-thermal cutting and grinding tools**.

WEL-9-E3-17 Describe various **non-thermal cutting and grinding tools**, including

- selection of the appropriate non-thermal cutting and grinding tool
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-9-E3-18 Demonstrate how to safely and properly use various **non-thermal cutting and grinding tools**.


Strand F: Materials and Consumables

WEL-9-F1 Share and discuss Indigenous perspectives and environmental impacts.

WEL-9-F1-1 Share and discuss an **Indigenous perspective** on material selection, emphasizing sustainability, respect for natural resources, and cultural significance, such as

- principles of the honourable harvest
- four sacred elements (earth, wind, water, fire)
- inviting an Elder to teach sustainability

WEL-9-F1-2 Share and discuss the **environmental impact** of selecting and disposing of various mechanical materials.



WEL-9-F2 Identify the various hazards associated with consumables and materials, and describe and demonstrate the related safe work practices.

WEL-9-F2-1 Identify various **hazards** for welding consumables and materials, including

- burns
- lifting
- flux dust

WEL-9-F2-2 Describe various consumables and materials **safe work practices**, including

- wearing appropriate personal protective equipment (PPE)
- inspecting consumables and materials before use
- using the correct consumables and materials for the job
- keeping the work area clean and organized
- following manufacturer instructions and safety guidelines
- reporting and removing damaged consumables and materials from service
- staying alert and avoiding distractions while working
- storing consumables and materials properly after use

WEL-9-F2-3 Demonstrate safe work practices related to **consumables and materials**.


WEL-9-F3 Identify and describe organizing materials, including their characteristics, applications, and procedures.

WEL-9-F3-1 Identify various types of **materials and consumables**, including

- base materials
- filler materials
- shielding gases
- flux
- consumable parts

WEL-9-F3-2 Describe various types of **materials and consumables**, including

- selection of the appropriate materials or consumables
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage



WEL-9-F4 Identify and describe non-thermal cutting and grinding consumables, including their selection, characteristics, applications, and limitations.

WEL-9-F4-1 Identify various **non-thermal cutting and grinding** consumables, including carbon steel.

WEL-9-F4-2 Describe various non-thermal cutting and grinding **consumables**, including

- selection of the appropriate non-thermal cutting and grinding consumable
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-9-F5 Demonstrate how to safely and properly use various types of materials and consumables.

WEL-9-F5-1 Demonstrate how to safely and properly use various types of **materials and consumables**.

Strand I: Weld Process and Quality Inspection (A8)

WEL-9-I1 Identify, describe, and demonstrate an understanding of terminology associated with weld processes and quality inspection.

WEL-9-I1-1 Identify **key terms** and **names** of various weld processes, and of quality inspection.

WEL-9-I1-2 Describe the **names** and **purposes** of various weld processes, and of quality inspection.


WEL-9-I1-3 Demonstrate an understanding of the **names** and **purposes** of various weld processes, and of quality inspection.

WEL-9-I2 Identify the various hazards associated with weld processes and quality inspection, and describe and demonstrate the related safe work practices.

WEL-9-I2-1 Identify various **gas cylinder hazards**, including

- explosions
- displacement of oxygen (asphyxiation)

WEL-9-I2-2 Describe the safe work practices for **gas cylinder hazards**, including safety data sheets (SDS).

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- WEL-9-I2-3** Identify various **final product hazards**, including
- cuts
 - particulate projection/sparks
 - dust particulate inhalation
 - toxic chemicals
- WEL-9-I2-4** Describe safe work practices related to **final product hazards**.
- WEL-9-I2-5** Identify various hazards related to **controlling temperature of weldments**, including
- electrical shock
 - burns
- WEL-9-I2-6** Describe safe work practices related to **controlling temperature of weldments**.
- WEL-9-I2-7** Demonstrate safe work practices related to **weld processes and quality inspection**.

WEL-9-I3 Interpret jurisdictional codes, regulations, and job specifications pertaining to weld processes and quality inspection.

- WEL-9-I3-1** Understand and apply the rules and job requirements that relate to how welding is done and how its quality is checked, based on the laws and standards in a specific area.

WEL-9-I4 Identify and describe welding consumables and gas cylinders, including their characteristics, applications, and storage.

- WEL-9-I4-1** Identify various **welding consumables**, including
- electrodes
 - welding wires
 - welding fluxes
- WEL-9-I4-2** Describe various **welding consumables**, including
- selection of the appropriate welding consumable
 - characteristics and key features
 - application (i.e., role or utility in specific scenarios)
 - limitations in scope or performance
 - procedures for conducting a thorough inspection
 - procedures for regular maintenance
 - guidelines for proper storage



WEL-9-I4-3 Identify various **gas cylinder** product types and identification, including

- fuel gas
- oxygen gas
- inert gas
- active gas

WEL-9-I4-4 Describe various **gas cylinder** product types and identification, including

- selection of the appropriate gas cylinder product type
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-9-I5 Demonstrate how to safely and properly use welding consumables and gas cylinders.

WEL-9-I5-1 Demonstrate how to safely and properly use welding consumables and gas cylinders.

WEL-9-I6 Identify and describe welding processes, including their selection, characteristics, and applications.

