

## **COMPANY INFORMATION AND PROCESS DESCRIPTION**

### **1. BACKGROUND**

The location of the works, Leys Road, Brockmoor, Brierley Hill, West Midlands, DY5 3UJ. Grid Reference: SO905873.

The Company name was established in 1936 for the production of Malleable Castings. The primary production made at the company today is S.G. Castings for Off Road and Heavy Goods, Commercial Hydraulic. Currently the output of the plant is in the region of 8000 tonnes of finished castings per year, averaging approximately 35 Tonnes per day.

The foundry is currently operating a single shift plus overtime in our melting and moulding departments, a double shift system i.e. 6am-2pm & 2pm-10pm worked within our Core Department and Machine Shop with an additional Night Shift when required. There are approximately 120 people employed on site, the number will vary according to demand and complexity.

### **2. DESCRIPTION OF PRODUCTION PROCESS**

Castings are produced by melting scrap metal, pig iron when this is molten, the molten metal is poured into sand moulds, sand cores are used to produce the castings that require cavity, after the molten metal has cooled, the castings is separated from the Sand the casting undergoes cleaning, finishing and machining techniques to meet the customers specifications.

The production process involves a number of steps; these are shown in a flow diagram (Fig 1) followed by further detail at each step.

#### **MELTING, METAL TREATMENT AND DISTRIBUTION**

Metal is produced in our 2 x 8 Ton 4.5MW medium frequency power shaker Induction Furnace from recycled scrap purchased in accordance to our ISO 9000 Quality Procedures, Pig Iron is also purchased to the same standard all materials are delivered to a predetermined point and stored internally awaiting use.

Material is transferred into an automatic charge car by magnetic crane to the correct weight, the transfer car moves forward and deposits the material into the melter; after melting is completed the unit are deslagged.

Molten metal is then transferred from the melter by a 2 ton ladle by overhead crane to the George Fischer Converter where 3 kg of magnesium is added, the ladle is the rotated inside a fume capture hood to allow the conversion to take place, after conversion the material is transferred into our Automatic Pouring Unit/Hold Unit ready for pouring our Disamatic Green Sand Moulding Plant. Alternatively the material can be transferred to half-ton ladles for pouring on our Air Set Unit.

#### **GREEN SAND MOULDING**

Moulds are produced on our Disamatic Automatic Moulding Machine using green sand, the sand is held in a storage hopper along with clay and coal dust holding hoppers, when required the sand is transferred by conveyor belt to Erich Sand Mill and weighed to the correct batch weight at the same time Coal Dust and Clay are added to the sand at the Erich Sand Mill the final additive being water after a predetermined mix time the sand is automatically discharged onto a belt and conveyor to the Disamatic Moulding machine, where the sand is then vacuumed onto the pattern and squeezed.



This comprises of a cope and drag mould, at this point a core may be added if required to the drag mould before the cope mould is placed onto the drag. The mould is then pushed automatically onto the casting/cooling conveyor where the mould is cast automatically by the Press Pour and continues for cooling. After cooling the mould is transferred to the Knock Out where casting is separated from the sand; the sand is transferred by conveyor belt back to the storage hopper and the process is repeated.

## **COLD BOX CORE PRODUCTION**

Silica Sand is stored internally and is blown into main storage hopper, 25 ton per delivery by road tanker, the sand is then blown pneumatically to machine day hoppers. The sand is fed into sand mixer by gravity to the desired weight where resins Part I and Part II are mixed with the sand after this operation. The sand is vibrated into the core machine where the mixed sand is blown into the core pattern, it is then injected with TEA to harden, after this operation the core is removed from the machine and stored on portable trolley ready for use or core coating, depending on product. The Core Coating is a refractory based coating designed to protect the core during the initial impact of liquid metal after this the core would go to the Disamatic Moulding line for use. Rejected cores are stored in transportable tipping skips and are sent to the Air Set Section for attritic/Therm reclaim. The sand is then pneumatically blown to Air Set or Core Shop for reuse.

## **SHELL CORE**

The volume made are very small, they are made from Resin Coated Sand this reacts through heat. Total production would not exceed 10-11 tonnes per annum.

## **AIR SET**

This unit is used to produce low volume castings. The unit is 90% self-contained with the exception of some Cold Box Cores. The sand for the unit is mixed in a continuous mixer with a fixed mixing rate. The resins are mixed into the sand on a percentage to suit the sand flow along with the catalyst for hardening moulds, and cores are assembled, and cast with in the area. Sand is reclaimed and reused after Knock off.

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## **WHEELABRATING/FETTLING**

After the casting has been separated from the sand it moves down a cooling line at the first stage of this line the feeder/runners are detached from the castings they proceed together to an inline rotary Shot Blast Machine where the casting runner, feeder are cleaned. When they transfer out of the Shot Blast the castings are inspected and put into steel bins for transporting to the fettling department, the clean runners, feeders are placed into steel tipping skips and returned to the melting department for re-melting.

