

SELECTION GUIDE / 01

Jockey Pump Selection

Practical guidance for fire pump systems

A jockey pump maintains standby pressure and replaces small, normal water losses. Its flow and controls should allow the main fire pump to respond to a genuine fire demand. A large fire pump does not automatically require a large jockey pump. [4]

1. Establish the selection basis

Record the system type, aboveground and underground pipework, minimum and maximum suction pressure, the fire-pump certified curve, component pressure ratings and controller characteristics. Use the edition adopted for the project and any project-specific requirements.

NFPA 20 Section 4.27 addresses pressure maintenance. Its sizing provisions concern allowable leakage and normal pressure loss; the annex adds explanatory guidance for different systems. Requirements in the body of a standard and informative annex recommendations have different status. [1]

2. Select capacity from the system

Estimate or measure normal leakage and define a reasonable pressure-recovery time. Aboveground sprinkler pipework should be tight when new. For aboveground-only sprinkler and standpipe systems, the NFPA annex recommends a jockey flow below that of a single sprinkler so an operating sprinkler can trigger the main pump. Large underground networks can have different leakage needs. [1]

Assess the jockey pump's entire operating curve through the pressure-control band. A nominal 10 USgpm rating at one pressure does not prove that the pump delivers less than the relevant fire demand at a lower pressure. Check the actual flows at the main-pump start pressure and the expected suction conditions.

A useful project calculation is: $\text{required recovery flow} = \text{continuing leakage flow} + \text{recovery volume} / \text{recovery time}$. The recovery volume is the water needed to restore the selected pressure band; it is not the full pipe-system volume. This is an engineering check, not an NFPA-prescribed sizing formula.

The supplied reference gives 1% of the main-pump rated flow as a rule of thumb. For example, 1% of 1,500 USgpm is 15 USgpm. That arithmetic is correct, but it does not demonstrate suitability. A fixed percentage can oversize a tight sprinkler system or understate a large network's needs. NFPA annex material also discusses a 10-minute make-up guideline and a 1 USgpm benchmark; neither creates a universal jockey-pump selection. [1, 4]

PRESSURE & CONTROLS / 02

3. Select pressure from the complete hydraulic system

Keep three values separate: the fire pump's rated differential pressure, its shutoff or churn differential pressure, and the total pressure at the system header. Total header pressure includes the available suction pressure and the pressure added by the operating pump, adjusted for elevation and piping losses.

At the required make-up flow, the jockey pump must recover the chosen stop pressure under the minimum available suction condition. In a simplified common-elevation check: required jockey differential pressure $\geq$ target header pressure - minimum jockey suction pressure + losses between pump and sensing point. Add elevation correction where applicable.

Check maximum suction pressure plus the jockey pump's shutoff differential separately. Also check the main fire pump's maximum discharge pressure and relevant transient conditions. A satisfactory operating point does not prove that valves, gauges, controllers and pipework have adequate pressure ratings. NFPA 20 addresses excess-pressure protection for jockey pumps and restrictions on run timers where excessive pressure is possible. [2]

The shorthand 'jockey head = fire-pump rated head + 10 psi' omits suction pressure, actual churn head and control settings. Treat it as insufficient for final selection. A 10 psi switch differential is a control setting; it is not automatically the extra differential pressure the jockey pump must produce.

4. Coordinate the pressure settings

The intended sequence is jockey stop above jockey start, with the first fire-pump start below jockey start. Additional fire pumps require coordinated staging. NFPA's public development record for FR-91 discusses 10 psi separation to the first fire pump; older examples can show 5 psi. This public record contains proposed annex guidance; it does not replace the adopted edition or the actual controller's operating differential. [3]

The following example uses assumed values to explain the method. It is not a project setting schedule. It assumes a constant-speed fire pump with 115 psi differential pressure at churn, minimum static suction of 50 psi and maximum static suction of 60 psi. [3]

Item	Illustrative calculation	Result
Jockey stop	115 + 50	165 psi / 11.38 bar
Jockey start	165 - 10	155 psi / 10.69 bar
First fire-pump start	155 - 10	145 psi / 10.00 bar
Main-pump maximum static churn	115 + 60	175 psi / 12.07 bar

At 50 psi suction, reaching 165 psi at the header needs about 115 psi of jockey-pump differential before losses. With tank suction close to 0 psi, it would need about 165 psi before losses. The same header setting therefore leads to different pump duties.

