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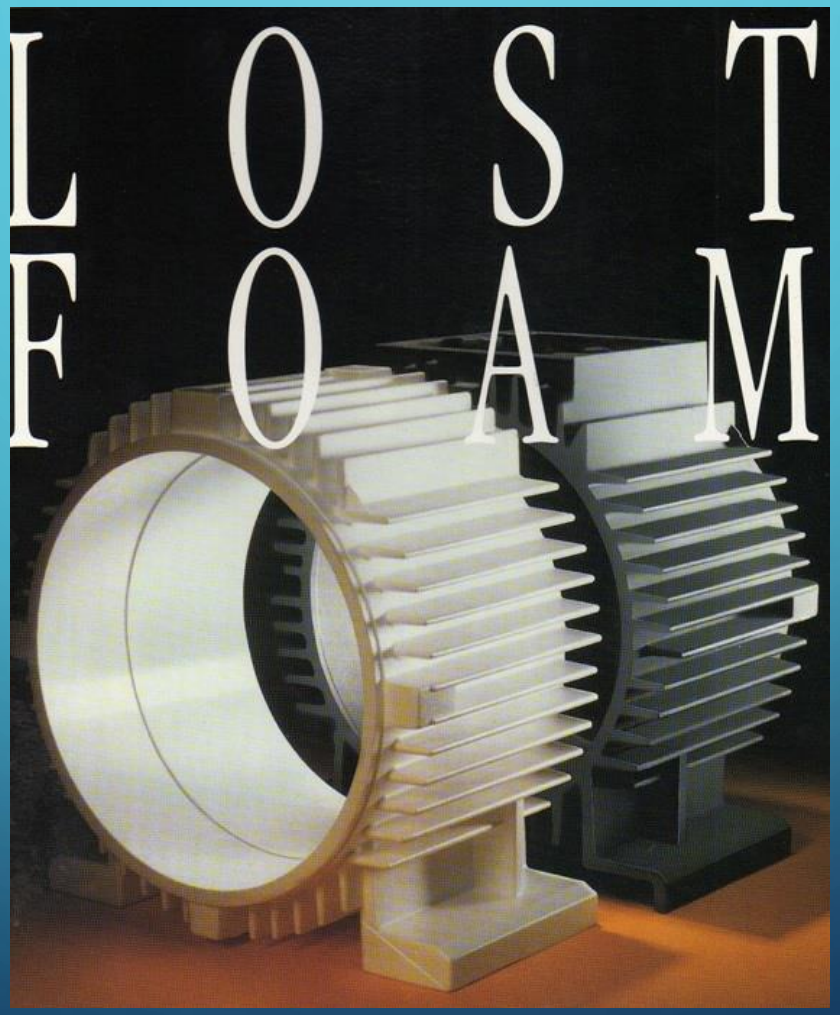
Von Machbarkeitsstudie bis zur Projekt realisation



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VORWORT

Phase 1-Kvalifikation des Komponents entsprechend der follgenden (1-3 capital) ist eine unbedingt erforderlicher Arbeitschritt um zu erkunden ob das Gussteil/Komponent fur den Lost Foam process geeignet ist.

We need full cooperation with customer. For this purpose we will , first of all, generate specific questioner.

Only if components qualifies for Lost Foam and Lost Foam for the process we can proceed to Phase 2- Items 4-8.

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Technical feasibility – the content

Phase 1

1. Analyze the Casting/Component for feasibility in Lost Foam Technology
2. Utilize existent design documentation like 2-d, 3-d images, pictures, real casting, Model, material specs, performance, *set realistic segment (slices) parting lines. Design Cluster. Estimate adaption needs to LF – process.*
3. Find out added values due to utilization of Lost Foam

All following pictures, drawings, spread sheets and other illustrations are exemplary only, which are typically part of specifically created documentation.

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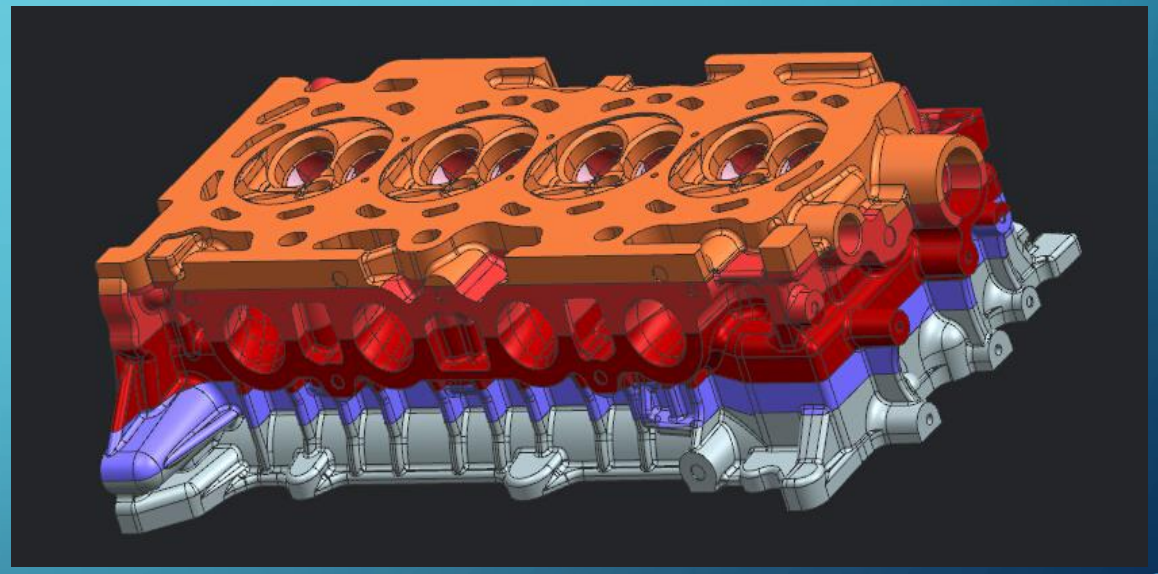

