Modularization in Grundfos

Joint development of Architectures and Platforms for Products and Production

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Grundfos in brief

• 16 mio pumps / year
• 60+ sales companies
• 14 production companies
• 4 R&D centers
Part of our Product Portfolio
History of platform development in Grundfos

Managing product variety and market requirements
Managing make/source decisions

Limited focus on manufacturing
Limited focus on sharing of design principles across product families

Product Family Master Plan

Project X

Project variants
Modularization Scope and Focus

In a joint effort *Business Development* and *Operations* sets focus on module commonalities across all products.

### Mega Modules

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**Focus**

**Cross-family commonality**

**Product family commonality**

**In a joint effort *Business Development* and *Operations* sets focus on module commonalities across all products.**
Modularization Vision

Cost
• Reduction of labor costs
• Reduction of material costs
• Reduction of cost to produce

Capacity
• Higher capacity utilization
• Reduction or postponement of investments
• Ability to invest step-vice

Complexity
• Optimize number of lines, and variants per line
• Have the right number of architectures and platforms

Capability
• Reduce project lead-time
• Improve quality
• Better offerings in the product or in supply chain
Top-down approach

Collaborative product and manufacturing platform development
Modularization Waves and Deliveries

### Cross Portfolio Fact Pack
- Number of architectures
- Data: Cost & Performance
- Physical components

### Cross Portfolio Potentials
- Identify and quantify Opportunities

### Architectures and Platforms
- Strategy & Marked
- Product Architectures
- Operations Architectures
- Interface standardization
- Modules
- Roadmaps

### Guidance and Governance
- Compliance evaluation
- Product development governance
- Continuous updates
**Electronics – Project Ellehammer**

Drives 30-60% of unit cost  
Trend: More controls/electronics

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Baseline -> Development -> Execution
Development - Electronics

Baseline → Development → Execution

Standard Tester Module
Findings and Ambitions

Baseline

- **Cost**
  - COGS 1.4 BDKK/Year
  - COGS 460 MDKK/Year (Mech)

- **Complexity**
  - 24 product architectures
  - 20 final assembly lines

- **Capacity**
  - 28% OEE$_{24x365}$ in average

- **Capabilities**
  - Time-to-market
  - Quality
  - Product offerings

Development

- **Cost**
  - Short-term: Rationalization potential of 40 MDKK/year
  - Long-term: 15% reduction of COGS MECH cost base

- **Complexity**
  - 10 product architectures
  - 4 production architectures (8 final assembly lines)

- **Capacity**
  - 75% OEE$_{24x365}$ in average

- **Capabilities**
  - Improve time-to-market (24)
  - Improve quality
  - Improve product offerings
Execution - Electronics

Design Rules

• Max. product dimensions & weight
• Global manufacturing concepts
• 3-step capacity scalability in FA
• Min. tact time 10s
• ...

Interface standardization:

• Box//Cover
• Pallet//Box
• Tester//Cover//PCB
• ...

Standard modules:

• Tester
• Cooling
• Pallet
• ...
Modularization Waves and Deliveries

1.0 Baseline

Cross-Portfolio Fact Pack
- Number of architectures
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Cross-Portfolio Potentials
- Identify and quantify Opportunities

2.0 Development

Architectures and Platforms
- Strategy & Marked
- Product Architectures
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- Modules
- Roadmaps

3.0 Execution

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MARKET
PRODUCT
PRODUCTION
Status

Modularization in Grundfos
Progress - today

Opportunity pool of ~120 MDKK/year

Baseline  Development  Execution

Controls  Rotor  Rotor can  Stator  Impellers  Chambers  Pump house  ...

Short-term  Long-term
Modularization Collaboration Framework

- Area of responsibility

Chief Concept Engineer + team
- Facilitate and drive modularization initiative
- Process ownership (methods, tools, formats)
- Development of best-practice
- Communication and training

Group VP’s from Development, Group Quality, and Advanced Manufacturing Engineering
- Align strategies
- Overview of portfolio and roadmap

Directors and Chief Engineers from Advanced Manufacturing Engineering and Product Development
- Initiate and drive modularization projects
- Ensure deployment of platforms in DP projects
- Enable and ensure cross-organizational collaboration
Learning and challenges

1. Product focus

2. Project focus

3. Cost-down focus

4. Standard-Unit-Cost focus
Q&A