Check the real jockey shutoff pressure, not just the 175 psi main-pump figure above. Verify that the main-pump start setting still satisfies the protected system, that the jockey can reach its stop setting, and that each pressure switch or transducer agrees with a calibrated test gauge. Fire-pump shutdown and reset logic must follow the approved design; do not use the jockey stop setting as an instruction to stop the fire pump.

INSTALLATION & PROJECT DATA / 03**5. Match the installation and controller to the duty**

NFPA 20 treats the jockey pump and its controller separately: approval is required for the pump, while a listed controller is required without necessarily being listed for main fire-pump service. The standard also addresses suction isolation, discharge check and isolation valves, individual pressure sensing, and excess-pressure protection. Confirm the detailed piping, sensing-line and electrical provisions in the adopted edition. [1, 2]

A centrifugal multistage pump is often practical for high pressure at low flow. Verify water quality, materials, seal duty, temperature, suction conditions, motor starting frequency, supply voltage and frequency, and the manufacturer's permitted operating range. Pump and controller selection should form one coordinated package.

6. Verify the sequence on site

- Measure the actual suction and header pressures and compare the gauges with the controller readings.
- Create a controlled small pressure loss and confirm jockey start, recovery and stop without a nuisance main-pump start.
- Test the approved demand or test-orifice scenario and confirm that the jockey pump cannot prevent the required main-pump start.
- Confirm the maximum pressure condition, check-valve performance, sensing-line arrangement and any required pressure-relief function.
- Record the settings, test results, selected curves and final equipment ratings. Investigate abnormal cycling or leakage instead of compensating by simply increasing jockey capacity.

Information to send with an inquiry

Provide the main fire-pump duty and certified churn pressure, minimum and maximum suction pressure, piping arrangement, estimated or measured leakage, smallest relevant fire demand, required maintenance pressure, component ratings, electrical supply and required code edition. Pumpsense Thailand can use these inputs to develop a coordinated pump and control proposal.

This is an engineering guidance article, not an NFPA publication or a certification statement. Public NFPA development records are cited as supporting context and are not substitutes for the adopted standard. Final equipment and settings require verification against the project hydraulic design and authority requirements.

REFERENCES & SOURCE NOTES / 04

Read the source in context

The original supplied reference is retained unchanged as a separate download. Its 1% sizing example and minimum +10 psi head statement need the project-specific checks explained in this article.

The supplied reference is a concise, undated summary. This guide adds hydraulic checks and clearly separates rules of thumb from the requirements and explanatory guidance referenced by NFPA 20. It does not reproduce the NFPA standard.

Source references

[1] NFPA 20 public Second Revision record, SR-12 (26 October 2023)

Report dated 21 December 2023, PDF page 20: Section 4.27.2 and Annex A.4.27.2.2; leakage sizing and aboveground-system guidance. Development record, not the adopted standard.

[2] NFPA 20 Second Draft meeting material (25-26 October 2023)

PDF pages 14-15: capacity, discharge pressure, excess pressure, piping, sensing and controller provisions shown in the public development material.

[3] NFPA 20 public input response, PI-50 / FR-91 (report: 9 January 2023)

Input submitted 25 May 2022. PDF pages 143-144: proposed annex settings, 10 psi first-pump differential, supply/churn example and committee response. Development record, not an adopted project setting schedule.

[4] Original supplied Jockey Pump Requirements & Sizing reference

User-supplied NFPA 20 Jockey Pump Selection.pdf, PDF pages 2-3; undated summary. Retained separately and read with the qualifications in this article.

[5] NFPA 20 official standard and current development information

Check the project's adopted edition, amendments and applicable authority requirements. Official 2025 reader: <https://link.nfpa.org/free-access/publications/20/2025>

Edition and application

Use the official NFPA reader and the edition adopted for the project to verify final clause numbering, amendments and exact provisions. The public revision records above explain the origin of the technical guidance; a proposal, committee record or this article is not itself an installation approval.

Useful conversions

1 USgpm = 3.785 L/min = 0.2271 m³/h. 1 psi = 0.06895 bar. For water, 1 bar is approximately 10.20 m head. Use one consistent pressure datum and unit system in the final selection.