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Phase 2

4. Facility needs
4.1 Estimate the size and type of production facilities
4.2 Investigate the need for related buildings, equipment, rolling stock, etc.

08.05.2016 I.F.- Tender-Equipment, India II KCE

Project content

Lost foam casting Technology

1. Equipment required in foam casting

I – Pattern Molding

Sr.	Equipment / Services.	Qty. No's	Supplied by
1	Pre- Expanding Machine	1	supplier
2	EPS Pattern Molding Machine	2	supplier
3	Steam Accumulator	1	supplier
4	Steam Boiler	1	supplier
5	Pressure Reducing Station	2	supplier
6	Pipelines for Steam Air & Water		Local supplier
7	Accessories for Boiler		supplier
8	Water Storage Tank		supplier
9	Water Softening Plant	1	Local supplier
10	Air Compressor with receiver & dryer	1	Local supplier
11	Aluminum Tooling for Patterns & Runners		

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08.05.2016 I.F.- Tender-Equipment, India II KCE

II – Pattern Assembly, Coating Preparation

SR	Equipment / Services	Qty. Nos.	Required by
1	Hot Wire Cutting Machine	1	Supplier
2	Hot Glue Guns	2	Supplier
4	Slurry Coating Tank	1	Supplier
5	Drying oven	1	Supplier
6	Gluing Machine	1	Supplier

III – Metal Casting.

SR	Equipment / Services	Qty. Nos.	Required by
1	Pouring Flasks		
2	Compaction Table	2	Supplier
3	Sand Handling & Recycling Plant	1	Supplier
4	Vacuum Pump Station	2	Supplier
5	Induction Furnace	1	Supplier

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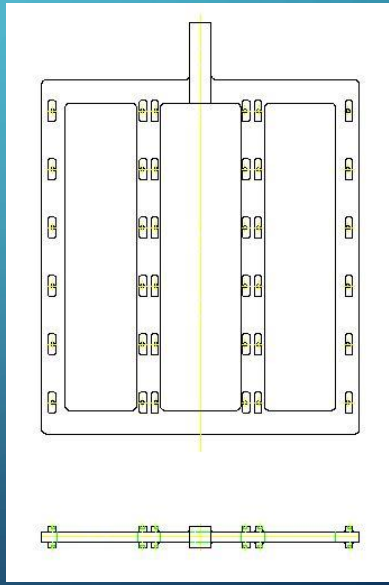
Cluster / Gating Design



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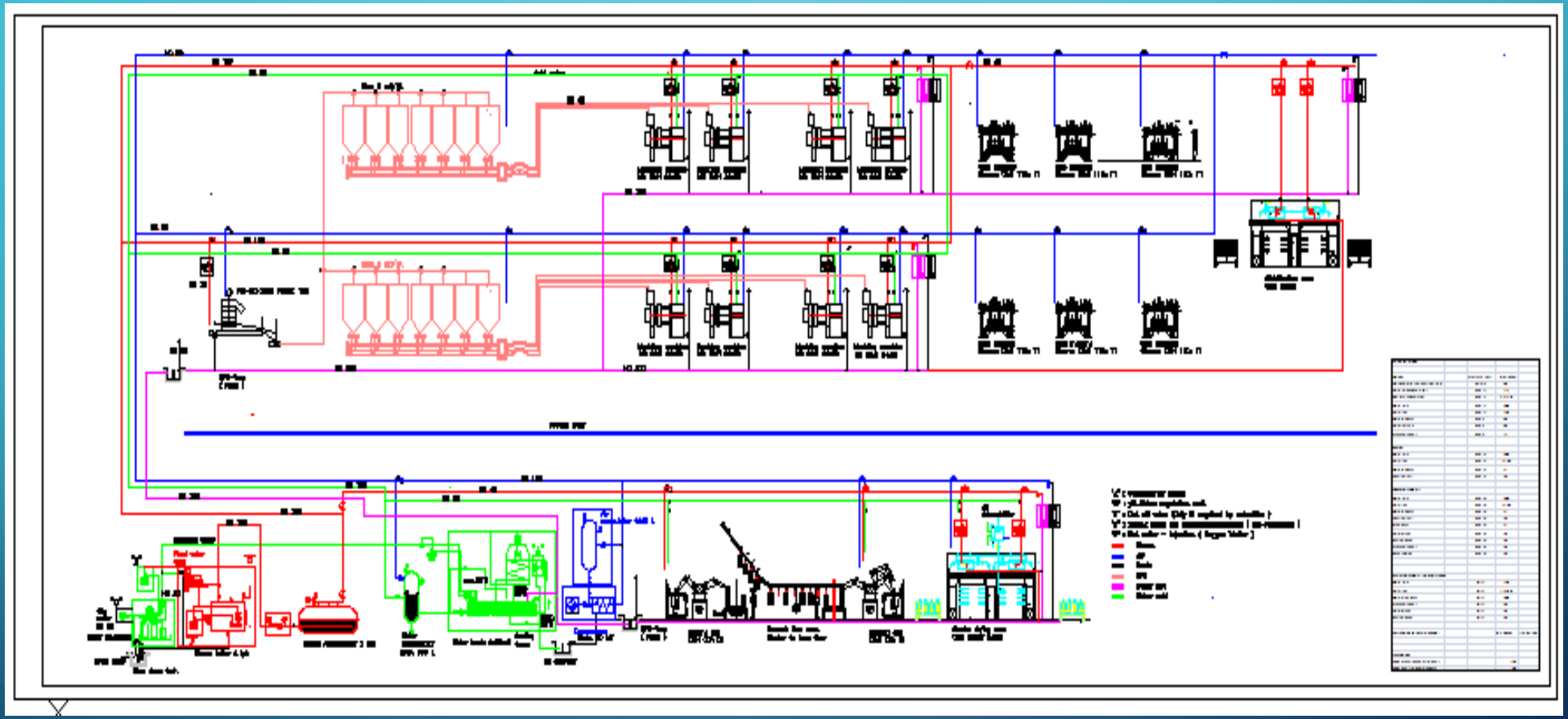
System Flow Diagram



