

Lithium ion battery Recycling plant (500Kg/Hour input material)

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The diagram illustrates the recycling process for lithium-ion batteries. It features a central circular icon containing a stylized lithium-ion battery cell with a circuit board overlay. Four blue dots connect this central icon to four surrounding elements: a tall, dark industrial machine on the right; a smaller control unit or pump on the bottom right; a small circular inset in the top right showing the element symbol 'Li' and its atomic number '3'; and a text box on the left. The text box contains the following information:

SUPERCritical FLUID TECHNOLOGIES

LITHIUM-ION BATTERY RECYCLING

RECOVERING THE VALUABLE METALS

As the demand for lithium-ion batteries for consumer electronics and electric vehicles increases, so does the need for technologies to safely recover and recycle the materials used in these batteries.

Supercritical Fluid Carbon Dioxide is an excellent green solvent that can be used in conjunction with chelating agents to recycle the valuable heavy metals used in lithium batteries.

Broad Commercial Parameter

Sr No.		
1	Plant Total Connected Load	180HP - 200HP
2	Plant Model	Semi Manual
3	Area Needed	1500 SquareMt
4	Black mass conversion rate	50%
5	Battery Input Capacity	500 Kg/Hr
6	Plant Cost	\$185,000 +Taxes



BRIEF INTRODUCTION:

Lithium battery mainly consists of shell, positive electrode, negative electrode, electrolyte and diaphragm. The positive electrode is formed by coating lithium cobaltate powder on two sides of an aluminum foil current collector through PVDF which plays a bonding role; The negative electrode structure is similar to the positive electrode and consists of carbon powder bonded to both sides of the copper foil current collector.

Lithium-ion batteries represent a key technology for the energy transition and electro mobility. Due to the growing battery market the amount of end-of-life batteries increases and thus is a valuable source of raw materials. With a new functional and material specific recycling process, the battery materials shall be recovered, reconditioned and reused most efficiently. At present energy-intensive metallurgical methods are used to recycle end-of-life batteries and production waste from battery manufacturing or automotive. With these methods only specific elements can be recovered. The added value depends on the market prices of the raw elements copper, aluminum, nickel or cobalt. The aspired recovery of the primal battery materials like Li-, Ni- and Co-containing chemical compounds and high-grade carbons for remanufacturing new cells, is more valuable instead of resynthesizing with high effort. The presented process of electrohydraulic fragmentation is energy- and resource-efficient and suitable for production residues as well as waste product

At present, the research on the recycling of waste lithium batteries is mainly focused on the recovery of high-value anode precious metals cobalt and lithium. Copper in the negative electrode of waste lithium batteries(content up to 35%) is an important production raw material widely used Carbon powder adhered to it can be used as additives such as plastics and rubber.



RAW MATERIALS:

Over the years, we have been engaged in the research, development, and production of a lithium-ion battery recycling plant. We have tested over a hundred types of lithium-ion battery recycling and our technology has been continuously improving. Our aim is to provide our customers with a more professional and reliable recycling machine.



At present The lithium battery recycling machine is used for dismantling and recycling the Soft pack-age battery, cell phone battery, Shell battery,Cylindrical battery etc. Different types of lithium bat-teries have different recycling procedures. Please contact us for detailed configuration.Based on the structural characteristics of lithium batteries, our company adopts an environmentally-friendly physical separation process to realize efficient separation and recovery of waste lithium batteries. The lithium battery recycling plant is used for dismantling and recycling the Soft package battery, cell phone battery, Shell batter Cylindrical battery etc. The final products of this plant are Graphite powder, Cobalt acid lithium Aluminum and Copper. The air

purification equipment of this production line has a very good performance. There is a water spray facility and activated carbon device used to absorb odors and pulse dust collection system for dust adsorption.

Shredder: Shredded lithium batteries into smaller pieces.

Hammer crusher: For the secondary crushing of shredded materials.

Grinder: For the grinding of the crushed materials.

Separation machine: Separate the materials after being ground.

Collector: Collect and release the dust .

Pulse purifier (air cleaner): Clean all the dust produced during the operation of the whole system.

Classifying screen: Screen the materials sorted by the separation machine, and screen out of larger metal materials.

Magnetic machine: Separate nickel from the metals.

Gravity separator: Separate those finer materials from the screening machine and separate the metal completely.

High-pressure blower: Keep the whole system in a negative state so as to collect the materials and purity the air .

