

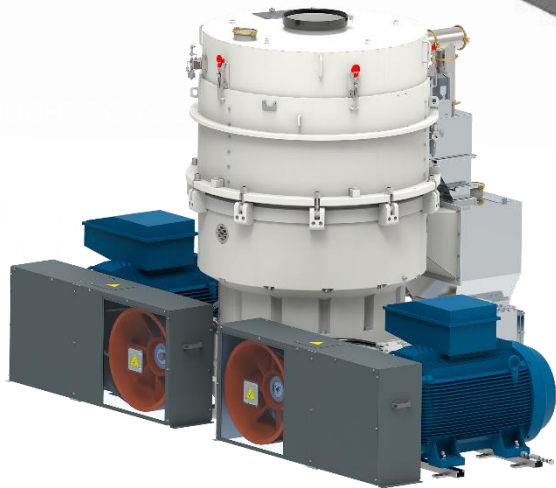
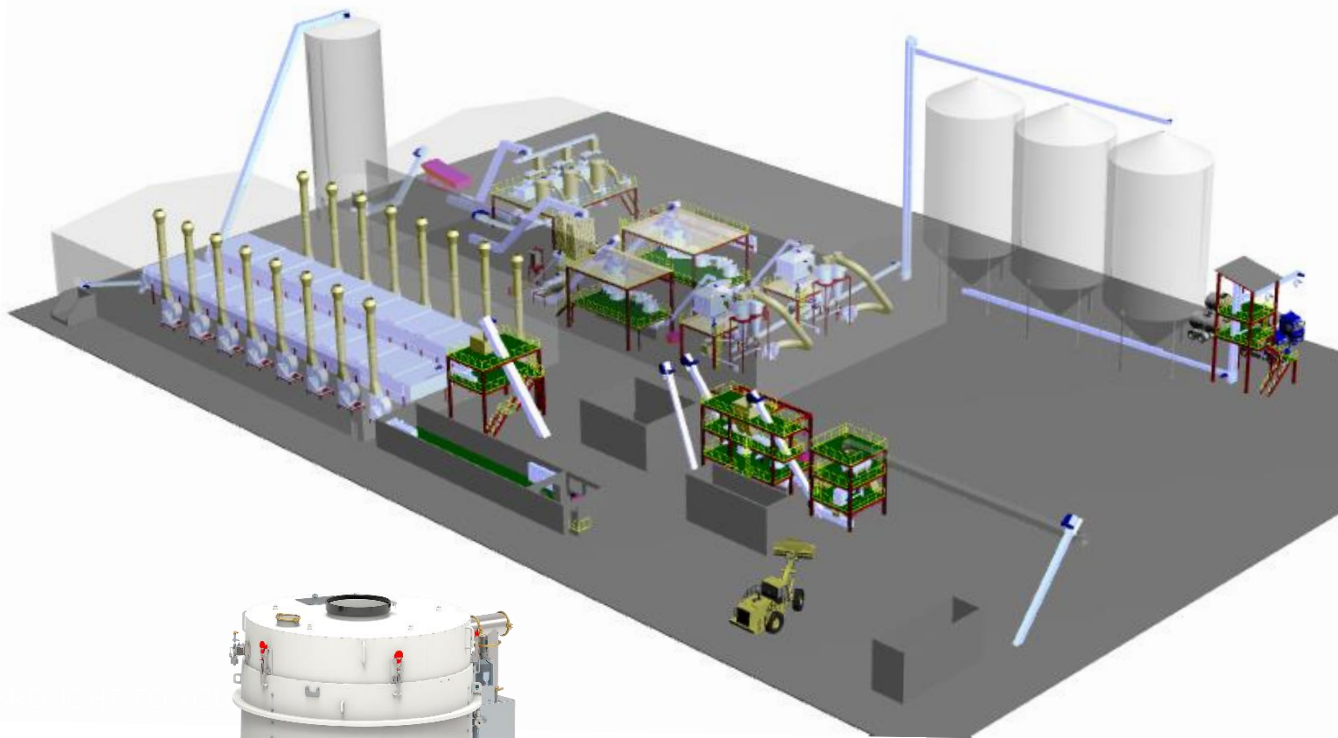


