

Parameters for N-Spindle Mixing Equipment Specifications

We recommend that the customer performs the following steps.

1. **Classify the Process:** In addition to general data required for almost any mixing operation, other data are required for specific processes. The various classifications are listed below:
 - a. Blending of miscible liquids
 - b. Solids suspension
 - c. Dispersion
 - d. Dissolving
 - e. Heat Transfer
 - f. Crystallization
 - g. Chemical reaction
 - h. Extraction
 - i. Polymerization
 - j. Fermentation
 - k. Coagulations
 - l. Flocculation

2. **Define the Objective:** State explicitly what the mixer must accomplish for satisfactory results.

3. **Describe the Materials to be mixed:** Give the relative percentages by weight and the specific gravity and viscosity of each material. State whether the liquids are miscible and describe solids or gasses if any. Give the characteristics of the final mixture, including specific gravity, viscosity and temperature.

4. **Outline the Mixing Cycle:** State whether it is a batch or a continuous operation. If batch, give the following data:
 - Batch size.
 - Time allowed for mixing.
 - Sequence of adding materials.
 - Progressive changes in production characteristics
 - Whether mixer will operate during filling or draining

If continuous, give the following data:

 - Gallons per minute flow rate
 - Required retention time

- 5. Give Vessel Data:**
 - Type and dimensions
 - Shape and depth of top and bottom
 - Mixer supports and dimensions
 - Baffle details
 - Largest opening to pass impeller
 - Whether a steady bearing is permissible

6. **Specify type of mixer:** State the type mixer required or preferred (e.g., top entering, side entering, clamp-on portable, fixed mount portable, V-belt or gear drive, etc.).

7. **Specify sealing data:** If a shaft seal is required, state the preferred type and material and give data as to pressure, vacuum and temperature. In case of aside entering application, state whether the seal is to be serviced while the vessel is under pressure.

8. **Specify Materials of Construction of Wetted Parts:** Stainless steel, Carbon steel, FRP lined, Rubber lined, Tar Epoxy, Special coating.

9. **Specify Motor Data:** State the motor type and enclosure and the electrical requirements.

10. **Advice Previous Experience:** If the mixing operation has been performed in the past, details as to the process, the equipment and the results are valuable assistance for determining the optimum solution. *Although information is sufficient for any qualified mixer manufacturer to recommend his best solution to the problem, the customer may wish to add the following mechanical details for assurance of quality and performance*

11. **The Drive Assembly:** State preference for right angle or vertical arrangement. State preference for flange or foot mounted (flexibly coupled) motor.

12. **The Gear Reducer:** The gear reducer should be specifically designed for mixer service with the output shaft and bearings of sufficient size to carry the weight of the impeller shaft and impellers, and to withstand all torsional, bending and thrust loads so that significant deflections are not transmitted to the gears and other bearings. The thermal rating should not be less than the rated motor horsepower, and the mechanical horsepower rating should provide the service factor suggested by the following table as a minimum:

Service	AGMA CLASSIFICATION		
	Uniform Load	Medium Shock	Heavy Shock
Normal (10 hour/day)	1	1.25	1.5
Severe (24 hour/day)	1.25	1.5	1.75

13. **Reducer Bearings:** All N-spindle reducer bearings are anti-friction type and oil or grease lubricated. No bearings should be located below the drive base.
14. **Lubrication:** Bearings lubricants should be in accordance with AGMA standards and available from local sources.
15. **Impeller Shafts:** Impeller shafts must be able to withstand the torsional and bending moments inherent in the application, and to operate at or below 80% of the natural frequency of the system.
16. **Impellers:** Require only that impellers be removable and that they be attached to the shaft by positive means of the manufacturer's design.

It is our sincere belief that these recommendations assure the benefits of head-on competition and a sound basis for evaluation of bids.

Thus engineers will have a greater opportunity to realize the optimum solution for mixing process.

Please contact N-Spindle for more details information required and sizing.

