What to Check When Choosing Industrial Generators for Standby and Temporary Power

When you need power on a job site, during a planned outage, or as backup for a facility that cannot afford downtime, choosing the right equipment matters. Industrial generators differ from consumer or light commercial models in several ways: they are built for sustained operation, heavier loads, and rougher conditions. But even among industrial units, the options vary widely. A clear checklist helps you match the machine to the real demand without overspending or undersizing.

Load type and starting current

The first thing to understand is what you will actually run. A generator's rated output is usually given in kilowatts (kW) or kilovolt-amperes (kVA), but that figure assumes a certain kind of load. Motors, compressors, and pumps draw much more current when they start than when they run. This starting current can be three to seven times the running current, depending on the motor type and how it is started. If you add up the running watts of everything you plan to connect and then pick a generator that matches that total, you may find that the machine stalls or trips its breaker the moment a large motor kicks on.

To avoid that, list every device and note its starting requirement. For motor-driven equipment, look for the locked-rotor amperage or the surge rating. Add the largest starting load to the total running load of everything else that will be on at the same time. That sum tells you the minimum surge capacity you need. Many industrial generators are built to handle a short overload for starting, but you have to check the spec sheet to see how much and for how long. If the numbers are close, go up one size rather than risk a shutdown.

Fuel choice and consumption

Diesel and natural gas are the two common fuels for industrial generators. Diesel units tend to be more fuel-efficient at high load and store well if you rotate the supply. Natural gas models burn cleaner and avoid the need for on-site fuel storage, but they depend on a pipeline supply that may fail in a natural disaster. For temporary power on a remote site, diesel is usually the practical choice because you can bring fuel in drums or a tank. For standby power at a facility with a reliable gas line, natural gas can save on fuel handling and long-term maintenance, though you still need a backup plan for when the gas supply is interrupted.

Fuel consumption is not a fixed number. It varies with load: a generator running at 30% load burns more fuel per kilowatt-hour than one running at 80% load. If your application will run the unit at light load for long periods, you may be paying for fuel you do not need. A load bank can

be used during maintenance to run the generator under a proper load, but for everyday operation it is better to size the machine so that it usually operates between 60% and 80% of its rated output. That range gives a good balance of efficiency and engine life.



Runtime and refueling intervals

How long does the generator need to run without stopping? For temporary power during a construction project, you may run it eight or ten hours a day and shut it down overnight. For standby power at a hospital or data center, you may need days of continuous operation. The runtime depends on the fuel tank size and the load. A larger tank means longer intervals

between refueling, but it also adds weight and may require a separate fuel trailer or a bulk tank installation.

If you are using diesel, factor in the refueling logistics. Can you get fuel delivered on site? Will someone be available to refill the tank in the middle of the night? For extended runtime, consider a unit with a day tank and a transfer pump from a main storage tank. That arrangement lets you refuel the main tank without shutting down the generator. For natural gas models, the runtime is limited only by the gas supply, but you still need to verify that the gas pressure and pipe size are adequate for the generator's full output.

Transfer switch and power distribution

Connecting a standby generator to a facility requires a transfer switch. This device disconnects the building from the utility grid and connects it to the generator. Without a transfer switch, you risk backfeeding electricity into the grid, which is dangerous for line workers and can damage the generator. For temporary power on a construction site, you may use a portable distribution panel or a spider box that splits the generator output into several circuits. The key is to match the connector type and the voltage to the equipment you are powering.

Pay attention to the voltage and phase. A three-phase generator running a single-phase load is inefficient and may cause voltage imbalance. If your site has a mix of single-phase and three-phase equipment, you need either a generator that can supply both or a transformer arrangement. The same goes for frequency: most industrial generators in North America produce 60 Hz, but some equipment designed for other regions may require 50 Hz or a different voltage. Check the nameplate on each machine before you connect.

Environmental factors and placement

Where will the generator sit? Outdoors, it needs clearance for cooling air and exhaust. Indoors, it requires a ventilation system that can handle the heat output and the exhaust gases. Even a well-ventilated room may need a separate exhaust duct and a carbon monoxide detector. For temporary power, a weatherproof enclosure or a sound-attenuated container may be necessary if the generator will run near occupied spaces or in a residential area.

Altitude and ambient temperature also affect generator performance. At high altitude, the air is thinner, and an engine produces less power. The same is true in very hot weather. Manufacturers provide derating factors for altitude and temperature. If your site is above 3,000 feet or regularly exceeds 95 degrees Fahrenheit, apply those factors to the rated output to get the actual available power. Ignoring them can leave you short on capacity on a hot afternoon.



Maintenance and testing

Even the best generator will fail if it is not maintained. For standby units, the engine needs to be run under load periodically to burn off moisture and keep the seals lubricated. A load bank is the proper tool for this because it applies a controlled electrical load without connecting to the building. Without a load bank, a generator that runs only unloaded or lightly loaded can develop wet stacking in diesel engines or carbon buildup in gas engines.

For temporary power, the maintenance schedule is simpler but still important. Check the oil and coolant levels daily when the generator is running. Keep spare filters and belts on hand. And always test the transfer switch and the automatic start controls before you depend on

them in an emergency. A generator that starts but does not transfer power is no better than one that will not start at all.

Critical loads and sizing strategy

Not every load in a facility is equally important. In a hospital, life-support equipment and operating room power take priority over hallway lighting and vending machines. In a data center, the servers and cooling system come first. The concept is to identify which loads are critical and size the generator to support them, then add a margin for starting surges. This approach often leads to smaller, more efficient setups than trying to power everything.

When you are working through the sizing, pay close attention to generators sized for critical loads. These machines are selected to cover only the essential equipment, with a transfer switch that drops non-critical circuits automatically. The result is a more compact unit that runs at a higher load factor, which improves fuel efficiency and reduces wear. You can always add a second generator later for other loads if needed, but starting with a clear priority list keeps the project manageable.

For temporary power at a construction site, the critical loads might be the tower crane, the elevator, and the lighting for the work area. Everything else can wait or run off a smaller portable generator. The same principle applies to standby power for a manufacturing plant: keep the process equipment and the safety systems running, and let the break room and the parking lot lights wait until utility power comes back. In every case, the sizing decision comes down to matching the generator to the highest-priority loads first.

One last point on sizing: never assume that a generator will handle its full rated output continuously. Most industrial generators are designed for prime power applications where they run near full load for long periods, but the engine and alternator still have limits. Check the manufacturer's data for the continuous rating and the standby rating. The standby rating is usually higher but is intended for short-term use during an outage, not for day after day of operation. If your application requires continuous running at high load, use the prime or continuous rating, not the standby number.



Final practical checks

Before you commit to a specific model, verify the physical fit. Can you get the generator to the site? A large industrial unit on a skid may need a crane or a forklift. A trailer-mounted unit is easier to move but may need a heavy-duty tow vehicle. Also check the noise level. Many municipalities have noise ordinances that limit generator operation at night, and a loud unit can cause complaints even during the day. Sound-attenuated enclosures add cost but may be necessary for compliance.

Review the warranty and parts availability. Industrial generators often have a five-to-ten-year warranty on the engine and alternator, but the terms vary. Find out whether the warranty requires professional installation and regular service by an authorized dealer. If the generator is

going to a remote location, make sure replacement parts and service technicians are available within a reasonable distance. A generator that is cheap to buy but impossible to repair when it breaks is not a bargain.