Glass Recycling – Potentials for Indian Glass Manufacturer

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Outline

1. **Introduction**
2. Potentials and challenges for Indian glass producers
3. Glass recycling concepts and technologies
4. EME capabilities for Indian customers to implement a tailor made cullet recycling system

What we do?

Batch Plants

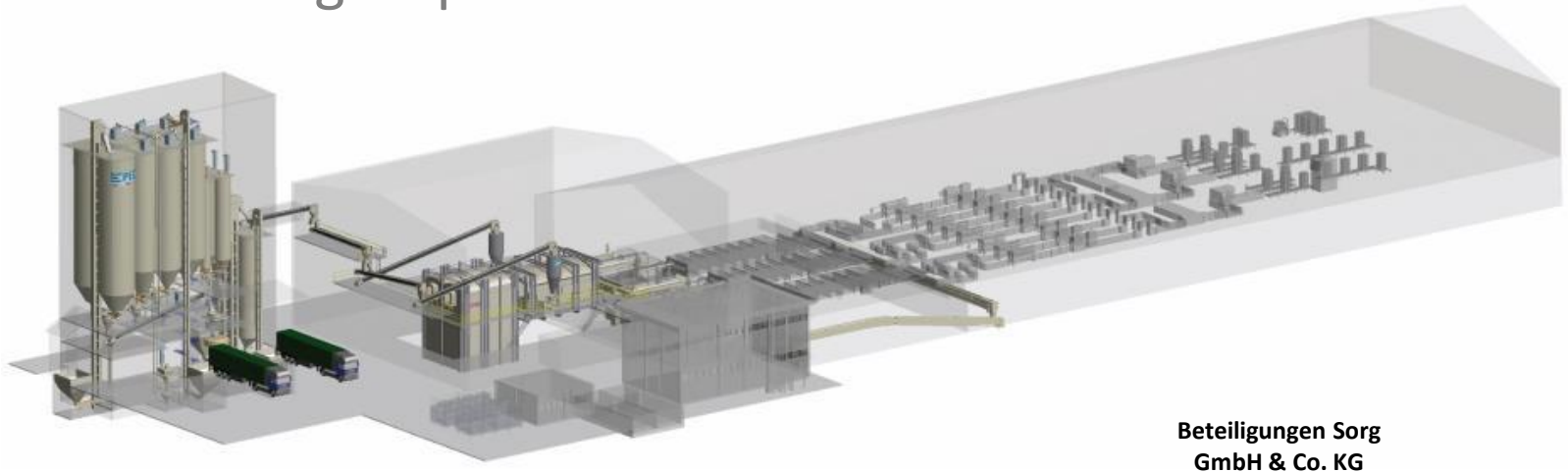
Batch Charging

Batch Preheating

Cullet Treatment

Glass Recycling

The SORG group



From raw material delivery to batch charging

Glass melting and conditioning

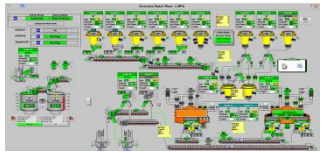
Refractory Installation

Maintenance Services

Beteiligungen Sorg GmbH & Co. KG

	batch and cullet handling	glass melting and conditioning	refractory installation and maintenance services
	EME GmbH	Nikolaus Sorg GmbH & Co. KG	Sorg Keramik Service GmbH
Design and engineering	●	●	
Equipment supply	●	●	
Installation services	●	●	●
Commissioning	●	●	●
Technological support	●	●	
Special refractory services			●
Steel structure supply			●

Introduction EME GmbH



consulting, audits,
feasibility studies

pre-engineering
plant engineering
process engineering
basic engineering
detailed engineering
utility engineering

maintenance supply
spare part supply
remote service

EME

engineering and construction, equipment supply, services consulting,

project
management
time, interface
and site
management

turn-key supply as
general contractor or
job sharing

upgrades and
modernization of
existing batch plants

single
machineries

More than 250 References – all over the world

Encirc, England

AGC, Russia

Gallo Glass Company, USA

Vicrila, Mexico

Jushi, China

CedarGlass, Egypt

Industria Vidreira do Nordeste (IVN), Brasil

AGC, Brasil

Consol Glass, South Africa

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Benefits for glass manufacturers

The use of additional cullet from internal or foreign sources has various benefits for glass manufacturers:

- 10 % cullet addition results in approx. 2,5 % energy savings in the furnace
- 10 % cullet addition reduces approx. 8 % particulates
- 10 % cullet addition reduces approx. 4 % NO_x
- 10 % cullet addition reduces approx. 10 % SO_x
- Six tons of recycled glass reduces approx. one ton of CO_2 emission
- Lower amount of raw material consumption results in less spillage/less cost
- Lowering of melting temperature results in less wear in the furnace and thus an extension of the lifespan of furnace refractories and the complete furnace campaign can be achieved.

Many European producers already use up to 80 % cullet in their furnaces.

