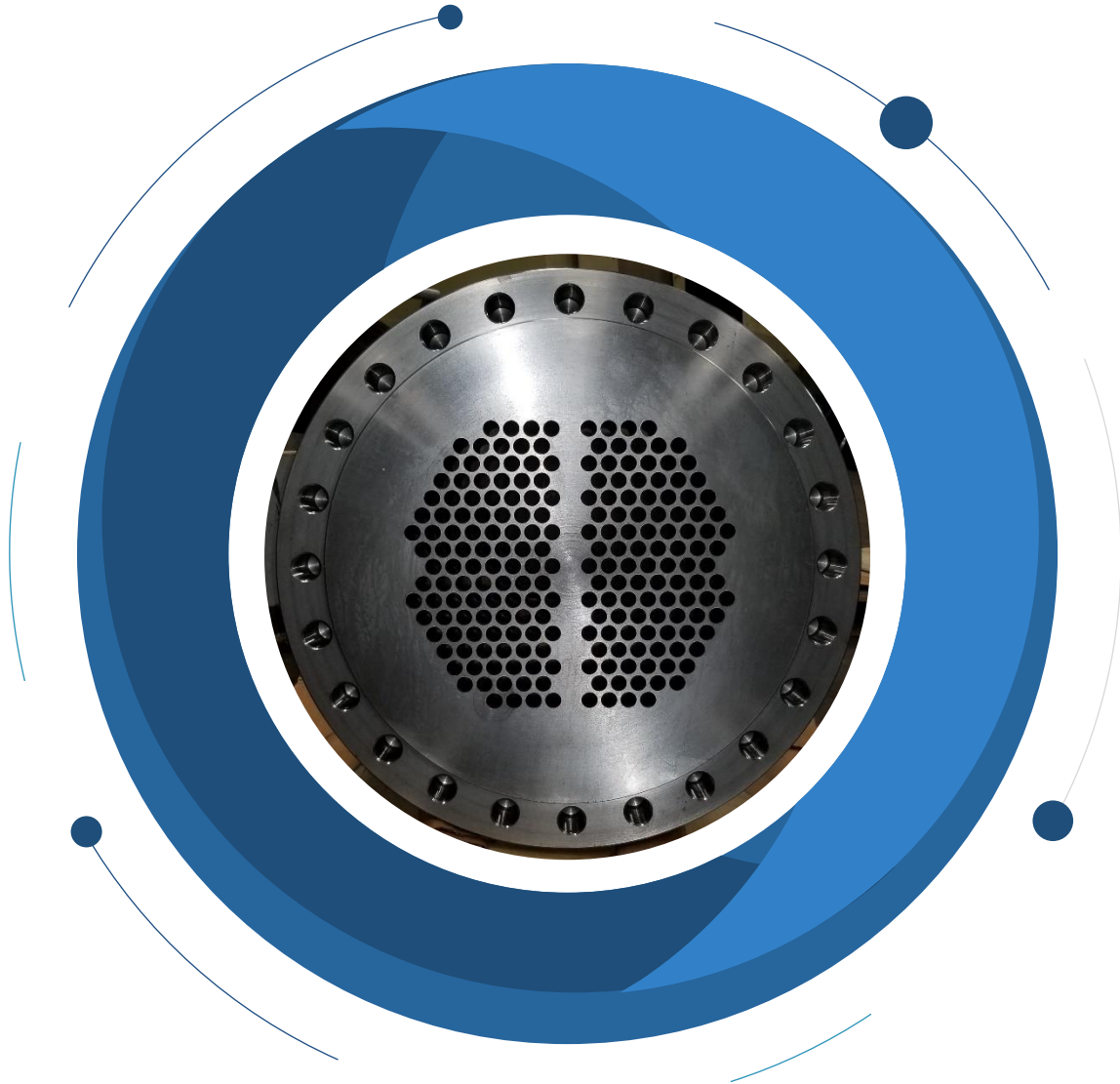


LIMPID™



2023

An ultrasonic technique to prevent the scaling
& fouling of the tubular heat exchangers,
evaporators, and surface condensers.

LE-CIP™

Limpid Engineering



“PREVENTION IS BETTER THAN CURE”
IT THE MOST IMPORTANT ASPECT IN ANY
FORM OF LIFE.