KAHL wood and biomass pelleting technology

Global trend towards High Efficiency Wood and Biomass Pelleting Plants

Olaf Naehrig – Senior Area Manager

AMANDUS KAHL



Made in Germany



- Independent
- Medium-sized
- More than 900 employees worldwide

AMANDUS KAHL – Market leader high performance pellet mills >500 kW motor power



Industry Flagship: KAHL 65-1500 – 630 kW

- 10 – 12 t/h basic capacity
- Lowest energy consumption and operating costs
- Used by market leaders
- More than 8 years in the market already
- More than **100** pellet mills built

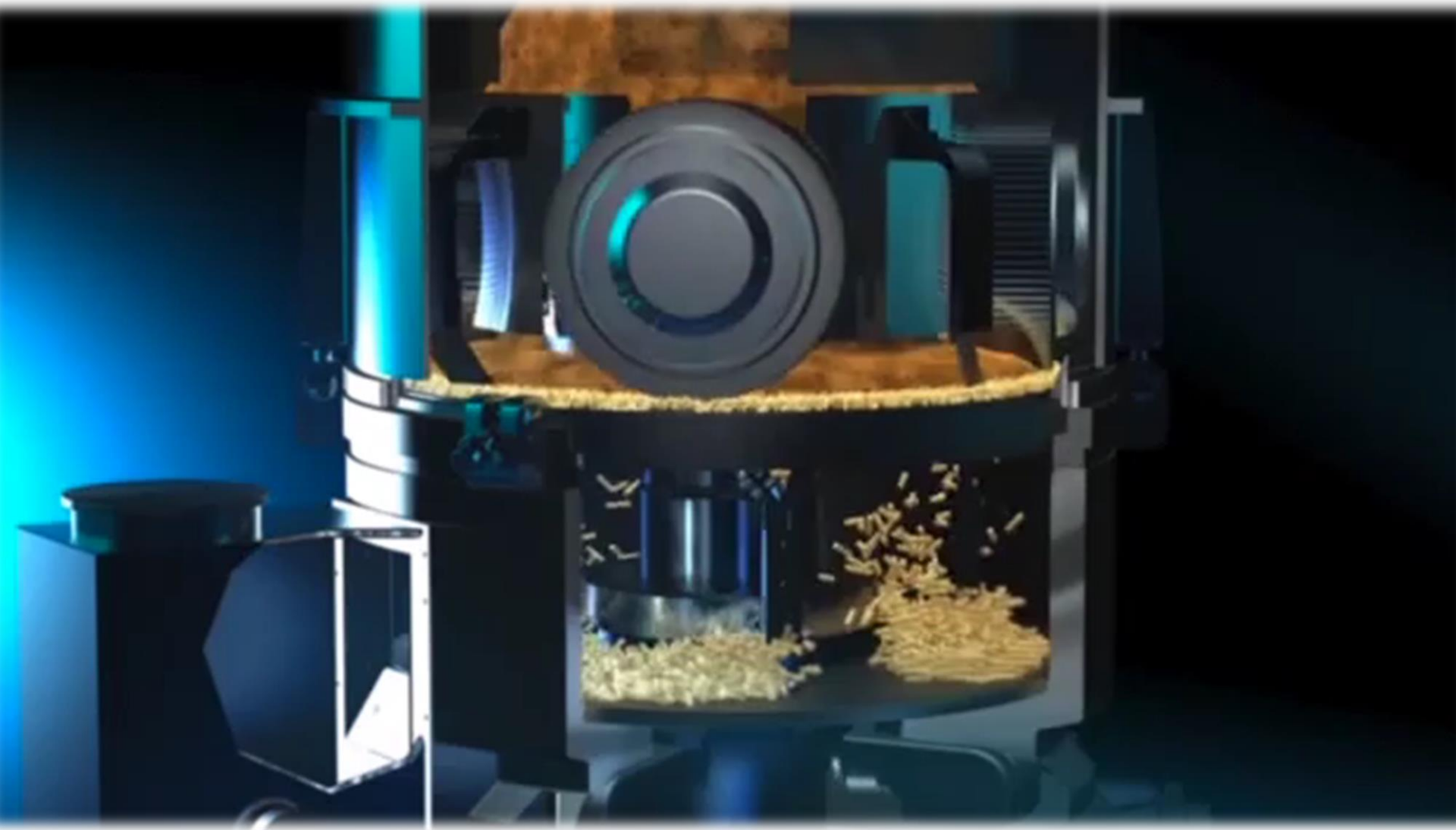
NEXT GENERATION, KAHL 75-1800 – 800 kW



- 13 – 15 t/h basic capacity
- Same design as successful 65-1500
- For softwood, hardwood, mixed woods, agricultural residues

Substantial Savings in Plant Design and Operation

- Less conveying elements
- Smaller buildings
- Less maintenance
- Less operators
- Lower OPEX



Different market qualities are required

Wood pellet quality suitable for the final users

- For **co-firing** in coal power plants durable pellets with fine particle size structure, e.g. as per I2 and I3 industrial pellet standard
- For **home heating** durable high quality pellets without particle size requirements, e.g. as per EN Plus A1 standard