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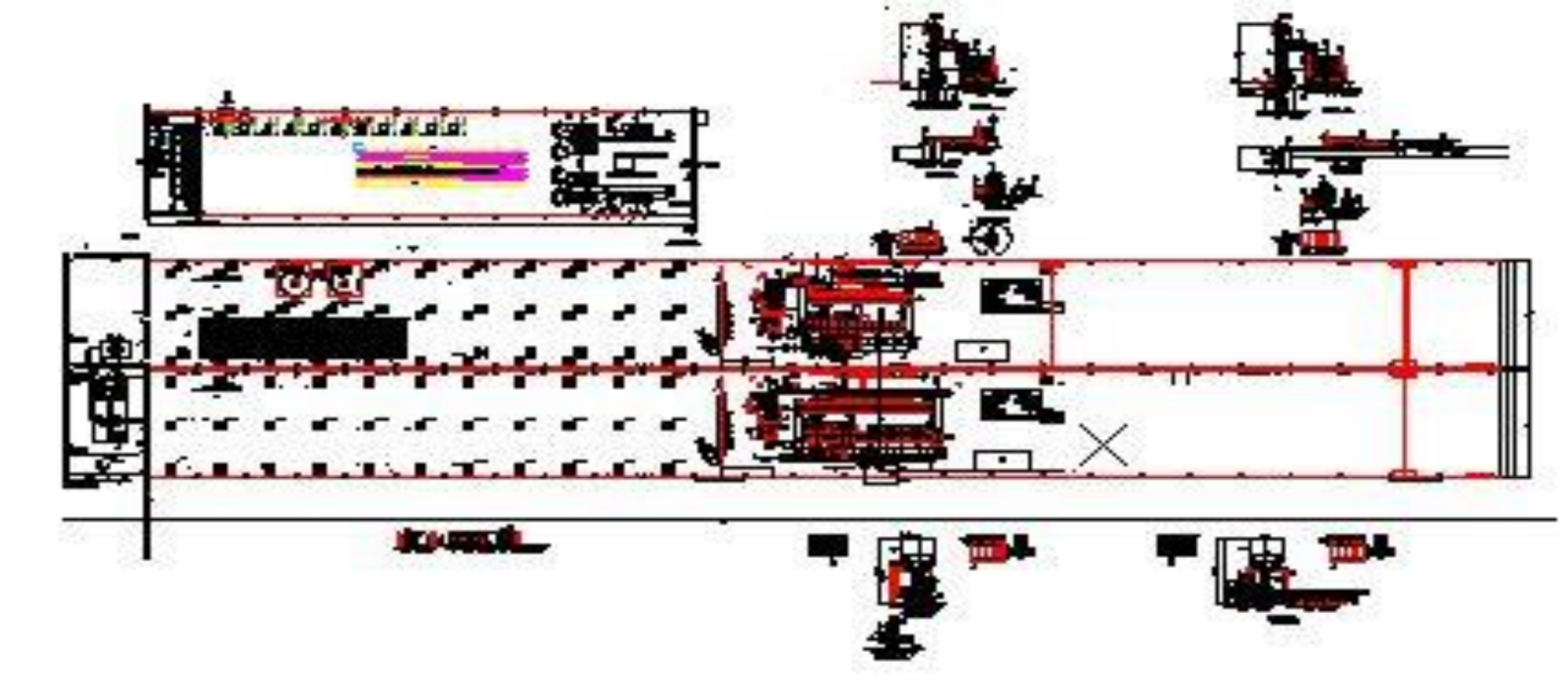
Plant Layout, white site on mezzanine floor, @ Cast lines , Aluminum, Iron



