



Global Industrialisering & Produktkonfigurering



Virksomheder i netværk
Trondheim Maj 2004



Agenda

1. Introduction to Aalborg Industries
2. Why Product Configuration ?
3. The Standardisation Process
4. Challenges
5. Demonstration of Configuration Tool

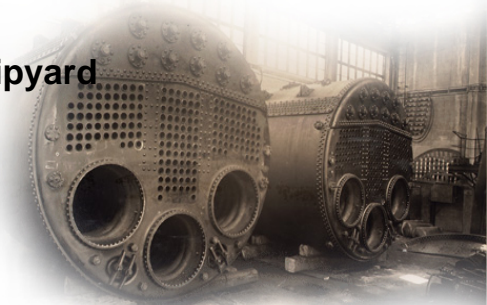
Aalborg Industries

Facts

- **Global market leader (Marine boilers and energy equipment)**
- **Owned by Danish investors group headed by Axcel**
- **Production area:** **80,000 m² in the Aalborg Industries Group**
- **Employees AI Group :** **1,412**
in Aalborg **455**
225 blue-collar workers
230 white-collar workers
- **Quality certifications** **ISO 9001:2000 Quality Management System (since 1989**
ASME Boiler and Pressure Vessel codes “S”
and NBBI’s “R” since 1986
LRS, DNV, BV, NK, RINA, CS, KS, ABS, AT.

Aalborg Industries History

- 1912 Aalborg Shipyard established
- 1919 First Aalborg boiler (Scotch marine type)
- 1930's New types of boilers developed
- 1937 Danish J. Lauritzen Holding (shipowners) acquired Aalborg Shipyard
- 1944 First power station boilers built
- 1978 First after sales service company established in Singapore
- 1980 Production of large industrial power plants
- 1988 Burner company acquired (KB burners)
- 1990 Heat exchanger / incinerator company acquired, A/S Vesta
- 1995 The Sunrod Group (marine boilers and heat exchangers) acquired from ABB
- 1997 Zurn Energy Division (HRSG & Keystone® Package Boilers) acquired from Zurn Industries Inc.
- 1997 Pipemasters Oy (UNEX™ marine and industrial boilers) acquired from Finnyards Oy
- 1998 Name change to Aalborg Industries as per 1st September 98 for all group companies
- 1999 Acquisition of Wiesloch (thermal fluid heating systems), The Netherlands
- 2000 Aalborg Industries acquired by Danish investors group headed by Axcel
- 2000 Acquisition of ATA Combustão Técnica, Brazil boilers from Mitsubishi, Japan.
- 2001 Subsidiary Ciserv AB, Sweden, sold to Wärtsilä, Finland
- 2002 Subsidiary Aalborg Industries Inc., USA, sold to Daekyung Machinery & Engineering Co. Ltd., Korea



Aalborg Industries Global overview

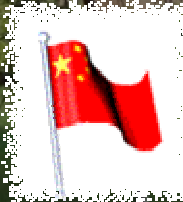
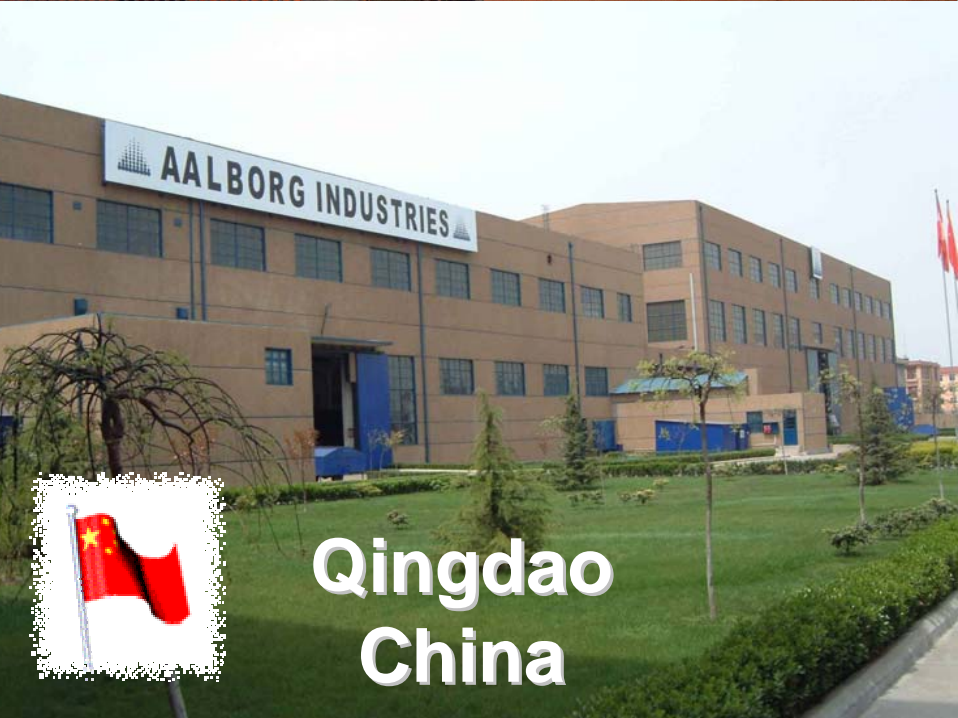




