

Chartered Professional Guideline 3: Areas of Practice

1. Areas of Practice: Metallurgy

A metallurgist is a professional who either investigates, plans, designs or directly controls the process of converting minerals produced by mining into primary commodities of economic value in sufficient quantity to be used in the manufacture of economic goods.

The following areas of practice are offered as examples of experience that is required for registration as a Chartered Professional (Metallurgy). Professional experience need not be limited to those listed and applications will be considered for appropriate areas of practice in addition to those listed below.

1. Process investigation and test work:

- 1.1. a minimum of five years' experience of laboratory and pilot plant investigations using mineral processes
- 1.2. extensive experience in undertaking process investigation and development for mineral projects
- 1.3. experience in testing and developing new process technology

2. Flow sheet development, plant design and commissioning:

- 2.1. a metallurgist who uses the results of process investigation and test work to design a flow sheet for a planned mineral development
- 2.2. a metallurgist with appropriate experience to select and size suitable equipment, and to prepare materials balances for a proposed or existing operation
- 2.3. usually a person who has had extensive practical process plant operating experience and/or extensive commissioning experience on which to base their design recommendations

3. Project appraisal.

Note: This specialisation may not include the economic valuation of existing and proposed metallurgical operations.

- 3.1. the technical assessment and evaluation of current and proposed mineral treatment operations such as conducting Due Diligences and Independent Technical Reviews (ITRs)
- 3.2. a person with sufficiently broad and relevant experience to qualify as the author of a Technical Report, as defined in the VALMIN Code (1998) (as modified from time to time), on an exploration property includes supporting JORC Resource and Reserve statements and NI43-101 reports

4. Project planning and management:

- 4.1. Extensive experience in the planning, design, implementation and commissioning of new processing plants, or in the upgrading/optimisation of existing processing plants.

5. Project Studies.

- 5.1. Includes: experiences in studies such as Conceptual, Scoping, Pre-Feasibility and Feasibility, including test work evaluation, flowsheet selection, process modelling, mass and water balances, design criteria, equipment sizing and selection, development of operating and capital costs, provision of inputs for financial modelling, and technical report preparation.

6. Operational management:

- 6.1. hands-on experience of plant operation and management
- 6.2. working as a mill or smelter superintendent
- 6.3. experience gained in trouble-shooting operations

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7. Mineral processing:

- 7.1. the application of mineral processing, such as, but not limited to, flotation, magnetic separation, electrical separation, gravity, sorting, classification and cyanidation in the testing laboratory, pilot plant, or production plant
- 7.2. experience may have been gained in the treatment of, but not limited to, base and precious metal ores, uranium ores, iron ores, mineral sands, alloying metal ores (manganese, chromium, tungsten, molybdenum, etc.), rare earth ores and industrial minerals such as graphite and mineral sands
- 7.3. establish and manage tailings discharge requirements including an Operation, Maintenance and Surveillance (OMS) Manual, Dam Safety Emergency Response Plan, and facilitate routine compliance inspections/audits.

8. Hydrometallurgy (including electrowinning, leaching and bacterial action):

- 8.1. the application of hydrometallurgy to mineral processing operations, in the testing laboratory, pilot plant, or production plant
- 8.2. may have chemical engineering qualifications rather than metallurgy
- 8.3. experience gained in the treatment of uranium, copper, nickel and rare earth ores, but not gold cyanidation

9. Roasting, smelting and refining:

- 9.1. experienced in pyrometallurgical or electrometallurgical aspects of mineral processing
- 9.2. experience may be in laboratory investigations plant/ process design or in operations, or in all of these

10. Comminution and sizing.

- 10.1. a metallurgist who advises on aspects of size reduction including crushing, grinding and sizing in a production plant or staged crushing, sieving, cyclosizing/laser sizing in a laboratory
- 10.2. the person may have spent most of their career working in this field of processing

11. Materials handling:

- 11.1. experience in materials handling by conveyor, elevator, chutes, pumped slurry, thickening, tailings management and storage etc.
- 11.2. qualifications may be in metallurgy or in chemical or mechanical engineering

12. Coal washing. A metallurgist with experience in the test work, development, design, commissioning and/or operation of coal washeries.

13. Infrastructure management:

- 13.1. the assessment and/or the design, construction and/or management of power and water supply facilities and/or tailings storage facilities.
- 13.2. qualifications may be in metallurgy, but may also be in other fields of engineering

14. Laboratory testing methods.

- 14.1. Includes knowledge/understanding of basic mineral processing laboratory techniques such as Work Index determination, breakage factors, locked cycle flotation testing, variability testing, leaching, effect of gangue minerals, dewatering and mineralogical techniques such as XRD and QEMSCAN/MLA for liberation and quantitative mineralogical analysis.

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15. Geochemical Analytical Methods.

15.1. Includes knowledge of basic geochemical techniques, particularly where they apply to metallurgical assays of head, tailings and concentrate samples. Examples include XRF, XRD, Wet Chemistry Methods, ICP-OES, ICP-MS, AAS etc.

16. Safety, health and risk. Implementation of workplace health and safety systems that provide for:

16.1. hazard identification (particularly in the usage of chemicals, heat, pressure and electromagnetic/electrostatic fields)

16.2. risk assessment

16.3. implementation of controls

16.4. effective monitoring

16.5. comprehensive review.

This should be undertaken with reference to appropriate codes and guidelines.