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5. Suitability of production technology

5.1 Investigate and compare technology providers.

5.2 Determine reliability and competitiveness of technology (proven or unproven, state-of-the-art. Etc.

5.3 Identify the limitations or constraints of the technology

3.3 SCHÄUMWERKZEUG

Art :		Monoblock (Integrierte Dampfkammern)		
Material:		Al-Legierung		
Gewicht Feste Seite:		bis 250 kg		
Gewicht Fahrbare Seite:		bis 250 kg		
Perforation :		Lochdüsen		
Fertigungsart:		CAD-CAM		
Schnittstellen Werkzeug / Maschine				
Aufspannmasse:		siehe Zeichnung		
Dampf/ Auswerferluft/Überga	2 x	Feste Seite	3/4"	0,1 bis 1,5 bar
	2 x	Feste Seite - Ziehke	1/2"	0,1 bis 1,5 bar
	2 x	Fahrbare Seite	3/4"	0,1 bis 1,5 bar
	2 x	Fahrbare Seite - Ziel	1/2"	0,1 bis 1,5 bar
Kondensat / Vakuum:	2 x	Feste Seite	3/4"	
	1 x	Feste Seite - Ziehke	1/2"	
	2 x	Fahrbare Seite	3/4"	
	1 x	Fahrbare Seite - Ziel	1/2"	
Kühlwasser :	16 x	Feste Seite	1/4"	
	4 x	Feste Seite - Ziehke	1/4"	
	16 x	Fahrbare Seite	1/4"	
	4 x	Fahrbare Seite - Ziel	1/4"	
EPS-Druckbehälter	15 x	Feste Seite	Schlauchtülle dia 1	0,05 - 0,5 bar
	15 x	Fahrbare Seite	Schlauchtülle dia 1	0,05 - 0,5 bar
EPS - Füllinjekt	Doppelwirken 15 x	Feste Seite	Schlauchtülle dia 1	Treibluft indiv. Regelbar von 2- 4 bar
	Doppelwirken 15 x	Fahrbare Seite	Schlauchtülle dia 1	Treibluft indiv. Regelbar von 2- 4 bar
Ziehkern hydra	Doppelwirken 2 x	Feste Seite	NW 8	Endlagenendschalter
	Doppelwirken 2 x	Fahrbare Seite	NW8	Endlagenendschalter
Ziehkern pneum	Doppelwirken 2 x	Feste Seite	1/8"	Endlagenendschalter
	Doppelwirken 2x	Fahrbare Seite	1/8"	Endlagenendschalter

Foam Pattern Tooling specs

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6. Availability and suitability of site

Investigate access to:

6.1 Raw materials

6.2 Transportation

6.3 Labor

6.4 Production inputs (electricity, natural gas, water etc.)

6.5 Investigate potential emissions problems

6.6 Analyze other environmental impacts

6.7 Explore economic development incentives.

	Sizing of piper				
	Steam		**Pressure (bar)**	**ND (mm)**	
r1	Steam boiler Reduction train		min.8	80	
r2	Train to Acumulator		min. 3	125	
r3	Out of acumulator		min. 3	3 x 150	
r4	Main line		min. 3	200	
r5	Ring line		min. 3	150	
r6	Molding m/c		min.3	80	
r7	Stabil. Oven		min.3	40	
r8	Pre-expander		min.3	25	
r9	Drying oven		min.3	40	
	Water				
u1	Main line		min. 4	100	
u2	Ring line		min. 4	2 x 80	
u3	Molding m/c		min. 4	32	
u4	Coating cell		min. 4	20	
u5	sand cooler				
	Compressed Air				
a1	Main line		min. 6	100	
a2	Ring line		min. 6	2 x 80	
a3	Molding m/c		min. 6	32	
a4	Coating cell		min. 6	20	
a5	Glue m/c		min. 6	32	
a6	Stab. Oven		min. 6	20	
a7	Drying oven		min. 6	20	
a8	Pre-expander		min. 6	20	
a9	Bead room		min. 6	20	
a10	Sand transporter		min. 6	100	
	Drain, vented all 10 m distance				
d1	Main line		0.25	250	
d2	Ring line		0.25	2 x 200	
d3	Moulding m/c		0.25	100	
d4	Pre-expander		0.25	50	
d5	Stab. Oven		0.25	20	
d6	Drying oven		0.25	20	
	Surface water drain chanel			40 x 40 cm	Grid on top
	EPS-beads				
b1	from Pre-expander to bagr			150	mm
b2	from bagr to Molding m/c			40	mm
	Dust/Fumes extraction		v-2 m/s		
e1	Sand bin			200	mm
e2	Prefill sand			200	mm
e3	fill & compact			200	mm
e4	Compac. Enclosure			150	mm
e5	pouring hood	TBD later on	2 x	250	mm
e6	cooling line		3 x	200	mm
e7	dump hood	TBD later on	8 x	250	mm
e8	bucket elevator		2 x	200	mm
e9	screener			150	mm
e10	new sand top up bin			200	mm
e11	sand cooler inlet		2 x	250	mm
e12	sand cooler outlet			200	mm