Jakarta
Indonesia



Petrópolis
Brazil

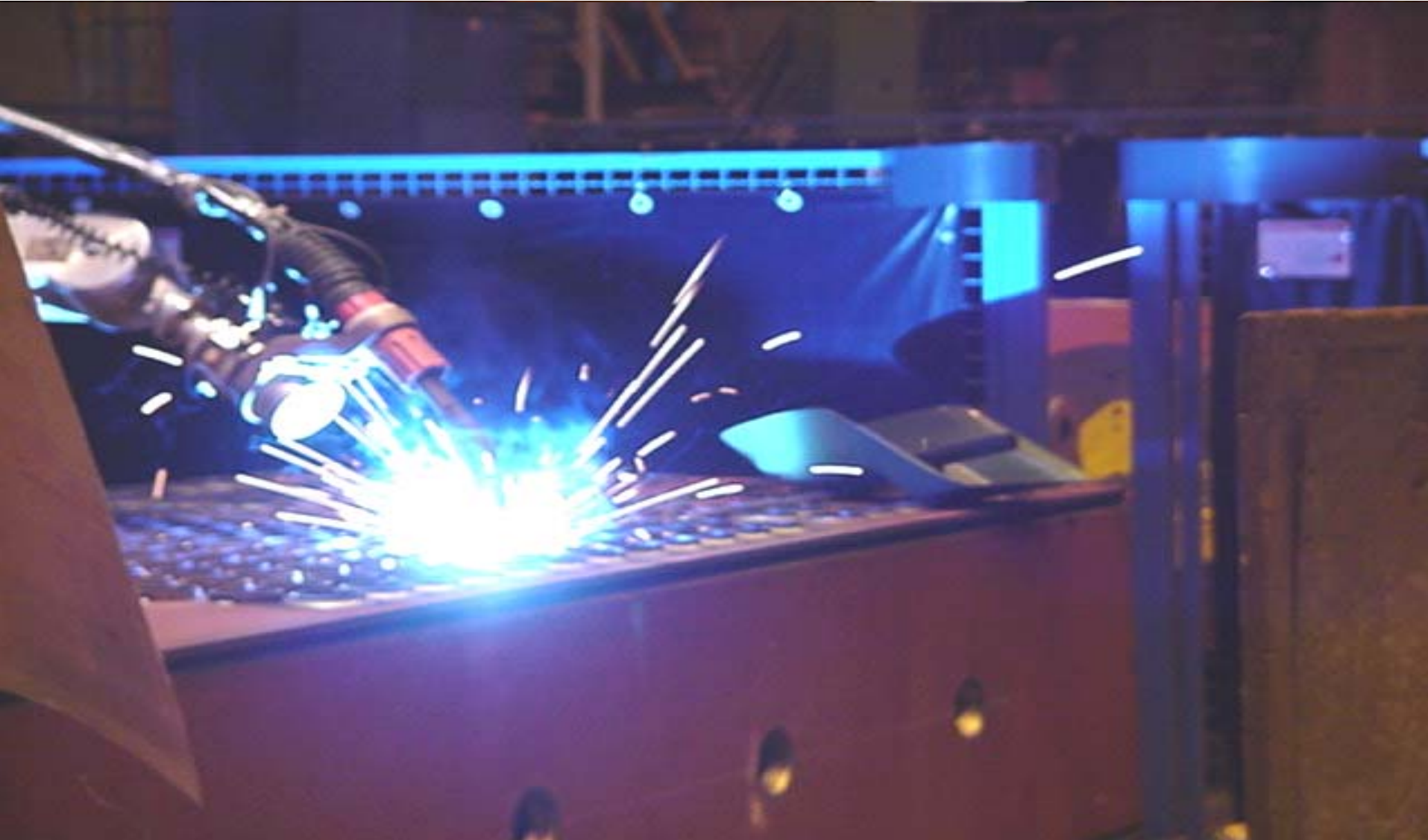


Qingdao
China



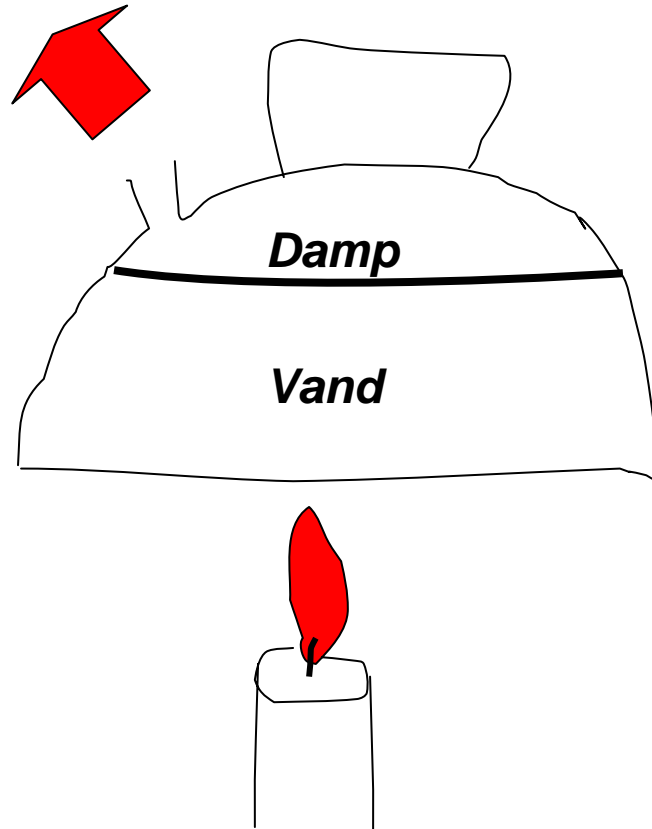
Aalborg
Denmark

Industrialization of Boiler Manufacturing

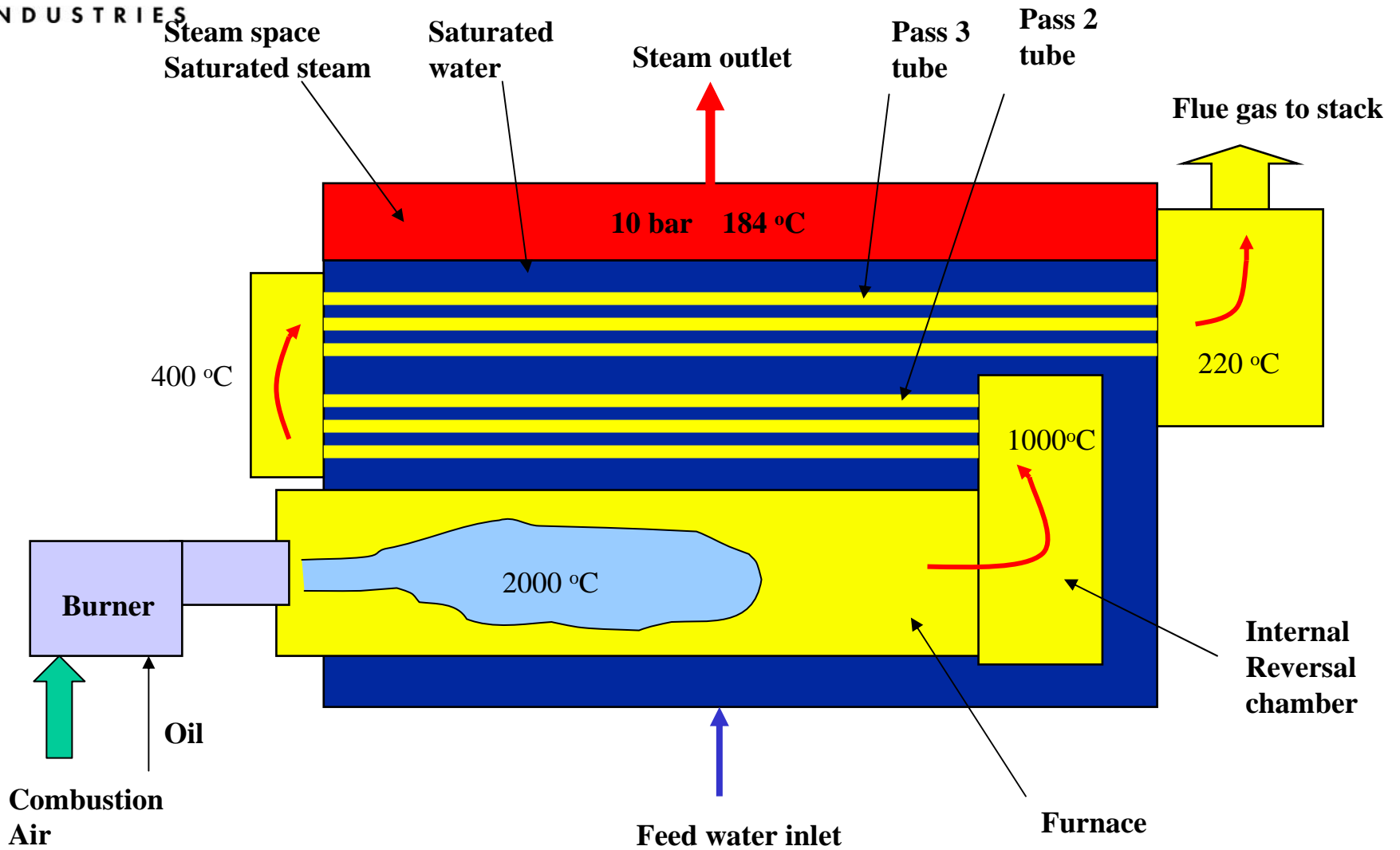


KEDEL

DAMP



Three pass smoke tube boiler





MISSION™ 3 Pass



Aalborg Industries Business areas

- Marine Boilers
- Heat Recovery Steam Generators
- Industrial Boilers
- Heat Exchangers
- Inert Gas Systems



Complete solutions

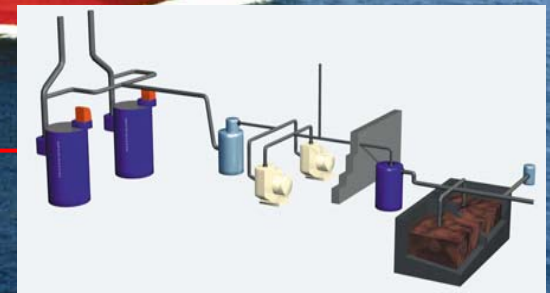
Exhaust gas
economisers
Composite boilers



Heat exchangers
Coolers
Condensers
Cargo heaters



Oil-fired boilers



Inert Gas Systems



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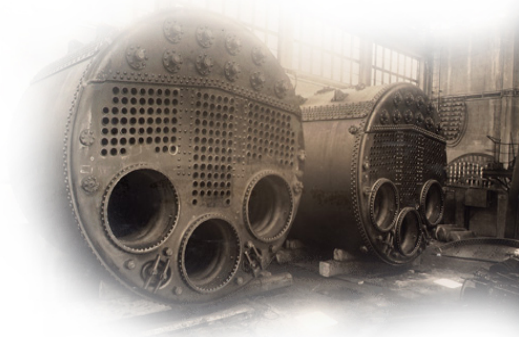


Aalborg Industries Manufacturing



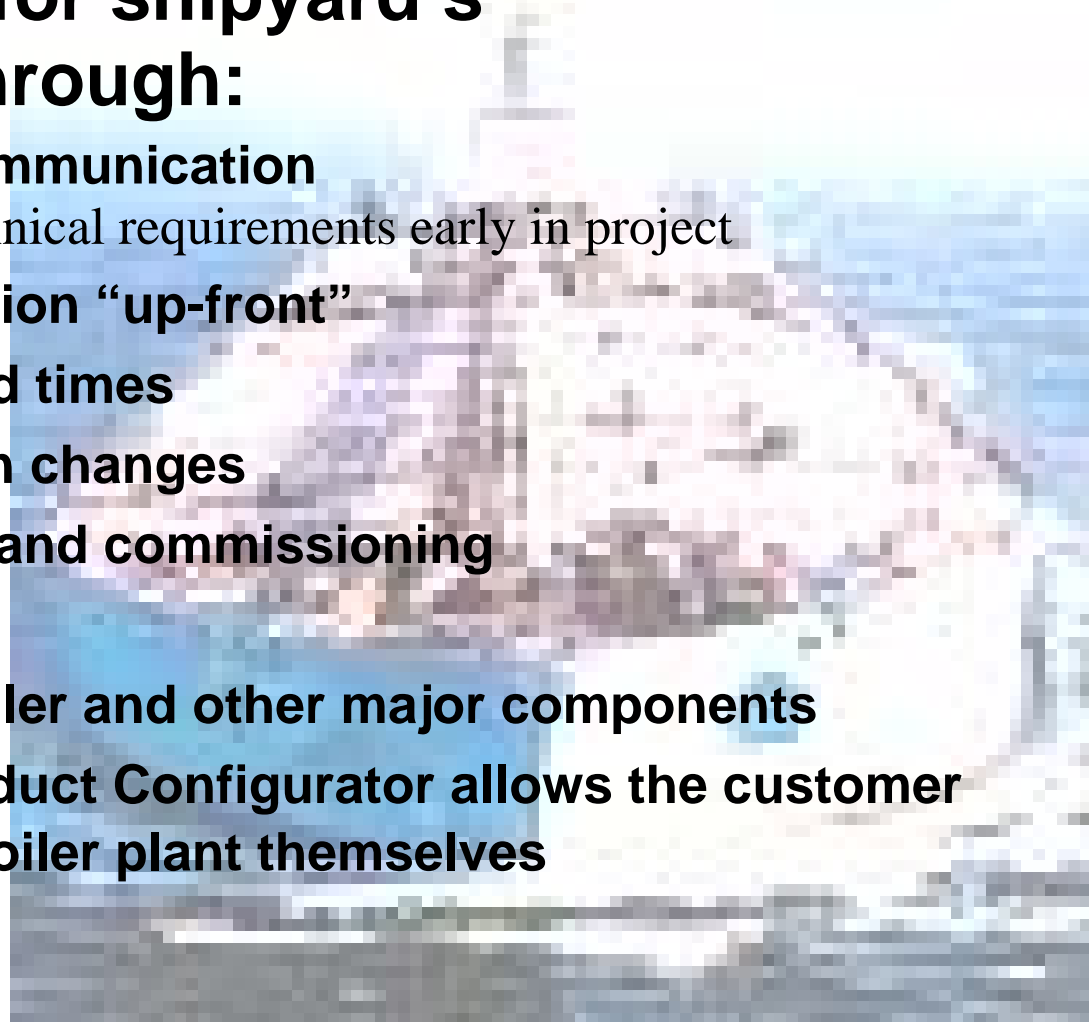
Competitiveness through Standardisation

- **Quicker and more precise clarification with the customer**
- **Increased application of prefabrication**
(From unit production till mass-produced components)
- **Increased automation of the order process**
- **Reduction of mistakes.**
- **Stronger purchasing power**
(Volume / stock purchase)



Improvement of Business Relationship with our Customers

- **Improve the basis for shipyard's competitiveness through:**
 - **Improved the communication**
Clarification of technical requirements early in project
 - **Fast documentation “up-front”**
 - **Reduction of lead times**
 - **Fast response on changes**
 - **Fast installation and commissioning**
 - **Less faults**
 - **3D models of boiler and other major components**
 - **In future the Product Configurator allows the customer to design their boiler plant themselves**





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Overlapping Boiler Products

AQ12
AQ10/12W
MISSION™ OS
AV14
MISSION™ WHR-GT
Pioneer™ GE1
Pioneer™ GE2
Pioneer™ DE1