Project information

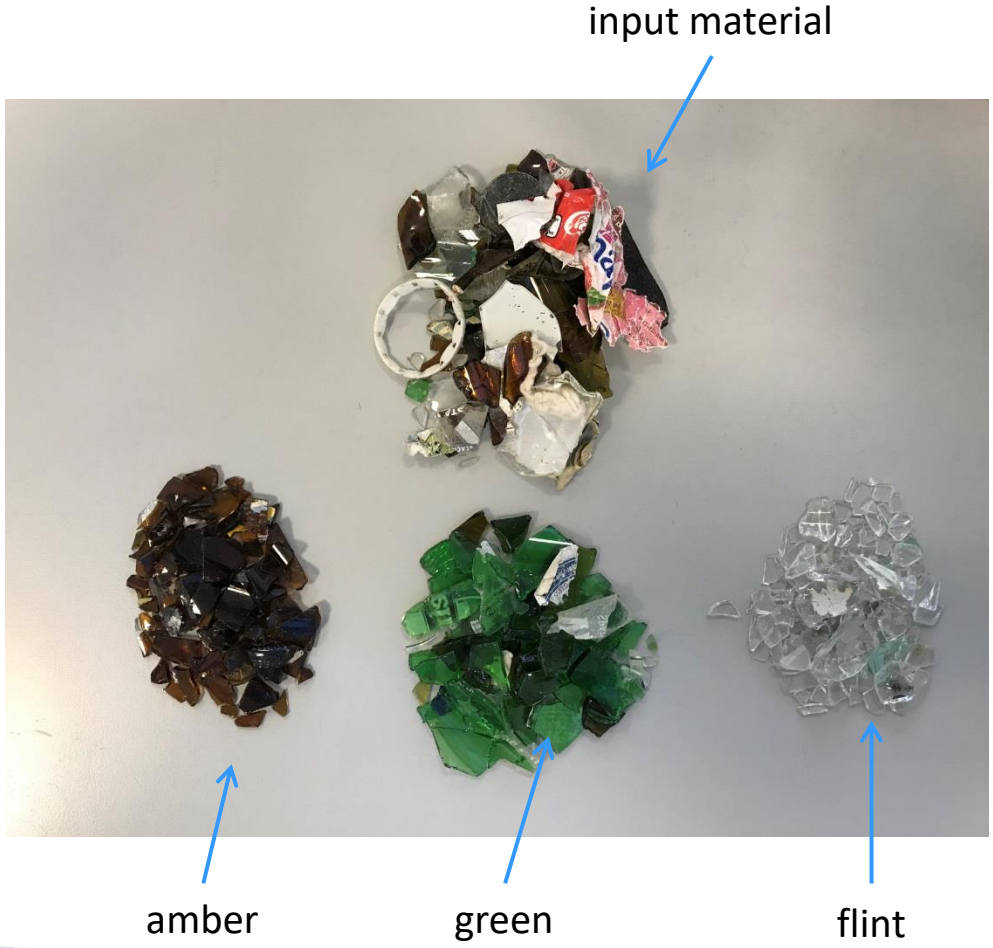
Required project information for processing waste glass

1. <u>Input material - Specification quality</u>
    - Source
        - Post-consumer glass (returnable bottles) - Dual system (container collection) - Kerbside collection - Single stream material from MRF
    - Input quality
        - Grain size - Content of contaminations - Color purity

2. <u>Outgoing material - Specification quality</u>
    - Re-melting for container glass or fiberglass industry
        - Definition of content of contaminations
        - Definition of color purity
        - Definition of required cullet sizes
    - Other use, like construction industry, aggregates, etc.

MRF glass - materials

Redemption glass - materials



Specification of the material

		input	output
Capacity		> xxx to/h	> xxx to/h
CSP (ceramics, stone, porcelain)		< xxx g/to	< xxx g/to
Magnetic metals		< xxx g/to	< xxx g/to
Non-magnetic metals		< xxx g/to	< xxx g/to
Organic and plastic		< xxx g/to	< xxx g/to
Lead glass		< xxx g/to	< xxx g/to
Heat resistant glass		< xxx g/to	< xxx g/to
Moisture		< xxx %	< xxx %
Color purity	flint	> xxx %	> xxx %
	green	> xxx %	> xxx %
	amber	> xxx %	> xxx %
Average size distribution	45 - 50 mm	xxx %	
	31 - 44 mm	xxx %	
	16 - 30 mm	xxx %	
	< 16 mm	xxx %	
Minimum grain size of material to be sorted			> xxx mm

Test facility in Germany

One of the main challenges for the Indian market is to configure the recycling plant for varying input qualities.

