Purpose of Minimum Flow

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Minimum flow

- the lowest continuous flow the pump is permitted to operate
- without reference to a specific vibration limit or other criteria
- the ‘default’ pump manufacturer’s recommendation

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Main purposes of minimum flow

- Permissible vibration
- Impeller cavitation erosion life
- Radial bearing loading, shaft bending
- Temperature rise

One or more of the above may be applicable.

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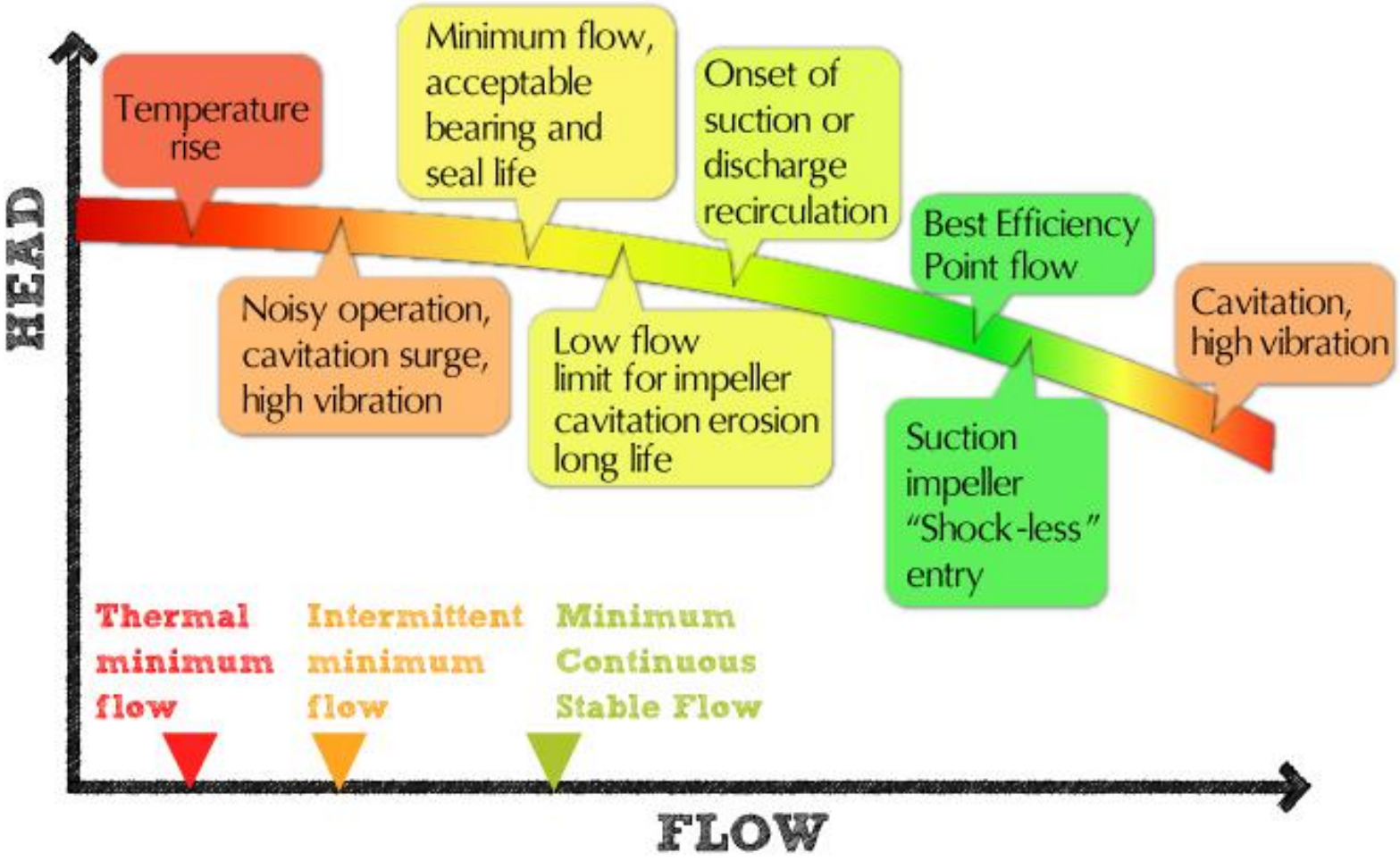
Pump phenomena versus flow



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Minimum Continuous Stable Flow (MCSF) or (Q_{min})

MCSF is the minimum allowable flow for which specified vibration limitations will not be exceeded.

Specified in API 610, and also used in other critical service applications.