UNEX™ CHB
MISSION™ OM
UNEX™ G
AV8N
AV6N
AV10GE
AV10DE

AQ9
CHS
CPH
WPH AT8D
AO1

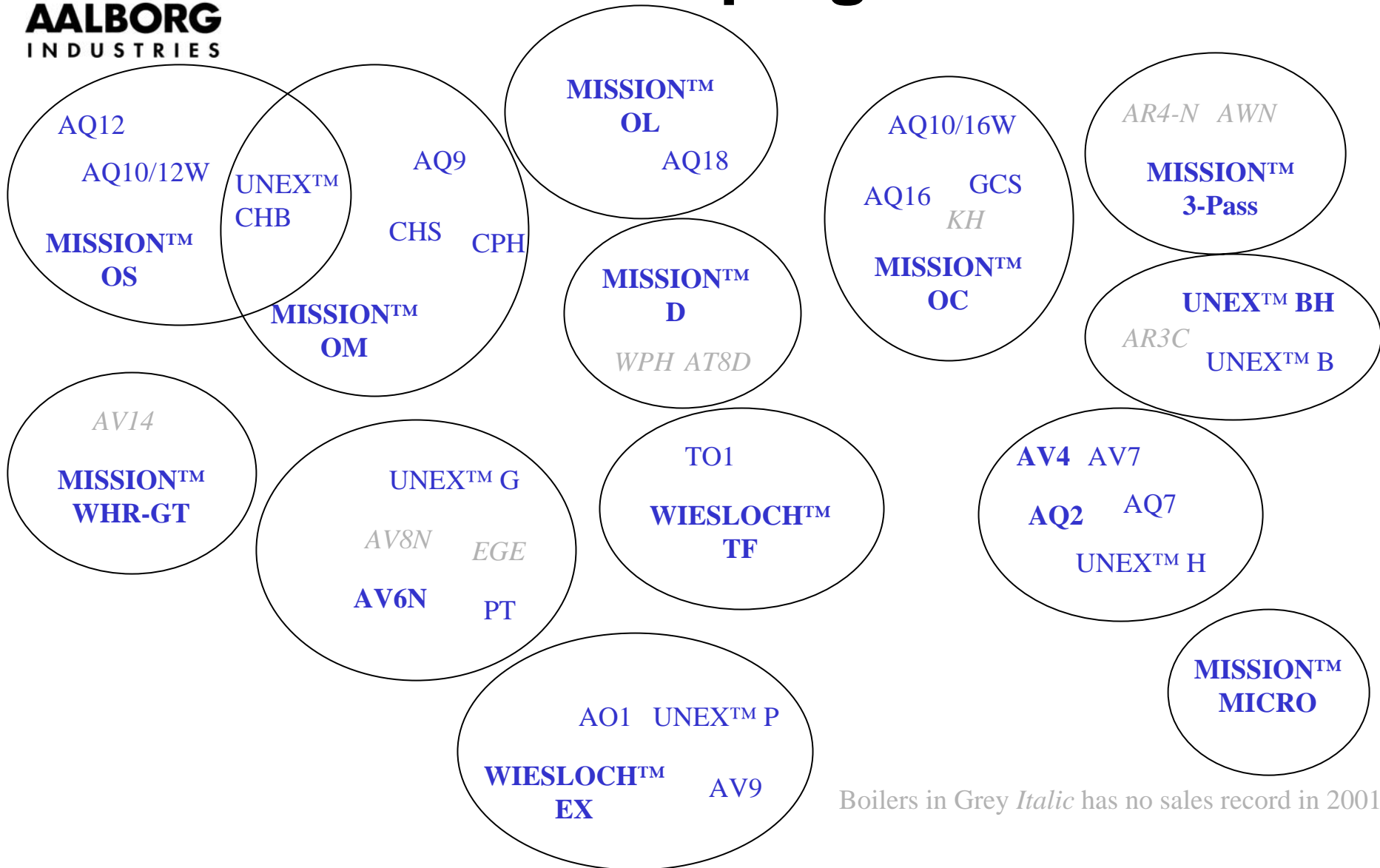
MISSION™ OL
AQ18
MISSION™ D
TO1
WIESLOCH™ TF
UNEX™ P
WIESLOCH™ EX

AQ10/16W
AQ16
MISSION™ OC
AV4
AQ2
AV7
AQ7
AV9

AR4-N AWN
MISSION™ 3-Pass
UNEX™ BH
AR3C
UNEX™ H
MISSION™ MICRO

Boilers in Grey Italic has no sales record in 2001

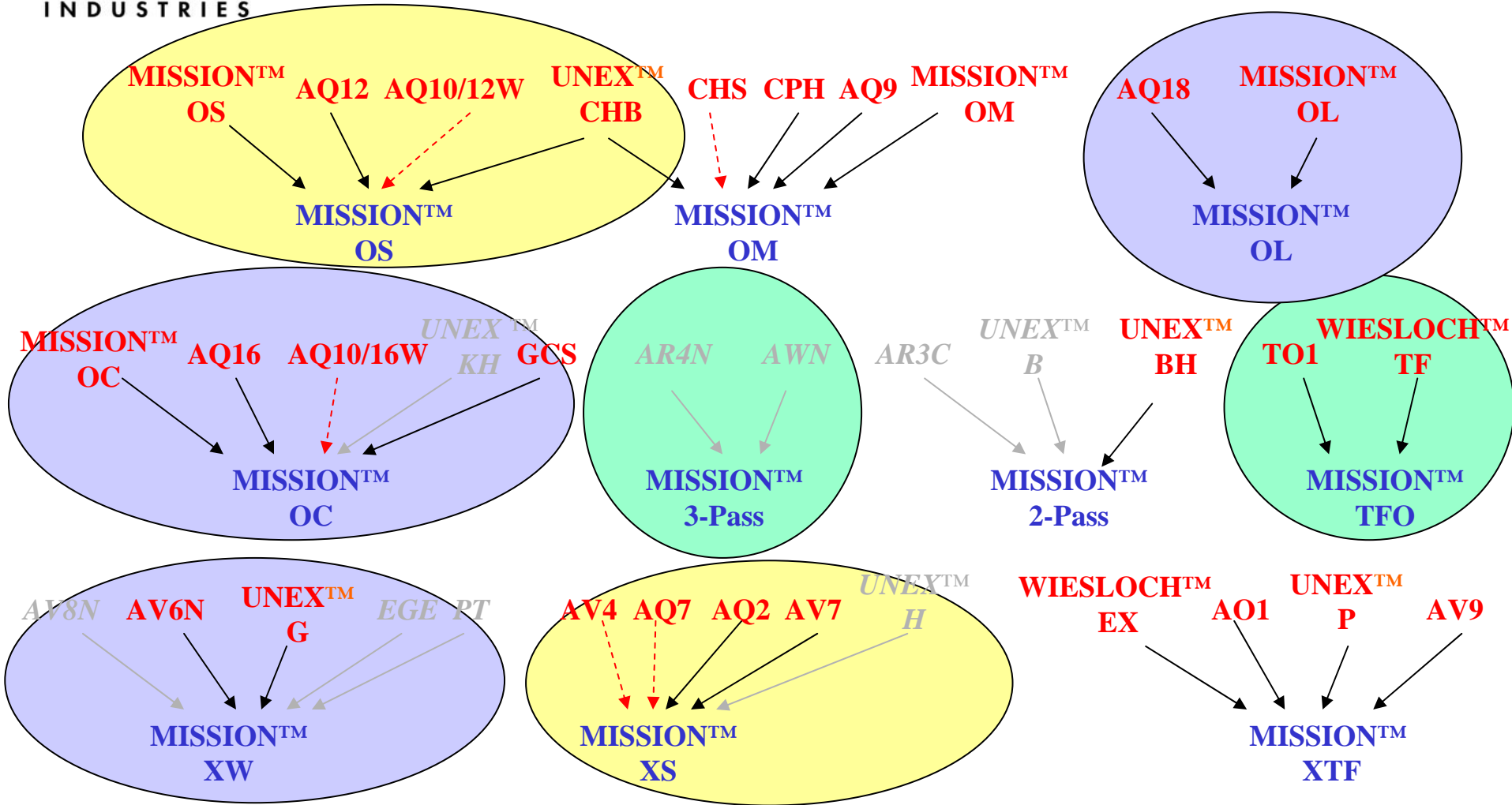
Grouping of Products



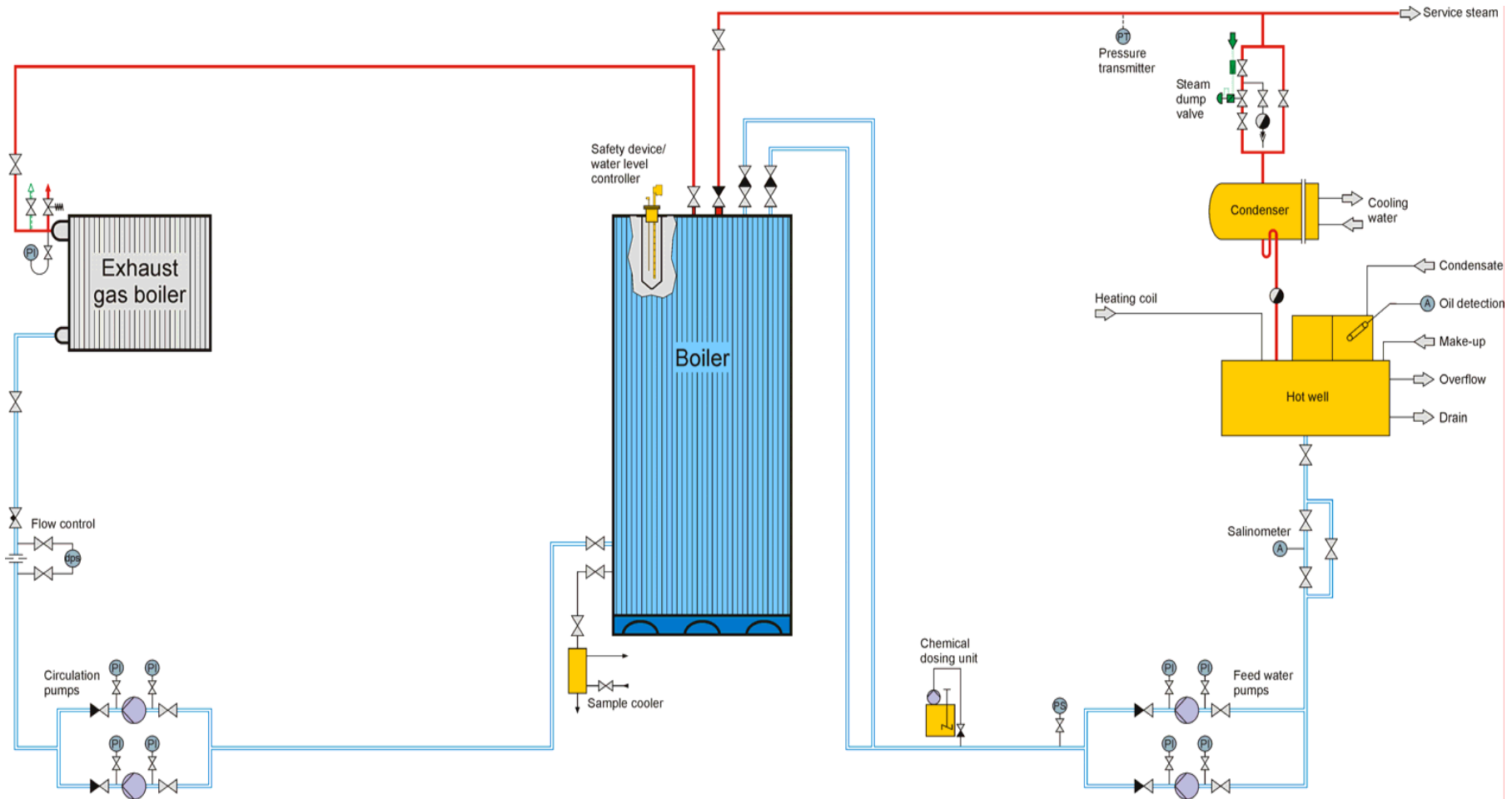
Boilers in Grey *Italic* has no sales record in 2001