Infeed hopper

Screening unit

Optical sorters

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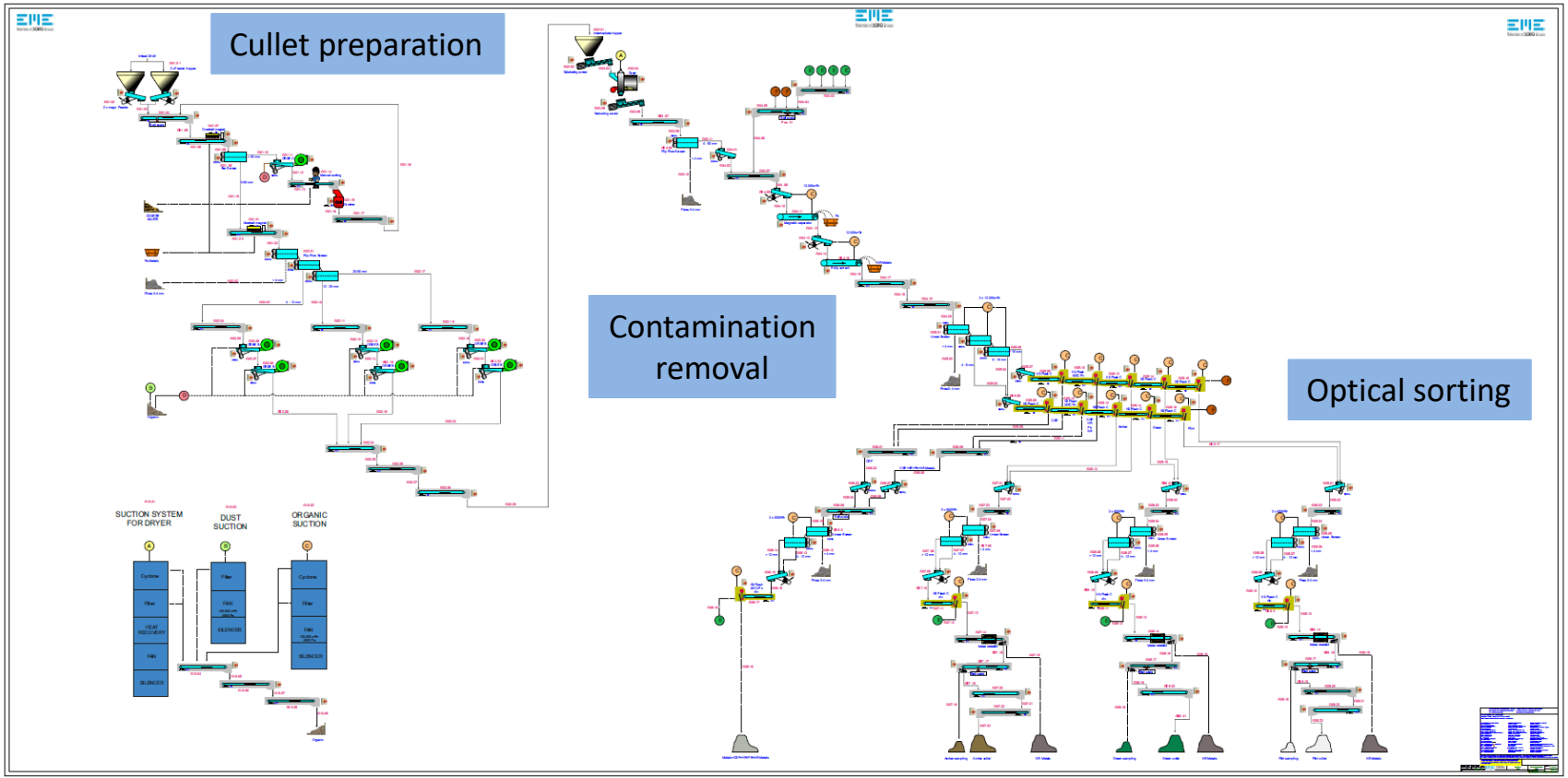
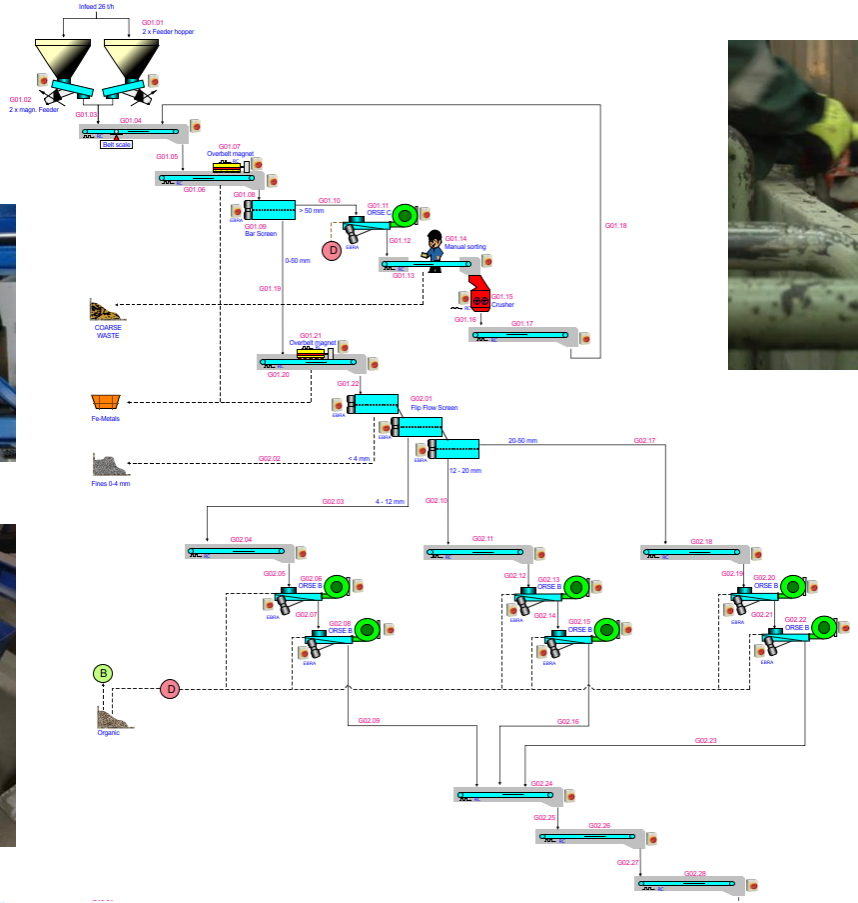
Process steps glass recycling



