

# ISO Rules

## Part 500 Facilities

### Division 503 Technical & Operating Requirements

#### Section 503.3 Reactive Power



#### Applicability

- 1 Section 503.3 applies to:
  - (a) the **legal owner** of a **generating unit, aggregated facility, or energy storage resource** that is directly connected to the **transmission system** or to **transmission facilities** within the City of Medicine Hat, including a **generating unit, aggregated facility, or energy storage resource** situated within an industrial complex that is directly connected to the **transmission system**;
  - (b) the **legal owner** of a load facility, where for purposes of this Section 503.3:
    - (i) “legal owner” refers to:
      - (A) the **legal owner** of an **electric distribution system**;
      - (B) a **person** who has entered into an arrangement directly with the **ISO** for the provision of **system access service** under subsection 101(2) of the **Act**;
    - and
    - (ii) “load facility” refers to a facility connecting industrial load or distribution load to the **transmission system**;
  - (c) the **legal owner** of a **transmission facility** to which a load facility is connected;  
and
  - (d) the **ISO**.

#### Requirements

##### Reactive Power

- 2(1)** The **legal owner** must, for the purposes of determining the **reactive power** requirements of this Section 503.3, determine the root mean square phase-to-phase voltage at:
  - (a) the stator winding terminal, for a **generating unit** or synchronous **energy storage resource**;  
or
  - (b) the **collector bus**, for an **aggregated facility**;to be used as the 1.00 per unit voltage value.
- (2)** The **legal owner** of a **generating unit, aggregated facility, or energy storage resource** must ensure that the **generating unit, aggregated facility, or energy storage resource**, as well as any external **reactive power** resource approved under subsection 2(7), have the capability to operate in accordance with the requirements of this subsection 2 by both:
  - (a) manual control of the set point of the **automatic voltage regulator** or **voltage regulating system** of the **generating unit, aggregated facility, or energy storage resource**; and
  - (b) automated action of the **automatic voltage regulator** or **voltage regulating system** of the **generating unit, aggregated facility, or energy storage resource**.
- (3)** The **legal owner** of a **generating unit, aggregated facility, or energy storage resource** must ensure that **reactive power** capability complies with the following minimum requirements:
  - (a) 0.9 **power factor**, supplying dynamic **reactive power**; and
  - (b) 0.95 **power factor**, absorbing dynamic **reactive power**.
- (4)** The **legal owner** of a **generating unit, aggregated facility, or energy storage resource** must

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ensure that the **reactive power** capability set out in subsection 2(3) is based on:

- (a) for a **generating unit**, or **aggregated facility** not containing an **energy storage resource**, the **maximum authorized real power** of the **generating unit** or **aggregated facility** over the entire **real power** operating range, down to the applicable minimum **gross real power**; or
- (b) for an **energy storage resource**, or **aggregated facility** containing an **energy storage resource**, the **maximum authorized real power** and **maximum authorized charging power** of the **energy storage resource** or **aggregated facility** over the entire **real power** operating range.

(5) Notwithstanding subsection 2(4), when a **generating unit**, **aggregated facility**, or **energy storage resource**, shares a common **point of connection**, the **reactive power** resources may be shared to meet the **reactive power** capability set out in subsection 2(3) if:

- (a) the **reactive power** resources are designed to be in service at all times for any operating combination of the **generating unit**, **aggregated facility**, or **energy storage resource**; and
- (b) the shared **reactive power** resources are sufficient to meet the total of the individual requirements of subsection 2(3) for each **generating unit**, **aggregated facility** or **energy storage resource** sharing the common **point of connection**.

(6) The **legal owner** of a **generating unit**, **aggregated facility**, or **energy storage resource** must ensure that the limiters are not set to reduce the **reactive power** capability set out in subsection 2(3).

(7) The **legal owner** of a **generating unit**, **aggregated facility**, or **energy storage resource** that does not have the capability to meet the dynamic **reactive power** capability set out in subsection 2(3) must submit to the **ISO** a request in writing for approval of the use of an external dynamic **reactive power** resource to compensate for the lack of capability, such that the combined capability of the **generating unit**, **aggregated facility**, or **energy storage resource** and the external dynamic **reactive power** resource meets the requirements of subsection 2(3).

#### Load Facility Power Factor

3(1) The **legal owner** of a load facility and the **legal owner** of the **transmission facility** to which the load facility is connected must design the load facility with **reactive power** resources to result in a **power factor** of above 0.9 lagging.

(2) The **legal owner** of a load facility and the **legal owner** of the **transmission facility** to which the load facility is connected must ensure the **power factor** requirement in subsection 3(1) is based on expected normal operating conditions up to the **contract capacity**, and measured at the **point of common coupling**.

#### Revision History

Date	Description
2024-08-08	Administrative amendment to correct formatting and cross reference to subsection 2(7).
2024-04-01	Initial release.