Standardisation into Product Families



Configuration of Boiler Plants (Complete Systems)



Consolidating "Best Practice"

Predefined Concepts and well-defined Options



Container ships



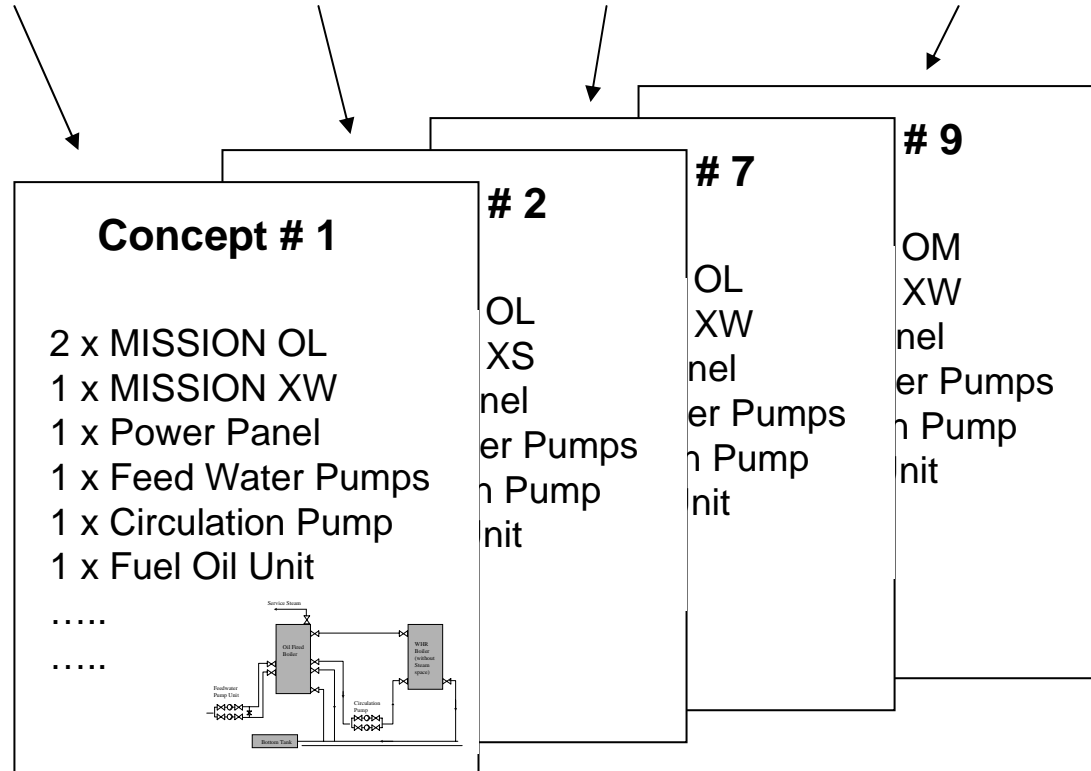
Crude carriers



Gas tankers



Cruise ships



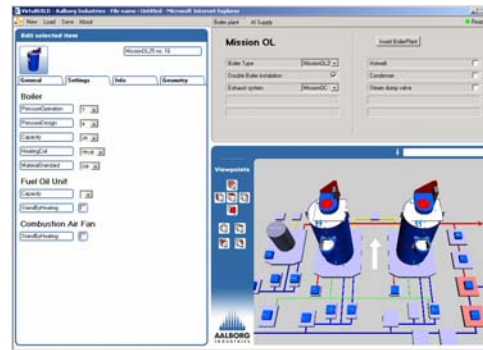
Intelligent Product Configuration Tool

Customer
Options

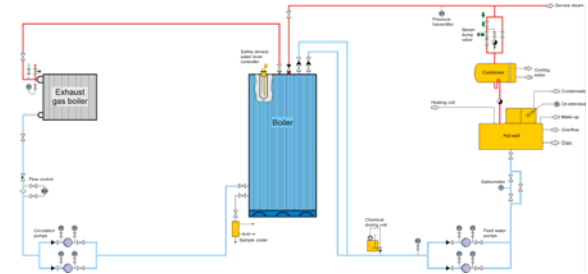
Class Rules

Engineering
Experience

Production
Experience



Product Configuration Tool



Consistent and
well-proven Solutions



Documentation and Drawings from the Product Configurator

Price Calculation

Item	Description	Quantity	Unit Price	Total Price
1	Boiler - M2000*700	1	1.000.000	1.000.000
2	Boiler - M2000*700	1	1.000.000	1.000.000
3	Boiler - M2000*700	1	1.000.000	1.000.000
4	Boiler - M2000*700	1	1.000.000	1.000.000
5	Boiler - M2000*700	1	1.000.000	1.000.000
6	Boiler - M2000*700	1	1.000.000	1.000.000
7	Boiler - M2000*700	1	1.000.000	1.000.000
8	Boiler - M2000*700	1	1.000.000	1.000.000
9	Boiler - M2000*700	1	1.000.000	1.000.000
10	Boiler - M2000*700	1	1.000.000	1.000.000

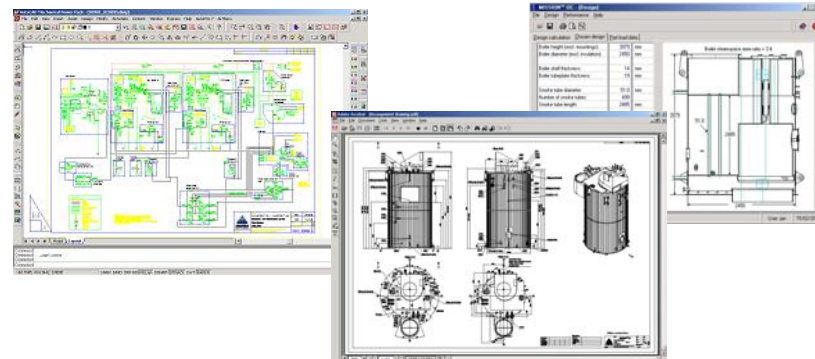
Documentation

Technical documentation and performance calculation results. The performance calculation window shows:

- Performance Calculation
- MSB00A™ OL
- Rated Size 2000 t/h
- Rated Power: 4000 kW
- Rated Pressure: 10 bar g
- Rated Temperature: 150 °C
- Rated Efficiency: 88 %

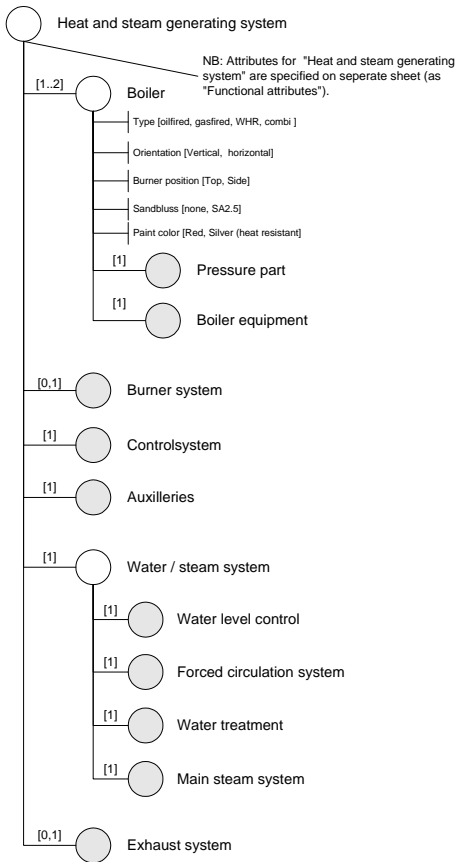
The documentation includes detailed technical specifications and a graph showing the relationship between boiler capacity and efficiency.

Drawings

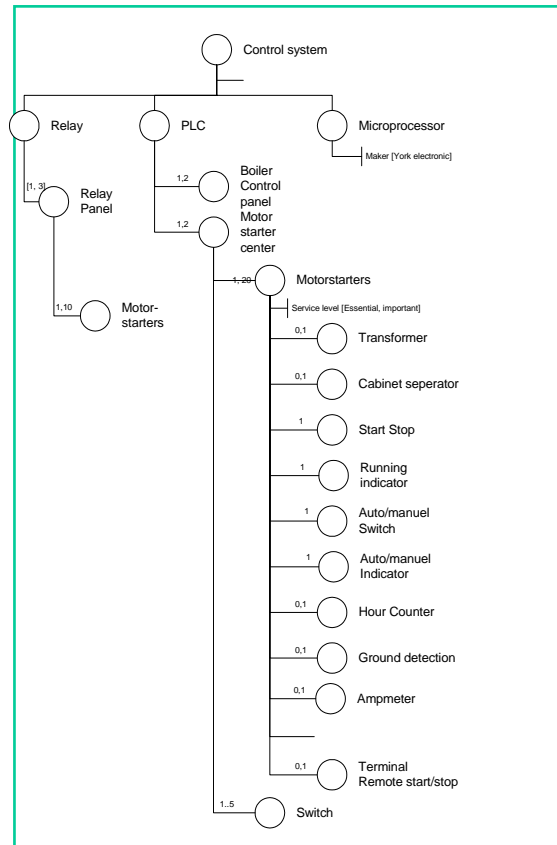


Configuration tool

Product Family Master Plan



"Part-of" model



"Kind-of" model

The preferred class of water and steam section depends on the required steam pressure and the required steamflow. In theory all the classes can be designer for the required pressure range and steam flow range but the plate scantlings will be increase dramatically. The typical relations are expressed in the following table

Water & steam section	Steam pressure [barg]			Steam Flow [t/h]		
	10	18	24	1-8	8-20	25-120
Drum			x			x
Space	x	x			x	
Chamber	x			x		