## **HEAT TREATMENT**

The heating of the casting to alter the as cast structure of the material to obtain specific customer requirements. This is achieved by heating the casting to a predetermined temperature and controlling the cooling rate. This process is only required on 7% of the total tonnage produced.



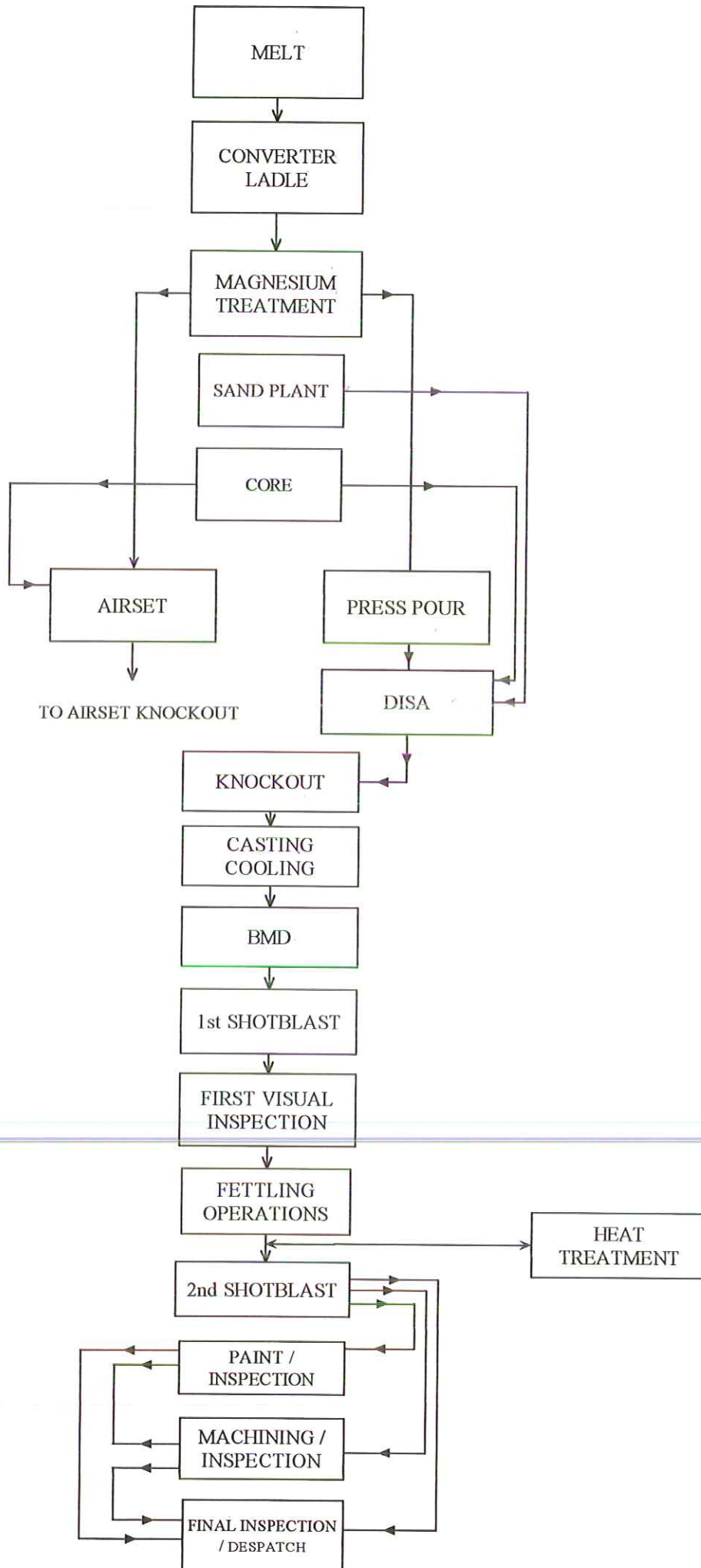
## **FETTLING/PAINTING**

When the casting arrives within the fettling department excess material is removed by one the following methods, Pedestal Grinding, Bench Fettling or Robotic Fettling, after these operations the casting is inspected, reject would be returned to Melting Department, good product would be transferred for re-wheelabrating, painting or to despatch.

## **MACHINING**

Castings are transported to the Machine Shop by forklift truck where they are machined to the customer's requirements. Swarf is collected into steel tipping skip and left for a period of time to allow the cutting oils to drain off.