- For **gasification** pellets with superior pellet quality and durability, better than EN Plus A1 standard
- For **torrefaction after pelleting** higher bulk density – very strong trend in South East Asia

Energy Efficiency – kWh/ton savings

Case 1:

Production of pellets WITHOUT particle size requirements, like EN Plus A 1 or others

Lowest ENERGY consumption from Chip to Pellet



Energy consumption*: ca. 74 – 81 kWh/t
(64 – 71 kWh/t with steam)

*For grinding and pelleting only – average figure

Lowest ENERGY consumption from Chip to Pellet

- Energy consumption KAHL Flat Die Pellet Mill:

abt. 50 – 55 kWh/t

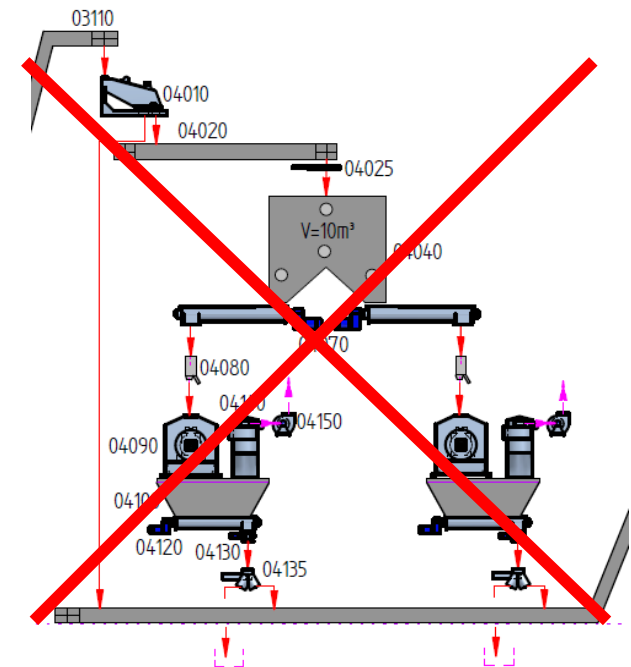
with steam only 40 – 45 kWh/h

What about Grinding?

No I2 pellet standard – no particle size requirements!

NO HAMMERMILL

Minus 25 - 35 kWh/t



4. Dry grinding

KAHL Pan Grinder Mill

Abt 15 kWh/t – wet

= abt. 24 - 26 kWh/t

Pellet based moisture



Lowest ENERGY consumption from Chip to Pellet



Energy consumption*: ca. 74 – 81 kWh/t
(64 – 71 kWh/t with steam)

*For grinding and pelleting only

Extract of reference installation



Börde Pellets Germany



Bio Peleti Croatia



1Heiz Germany

Case 2:

12 standard required, pellets WITH
particle size requirements

From Chip to I2 Standard Pellet

Abt. 40 % of material after wet grinding is suitable for I2 pellet standard

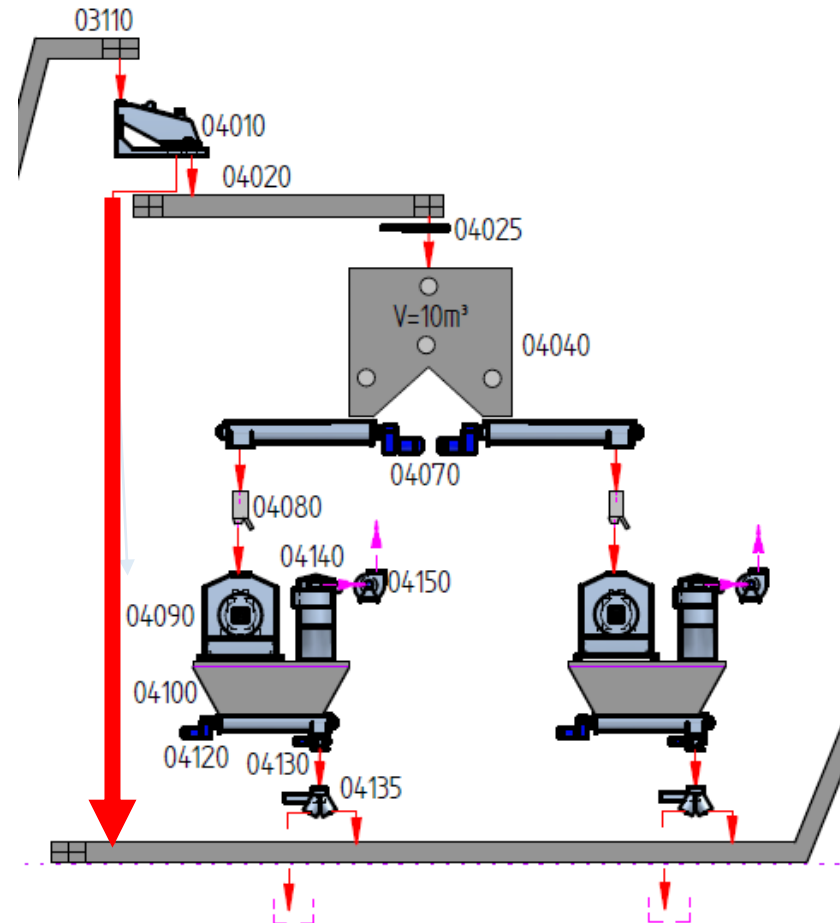
*wood chip grinding with KAHL pan grinder mill – average figure