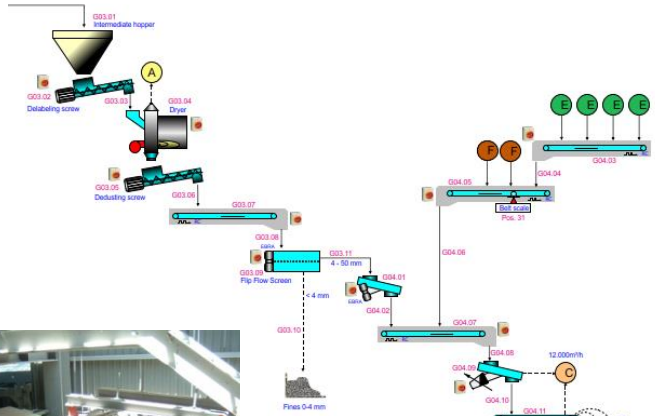
Process steps glass recycling

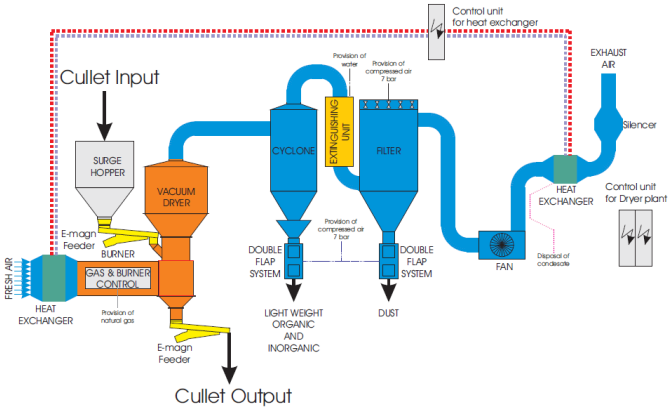
Cullet preparation



Process steps glass recycling

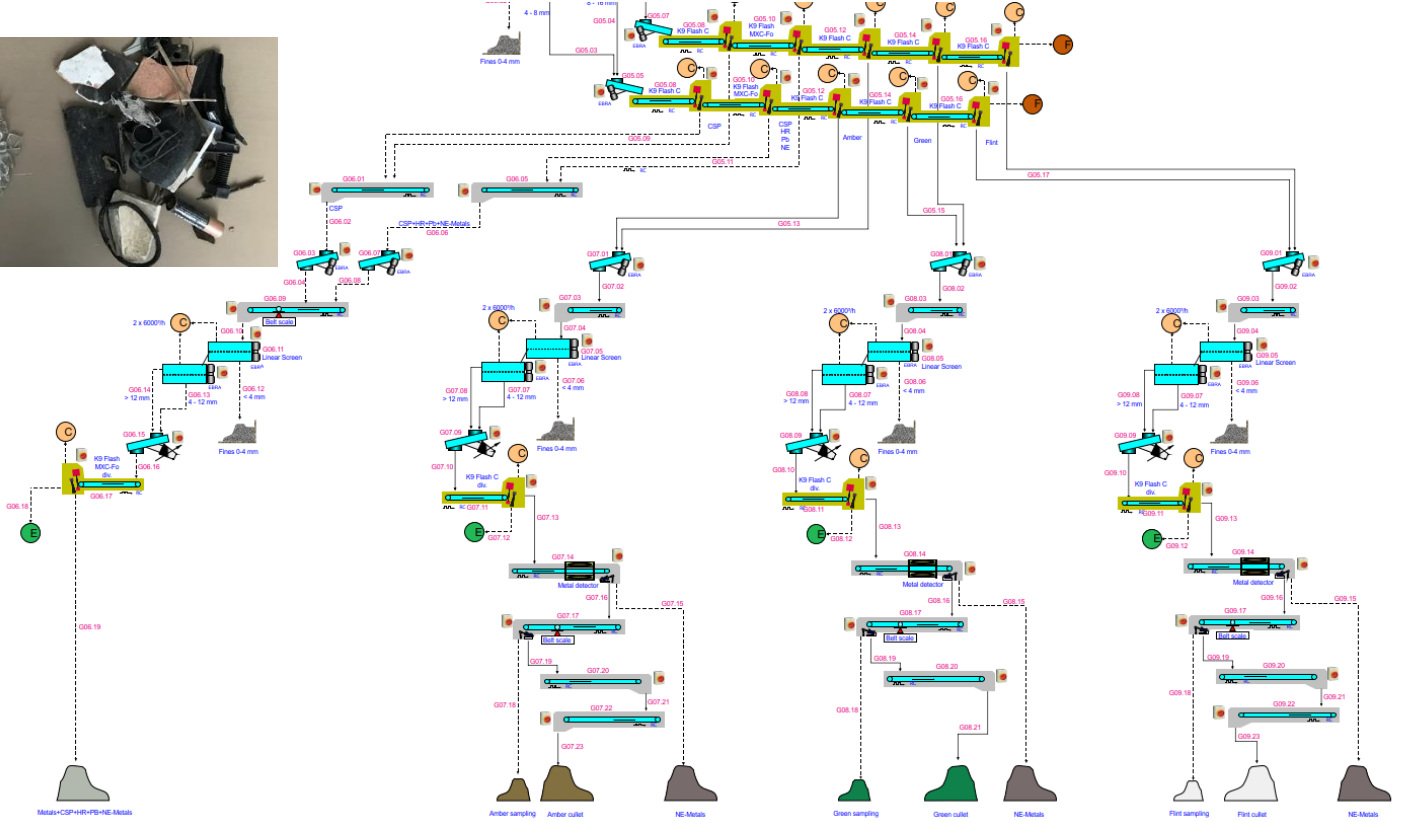
Contamination removal