The final products are black mass, aluminum granule, copper granule, plastic, steel shell and separator plastic etc. The output will vary depending on the type of battery.

TECHNICAL STANDARDS

The conversion of Black Mass will be 50% of the net battery input weightage.

TECHNICAL STANDARDS:

Feature Item	Indicator Requirements
Recovery Rate of Metallic Aluminum	98%
Powder Recovery Rate	98%
Content of Powder In Metal Aluminum	2%
Content of Metallic Aluminum In Powder	2%
Other	Contain dust collector with not pollute
Qualified Rate	99%
Failure Rate	1%
CMR	≥1.67

Note: Working voltage:380±10V(415V ,440V also can be custom);

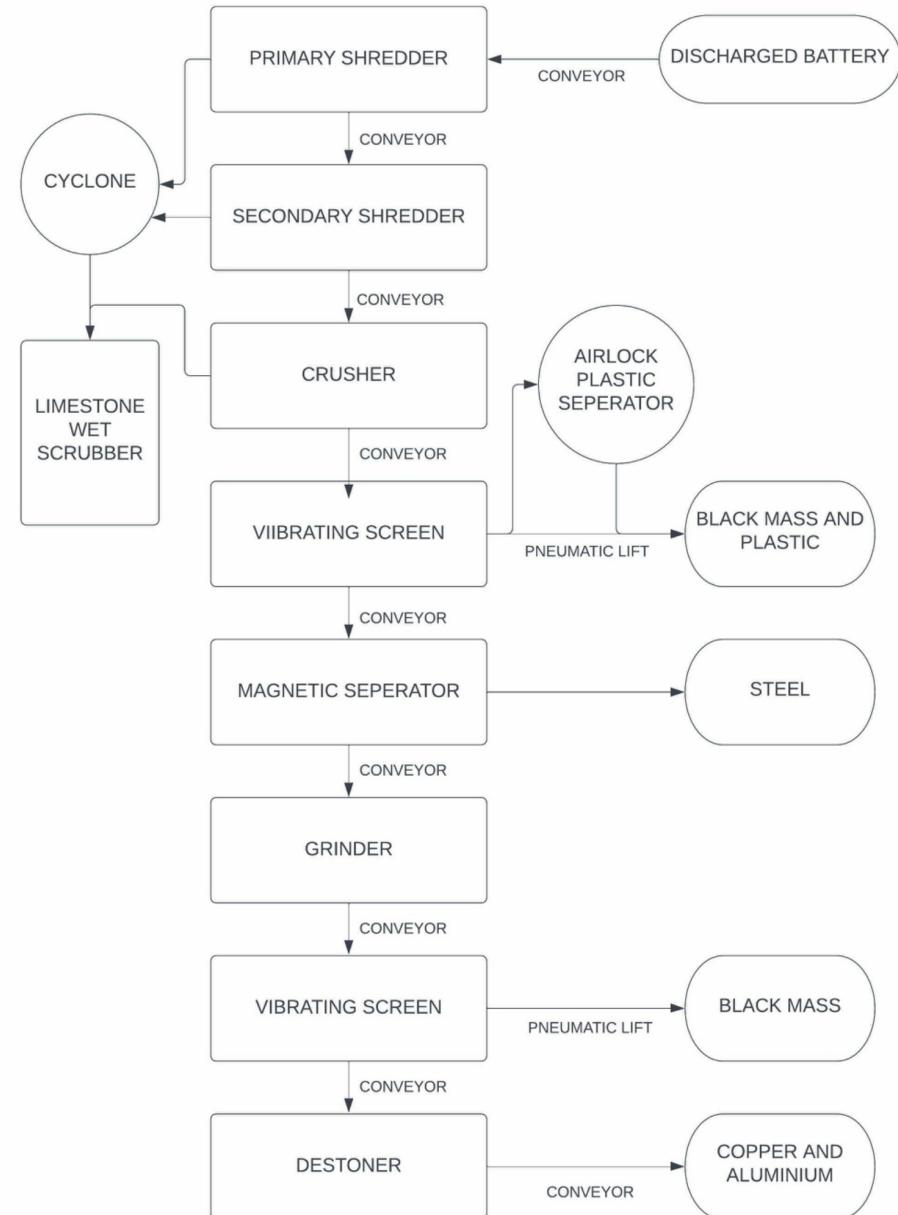
CUSTOMER WORKSITE:

1. Provide field installation service to make sure the normal operation of the equipment.
- 2 Provide detailed technical training for customers. Including the equipment operation process, primary and common troubleshooting methods, etc.
3. Provide lifelong technical support for the machine.