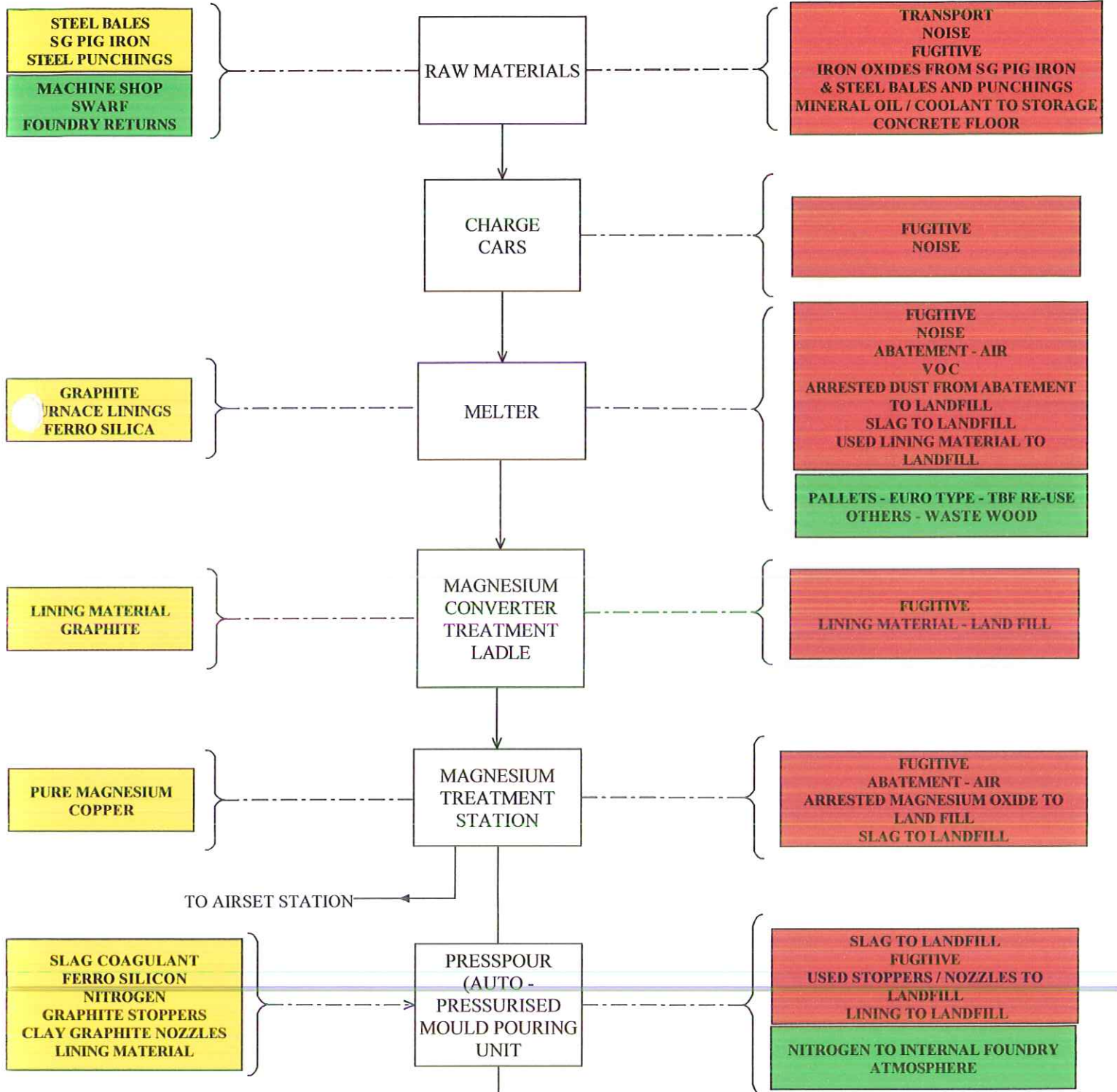


# BROCKMOOR FOUNDRY COMPANY LTD

**INPUTS**

**MELTING PROCESS FLOW**

**OUTPUTS**



**KEY**

- LAND FILL / WASTE STREAM
- RECYCLED MATERIAL EITHER  
IN-HOUSE OR EXTERNALLY
- NEW VIRGIN MATERIAL



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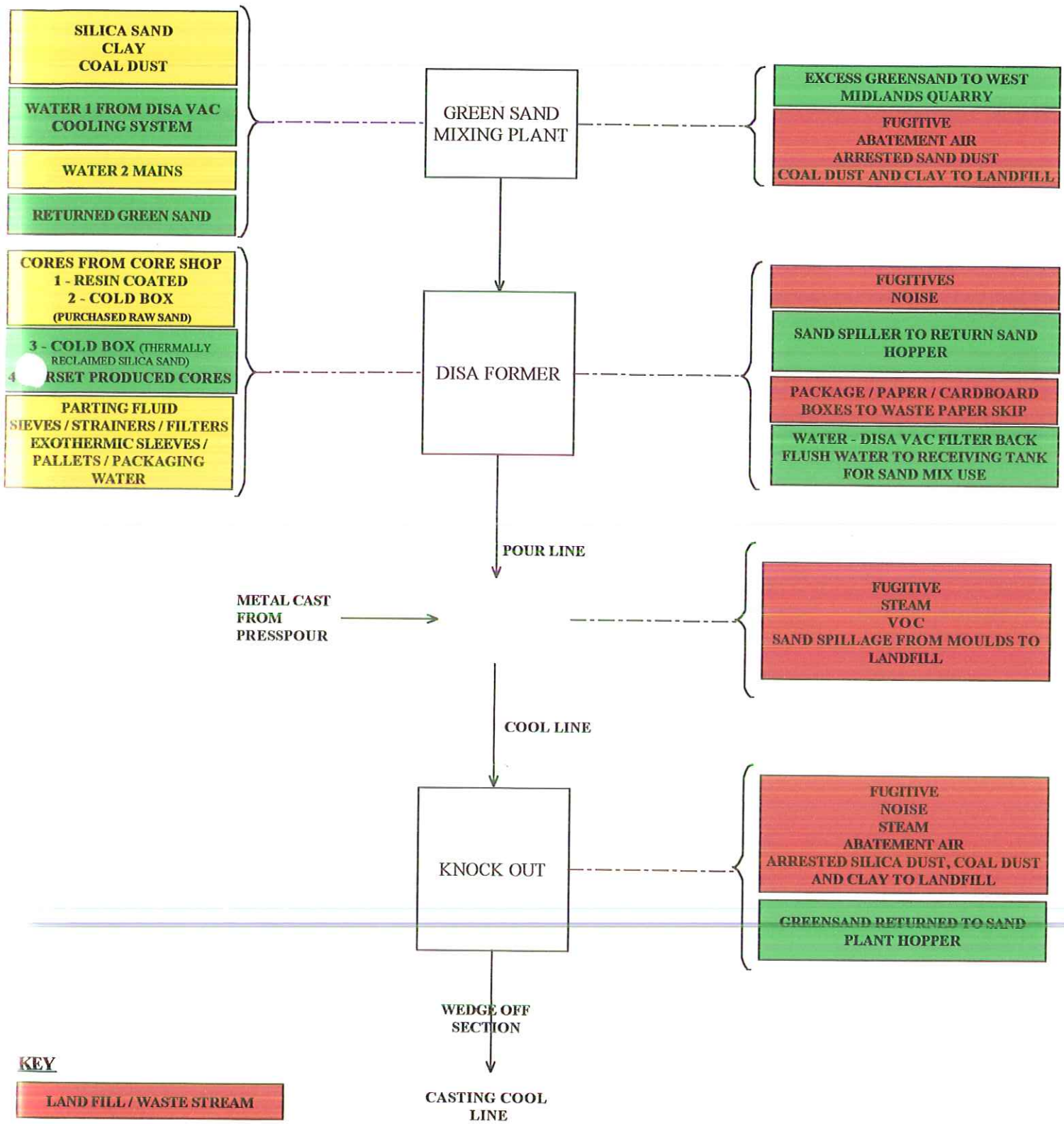


# BROCKMOOR FOUNDRY COMPANY LTD

**INPUTS**

**PROCESS FLOW**

**OUTPUTS**



**KEY**

- LAND FILL / WASTE STREAM
- RECYCLED MATERIAL EITHER IN-HOUSE OR EXTERNALLY
- NEW VIRGIN MATERIAL

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions. This is essential for ensuring the integrity of the financial statements and for providing a clear audit trail.

2. The second part of the document outlines the various methods used to collect and analyze data. These methods include direct observation, interviews, and the use of specialized software tools. Each method has its own strengths and limitations, and they are often used in combination to provide a comprehensive view of the data.

3. The third part of the document describes the process of data analysis. This involves identifying patterns, trends, and anomalies in the data. Statistical techniques are often used to quantify these patterns and to test hypotheses about the data.

4. The fourth part of the document discusses the importance of data security. It is essential to ensure that all data is protected from unauthorized access, loss, or destruction. This can be achieved through a variety of measures, including encryption, access controls, and regular backups.

5. The fifth part of the document outlines the various types of data that can be collected. These include quantitative data, which can be measured and analyzed statistically, and qualitative data, which is descriptive and often analyzed through content analysis.

6. The sixth part of the document discusses the importance of data quality. It is essential to ensure that all data is accurate, complete, and consistent. This can be achieved through a variety of measures, including data validation, data cleaning, and data auditing.

7. The seventh part of the document outlines the various methods used to analyze data. These include descriptive statistics, inferential statistics, and regression analysis. Each method is used to answer different types of research questions.