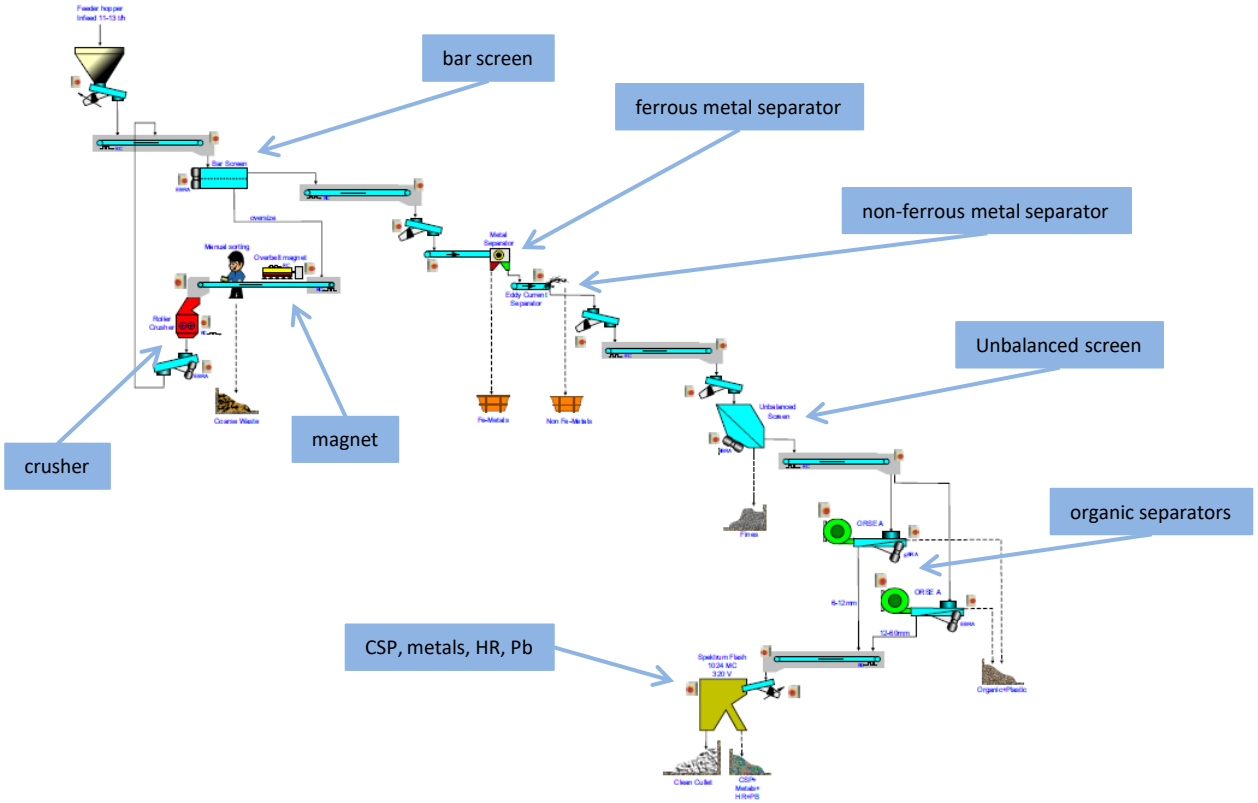
Process steps glass recycling

Optical sorting



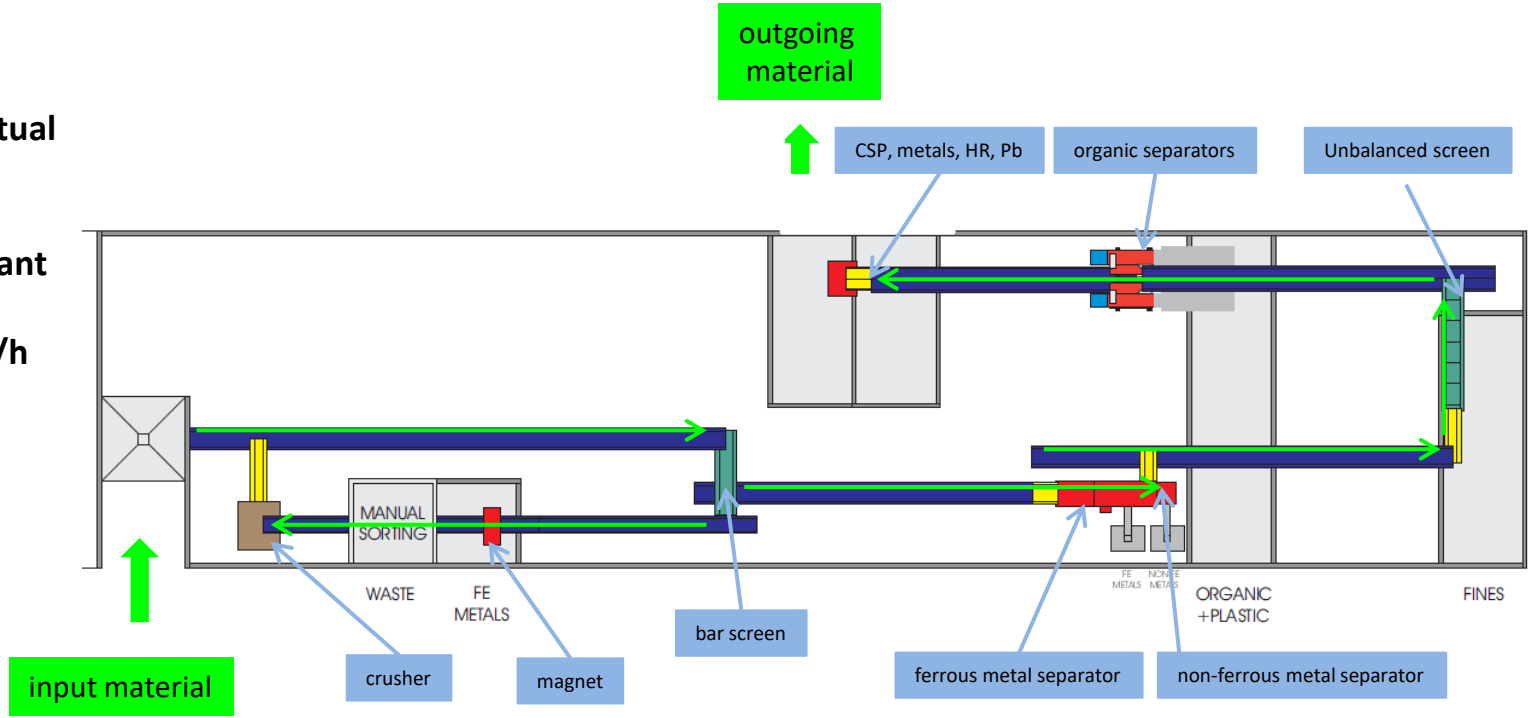
Glass Recycling Project

Overview conceptual flowsheet for a glass recycling plant with an input capacity of 12 t/h