Product advantages:

- 1.High automation program, simple operation, stable performance;
- 2.Low power consumption, low noise, small footprint, no dust pollution;
- 3.Electrical separation efficiency of 99%, the finished products can be directly sold;
- 4.Wide range of sorting materials, sorting speed is fast;
- 5.No waste gas emissions, real green environmental protection sorting, no secondary pollution generation;
- 6.The lithium battery recycling equipment adopts water-cooled and air-cooled turbine mill, which makes the material separation cleaner and more suitable for The recycling value of lithium batteriesLithium battery recycling provides essential raw materials for manufacturing new batteries while lessening dependence on finite resources, fostering sustainable development.Lithium batteries contain several valuable materials worth recycling, including: Lithium(primary component of lithium batteries), Cobalt, Nickel(provide high energy density), Aluminum (the casing of lithium batteries is typically made of aluminum), Manganese(used to enhance battery performance and stability), Copper(connectors and wires in lithium batteries are often made of copper), Plastics and other components.

Process Flow Diagram



.Configuration List of Front Equipment for Hard Shell Battery Processing

Machine Name	Model	Power (kw)	Qty	Photo
Belt conveyor	BLT 01	2.5HP	2	
Single shaft shredder 1	DS-800	15HP	1	
Screw Conveyor	SR 02	3HP	3	

Magnetic Separator	BAT-500	2.2kw	1	
Positive pressure wind conveying system	ZFS-550	5.5kw	3	
Elevator conveyor	DT-500	5kw*2	1	
Wind conveying system	FS-133	7kw*3	2	
Plastic Separation unit	GTF-1200	10kw	1	

Z shape air separator	BT500	7kw	1	
Pulse dust collector	MC-36	5kw*3	1	
Material Hopper	SKL-800	1.5kw*4	2	
Round vibration screen	YS-1200	0.37kw	1	

Pulse Dust Collector	MC-64	3kw*3	1	
Vibrating Screen	ZDS-1240	3	1	

Crusher	CP-600	20kw	1	
Pneumatic powder Airlift 1	PN 6001	10Kw	1	
STEEL Structure	BT3L0	//	1	
High Speed Electrical Duct Industrial Centrifugal Fan Blade Material	DCT	5KW	3	

Airlock Powder conveying System	MP200	///	5	
Scrubbing System	MLK 320	7KW	1	
Control cabinet	2 sets. One for a single shaft shredder, one for the whole system. .			

Extra information about machine:

- a) Specification like composition and particle size of the products obtained: Copper and aluminum grits:1-3mm. Black mass powder:0-0.125mm**
- b) Workshop :34*11*8m for machines and about 200m² for operation, 3-5 workers per shift**
- c) Wearing parts list: After purchase machine, we can provide spare parts design drawings. So you can find a local metal workshop to produce wearing parts.**
- d) Power supply: 200 KW**

Equipment 1

Battery Shredder - 1		
S,no.	Part name	Specification
1	Chamber Size	450mmX500m
2	Cutter	Size 16mm, Material-Die Steel
3	Cleaner	Ms, for material cleaner
4	Shaft	Hex- 100 mm,center to center machining
5	Motor	10hp, 1440 rpm, Qty -1 nos
6	Gear Box	Heavy Duty Helical Gear Reduction, Ratio 1:60, Qty- 1 nos, make- reggiana riduttori/Equivalent, (gearbox specification will send separately)
7	Machine Size	Width 1 meter approx, Length 1.5 Meter, Height 1000mm
8	Cleaner	For material Removal
9	Electric Panel	Electric panel reverse , Forward and automatic trip off on overload



Equipment 2

Name	Model	Parameters	Capacity (t/h)	Motor power(KW)	Weight (t)	Size
Hammer crusher	PC-64	Charge40mm, discharge<5mm	1000 kg/Hr	20	1.3	1235 700 900

- Durable, heavy-duty fabrication designed for superior operation and long lifespan
- 100% of screen utilized for maximum efficiency
- A variety of hammer sizes, patterns, and screen openings
- available to tailor parameters for each application
- Balanced HP to screen area for maximum power efficiency
- Symmetrical, precision balanced, and reversible rotors
- Durable pillow-block bearings enhance unit lifespan
- Rigid-frame screen mounting for uniform hammer-to-screen clearance
- Unique frame track designed for easy screen removal and exchange without tools
- Large access doors make cleaning and maintenance simple and quick
- Stainless steel and sanitary design available
- Optional wear liners and wear-resistant hammers for abrasive products