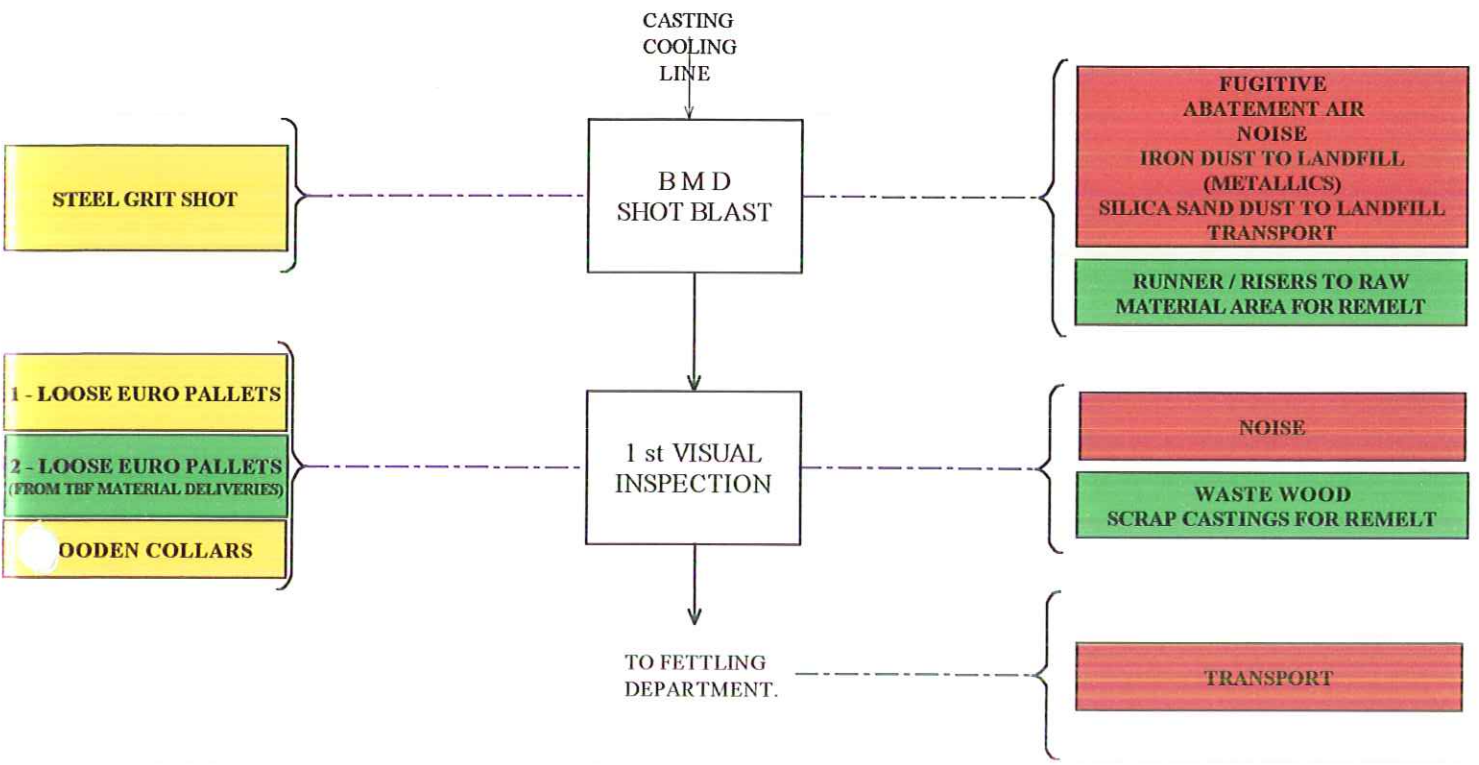
8. The eighth part of the document discusses the importance of data visualization. It is essential to present data in a clear and concise manner that is easy to understand. This can be achieved through a variety of methods, including bar charts, line graphs, and pie charts.