Relationships between service level and transformer

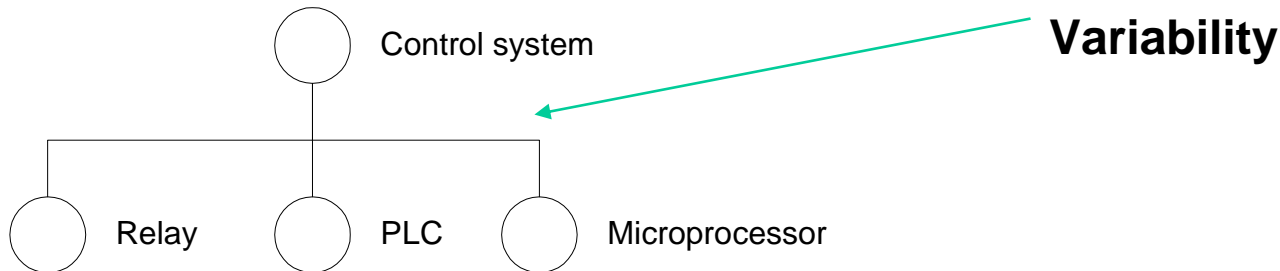
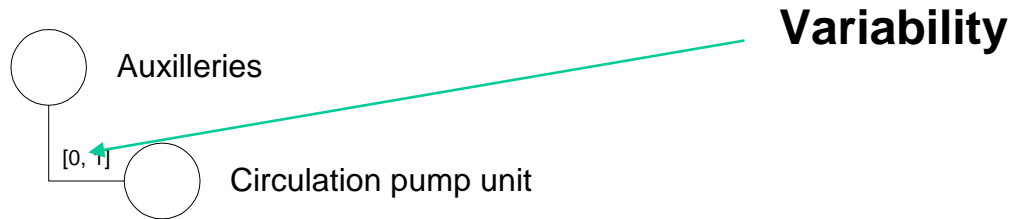
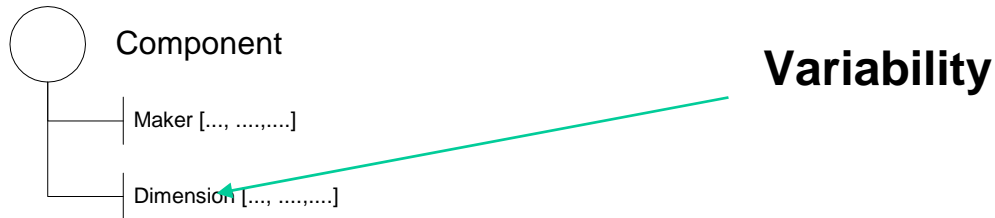
§ If the required service level is essential a transformer and a cabinet separator is mandatory

Relationships between power and the ampmeter

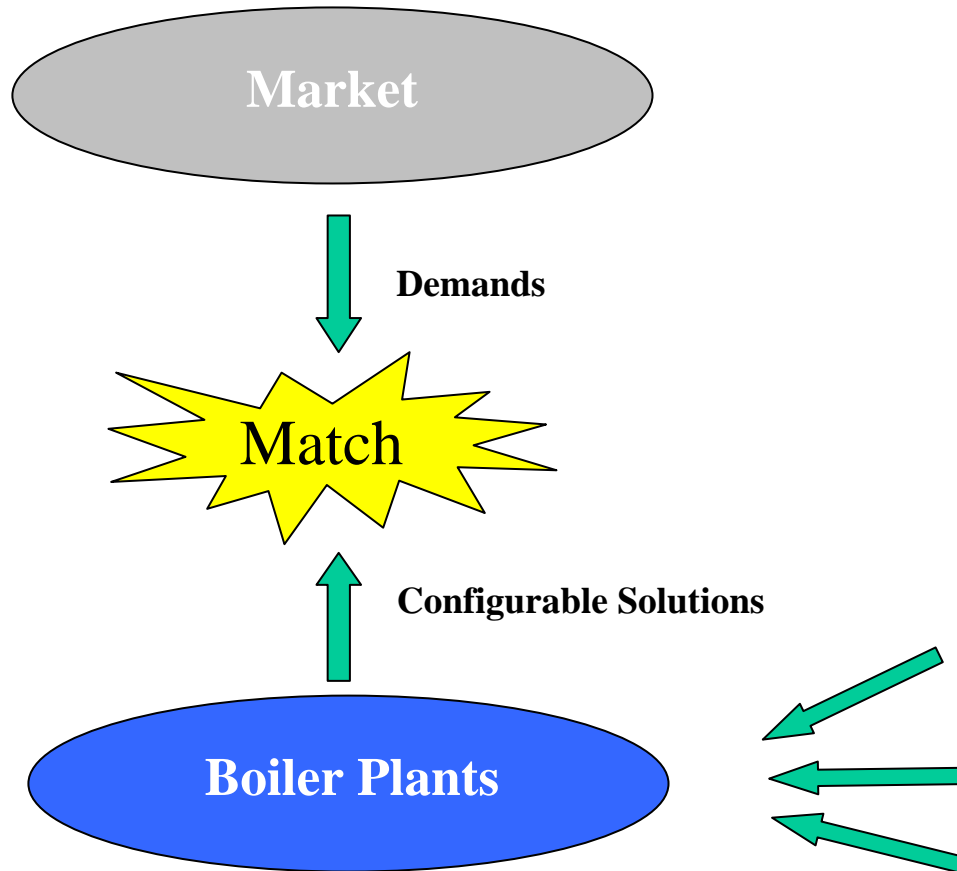
§ Use of Ampmeter is optional but if the power is greater than 11Kw a transformer is mandatory

Rules and relations

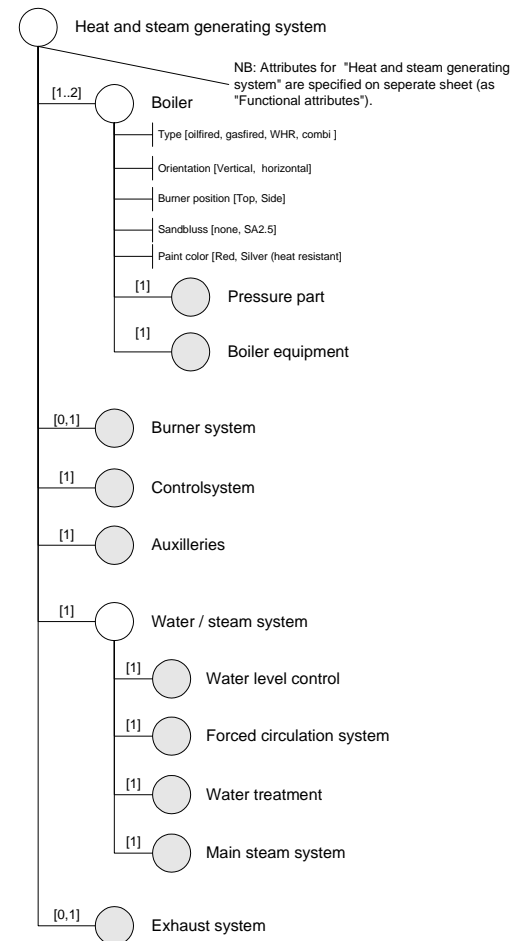
Variability has a Cost!



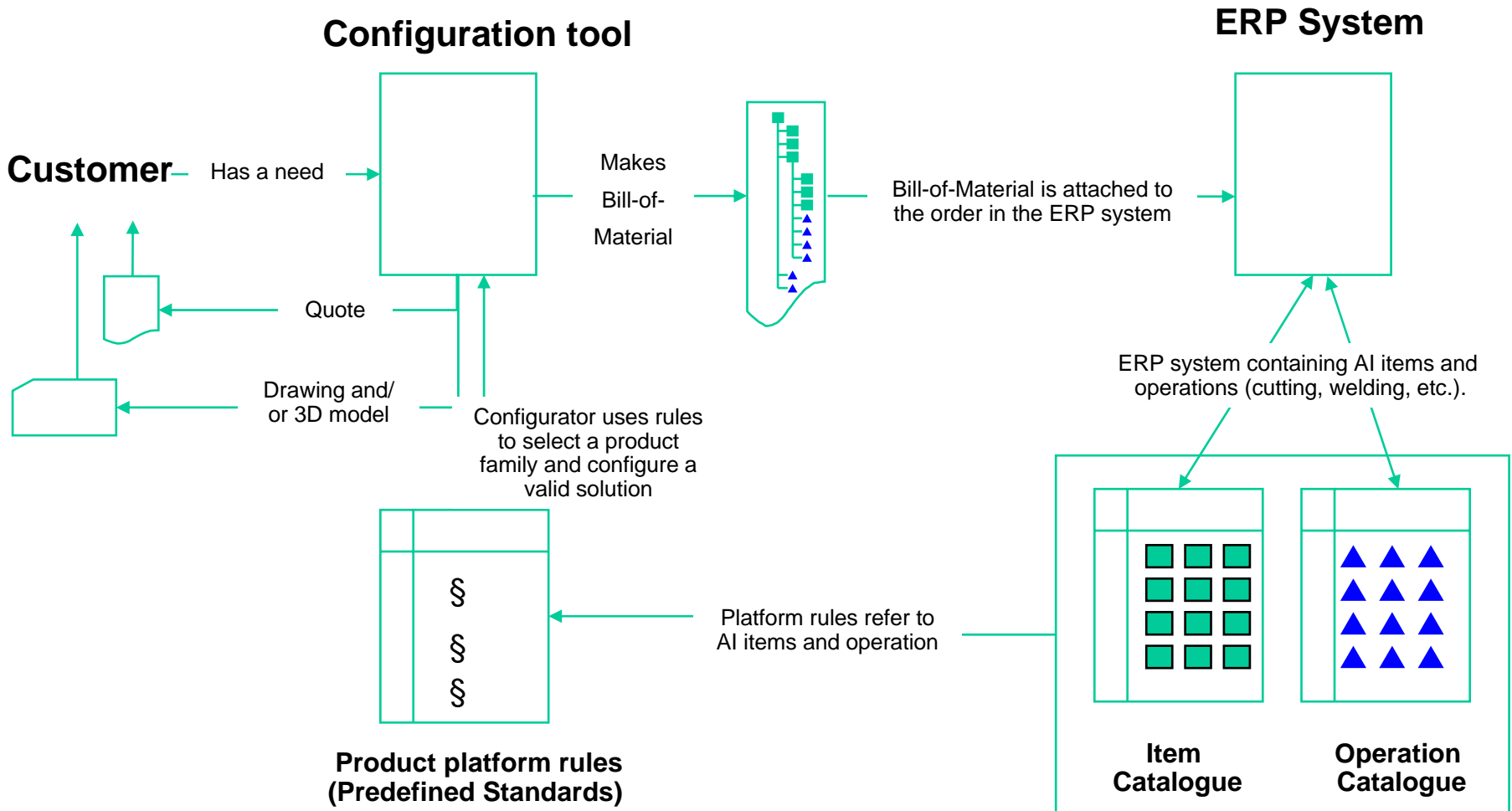
Configurable Boiler Plants supporting Market Demands