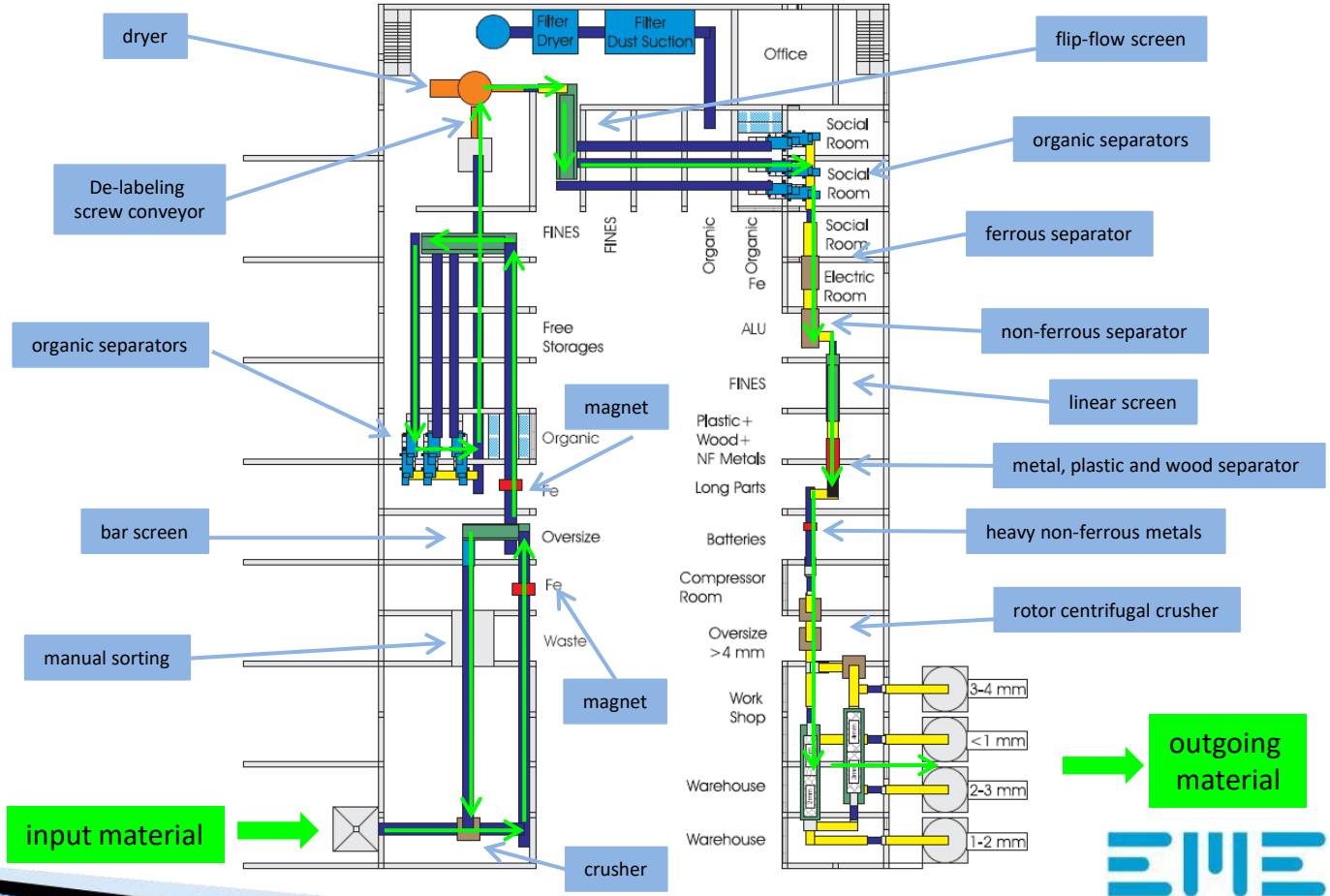
Glass Recycling Project

Overview conceptual drawing for a glass recycling plant with an input capacity of 12 t/h



Glass Recycling Project

Overview conceptual drawing for a glass recycling plant with an input capacity of 12 t/h for MRF-material



