



LOCUS[®]

Innovation, Technology & Manufacturing

Vacuum Frying Technology

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VACUUM FRYING TECHNOLOGY

Vacuum frying is a refined method of conventional frying that operates under low pressure and low temperature. This process enhances the quality attributes of fried food products, making it a superior and healthier alternative to conventional frying. Vacuum frying is accomplished at a lower temperature compared to conventional frying, resulting in vacuum-fried products that exhibit

- I. Improved nutritional quality (due to the retention of essential photochemical and essential nutrients,
- II. Enhanced color (due to reduced oxidation)
- III. Reduced oil degradation. One of the health benefits of vacuum frying is that vacuum-fried products contain a lesser oil content compared to conventional fried products. Lower operating temperature during vacuum frying reduces 94% of acrylamide formation, all the while maintaining the original texture /color, organoleptic, and nutritional properties of the raw material. Acrylamide is recognized as a potential carcinogenic compound found in fried snacks, which is formed by the Maillard reaction.

Vacuum frying is an efficient method for producing fruit and vegetable snacks with the desired degree of dehydration without excessive darkening or scorching. The resulting products are crispy and retain the original taste and flavor of the natural foods. Vacuum frying can be employed to fry high-sugar fruits and fresh vegetables, enabling the production of various snack varieties that are not achievable through conventional frying methods.

COMPARISON WITH OPEN FRYING

OPEN FRYING	VACUUM FRYING
The frying temperature should be maintained between 180°C and 220°C due to the boiling point of oil, but this leads to the burning of essential ingredients.	Frying temperature is around 100°C because of the vacuum chamber, which lowers the boiling point of oil so there is no burning of ingredients.
More than 50% degradation of vital nutrients and vitamins.	Nutrients and vitamins remain intact up to 99.99%.
Up to 100% destruction of vital fibers.	Natural fibers remain intact up to 100%.
The oil absorption % is higher.	Absorption of oil was reduced to 50% in vacuum frying compared to normal frying.
The oxygen in the atmosphere reacts and degrades with minerals and oils.	There is no oxygen, so no oxidation of oil and minerals.
There is no originality in taste and it depends purely on spices to make it taste better.	Shape, color, and texture of the products remain too close to originality.
Degradation & Deformation of Shape, Color, Texture	Less prone to moisture absorption and hence degradation takes place at 50% slower speed than normal frying.

PROCESS DESCRIPTION : VACUUM FRYING SYSTEM

Heating System

Thermic fluid, boiler steam, electric, or gas-fired systems shall be used as heating source options. The operating temperature shall be automatically controlled and maintained as per the preset requirements for different products.

Raw Material Loading

Raw material shall be loaded into perforated baskets. Each basket shall occupy approximately one-third ($1/3$) or one-fourth ($1/4$) of the drum capacity.

Loading into Cooking Chamber

The cooking chamber hatch shall be opened, and the loaded baskets shall be placed onto the designated platform inside the chamber. After proper placement, the chamber door shall be securely closed. The system shall then initiate automatic operation.

Vacuum Frying Operation

The baskets shall initially remain suspended above the heated frying oil without direct contact. Upon achieving the required vacuum level (approximately 720–760 mm Hg) and preset temperature, the baskets shall be automatically immersed into the heated oil for frying.

Completion of Frying Cycle

Upon completion of the preset frying time, the baskets shall be automatically removed from the oil. The vacuum shall be released automatically, following which the chamber hatch shall be opened.

