## Sustainable Development Cold-Box Systems

Ankiros 2022

Dipl.-Ing. Peter Gröning | 6 October 2022





#### Today's agenda:

#### Sustainable Development Cold-Box Systems

- Demanding Business Environment
- → About Cold-Box: Types & Development
- → Emission Reduction
- $\rightarrow$  Reduction of free Monomers
- → Conclusion



#### **Business Environment**

#### All at once

Global shortage in computer chips 'reaches crisis point'

Consumer price rises loom while dearth of semiconductors slow production from Samsung to Ford



Source: DW



Source: PG

Volkswagen to stop making combustion engine cars by 2035 in Europe

The German automobile giant has now set a timeline for its exit from combustion engine cars. The changes will affect Europe first, with the US and China to follow "a little later."

#### 🛉 🗾 🚳 🖂 🕂



Source: Guardian





Key contributors and policy tools

Europe has a strong track record of **cutting emissions whilst growing its economy**. Achieving our new target of 55% greenhouse gas emissions by 2030 will require action across all sectors.

September 2020



Source: EU





## **Cold-Box Milestones**

#### Traditionally innovative





## **Our Cold-Box Goals**

Sustainable products for the future

#### Improvement of organic binder systems

- Reduction organic share
- Reduction free monomeres





Worldwide goal reduction of emissions The goal of HA is to support you with customized solutions





## **HA Cold-Box Solvent Types**

Aromatic Cold-Box System Solvent: Hydrocarbon



# $C_n H_{2n+1}$ n = 3 bis 14

Silicatic Cold-Box System: Solvent: Tetraethylsilicate





Aliphatic Cold-Box System: Solvent: Rapeseedmethylester





Silicatic Resin Body Sipurid System: Partly silicatic resin







## **Cold-Box Product Portfolio**

#### Systematics





### **Development Cold-Box Systems HA**

Two main adjustments

**Reduction of Organics** 



#### **Reduction of Monomers**



## **Development Cold-Box Systems HA**





## **Development Cold-Box Systems**

Effects by higher proportion of inorganic share



Less carbon content through increased inorganic share

![](_page_9_Picture_4.jpeg)

## 1996 | Introduction of the Bio Cold-Box System

Renewable raw material as solvent

![](_page_10_Picture_2.jpeg)

![](_page_10_Picture_3.jpeg)

#### Aliphatic Cold-Box System: Solvent: Rapeseedmethylester

![](_page_10_Figure_5.jpeg)

![](_page_10_Picture_6.jpeg)

## **Bio System: Technical Advantages**

#### Significant improvements

![](_page_11_Figure_2.jpeg)

![](_page_11_Picture_3.jpeg)

#### Aliphatic Cold-Box System

 Reduction Catalyst consumption / Purge time
Low smell
Low sticking

![](_page_11_Picture_6.jpeg)

## 1999 | Introduction of the Silicatic Cold-Box System

![](_page_12_Figure_1.jpeg)

![](_page_12_Picture_2.jpeg)

# Solvent: Tetraethylsilicate

![](_page_12_Figure_4.jpeg)

![](_page_12_Picture_5.jpeg)

## 2008 | Introduction of Silicatic Sipurid System

![](_page_13_Figure_1.jpeg)

![](_page_13_Picture_2.jpeg)

Silicatic Resin Body Sipurid System: Partly silicatic resin

![](_page_13_Picture_4.jpeg)

## **Standard CB vs. Sipurid Production**

#### **Different processes**

![](_page_14_Figure_2.jpeg)

![](_page_14_Picture_3.jpeg)

## **Focus: Pollutant Emissions**

#### Significant reduction of emissions

![](_page_15_Figure_2.jpeg)

BTX emissions @ 900° C Less Benzole, Toluole and Xylole through increased inorganic share

![](_page_15_Picture_4.jpeg)

#### **Focus: Condensates**

![](_page_16_Figure_1.jpeg)

#### Low Condensate Level

- Reducing the risk of fire in extraction and piping system
- ↓ Reduced cleaning need
- Reduction of down times

![](_page_16_Picture_6.jpeg)

![](_page_16_Picture_7.jpeg)

## Focus: Smell

#### Case Study Die Casting

Production Unit	Smell concentration (Smell Unit / m³) Standard CB System	Smell concentration (Smell Unit / m³) Silicatic CB System		
1	3133	770		
2	1160	253		
3	1967	1633		
4	1400	453		
5	1400	453		
6	2900	2233		
7	1967	1633		
8	2900	2233		

![](_page_17_Picture_3.jpeg)

#### Case study:

#### Standard CB vs. Silicatic CB

Comparison of smell concentration shows significant differences.

![](_page_17_Picture_7.jpeg)

## Focus: Fume

Significant reduction of fume

![](_page_18_Picture_2.jpeg)

![](_page_18_Picture_3.jpeg)

19 Sustainable Development CB Systems | P. Grönung | HA Group

## **Development Cold-Box Systems HA**

![](_page_19_Figure_1.jpeg)

![](_page_19_Picture_2.jpeg)

## **Cold-Box Systems with reduced Phenolic Content**

#### Reduction of monomers

![](_page_20_Figure_2.jpeg)

![](_page_20_Figure_3.jpeg)

## Standard CB vs. Low Phenol vs. Free Phenol CB

Comparison of free phenol content

![](_page_20_Picture_6.jpeg)

## **Combination of Properties**

Advantages

![](_page_21_Figure_2.jpeg)

![](_page_21_Picture_3.jpeg)

![](_page_22_Picture_0.jpeg)

Гуре	Brand name	Example of implementation		
Aromatic	Sigmacure	Gasharz 6747	+	Sigmacure 6747 P1
CB systems		Aktivator 8989	<b>→</b>	Sigmacure 8989 P2
Niphatic	Biocure	Gasharz 7241	<b>→</b>	Biocure 7241 P1
CB systems	101	Aktivator 6324	+	Biocure 6324 P2
Silicatic	Silcure	Gasharz 6966	<b>→</b>	Silcure 6966 P1
CB systems		Aktivator 8431	<b>→</b>	Silcure 8431 P2
CB systems with	Sipurid	Sipurid 1000	<b>→</b>	Sipurid 1000 P1
emi silicate resin		Sipurid 2000	+	Sipurid 2000 P2

![](_page_22_Picture_2.jpeg)

![](_page_23_Picture_0.jpeg)

![](_page_23_Figure_1.jpeg)

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![](_page_23_Picture_4.jpeg)

# Thank you for your attention.

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![](_page_24_Picture_2.jpeg)