Electric Autoclave

✅ Description

An **electric autoclave** uses pressurized steam (121–134°C) to sterilize instruments in healthcare, labs, and veterinary fields.

✅ Specifications

Parameter	Typical Range / Detail
Chamber Material	Stainless Steel 304 or 316
Chamber Volume	2 L to 150+ L (varies by model)
Operating Temperature	121°C (standard) to 134°C (flash sterilization)
Operating Pressure	15 psi (approx. 1 bar) to 30 psi
Power Supply	110V/220V, Single Phase or Three Phase, 50/60 Hz
Power Consumption	1.5 kW to 6 kW depending on size and features
Cycle Time	15–45 minutes depending on load and cycle type
Control System	Microprocessor-based, digital display, programmable
Safety Features	Automatic door lock, pressure release valve, temperature sensors, alarms
Water Requirement	Distilled or deionized water preferred, 2–50 liters per cycle depending on size
Weight	25 kg (small tabletop) to 300+ kg (large models)
Dimensions (Typical)	Small: 40x40x60 cm; Medium: 60x60x80 cm; Large: varies
Sterilization Cycles	Gravity, vacuum-assisted (Class B), flash sterilization
Certifications	ISO 13485, CE, FDA (varies by manufacturer)

✅ Types & Shapes

- **By Design:**
  - ✔ Vertical (Top-loading)
  - ✔ Horizontal (Front-loading)
  - ✔ Tabletop / Portable

- **By Functionality:**

✔ Class N (basic, unwrapped)
✔ Class B (advanced, wrapped & hollow)
✔ Class S (custom cycles)

✅ Sizes & Capacities

Size Category	Volume Range	Usage
Small	2–20 Liters	Dental, small clinics
Medium	20–100 Liters	Clinics, labs
Large	100+ Liters	Hospitals, industrial labs

✅ Materials

- Chamber: Stainless Steel (304/316)
- Seals: High-grade Silicone
- Exterior: Powder-coated/Stainless steel
- Heating Element: Nichrome or Ceramic insulated

✅ Product Form & Features

- Electric-powered steam sterilizers
- Semi-automatic / Fully automatic
- Digital controls, programmable cycles
- IoT-enabled remote monitoring options

✅ Usage & Applications

👩 Human Medical

- Sterilization of surgical instruments, syringes, dressings
- Hospital waste decontamination
- Dental, gynaecology, microbiology labs

🐕 Veterinary

- Sterilization of veterinary surgical tools
- Preparation of biological media
- Sterilizing bedding and supplies
- Portable units for field clinic

✅ Sterilization Process

- Standard cycle: 121°C, 15 psi, 15–30 min
- Advanced cycles at 134°C with vacuum-assisted air removal
- Gravity displacement or vacuum-assisted steam penetration
- Validation using chemical and spore indicators

✅ Advantages

- Highly effective sterilization of spores, bacteria, fungi
- Cost-effective reuse of instruments
- Environmentally friendly alternative to chemicals
- Automated monitoring increases safety and compliance

❌ Disadvantages

- Not suitable for heat-sensitive materials
- Overloading reduces sterilization efficiency
- Higher upfront costs, especially for advanced Class B autoclaves
- Requires stable water and power supplies

⚠️ Precautions

- 🔸 Avoid sterilizing sealed liquid containers (explosion risk)
- 🔸 Do NOT use aluminum foil wraps
- 🔸 Avoid overloading chamber; allow proper steam circulation
- 🔸 Regularly inspect and maintain gasket integrity
- 🔸 Wait until pressure is fully released before opening
- 🔸 Use heat-resistant gloves when handling hot loads

✅ Handling & Maintenance

- Daily: Clean chamber and drain
- Weekly: Check for scale and residue
- Monthly: Inspect gaskets, test sterilization indicators
- Annually: Professional calibration and validation

✅ HS / HSN Code (India)

- **HSN Code**: **84192010** – Medical and laboratory steam sterilizers
- **HS Code: 8419.20** -- Steam sterilizers, autoclaves, used for medical/laboratory sterilization

❓ Frequently Asked Questions (FAQs)

Q1: Can plastics like syringes be autoclaved?
❌ Only autoclave-safe plastics (e.g., polypropylene) are suitable; others may melt or deform.

Q2: Is distilled water required?
✔ Yes, to avoid scale buildup and prolong autoclave life.

Q3: Can liquids be sterilized?
✔ Yes, but only in vented containers and with slow cooling to avoid explosion.

Q4: What is the difference between Class N and Class B autoclaves?
✔ Class B uses vacuum cycles suitable for wrapped and hollow instruments; Class N does not support these.