Equipment for glass recycling

Equipment machineries and separators for glass recycling

covered belt conveyor

overbelt magnetic separator

Eddy current separator

Two-roller crusher

Sensor based optical sorting equipment

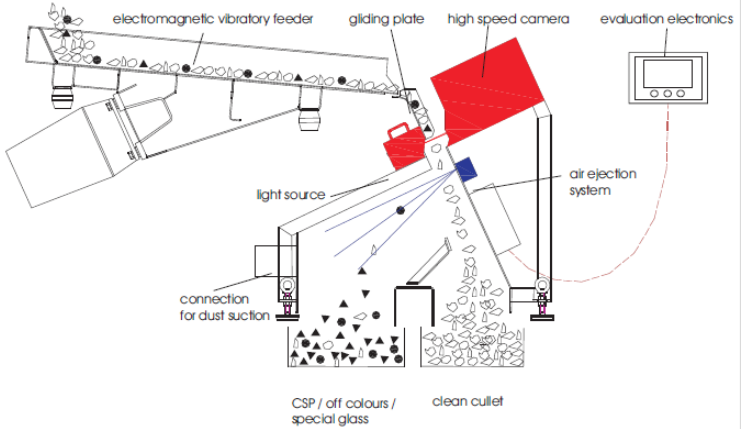
belt scale

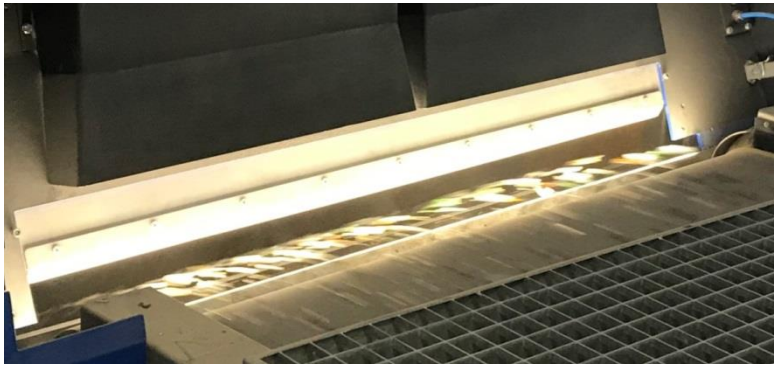
vibratory feeder

electro magnetic and unbalanced vibratory feeders / chutes

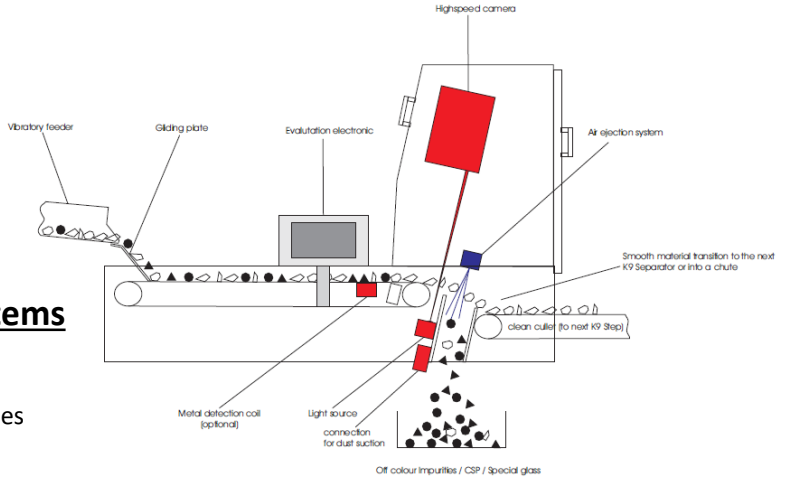
hammer crusher

Optical Sorters





Detection and rejection with horizontal system



Vertical sorting systems

- 2 way systems
- 3 way systems

Horizontal sorting systems

- Compact design
- Short transport ways
- Less cullet breakages and fines
- Less height
- Easy maintenance
- Higher ejection degree

Video

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EME – Special Features

Glass Recycling Plants in accordance with individual customer needs

EME capabilities for Indian customers to implement a tailor made cullet recycling system

EME incorporates its expert knowledge and experience of batch and cullet processes and conditions into the cullet recycling concepts which will lead to a successful project.

- Concept development according customer needs
- Engineering for general layout and project management
- Design and manufacturing drawings for supporting steel structure for local manufacturing
- Delivery of key equipment
- Selection of sub-suppliers for special equipment like sensor based sorting equipment
- Electrical control
- Project management for local sub-suppliers, installation etc.