Product Family Master



Sales and Order Execution





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Challenges

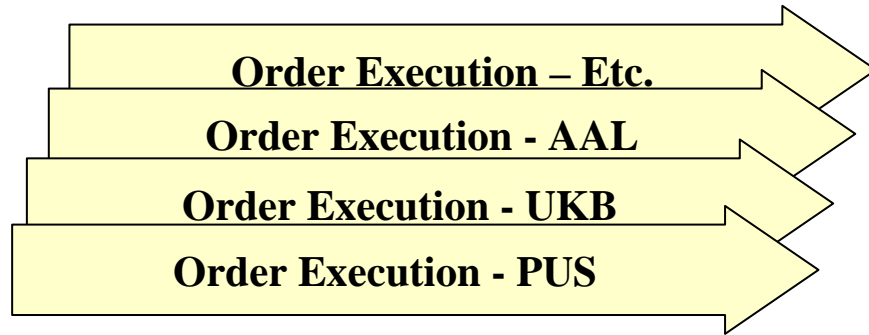
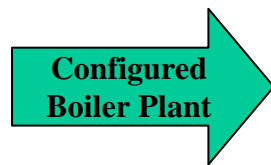
- Global Similarities vs. Local Differences
 - Market requirements (e.g. DIN/JIS flanges)
 - Material standards (e.g. EN/GB/NK standards)
- The configurable product platform is not complete
- To handle *partly* configurable solutions
- The order port folio - long horizon
- Repeat orders



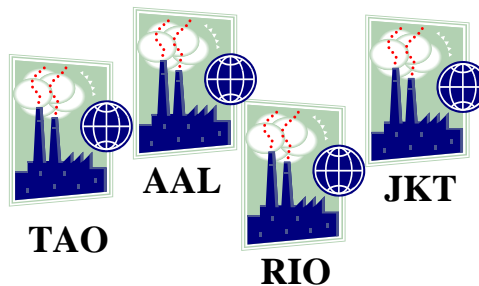
Challenges (Cont.)



Sales



**Delivered
Boiler Plants**

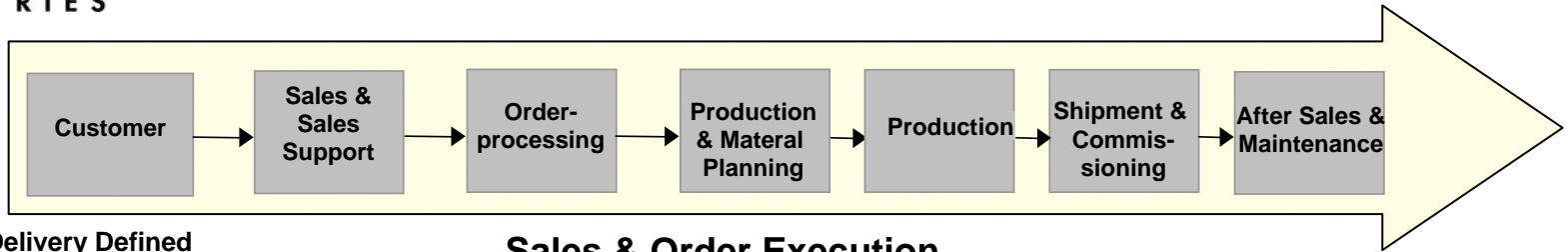


Production Sites



Suppliers

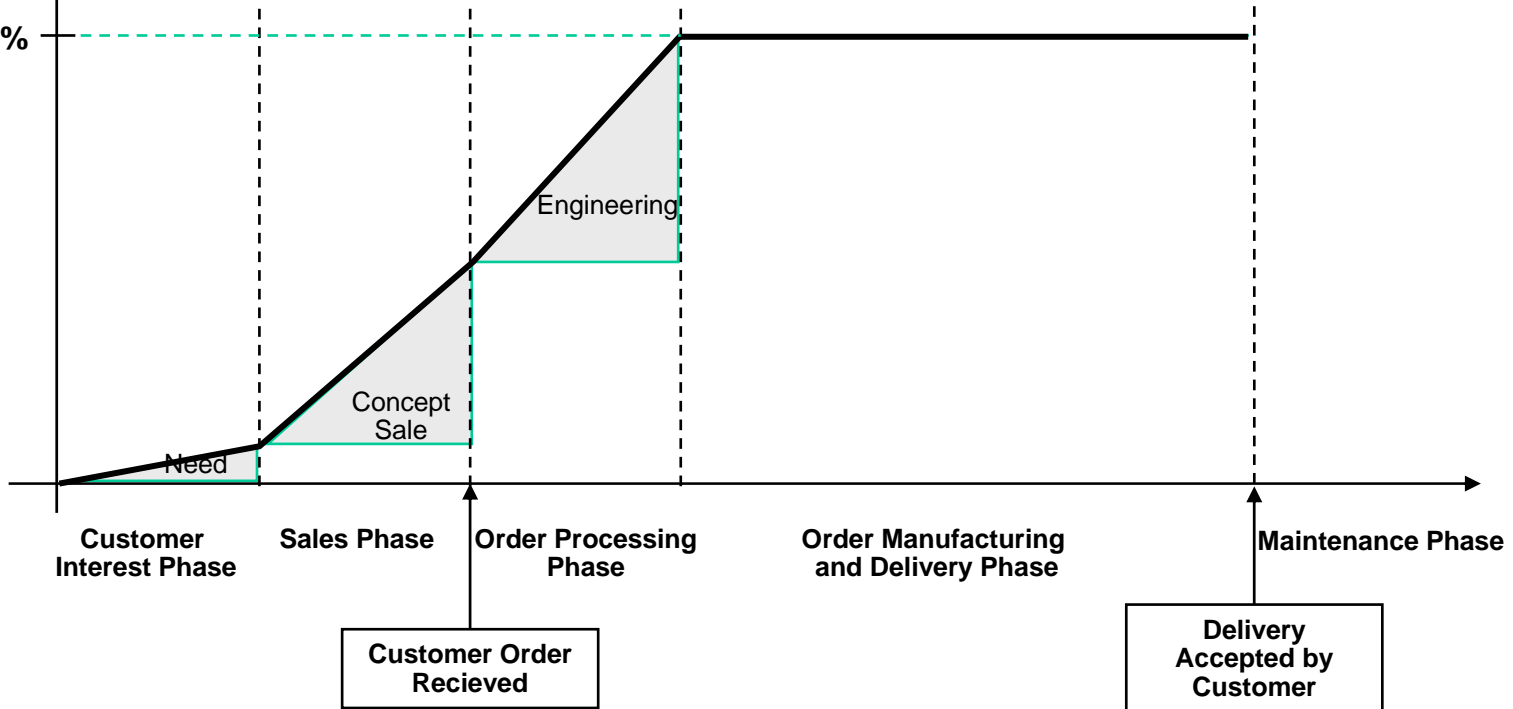
Sales and Order Execution Reference Model



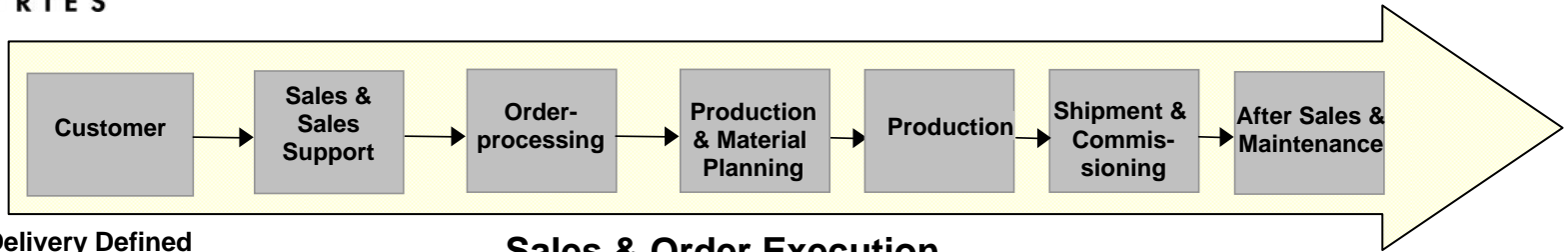
Scope of Delivery Defined

Sales & Order Execution

100 %



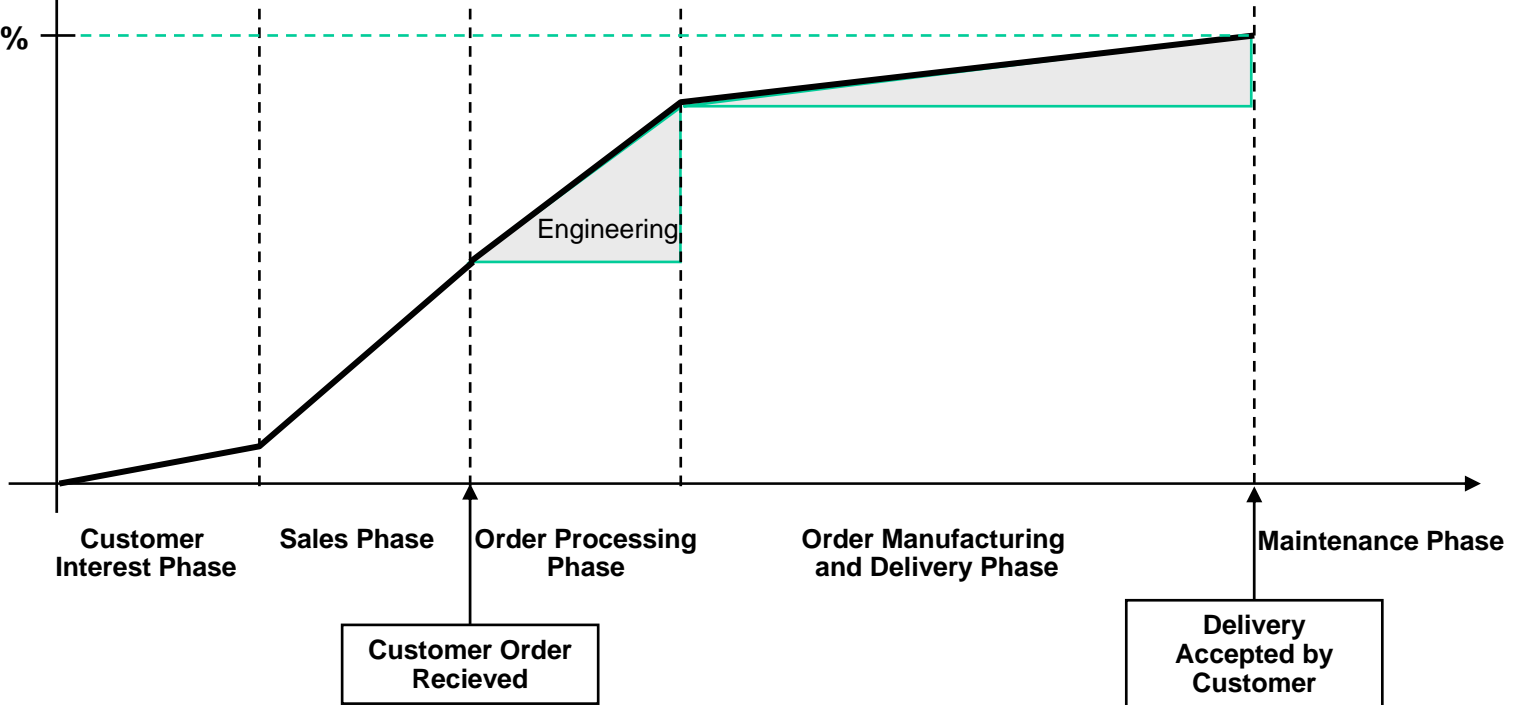
Sales and Order Execution Reference Model