Fumes and Dust extraction Volume

Fumes and Dust Extraction of Lost Foam (Al) Plant:				
Aluminium Poured	2352 kg/h			
	Volume m³/h	Velocity m/s	Temperature °C	Remarks
Fumes&Dust				*Bag House&incinirator*
Pouring Hood *	2,458	28	65	1
Extraction Enclosure	15,000	33	40	1
	17,458			
* addition Flow	1,000	28	65	
Total Fumes&dust	**18,458**			
Dust				*Bag House only*
Batch Hopper (2)	458	4	28	1
Screener Classifier	1,000	9	34	1
ScreenerClas.-discharge	1,034	16	30	1
Rain gate (2)	920		28	2

Energy Lines Dimension's

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Casting Cost Pre-Calculation

GUSSTEIL VORKALKULATION						
An: Klaus Geir						
Von: K.Cermak						
GIESSER:	**Düker, Laufach**					
KUNDE:						
DATUM:	**13-Jun-00**					
PRODUKT:	**Schraubring DN 100**					
MATERIAL:	GGG50	7.65	Kg/dm³			
TECHNIK:	LOSTFOAM					
AUSLEGUNGSWERTE						
Leistung der Anlage Behälter/h		3.00				
Gußbedarf/a		**$2,000.00**		Ausnutzung der Giessanlage		0.38
						7.00
kg/Teil		2.00				
tot/a		164.00				
Tage/a		220.00				
h/Schicht		7.20				
Schichten/Tag		1.00				
Teilbedarf/Tag		372.73				
Teile/h		51.77				
dm³/Teil		0.26				
g/dm³		0.01				
kg/Model		0.00				
Segmente/Model		1.00				

7. **Raw materials**
   - 7.1 Estimate the amount of raw materials needed.
   - 7.2 Investigate the current and future availability and access to raw material.
   - 7.3 Assess the quality and cost of raw materials

8. **Other inputs**
   - 8.1 Investigate the availability of labor including wage rates, skill level, etc.
   - 8.2 Access the potential to access and attract qualified management personnel.
   - 8.3 Estimate capital requirement for facilities, equipment and inventories
   - 8.4 Estimate Production cost for Casting / Component

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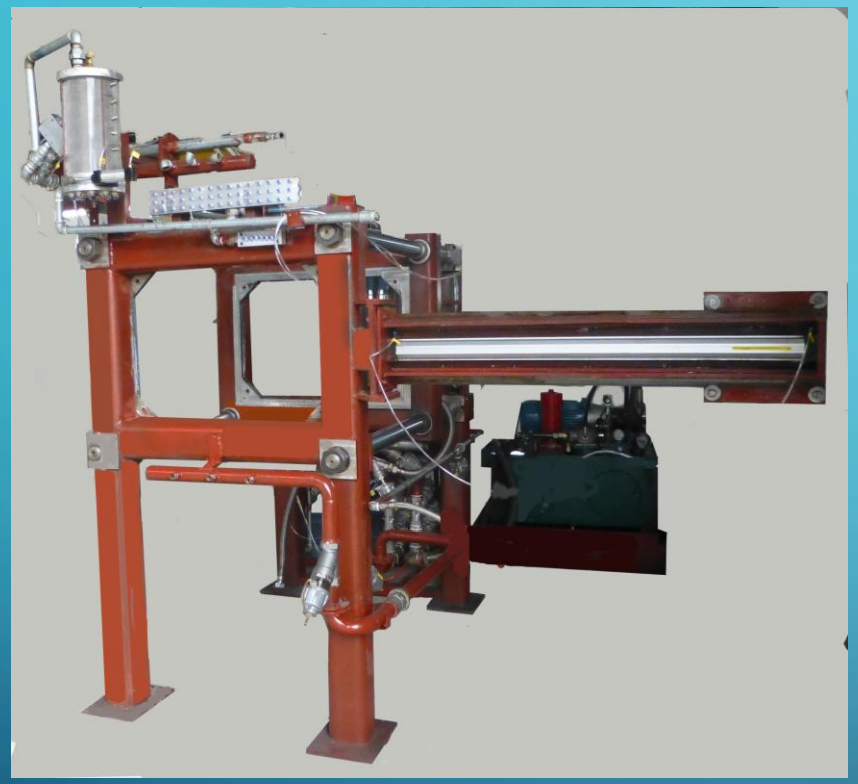
I some special cases is Feasibility proven only by pilot projects and designed experiments.