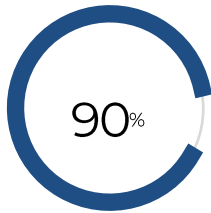
LECIP™ is a scale prevention technology that enables heat exchanging equipment to run without interruption, ensuring optimal use of capital and output.

INSTALLATION & COMPATIBILITY

LECIP™ can be installed on any class of tubular heat exchanger with flanged tube sheet. It can be installed either inside on the flat part of the tube sheet or outside on the curved surface i.e., on the periphery of the tube sheet. It all depends on the design, fluid corrosiveness and whether heat exchanger is existing or new.

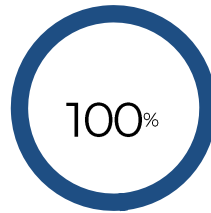


This novel method of preventing scaling in heat exchangers has been granted a patent by the Patent and Trademark Office in the year 2022.



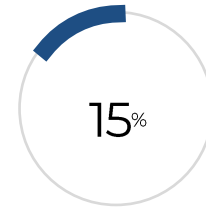
Reduction in cleaning cost

Significantly reduction the cost of keeping the heating surface clean by 90%. With LECIP™ while improving the efficiency and performance of the heat exchanger it saves money and energy.



Elimination of standby

LECIP allows uninterrupted operation without the need for standby equipment. It reduces operating & maintenance costs and improves reliability by eliminating the risk of failure due to idle components.



Increase in the heat transfer coefficient

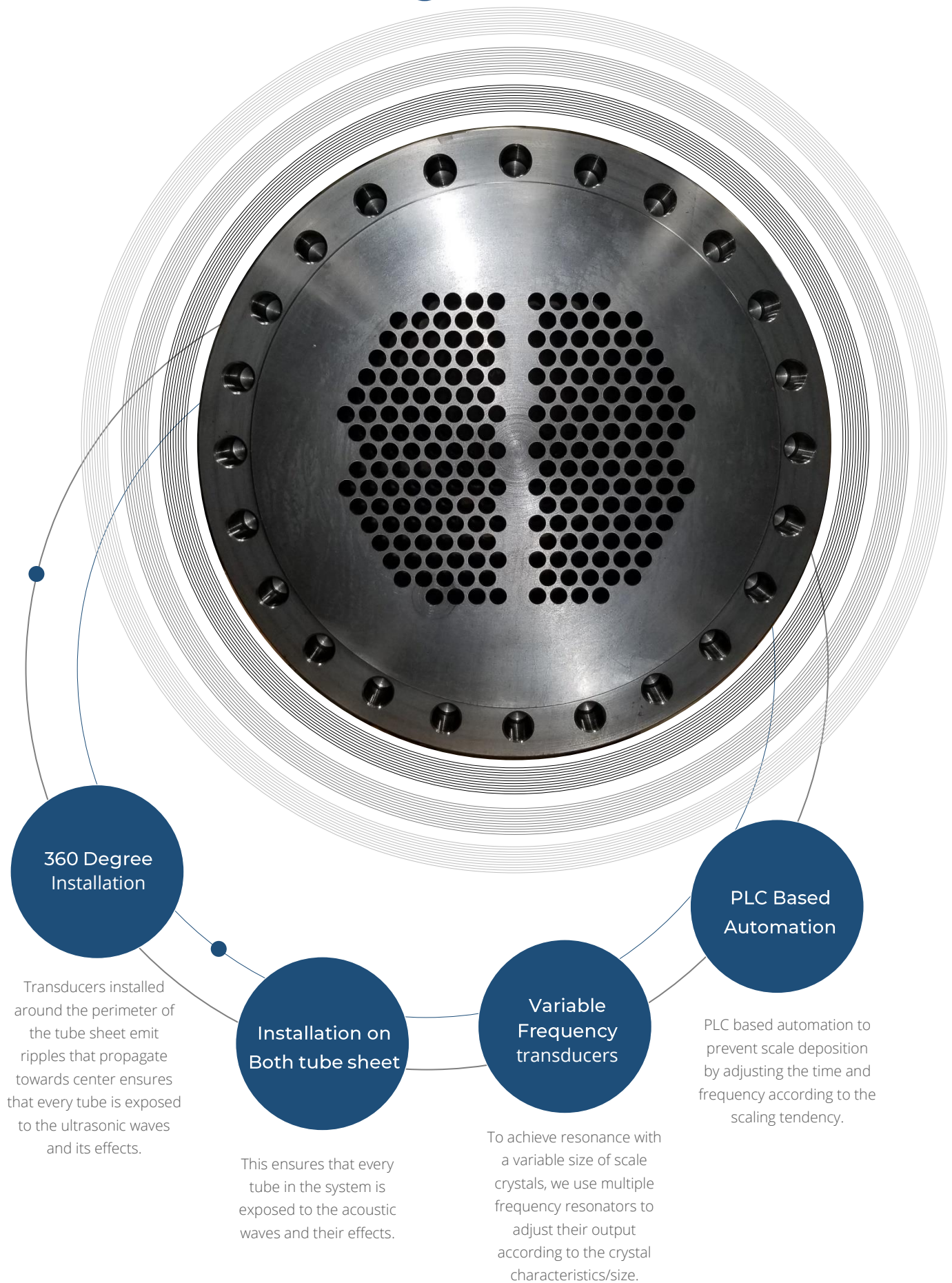
When liquid is exposed to high frequency vibrations, it breaks up into tiny droplets that are ejected from the liquid surface and improve the heat exchange and reduce built up of BPE.