WEL-9-I6-1 Identify various **welding processes**, including

- shielded metal arc welding (SMAW)
- gas metal arc welding (GMAW)
- oxy-fuel welding (OFW)

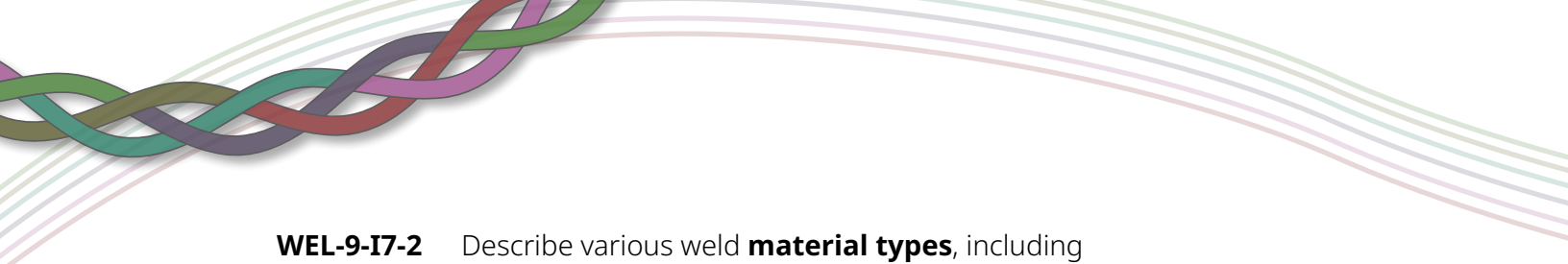
WEL-9-I6-2 Describe various **welding processes**, including

- selection of the appropriate welding process
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

WEL-9-I7 Identify and describe material types, including their characteristics and applications.

WEL-9-I7-1 Identify various weld **material types**, including

- ferrous
- non-ferrous

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- WEL-9-I7-2** Describe various weld **material types**, including
- selection of the appropriate weld material type
 - characteristics and key features
 - application (i.e., role or utility in specific scenarios)
 - limitations in scope or performance
 - procedures for conducting a thorough inspection
 - procedures for regular maintenance
 - guidelines for proper storage

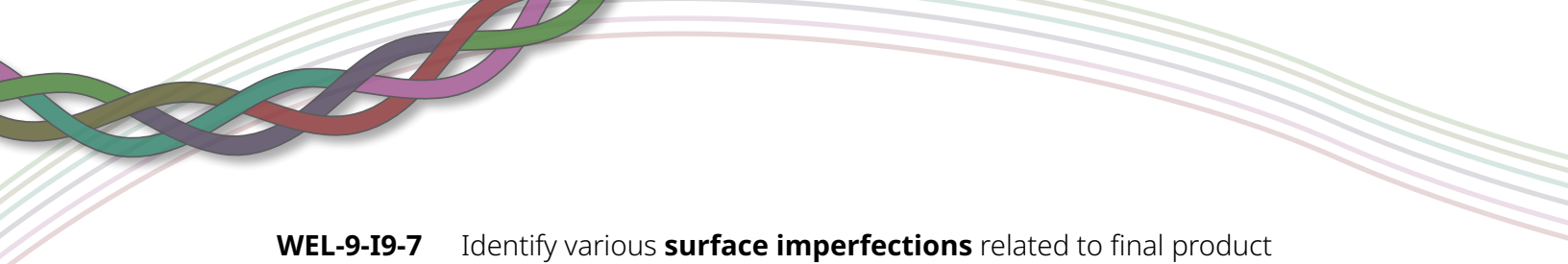
WEL-9-I9 Identify and describe final product finishing, including its characteristics and applications.

- WEL-9-I9-3** Identify various final product **finishing tools and equipment**, including
- grinders
 - wire wheels
 - buffers

- WEL-9-I9-4** Describe various final product **finishing tools and equipment**, including
- selection of the appropriate finishing tools and equipment
 - characteristics and key features
 - application (i.e., role or utility in specific scenarios)
 - limitations in scope or performance
 - procedures for conducting a thorough inspection
 - procedures for regular maintenance
 - guidelines for proper storage

- WEL-9-I9-5** Identify various **undesirable materials** related to final product finishing, including
- oils
 - oxides

- WEL-9-I9-6** Describe various **undesirable materials** related to final product finishing, including
- their identification
 - their characteristics
 - their effects on the final product
 - correction of undesirable materials on the final product finishing



WEL-9-I9-7 Identify various **surface imperfections** related to final product finishing, including

- welding spatter
- gouges
- stray arc strikes
- sharp edges
- plate clamp gouges
- miscellaneous defects

WEL-9-I9-8 Describe various **surface imperfections** related to final product finishing, including

- their identification
- their characteristics
- their effects on the final product
- correction of surface imperfections on the final product finishing

WEL-9-I10 Identify and describe quality inspection, including its characteristics and applications.

WEL-9-I10-1 Identify various quality inspection **tools and equipment**, including

- magnifying lenses
- inspection mirrors
- flashlights

WEL-9-I10-2 Describe various quality inspection **tools and equipment**, including


- selection of the appropriate quality inspection tools and equipment
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-9-I10-3 Identify various quality inspection **measuring devices**, including

- steel rulers
- measuring tapes

WEL-9-I10-4 Describe various quality inspection **measuring devices**, including

- selection of the appropriate measuring device
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

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- procedures for conducting a thorough inspection
 - procedures for regular maintenance
 - guidelines for proper storage

WEL-9-I10-7 Identify various quality inspection **fabrication defects**, including

- improper fit-up
- misalignment
- distortion
- incorrect dimensions and orientation

WEL-9-I10-8 Describe various quality inspection **fabrication defects**, including

- their identification
- their characteristics
- their effects on the final product
- correction of fabrication defects on the final product

WEL-9-I11 Demonstrate how to safely and properly use weld processes and quality inspections.

WEL-9-I11-1 Demonstrate how to safely and properly use weld processes and quality inspections.

Curriculum Implementation Resources

Curriculum implementation resources are frequently added. Please refer to <https://edu.gov.mb.ca/k12/framework/sytep/welding/resources/index.html>.