www.lipochem.com

LIPOCHEM (M) SDN BHD

LIPOCHEM BIO-TECH SDN BHD

HEAD OFFICE & FACTORY

Lot 34, Jalan Delima 1/3,
Subang Hi-Tech Industrial Park,
40450 Shah Alam,
Selangor Darul Eshan, Malaysia.
Tel : (603) 5631 6666
Fax : (603) 5632 6363

Email : lipochem@streamyx.com

JOHOR BAHRU OFFICE

19-01 & 21-01, Jalan Titiwangsa 3/2,
Taman Tampoi Indah, 81200 Tampoi,
Johor Bahru, Johor Darul Takzim,
Malaysia.
Tel : (607) 235 5352 / 232 8352
Fax : (607) 232 3352

Email : lipochem@streamyx.com

LIPOCHEM PTE LTD

SINGAPORE OFFICE

196 Pandan Loop #07-14,
Pantech Business Hub,
Singapore 128384.
Tel : (65) 6261 9620
Fax : (65) 6261 9629

Email : lipochem@singnet.com.sg

LIPOCHEM

The World's First "HydroFlex HYDROGENATION PLANT"

(A COMBINATION OF DEAD-END & LOOP REACTOR)

Superb Performance for Selective or Random Hydrogenation

LIPOCHEM'S HydroFlex HYDROGENATION PLANT

LIPOCHEM's HydroFlex Hydrogenation plant is another innovation from LIPOCHEM Group. As the name implies, the HydroFlex Hydrogenation Plant is a very versatile and flexible plant which can handle a wide variety of feedstocks with different processing conditions. Hydrogenation is a complex reaction where productivity and selectivity is influenced by a combination of temperature, pressure, agitation and catalyst (concentration and type). LIPOCHEM's HydroFlex Hydrogenation Plant is designed with the following innovative features to meet these stringent process and feedstock requirements:

Hybrid Converter System : Flexibility

The heart of all hydrogenation plants is the converter system which is basically a heterogeneous reactor. Mixing plays an important role in the productivity, selectivity and the degree of isomerisation in the hydrogenation of oils and fats. The LIPOCHEM's HydroFlex Hydrogenation Plant is equipped with a Hybrid Converter System which is a combination of dead end and loop reactor: it is a versatile system with the flexibility to control the performance of the reactor according to the product requirements such as high productivity, good selectivity or degree of isomerisation.

Efficient Heat Recovery System : Cost Saving

With the increasing cost of fuels, energy recovery and conservation is gaining priority in plant operations. To minimise utility bills, heat recovery has become part and parcel of a hydrogenation plant. The following heat recovery options are available to be incorporated into the LIPOCHEM's HydroFlex Hydrogenation Plant according to customers' preference:

a. Spiral Heat Exchanger
b. Heat Exchange Vessel
c. Modular Shell and Tube Heat Exchanger with Corrugated Tubes
d. Heat recovery from reaction heat.

Foolproof Sampling System : Safety

In LIPOCHEM, safety is always a key consideration. Our hydrogenation equipment and facilities involving hydrogen fully comply with Explosion Proof designs & requirements. The sampling of oil from the hot and pressurised system if not handled with care is a safety hazard. Hence we have included a foolproof oil sampling system. The system reduces the chance of introducing air into the reactor when sampling is carried out under vacuum conditions.

Automatic Nitrogen Purging System : Reduced Contamination

To reduce product contamination when changing feedstock, LIPOCHEM's HydroFlex Hydrogenation Plant is equipped with an automatic nitrogen purging system for effective emptying of the hydrogenation plant.

The LIPOCHEM's HydroFlex Hydrogenation Plant is also equipped with state-of-the-art catalyst handling, filtration and oil batching systems.

Performance of the LIPOCHEM's HydroFlex Hydrogenation Plant

1. Design Capacity: 10 - 20 MT/batch
2. Reaction Time: Full Hydrogenation of RBD PKO in one hour.
3. Application: All vegetable oils/fats.
4. Contamination per stock change : < 2%
5. Energy saving with heat recovery:

Feed Oil		Reacted Oil		Estimated Steam Saving
Inlet Temp. (°C)	Outlet Temp. (°C)	Inlet Temp. (°C)	Outlet Temp. (°C)	
60	121	160	100	60 kg/MT of oil
60	141	180	100	80 kg/MT of oil
60	162	200	100	100 kg/MT of oil

Note: Equivalent flowrate of oil is used for above calculations with LMTD of 40°C. A lower LMTD will give higher steam savings. Please consult us for details. Calculations above are based on properties of palm oil.

Hydrogen Savings and Faster Reaction Times

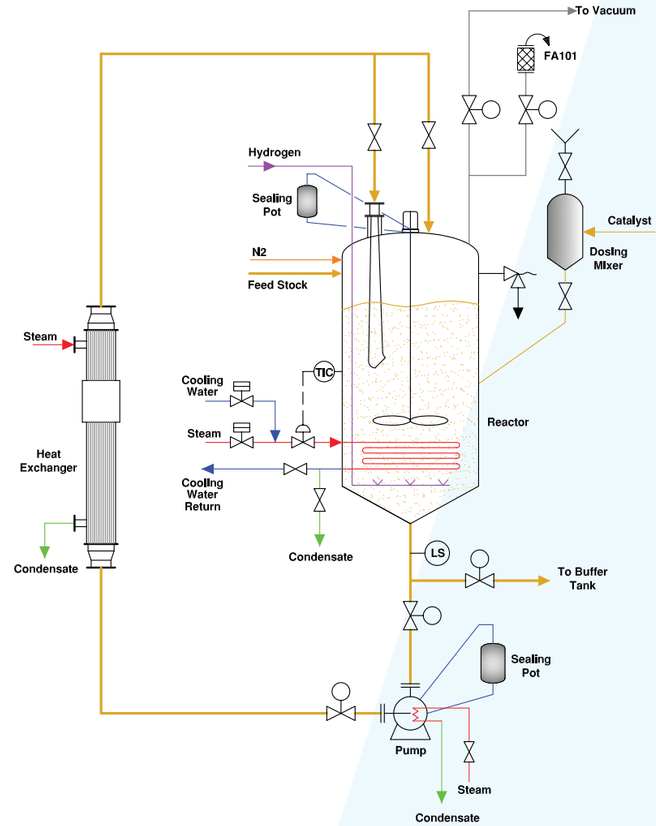
With the improved design of agitator, hydrogen can be dispersed in the oil medium at a faster rate with better utilisation of hydrogen. Minimal excess hydrogen is also needed to push the reaction to the end point, resulting in reduced usage of hydrogen.

Converter Pressure at End Point (Bar Absolute)	Hydrogen Wastage (NCM/m³ of Head Space)
0.50	0.30
1.00	0.60
1.50	0.89
2.00	1.19

NCM – Normal cubic meter at 1.013 Bar and 273.15 K. Hydrogen wastage is calculated based on reactor temperature of 180°C and ideal gas behavior.

In order to achieve even faster reaction times for full hydrogenation, the loop reaction can be carried out using liquid jet pump in our HydroFlex Hybrid Converter.

HydroFlex Hybrid Converter Flow Chart



We also offer upgrading and retrofitting of your existing plant/equipment. Kindly contact us with your enquiries or for more detailed information.