Development of suitable Equipment for the development phases is required

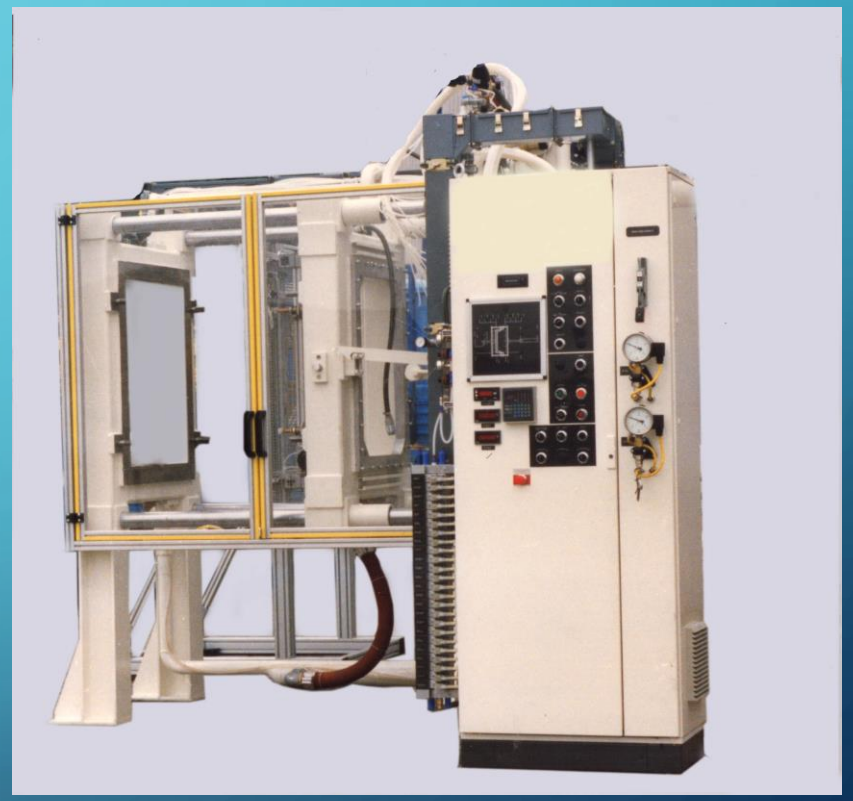
V 12 / 1.8 to/
1500/800/600 mm

Flask 1500 I.D. x
2040 Height/ Vacuum plenum

Molding Fully Automatic machine



Molding machine



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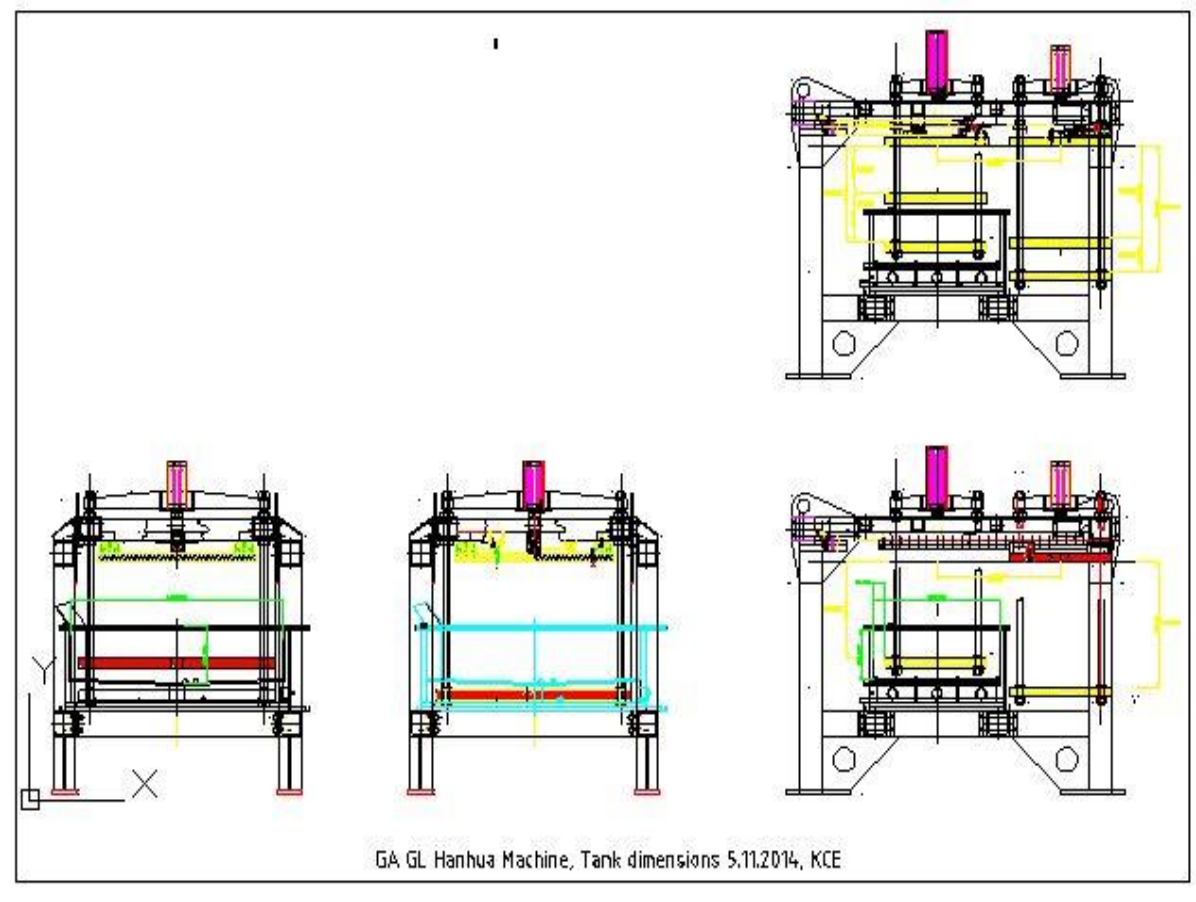
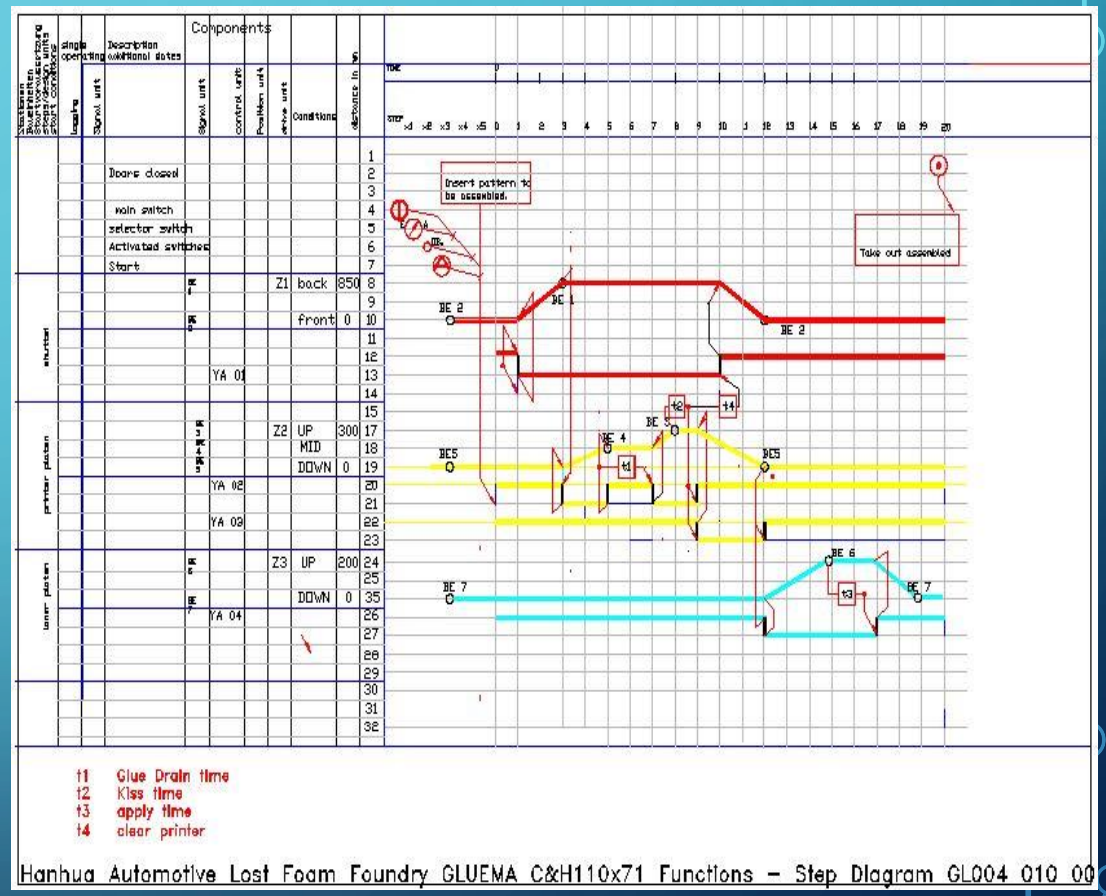
Special Hot melt gluing Machine