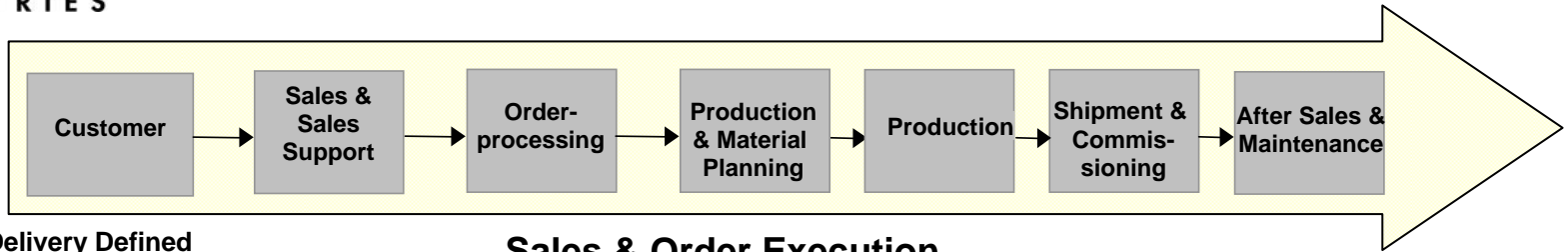
Scope of Delivery Defined

Sales & Order Execution

100 %



Sales and Order Execution Reference Model



Scope of Delivery Defined

Sales & Order Execution

100 %

Preferred

Engineering

Customer Interest Phase

Sales Phase

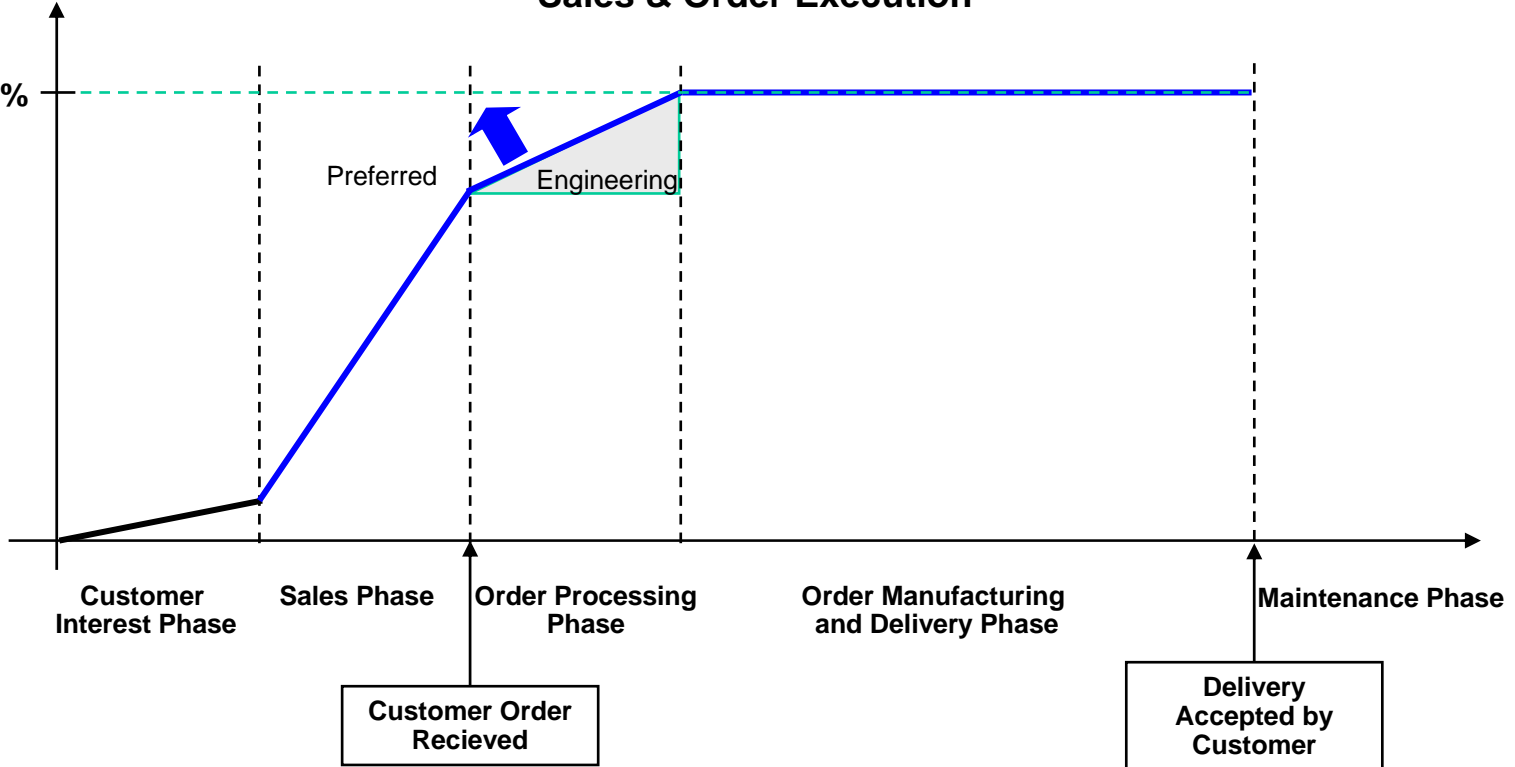
Order Processing Phase

Order Manufacturing and Delivery Phase

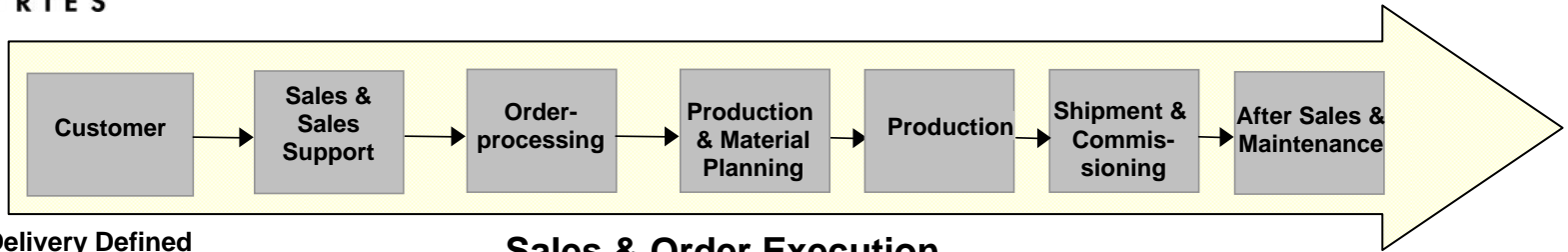
Maintenance Phase

Customer Order Received

Delivery Accepted by Customer



Sales and Order Execution Reference Model



Scope of Delivery Defined

Sales & Order Execution

100 %

Optimal

Customer Interest Phase

Sales Phase

Order Processing Phase

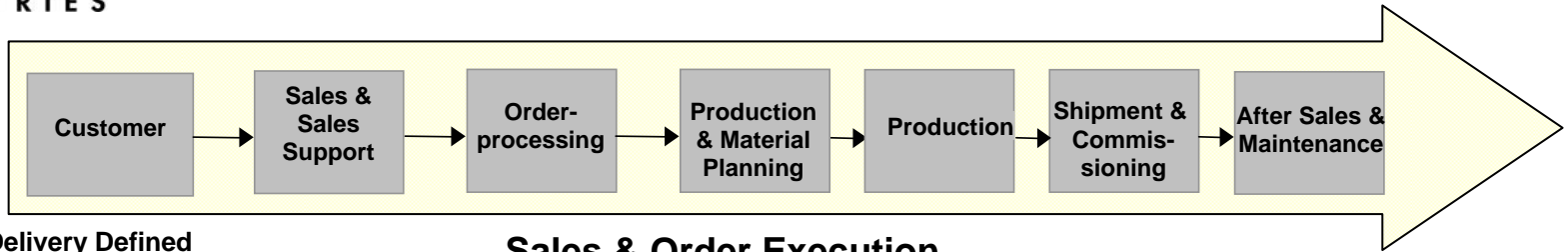
Order Manufacturing and Delivery Phase

Maintenance Phase

Customer Order Received

Delivery Accepted by Customer

Sales and Order Execution Reference Model

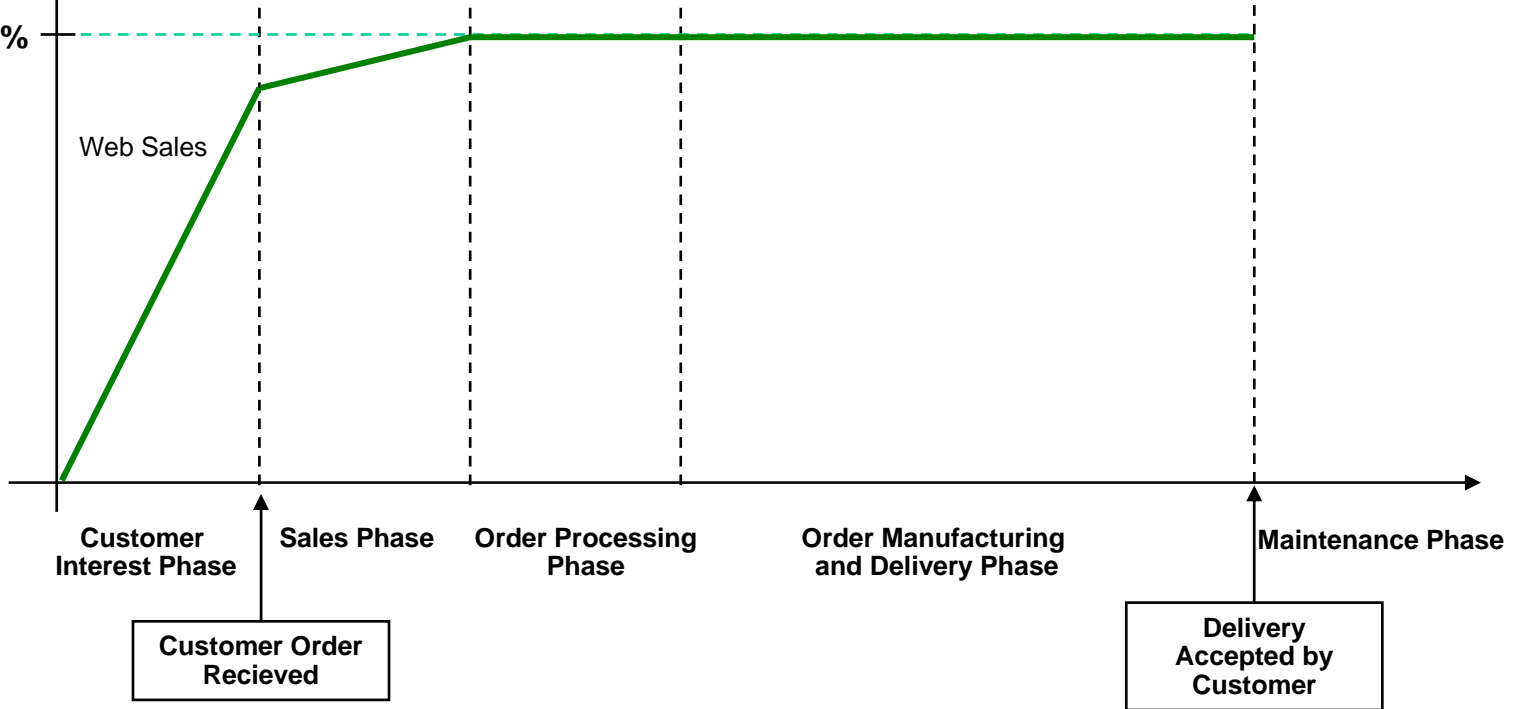


Scope of Delivery Defined

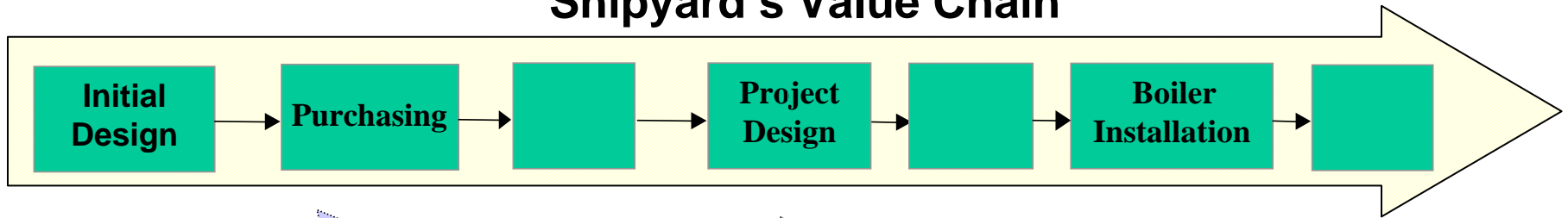
Sales & Order Execution

100 %

Web Sales



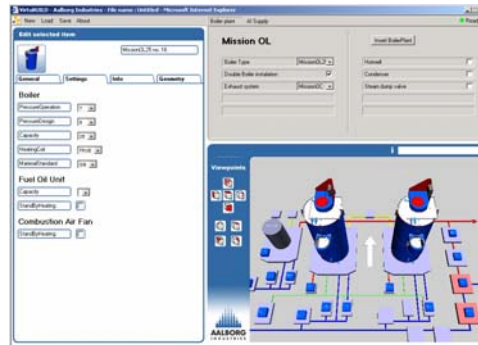
Shipyard's Value Chain



- Boiler Plant Specification
- Scope of Supply
- Boiler Performance
- P&I Diagrams / List of Parts
- Installation Manual

- 3D Boiler Model
- Arrangement Drawings