De-oiling Process

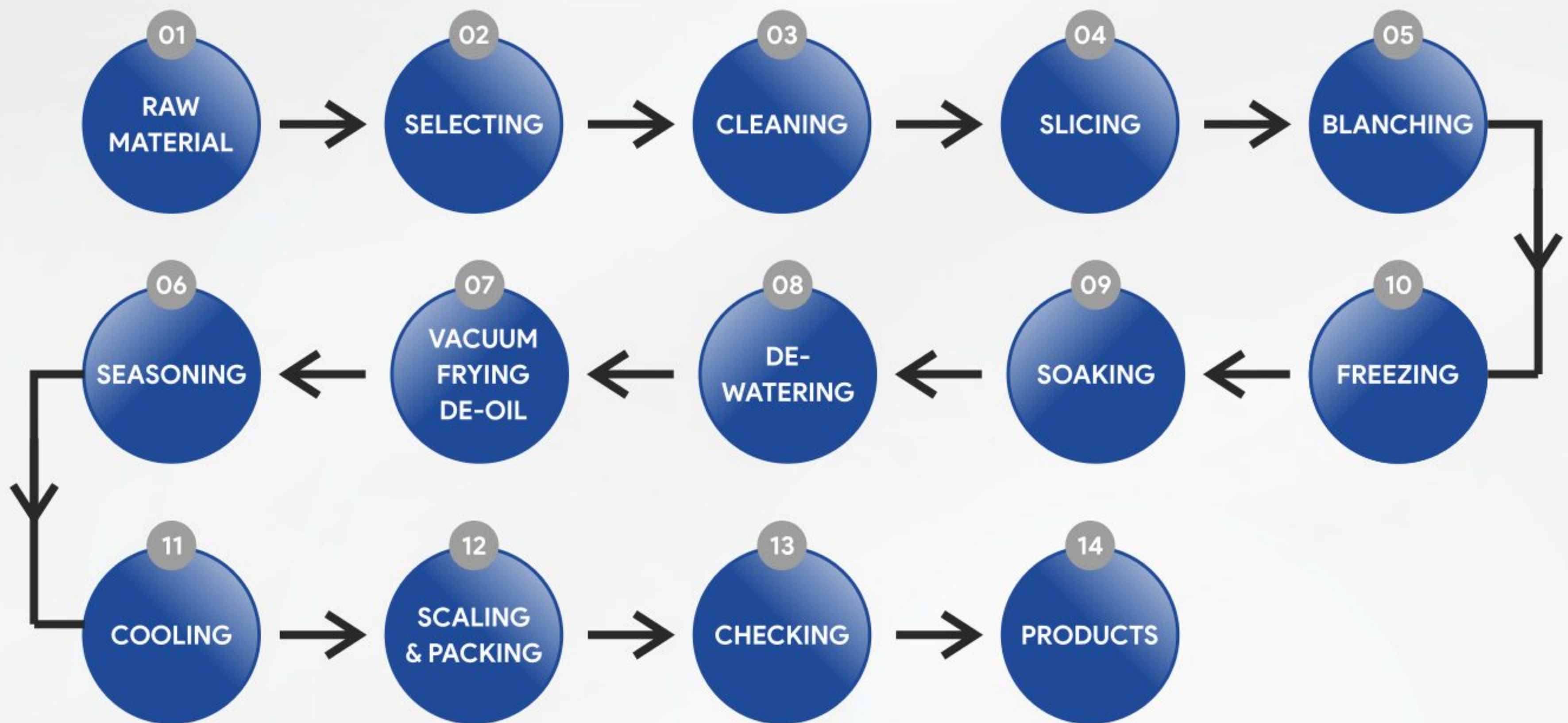
The operator shall remove the baskets from the chamber and transfer them to a centrifuge for removal of excess oil.

Post-Processing

After completion of the de-oiling process, the product shall be transferred to the flavouring and packaging section for further processing.