Microscopic water droplets generated by high frequency vibrations overcome the BPE effect partly in the boiling liquid.

High frequency piezoelectric vibration produces microscopic water droplets originated from the metallic surface of the heating surface and led to turbulence film just adjacent to the heating surface and improves film coefficient and consequently overall HTC.



**LIQUID
BOILING**



HOW IT WORKS!

LE-CIP™ is a system that uses ultrasonic vibration to keep the heating surface of heat exchangers clean and free from scale or fouling. It works by sending low amplitude ultrasonic frequency signals, either in pulses or continuously, from an external generator to piezo-electric transducers attached to the tube sheet of the heat exchanger. The transducers then transmit the signals to the tubes of the heat exchanger, causing them to vibrate at high frequency and prevent the scale crystals from settling on them.

**A**

Signals from PLC to resonator

The LECIP™ system uses a PLC to control the cleaning program that determines how the resonator produces the electric signals. The electric signals are then used to activate the transducers installed on the tube sheet.

B

Resonator to transducers

Transducers convert the electric signals received from the resonator into ultrasonic vibrations of predefined frequency & pass to the tube sheet.

C

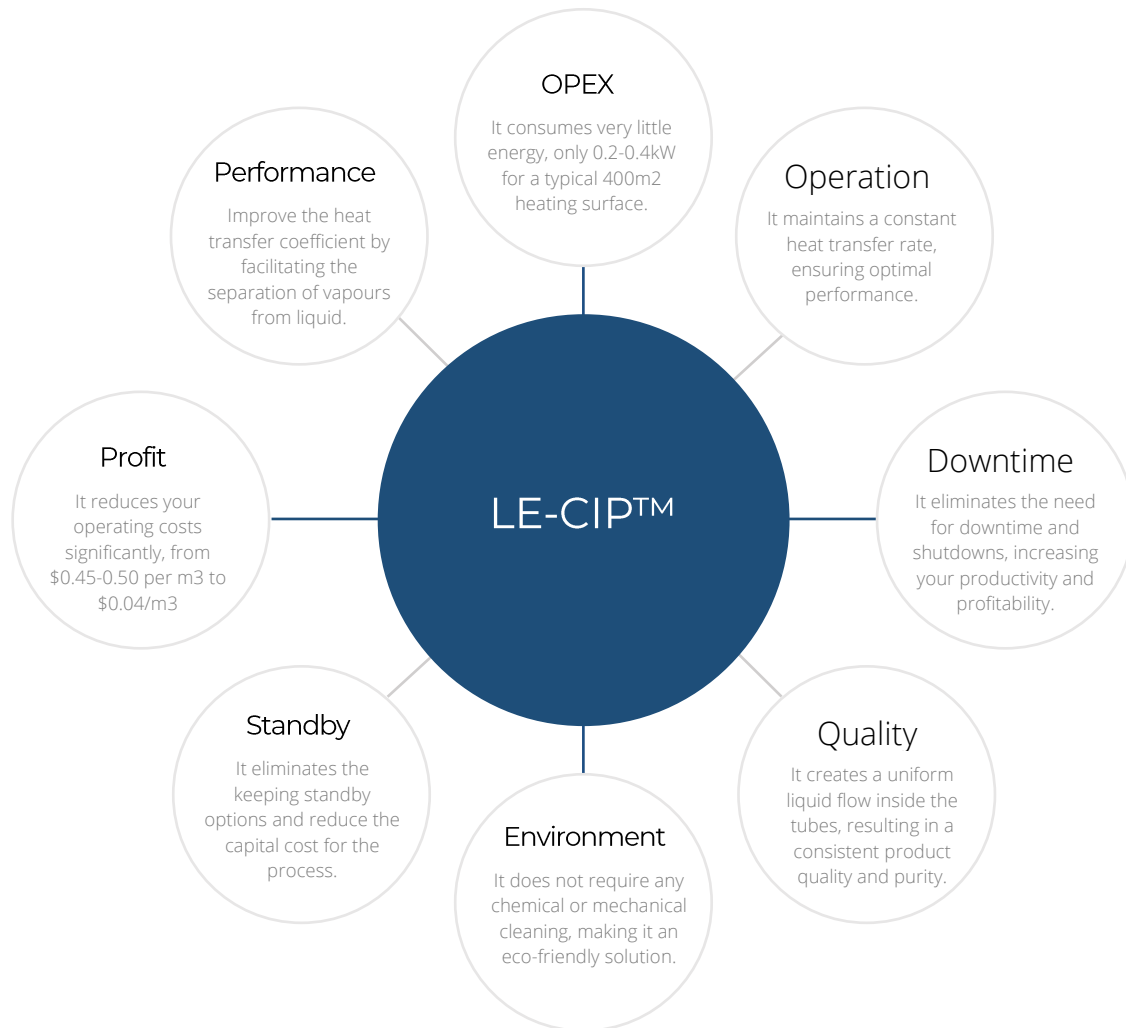
Transducer to Tubes

The tube sheet and the tubes as being welded together receive high frequency vibrations from the transducers and vibrate the tubes as well.