**INPUTS**

**FOUNDRY SHOT BLAST & INSPECTION PROCESS FLOW**

**OUTPUTS**



**KEY**

- LAND FILL / WASTE STREAM
- RECYCLED MATERIAL EITHER IN-HOUSE OR EXTERNALLY
- NEW VIRGIN MATERIAL

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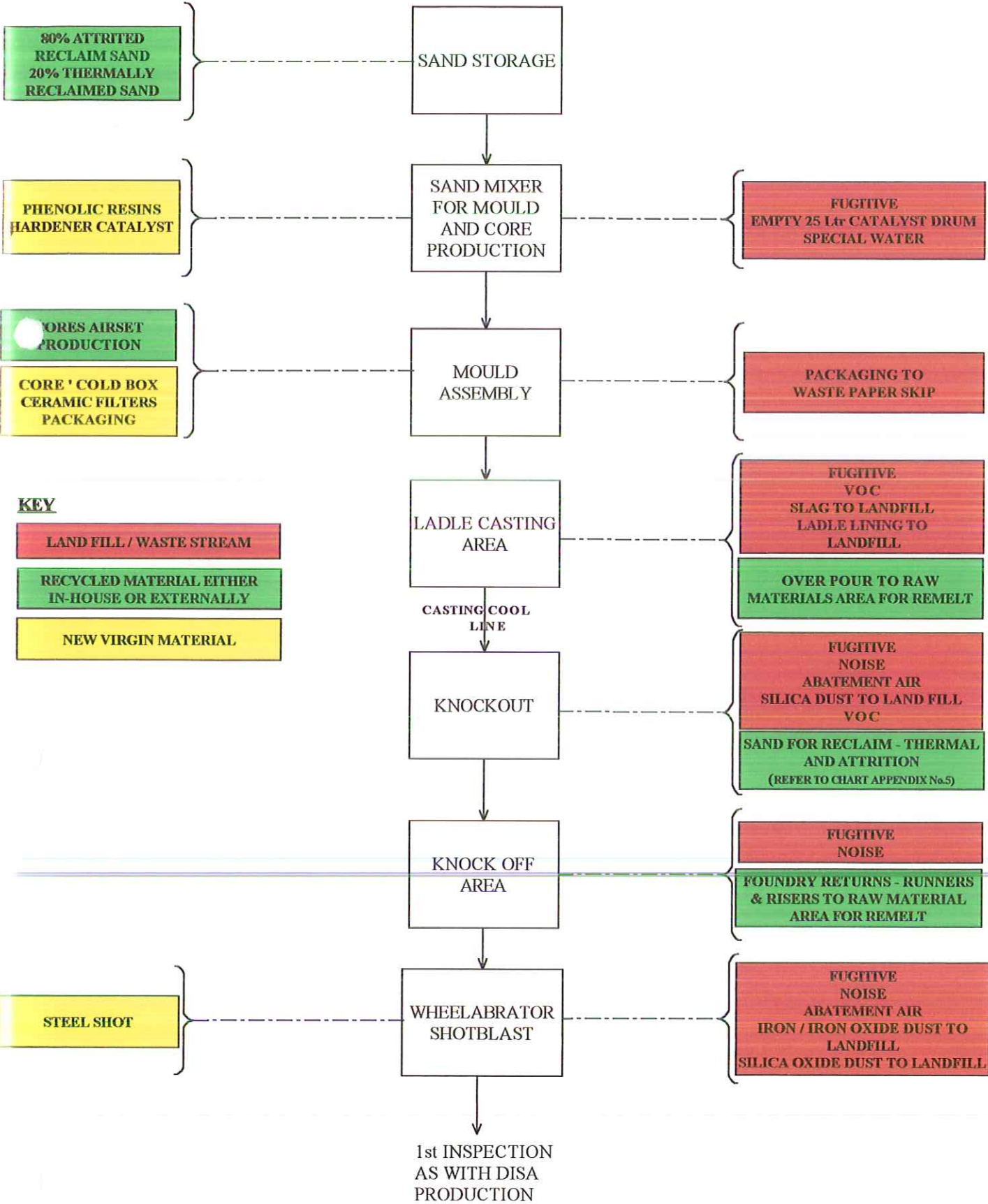


# BROCKMOOR FOUNDRY COMPANY LTD

INPUTS

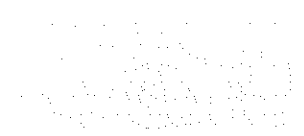
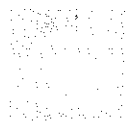
AIRSET PROCESS FLOW

OUTPUTS



**KEY**

- LAND FILL / WASTE STREAM
- RECYCLED MATERIAL EITHER IN-HOUSE OR EXTERNALLY
- NEW VIRGIN MATERIAL



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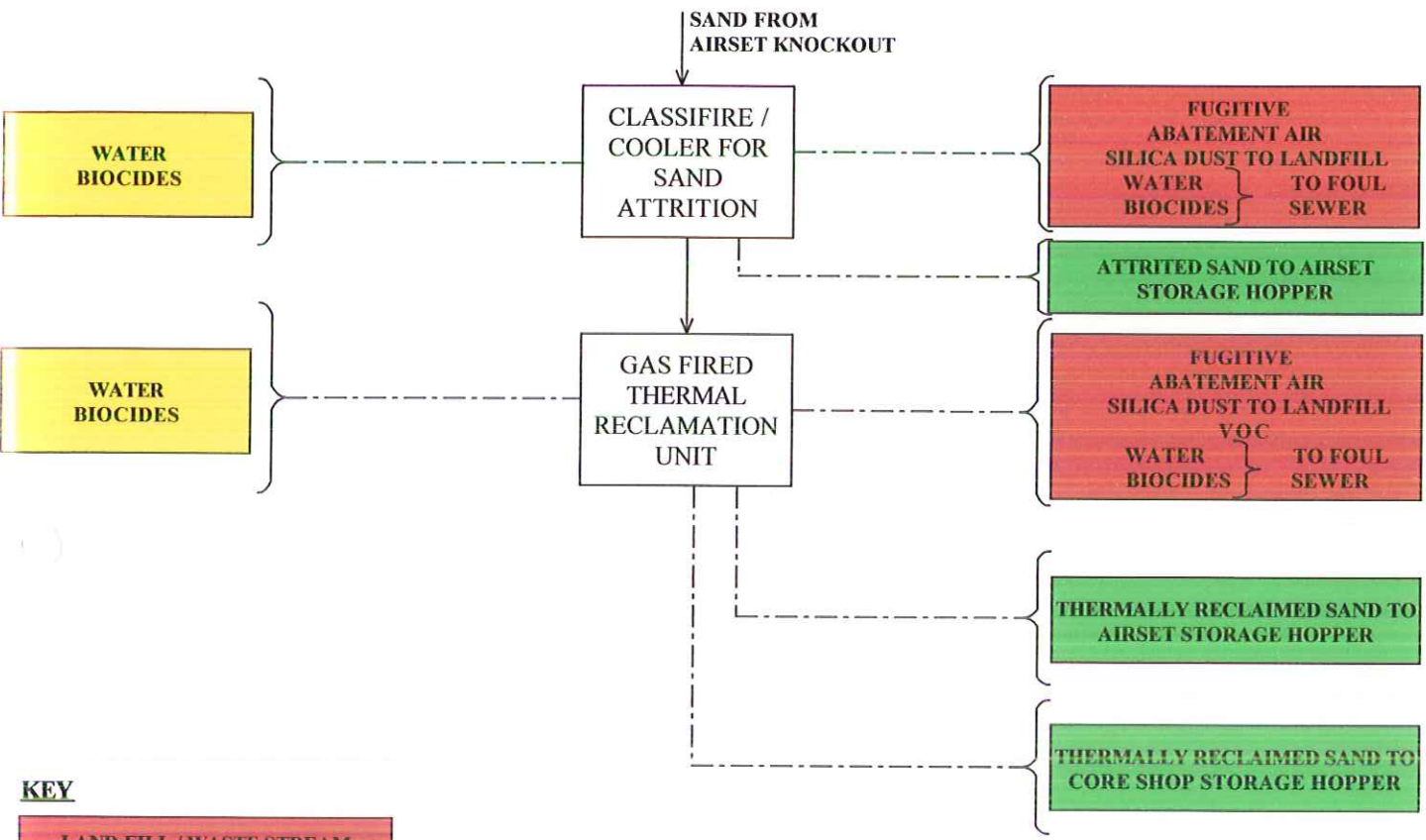