FLOW CHART FOR ENTIRE SYSTEM

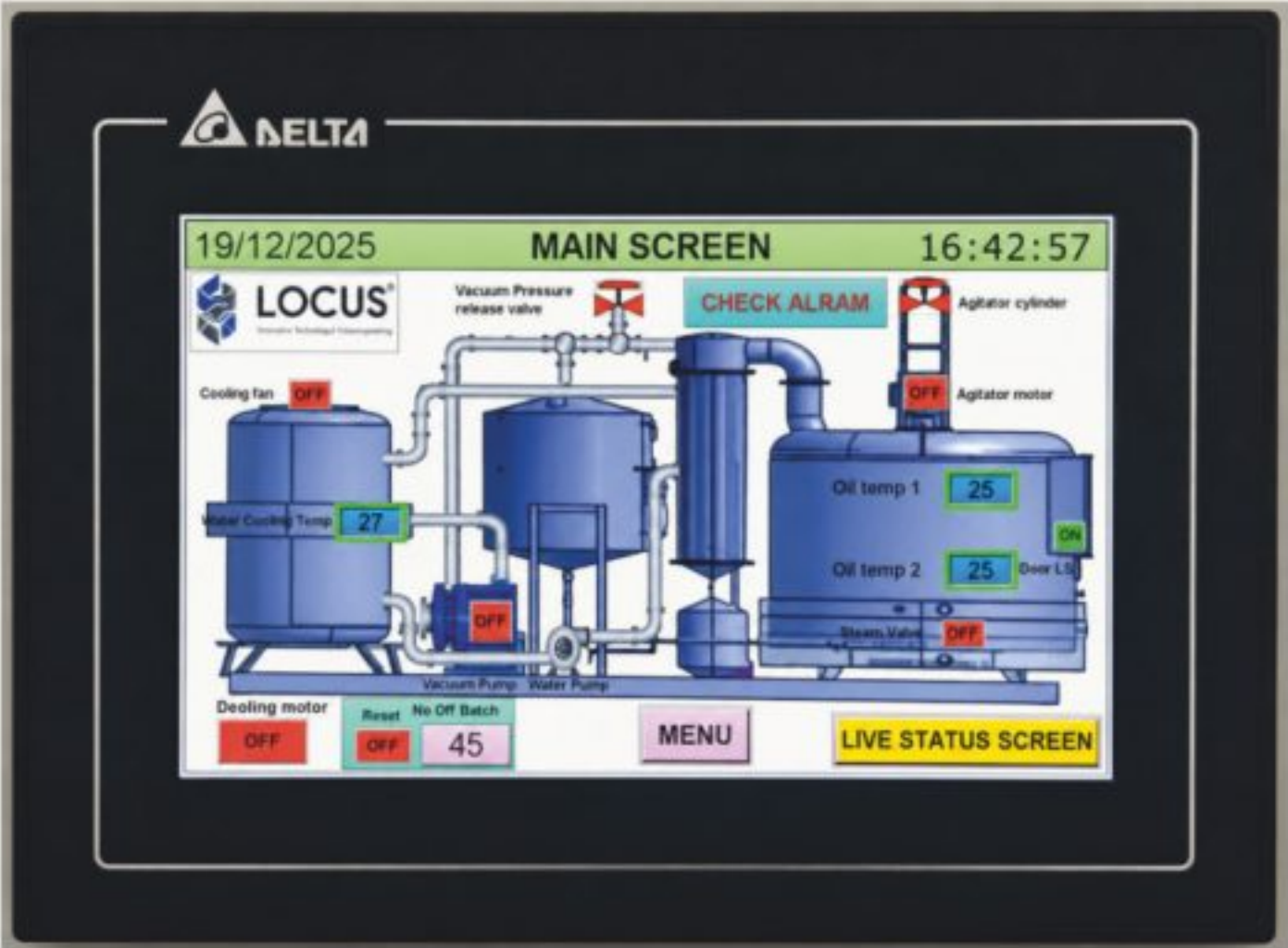
TECHNICAL FLOW CHART



*The processing method may differ depending on the specific product.

VACUUM FRYING SYSTEM





Options	Types Of Vacuum Frying Machinery Models	Options	Types Of Vacuum Frying Machinery Models
Option 1	Vacuum frying machine : (Model: LTVFM 15) Main Chamber (DxHxT) : 800 x 1,000 x 5 mm Vacuum pump : 2 stage liquid ring - 2 HP @1450 r.p.m. - Vacuum 550 mm Hg. Power of Cooling water circulation pump : 0.5 HP. Basket of fried products (RxH) : 600 mmx 400 mm (2 sets). Agitator Motor 0.5 HP. Frying Oil capacity : 150 litres De-Oil Centrifuge machinery : - Power of Motor : 1 HP @1450 r.p.m. PLC Control and Touch screen control panel. Heating system : GAS FIRED/Electrical All sheet metal and piping material SS 304. Foundation stand MS	Option 2	Vacuum frying machine : (Model : LTVFM 25) - Overall dimension : (LxWxH) 3000 x 900 x 3200 mm - Size of tank frying (DxHxT) : 900 x 850 x 5 mm Vacuum pump : 2 stage liquid ring - 5 HP @1450 r.p.m. - Vacuum 750 mm Hg. - 165 m3/hr. Power of Cooling water circulation pump : 0.5 HP. Basket of fried products (RxH) : 351 mmx 500 mm (8 sets). Agitator Motor 0.5 HP. Frying Oil capacity : 300 litres De-Oil Centrifuge machinery : - Power of Motor : 3 HP @1450 r.p.m. PLC Control and Touch screen control panel. Heating system : GAS FIRED/ Electrical. All sheet metal and piping material SS 304. Foundation stand MS
Capacity	Input Capacities : (Model: LTVFM 15) - Jackfruit/ Ripe banana : 10-12 kgs - Okra/ bitter gourd : 5-7 kgs - Nuts - 15 kgs	Capacity	Input Capacities : (Model : LTVFM 25) - Jackfruit/ Ripe banana : 22-25 kgs - Okra/ bitter gourd : 12-15 kgs - Nuts - 25 kgs