Function Step – way Diagram



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Special Hot melt gluing Machine

Details - Glue machine

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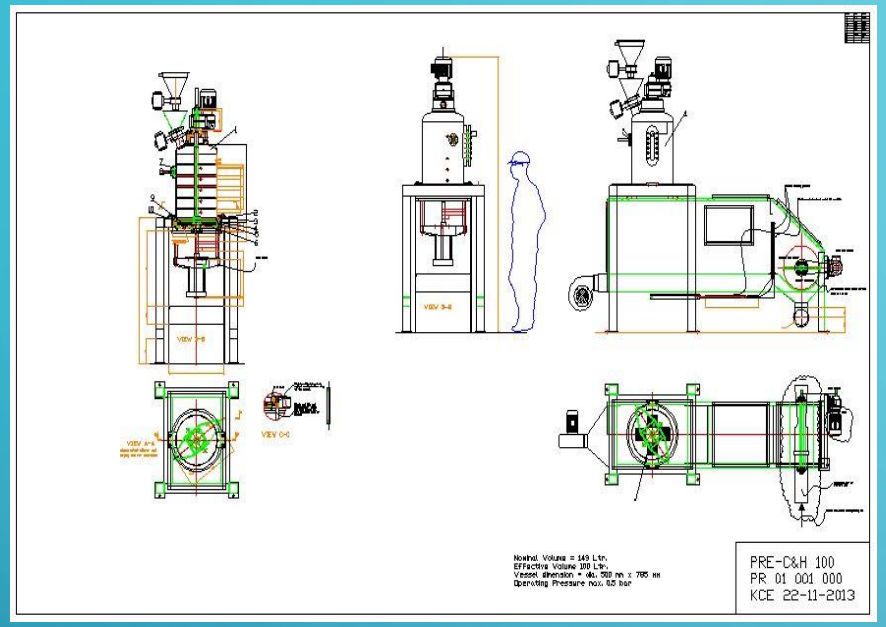