D

Prevention of Scale crystal settling.

Vibrating tubes with high frequency do not allow the scale crystal to settle on its surface and prevent scaling and fouling.



SOLUTION FOR STUBBORN PROBLEM

Scaling is a stubborn problem that is common in all the process industries.

Scale formation on heat transfer surfaces is a major problem in process industries. It reduces heat transfer efficiency, increases pressure drop, and causes corrosion of the metal. Scale is formed by the deposition of salt crystals from the fluid on the surface, which grow over time and create a thick layer. Removing scale is difficult and expensive, so preventing it is crucial for any process industry. LE-CIP™ is a revolutionary system that keeps the heat transfer surface clean and efficient, with many benefits for your business.

CASE STUDY

A MVR based thermal evaporator for the 120KLD effluent/wastewater treatment plant was supplied by Limpid Engineering to a client in 2021 and became operational on 1st April 2022. The system has two forced type tubular evaporators with Vapour separator, a steam stripper, and other accessories. The evaporator has an ultrasonic CIP system integrated.



Project Name: RL Fine Chem Private Limited, Hindupur

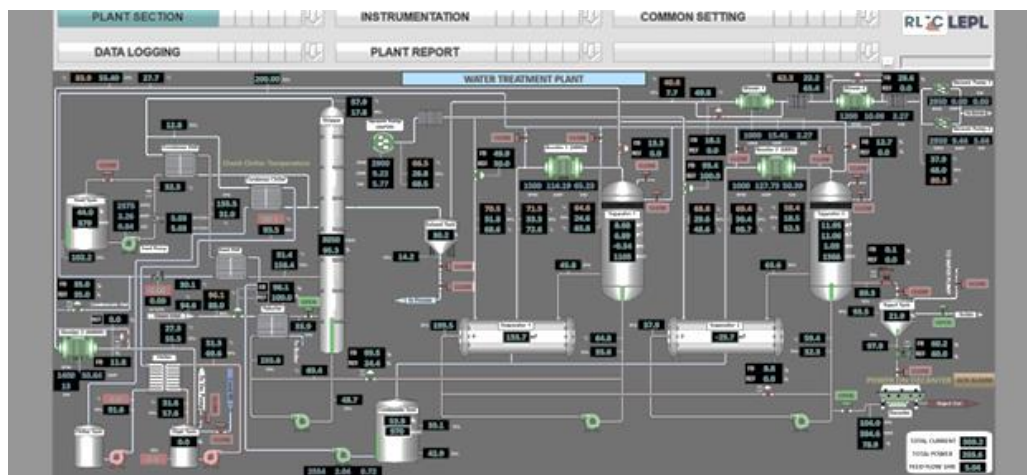
Installed evaporator is increasing the effluent concentration from 7-8% to +40%. Since the system began operating, no mechanical or chemical cleaning of the evaporator/ heat exchanger has been done.