# BROCKMOOR FOUNDRY COMPANY LTD

INPUTS

AIRSET PROCESS FLOW (APPENDIX 5 FOR SAND RECLAIM)

OUTPUTS



**KEY**

- LAND FILL / WASTE STREAM
- RECYCLED MATERIAL EITHER IN-HOUSE OR EXTERNALLY
- NEW VIRGIN MATERIAL

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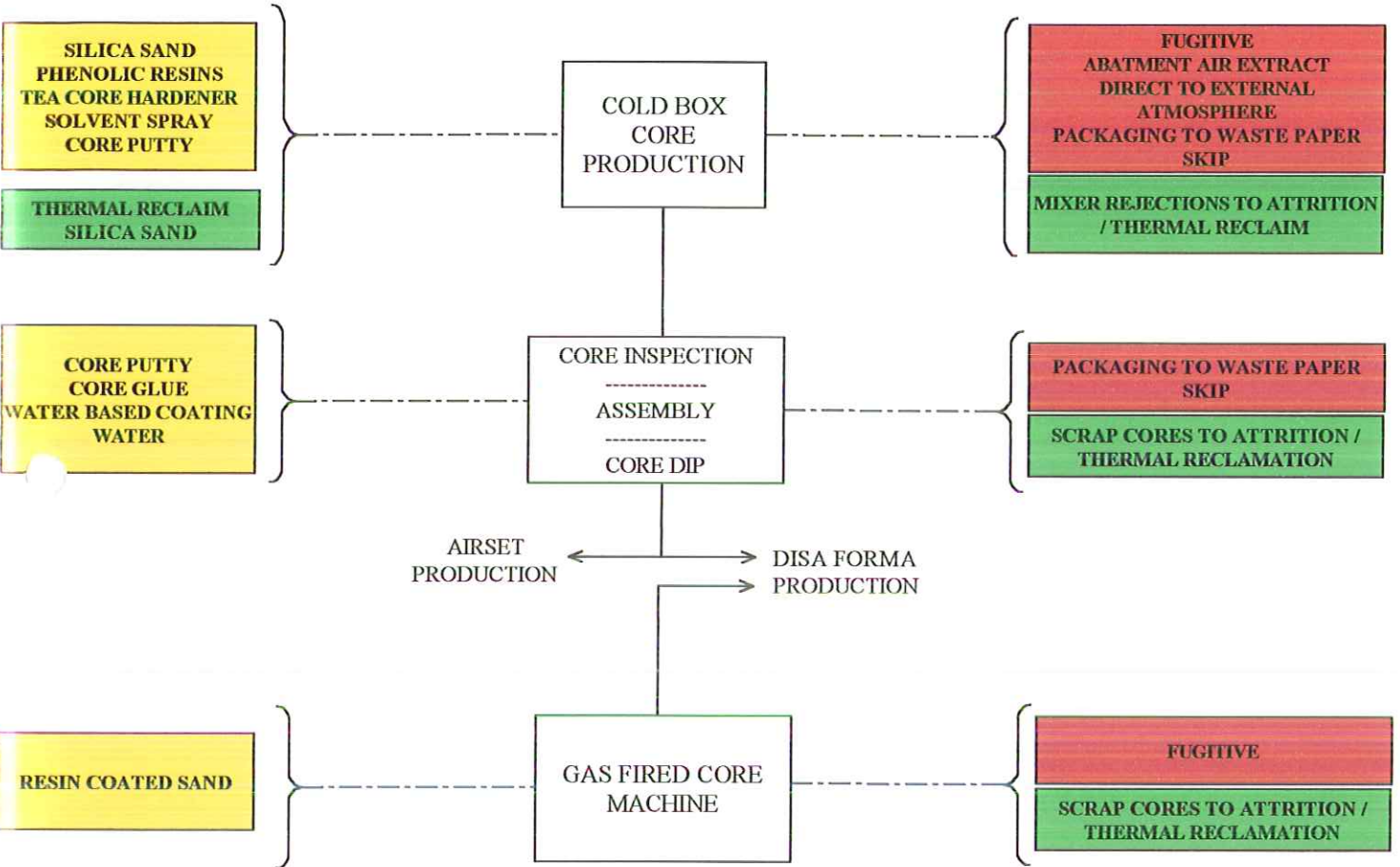