Batch Type of pre-expander

Project manager / Pre-expander

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Batch Type of pre-expander

Item	Qty	Name	OEM number/drawing No.	Cord	Material	Description	Brand	Cost Material	Remarks
1	1	Pneumatic cylinder	536393	ADN 125-300-A-P-A		Dia 125x300	Festo		Printer lift
2	1	Pneumatic cylinder	536 372	AND 125-200-A-P-A		Dia 125x 200	Festo		Press lift
3	1	Pneumatic cylinder	163432	DNC-80-850--PPV-A		Dia 80 x 850	Festo		Shuttel
4	3	5/3 way valve	19707	MFH 5/3-G-3/8-B			Festo		
a	6	Solenoid coil	4527	MSFG 24/42, 50/60			Festo		
5									
6	6	Throttel valve	6308	4R-3/8-B			Festo		
7	6	Silencer	2309	4 3/8			Festo		
8									
9	1	Air Acumulator		CRUZS-10			Festo		
10	1	Gauge	Ø 63	0-6 bar			Festo		
11	2	Gauge	Ø 63	0-6 bar			Festo		
12									
13	2	Pressure Red.	AR40-F04H	0,05-0,85 MPa 1/2"			SMC		
14									
15	2	Silencer	2309	U 3/8			Festo		

BOM-All components, German original Brands

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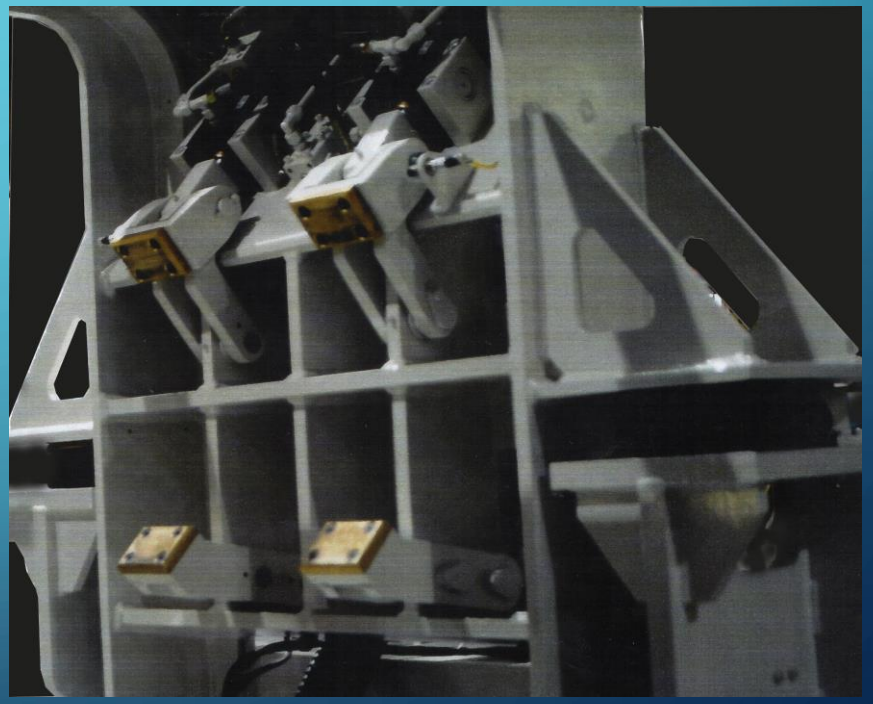
Product driven design

Multi-axial Compaction and fill unit

Details



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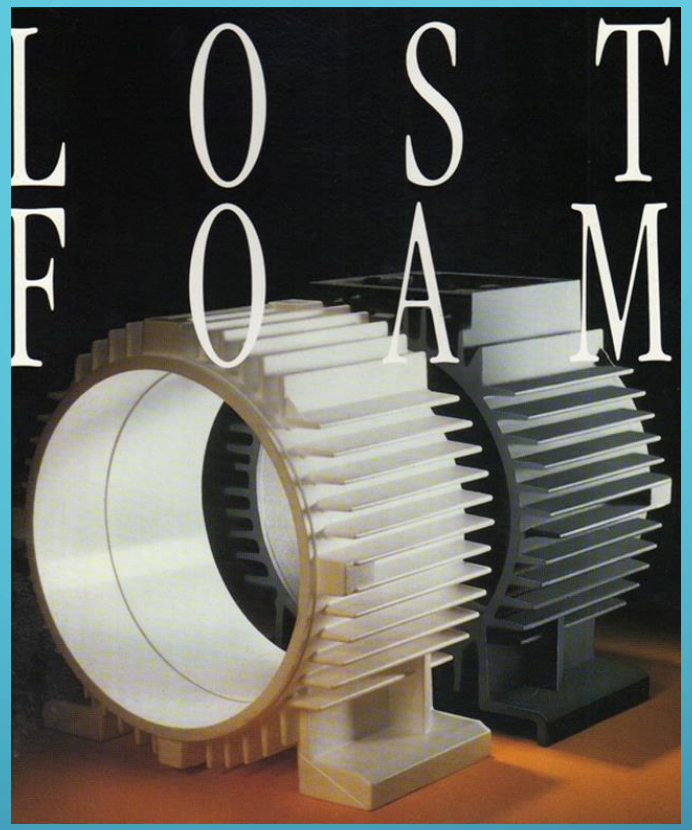

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