Options	Types Of Vacuum Frying Machinery Models	Options	Types Of Vacuum Frying Machinery Models
Option 3	Vacuum frying machine : (Model: LTVFM 50) - Overall dimension : (LxWxH) 3400 x 1200 x 3600 mm - Size of tank frying (DxHxT) : 1050 x 1600 x 5 mm Vacuum pump : 2 stage liquid ring - 7.5 HP @1450 r.p.m. - Vacuum 750 mm Hg. - 165 m³/hr. Power of Cooling water circulation pump : 1 HP. Basket of fried products (RxH) : 451 mmx 550 mm (8 sets). Agitator Motor 0.5 HP. Frying Oil capacity : 400 litres De-Oil Centrifuge machinery : - Power of Motor : 3 HP @1450 r.p.m. PLC Control and Touch screen control panel. Heating system : GAS FIRED/ Boiler Steam. All sheet metal and piping material SS 304. Foundation stand MS	Option 4	Vacuum frying machine : (Model: LTVFM 75) - Overall dimension : (LxWxH) 4000 x 1450 x 3600 mm - Size of tank frying (DxHxT): 1450 x 1800 x 5mm Vacuum pump : 2 stage liquid ring - 10 HP @1450 r.p.m. - Vacuum 750 mm Hg. - 165 m³/hr. Power of Cooling water circulation pump : 1 HP. Basket of fried products (RxH) : 451 mmx 650 mm (12 sets). Agitator Motor 0.5 HP. Frying Oil capacity : 500 litres De-Oil Centrifuge machinery : - Power of Motor : 3 HP @1450 r.p.m. PLC Control and Touch screen control panel. Heating system : GAS FIRED/ Boiler steam. All sheet metal and piping material SS 304. Foundation stand MS
Capacity	Input Capacities : (Model : LTVFM 50) - Jackfruit/ Ripe banana : 45-50 kgs - Okra/ bitter gourd : 25-28 kgs - Nuts - 50 kgs	Capacity	Input Capacities : (Model : LTVFM 75) - Jackfruit/ Ripe banana : 70-75 kgs - Okra/ bitter gourd : 45-48 kgs - Nuts - 75 kgs

OTHER MACHINES REQUIRED FOR VACUUM FRYING PROJECT :

Hot water blanching tank. (Vegetables, nuts etc.)

- Electric heating with coil and jacketing chamber.
- All sheet SS304.
- Temperature cuts-off sensor.
- Water holding capacity 100 litres.
- Wire mesh basket to lifting material from the tank.



Steamer Chamber.(Root Vegetables)

- Length-800mm,Width-600mm,Hight-1000mm.
- Tray-10 nos
- Electric heating
- All sheet material SS304.
- Capacity 50 kg/batch.(beet root)

Ripe Banana Cutting Machine

- Capacity 1500 bananas per hour.
- Vertical blade slicing motion.
- Horizontal food grade belt with VFD to control speed.
- Aluminium Extrusion side frame and MS Powder coated Supporting frame.
- Specifically designed to cut ripe banana.



Refrigerated Water Cooling Tank.

(Ripe banana)

- Maintains temp range 5 - 10 degree centigrade
- Water holding Capacity 50 litres.
- All sheet SS304.

SS 304 Fruit & Vegetable Washer :

- Capacity 500 litres Soaking tank,
- Water Pump with cleaning Water Nozzle's,
- Modular Belt elevator.
- All sheet metal SS304
- Control Panel



Blast Freezer : (Vegetables & Fruits)

- External Size of chamber: 1.5 X 1.4 X 2.1 Meters
- Shock Freezing cycle time +65 to -18 °C- (250 min)
- No. of freezers: 1
- Loading Capacity: 40 - GN 1/1 or 400*600 mm trays
- Total Refrigeration Capacity : 5900 watt -Refrigerant: R404a
- Insulation: PUF with SS body.

Flavoring Machine With Rotating Drum (All products)

- Unique drum design to eliminate Broken %.
- Control panel with VFD for controlling rotary speed.
- Machine Dimensions:
L-1500mm,W-1200mm, H-1900mm, D drum : 700mm.
SS 304 all Sheet metal and MS frame.
- Power Details :
1hp Gear motor, 0.5hp Blower, 4 Kw Heating coils



Food Grade Horizontal Inspection Conveyor

- 6 M length.
- Food grade belt.
- Variable speed control.
- All sheet metal SS 340.





Continuous Band Sealing Packaging Machine (All products)

- Adjustable temperature controller / micro controller
- Horizontal mountable table top model.

Additional Cooling Tower.

- With FRP Basin + With ABS Fills.
- This is kept out-side in open air and connected to Vacuum frying machine cooling tower.
- Helps in maintaining water temperature down.



IBR Approved SIB Wood Fired horizontal steam Boiler of 500 kg/hr Capacity with Working pressure 7 kg/cm².

- This Boiler will support heating for 3 No's Vacuum frying machines (LTVFM75).





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📍 **Locus Technologies, Pune Location**

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GSTIN-27AAJFL9220A1ZK

📍 **Locus Engg Solutions, Belagavi Location**

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