Equipment 3

Magnetic Separator

TDS-500 Iron Separator	TDR 500
Powerful Magnetic Drum Dia.	400*600mm
Drum Power : 3000G (+- 10%)	3000 gauss
Motor Power:	3HP
Belt / Pulley operated	VWQ
With reduction Gear box & Motor	Rratio 1:3
capacity	1000 Kg/hr

Product Detail

1. Polished Surface Treatment
2. 3 Phase Power Supply
3. Stainless Steel Materials
4. 250 Degree C Operating temperature

Features of Wet Drum Magnetic Separator:

- Wet drum magnets have high magnetic recovery and discharge.
- The feed slurries recover the magnetic field.
- It is available in single or multiple drum applications.
- Recover magnetic solids in as clean as a magnetic concentrate.
- Permanent magnet assembly eliminates coil burn-outs
- The magnet/pole elements are bolted to a mild steel shaft.
- The drum is made from thick stainless steel for long service life.
- Wet drum separators are available in different configuration like single drum, double drum and multiple drum. In double drum two separators are arranged back to back with a common feedback.



Equipment 4

Product Specification	
Capacity	550 kg/Hour
Operation Mode	Automatic
Electricity Connection	Three Phase
Motor Power	5 HP
Material of Construction(Contact)	MS-SS
Voltage	440 V
Weight	1200 kg
Frequency	50 Hz
Driven Type	Electric
Color	White and Green
Usage/Application	battery
Finishing	Powder Coated
Feature	Rustproof



Equipment 5

Name	Model	Parameters	Capacity (t/h)	Motor power(KW)	Weight (t)	Size
Impact crusher	IM-002	Charge40mm, discharge<2mm	700 kg/Hr	20	1200	1100 1000 900

Impact crusher specially designed for black mass material recovery

- Durable pillow-block bearings enhance unit lifespan
- Rigid-frame screen mounting for uniform hammer-to-screen clearance
- Unique frame track designed for easy screen removal and exchange without tools
- Large access doors make cleaning and maintenance simple and quick
- Stainless steel and sanitary design available
- Optional wear liners and wear-resistant hammers for abrasive products



Equipment 6

Pulse Jet Dust Collector range and specification:

- Prince Pulse Jet Dust Collector is available in different sizes. It is a selectable feature of our standard product
- Size and construction can be design based on customer input (DATA) like dust load, material fineness, air flow, material temperature, moisture, efficiency, type of application, outlet emission and site dimensions
- It is available in different shapes like circular or square housing, top or side removal, a body made from a different material
- Selection of filter bags fabrics is done based on chemical characteristics of dust, temperature, antistatic charge and another factor. Fabrics are like polyester, polypropylene and cotton etc.



Power (hp / kW)

10 hp

Material

Mild Steel

Brand

Prince Industries

Power Source

Electrical

Frequency (Hertz)

50 Hz

Voltage

440 V

Country of Origin

Made in India

Equipment 7

Air Flow Separator

Product Specification

Type Of Machine	Air Density Separation
Size/Dimension	7 F X 2.5 X 2.5 Feet
Material	Stainless Steel
Model Name/Number	LS
Color	any
Ambient Temperature	Ambient
Height	7F/ 14F (based on real space)
Usage/Application	separate PP PE labels Dust paper from Plastic Scrap.
Surface finish	Contact part 304
Surface Treatment	yes



Power Consumption	4HP to 20HP
Power Supply	415 V 3 phase
Country of Origin	Made in India

Equipment 8

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Product Specification

Airflow (m ³ /h or CFM)	25000 m³/h
Efficiency (%)	95%
Power (hp/ kW)	10 HP
Usage	Steel Industry
We Provide	Installation & Servicing, Consultation
Material	Stainless Steel
Power	30 hp
Country of Origin	Made in India
Minimum Order Quantity	1

Wet Scrubber, which is designed to control and curb the toxic fumes from the various processes. These wet scrubbers are fabricated using premium grade raw material and are strictly in conformation with the international quality standards.