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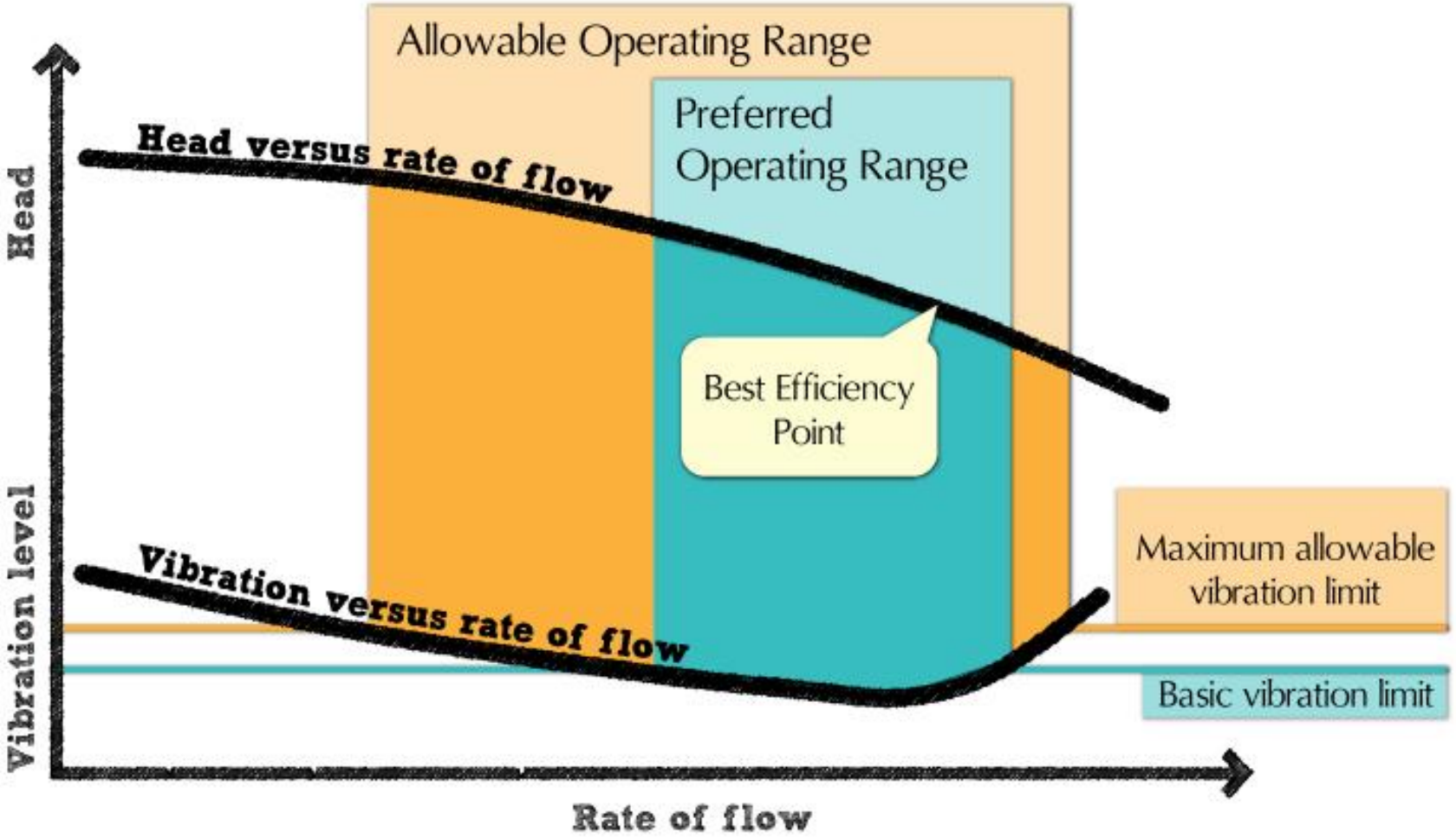
Vibration characteristic



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Minimum Intermittent Flow

It is the minimum flow for intermittent operation.

The cumulative duration of operation at this reduced flow is usually specified.

Applicable to nuclear safety-related pump applications.

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Thermal minimum flow

Also known as:
Minimum Continuous Thermal Flow (MCTF)

It is the minimum flow for which a maximum permissible pump temperature rise is anticipated.

MCTF prevents pump failure due to "flashing" of the pumped liquid

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Impeller long life

- **commonly known as:**
  40,000 hour impeller life
- **it is the pump operating range defined by a minimum level of NPSH Available**

Relevant to:

large boiler feed water; water injection; carbonate service; high energy pipeline pumps; liquid metal pumps

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Pump operation at shutoff

- Rapid heating
- Flashing / dry running potential
- High levels of vibration – destructive levels possible
- Higher energy levels - increasing danger
- ‘Small’ pumps – possible to run at shutoff continuously. Example: A fire sprinkler system’s jockey pump.

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Final slide for:
Purpose of Minimum Flow