# BROCKMOOR FOUNDRY COMPANY LTD

INPUTS

CORE SHOP PROCESS FLOW

OUTPUTS



**KEY**

- LAND FILL / WASTE STREAM
- RECYCLED MATERIAL EITHER  
IN-HOUSE OR EXTERNALLY
- NEW VIRGIN MATERIAL

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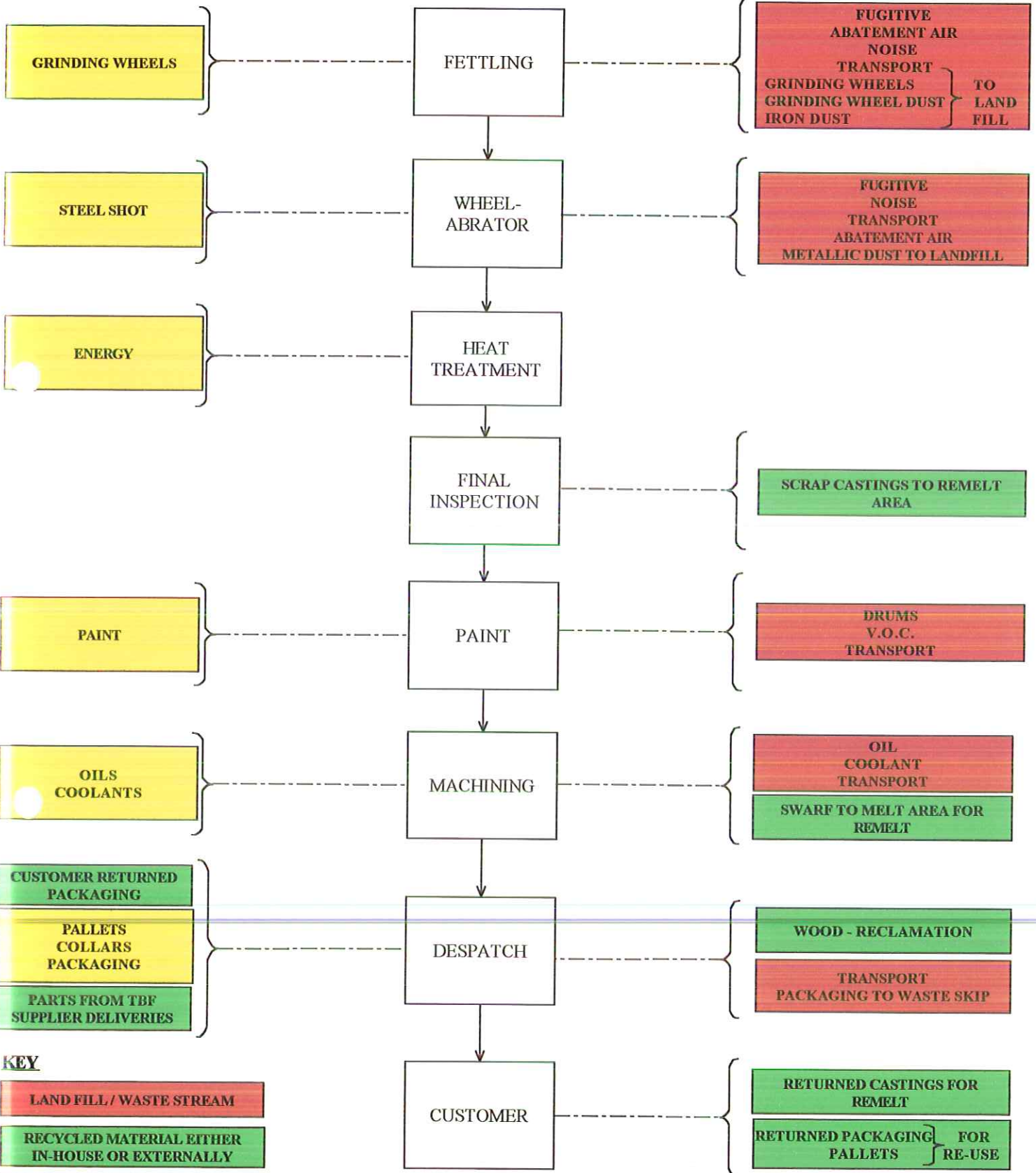
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**INPUTS**

**FINNISHING DEPT. PROCESS FLOW**

**OUTPUTS**



**KEY**

- LAND FILL / WASTE STREAM
- RECYCLED MATERIAL EITHER IN-HOUSE OR EXTERNALLY
- NEW VIRGIN MATERIAL