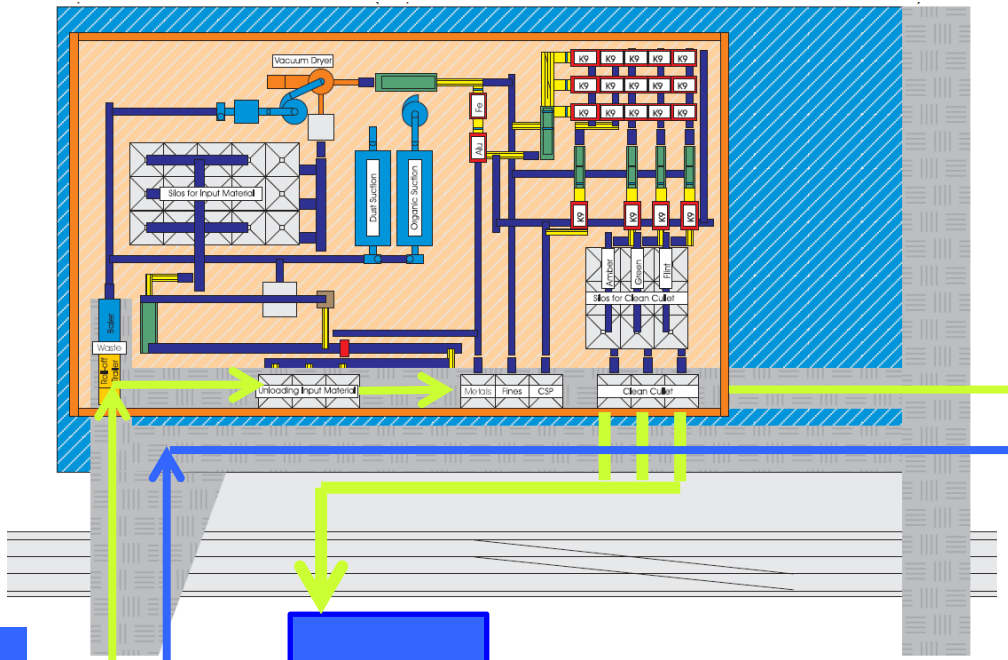
Concept integration in batch plant

Road ways for

input
output
waste
material transport

as well as
batch transport

inline integration in the batch house



Batch material

Glass recycling material

Batch house

At site inline solution

Factors to consider for an at side inline solution:

+ Low risk of additional contamination after sorting
+ Savings through shared operators
+ Savings through combined maintenance and cleaning routines
+ Savings through combined spare parts
+ Better cullet quality though less handling
+ Integration in the batch house process
+ Lower cullet transport costs

- Eventually advanced noise protection
- Risk of ordor/smell at the site
- Higher traffic through waste handling at the site
- Risk of animal difficulties, like birds, rats, etc.
- Risk of dust and wind (foils, etc.) difficulties
- Risk of self burning of MRF-material
- Higher investment due to higher quality equipment

Conclusion

Increasing demand for glass recycling plants world-wide

- Enormous benefits for glass producers, e. g. cost savings
- Specification of the input and output quality has to be validated in advance
- Plant concept and layout depend on capacity, input and output quality

If you have any questions or you require any further detailed information, please visit us at

BOOTH C47

Thank you very much for your attention!

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Process steps glass recycling

Typical steps of the glass recycling process

Cullet preparation
–
Contamination removal
–
Optical sorting
–
Fines processing