Equipment 9

Vibro separator

Product Specification

Transmission Structure	Eccentric Vibrating Shaker
Usage/Application	Industrial
Type Of Machine	Circular
Material	Iron
Automation Grade	Automatic
Color	as per need
Voltage	415 V
Bearing Type	SKF/NTN
Frequency	50HZ
Applications	Sieving
I Deal In	New Only
Country of Origin	Made in India

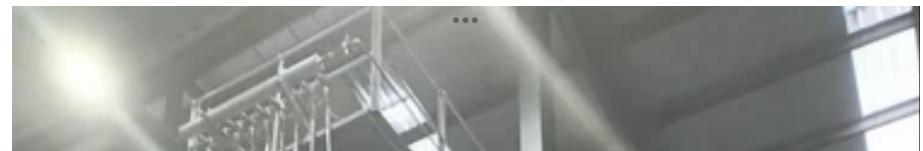


Vibro Separator

Product Specification

Brand	BE
Usage/Application	Black mass level one separator
Capacity	1 TPH
Model Name/Number	2
Material	MS
Voltage	415 V
Automation Grade	Automatic
Driven Type	VIBRO
Frequency	50 Hz
Phase	3 Phase
Color	any
Sieve Size	1000x2000 mm

Equipment 11



Pneumatic Conveyor with cyclone

Product Specification

Roller Material	Stainless Steel
Capacity	5000 kg/hr
Length	10 to 40 Feet
Material	Stainless Steel
Roller Diameter	50 mm
Brand	batx
Voltage	340 V
Usage/Application	Used to Transport Bulk Solids
Automation Grade	Automatic
Country of Origin	Made in India

Equipment 12

Automatic Black Mass conveyer station

Product Specification

Brand	Batx
Product Type	new
Type	Natural Halves
Capacity	100-150 kg per feet
Material	Steel
Power	15 kva
Usage/Application	industrial
Voltage	440v
Automation Grade	Automatic



Equipment 12

Black mass feeder

Filter

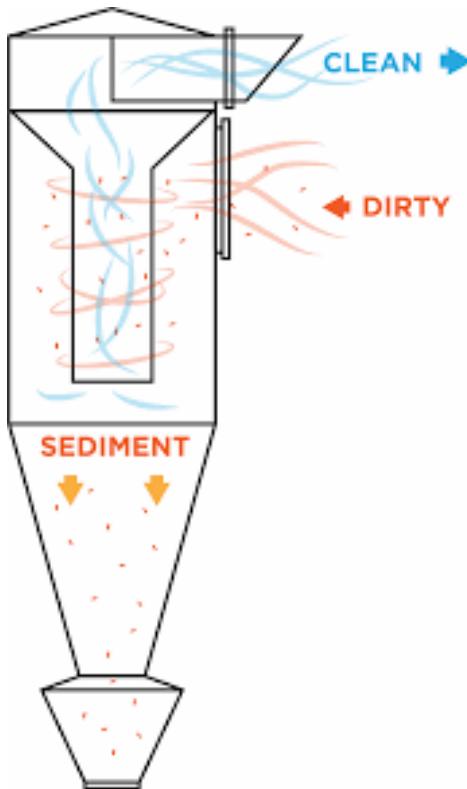
Product Type	Pressure Conveying, Vacuum Conveying, Closed Loop Conveying
Capacity	100 Kg/hr to 30000 kg/hr
Material	Mild Steel/ Stainless Steel
Voltage	415 V
Automation Grade	Automatic
Design	Customized
I Deal In	New Only

Equipment 13

Black mass feeder

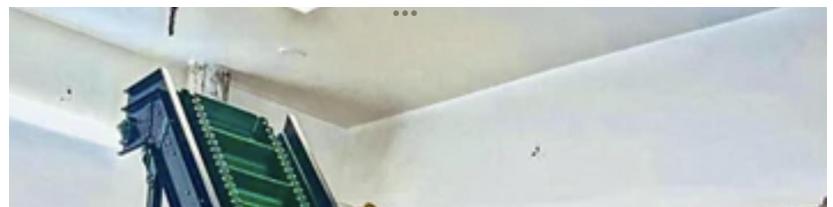
Model	Power (KW)	Air flow(m ³ /Hr)	Filter Surface Area (m ²)	Dimension LxBxH (m)

CS 7	5.5	3500	2.5	2.1×1.2×3.1
CS 10	7.5	5000	2.7	2.1×1.3×3.3



Equipment 14

Battery Conveyer Belt



Product Specification

Belt Thickness	5 mm
Material	PVC
Belt Width	Up To 40 mm
Type of Conveyor Belt	Cleated Conveyor Belt
Features	Chemical Resistant
Application Area	Dry
Length Of Belt	as per Customer's Demand
Country of Origin	Made in India