- Instructions & Datasheets

- As-build Documentation
- Maintenance Manual

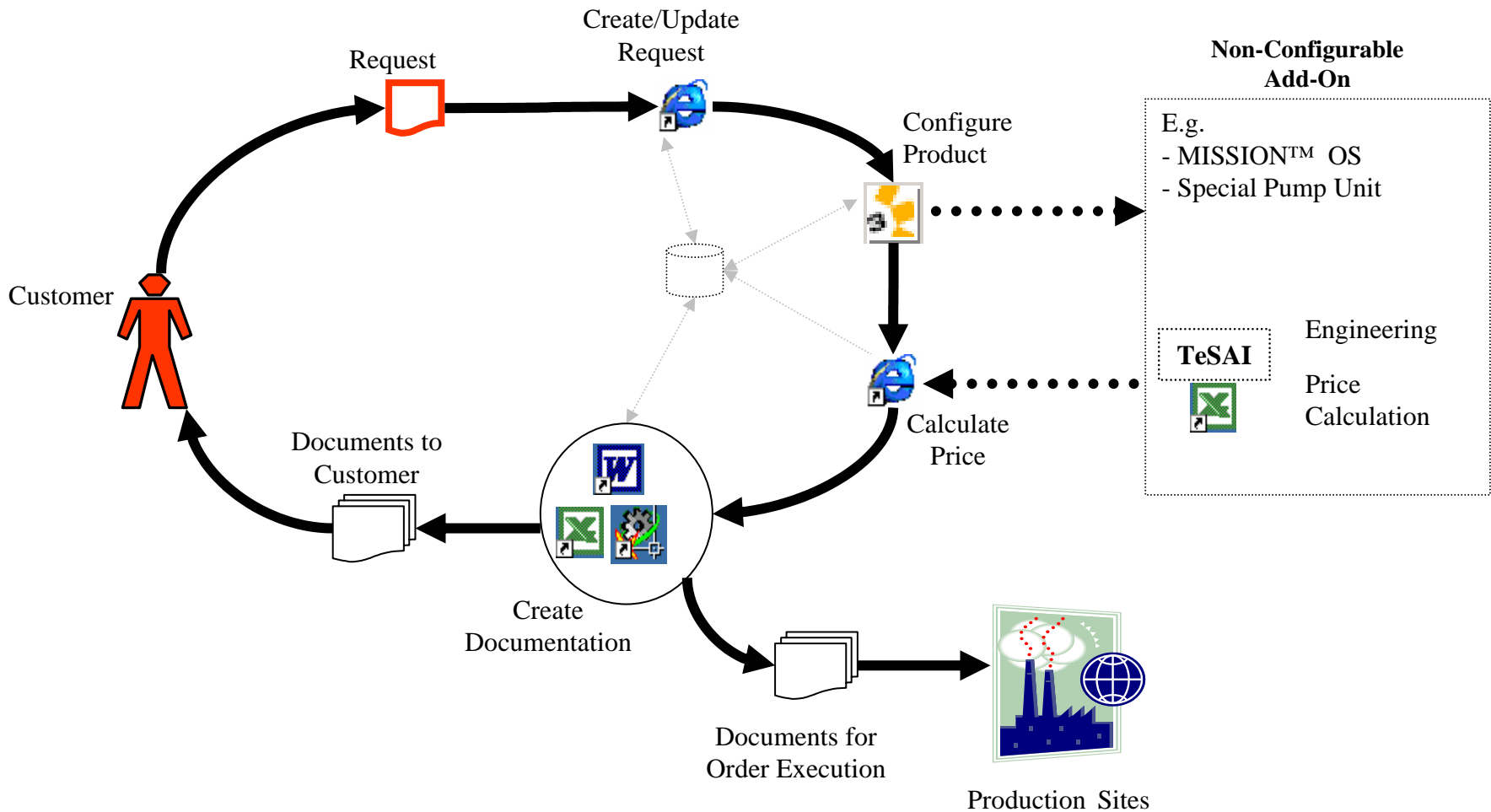




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Sales and Order Execution of Configured Solutions




Demonstration of the Product Configuration System

VirtuBUILD - Aalborg Industries - File name : Untitled - Microsoft Internet Explorer

New Load Save About

Boiler plant AI Supply ● Ready

Edit selected item



General | **Settings** | **Info** | **Geometry**

Boiler

PressureOperation: 7

PressureDesign: 9

Capacity: 25

HeatingCoil: TRUE

MaterialStandard: GB

Fuel Oil Unit

Capacity:

StandByHeating:

Combustion Air Fan

StandByHeating:

Mission OL

Boiler Type: MissionOL2!

Double Boiler installation:

Exhaust system: MissionOC


Insert BoilerPlant

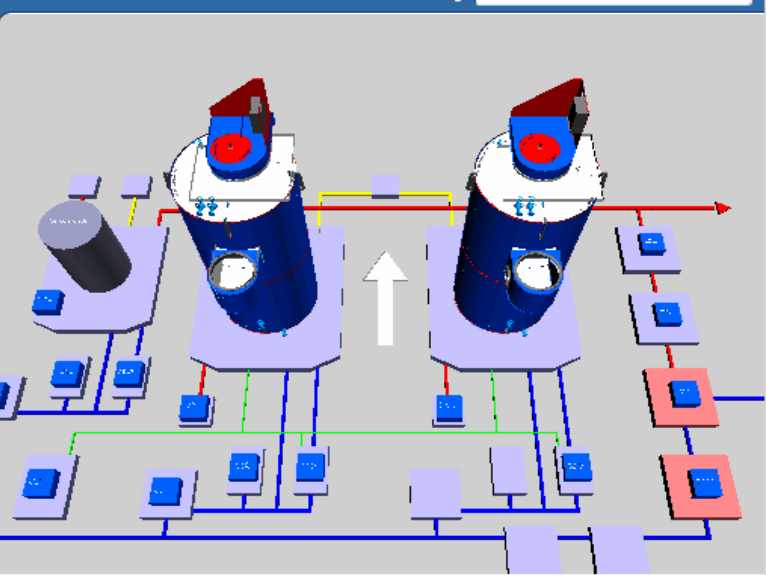
Hotwell:


Condenser:

Steam dump valve:

Viewpoints









Some Experiences

Economical

Initial cost (investment)

Increased maintenance cost

Long term saving

Organisation and workflow

Changed workflow

Changed work contents

Changed skill requirements

Changed organisation

Non-configurable solutions

Difficult and complex

Time consuming

Availability of skill





**Thank you for
your attention !**