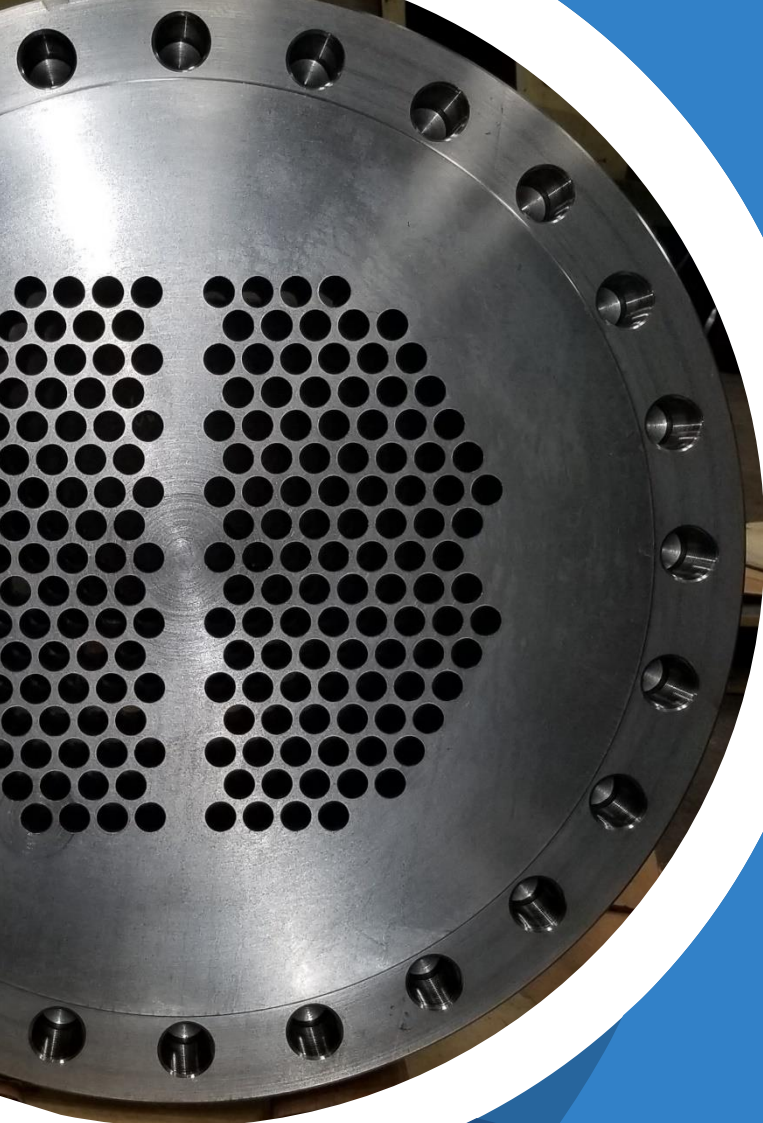
Results & Observations

The performance has been consistent. The system has been running continuously for months without any cleaning. Despite the high lime dosage, the system is operating with the same performance.

Trend with earlier evaporator

Earlier installed evaporator was required to be cleaned every fortnight to return from diminishing capacity.





LIMPID™



Limpid Engineering Pvt.
Ltd., 2nd Floor, N.P. Towers,
Plot No. F-464, Phase-VIII B,
Sector-74, Industrial Area,
SAS Nagar Mohali, Punjab,
India-160055



Telephone
+91 7814507510
Web:
www.limpid.ltd



E-mail:
info@limpid.ltd