Equipment 15 Battery Conveyer Belt



Product Specification

Roller Type	Double Sprocket Tapered Roller
Usage/Application	Pharma Industries
Thickness	50 mm
Finish	Polished
Capacity	200 kg
Material	Stainless Steel
Material Grade	SS316
Country of Origin	Made in India

Equipment 16



Battery Plant Control panel 180HP

- **Capacity 180HP**
- **Includes one panel in all**
- **complete star delta panel system**

Features:

- **High strength**
- **Low maintenance**
- **Enhanced service life**

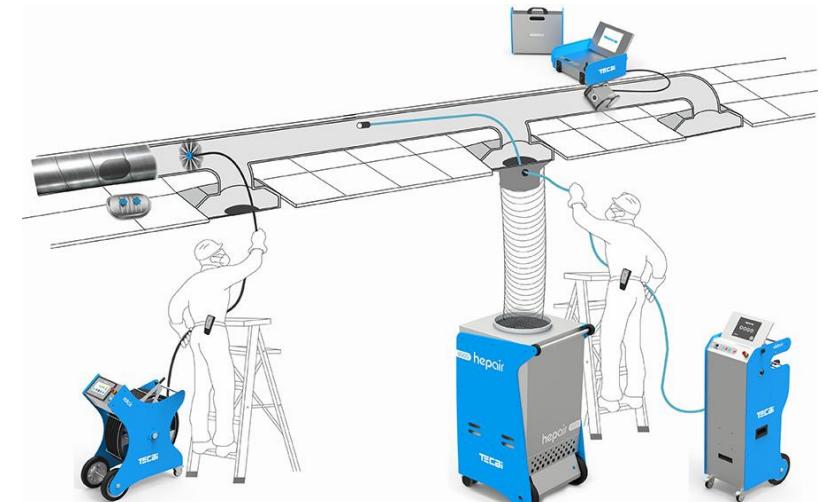
Equipment 16

Negative pressure line

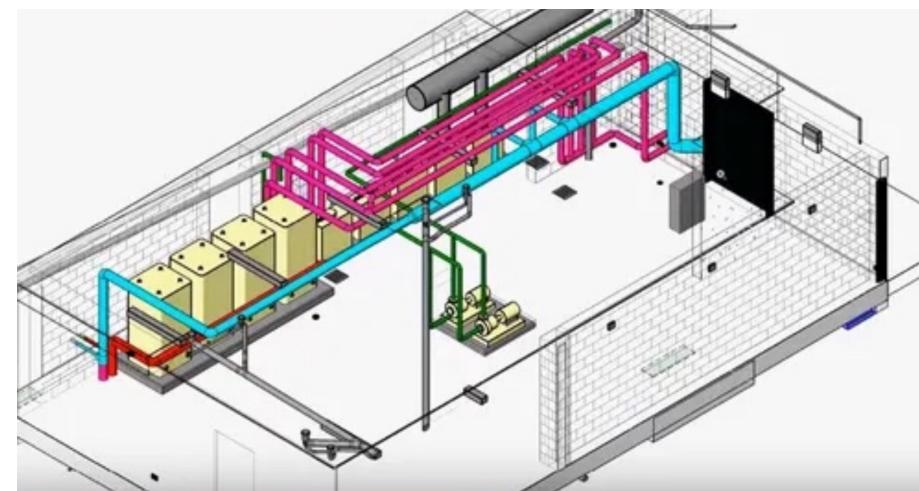
A local exhaust system is composed of 5 basic parts:

- A hood that captures the contaminant at its source
- Ducts for transporting the air
- An air-cleaning device that removes/minimizes the contaminant
- A fan that moves the air through the system
- An exhaust stack through which the contaminated air is discharged

Local Exhaust Ventilation System addresses the issue of avoiding the contamination of indoor air by specific high-emission sources by capturing airborne contaminants before they are spread into the environment. This can include water vapor control, lavatory bio effluent control, solvent vapors from industrial processes, and dust from wood- and metal-working machinery. Air can be exhausted through pressurized hoods or through the use of fans and pressurizing a specific area.



The whole plant will be equipped with a negative pressure line to ensure the flow.



Extra Utilities will be provided by the Vender such as power connection is needed at the same site,

- Discharging tank and Drying Activities is in the Scope of Vender
- The plant Completion time will be 90 days from the date of Advance payment.
- The flooring is in the scope of the vender side.