From Chip to I2 Pellet

Screening off the fine fraction before dry hammer mill

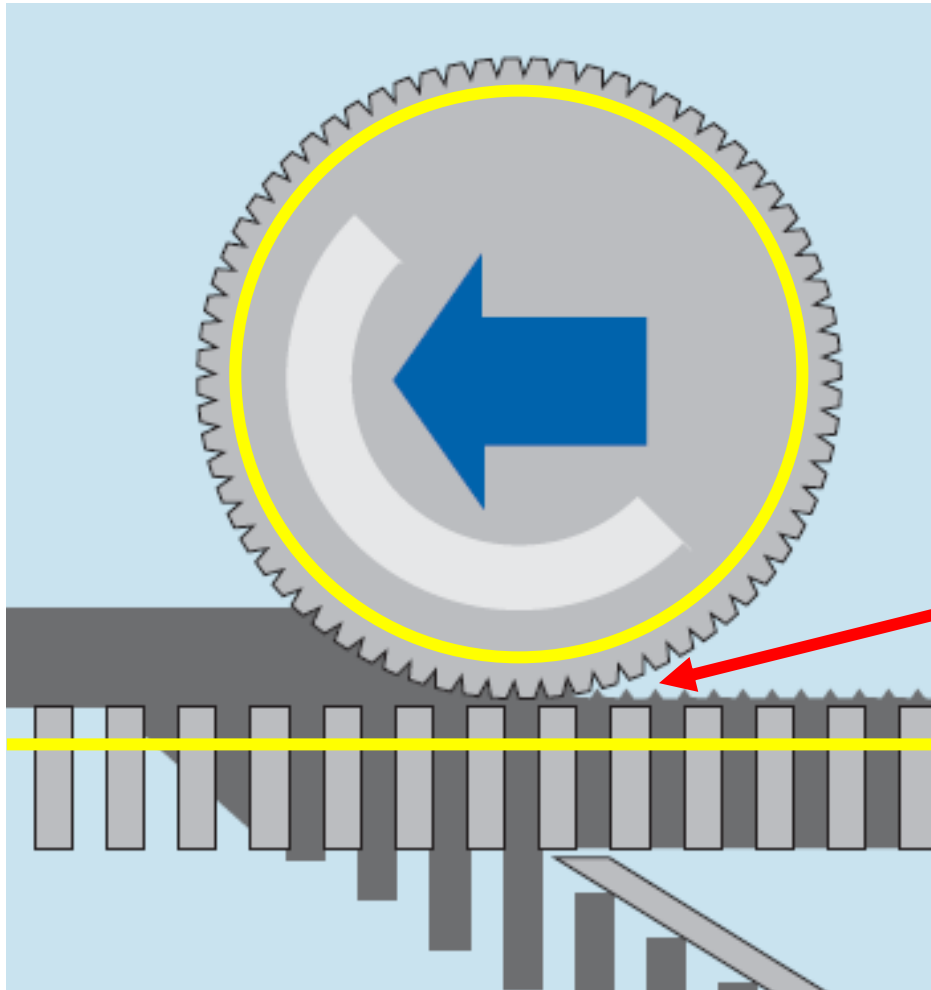
Save 40 % grinding energy!

From 25 – 35 kWh/t
to 15 – 20 kWh/t



Pellet Mill - Operation Reliability

Roller Gap – TO BE KEPT constant over time



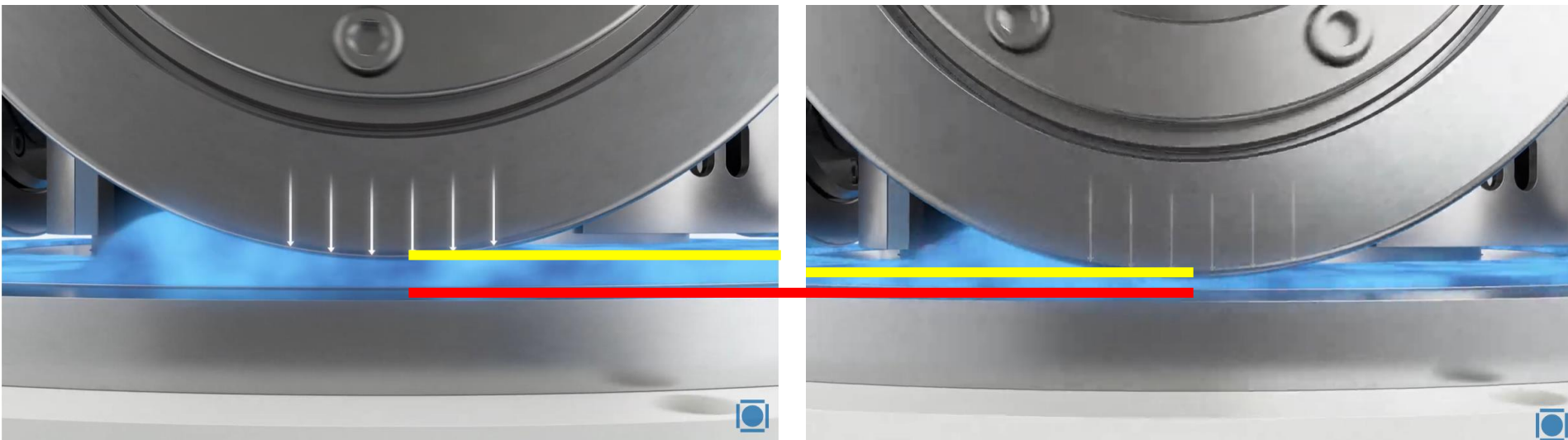
- Rollers are reduced in diameter
- Die becomes thinner

Result:

the roller gap widens

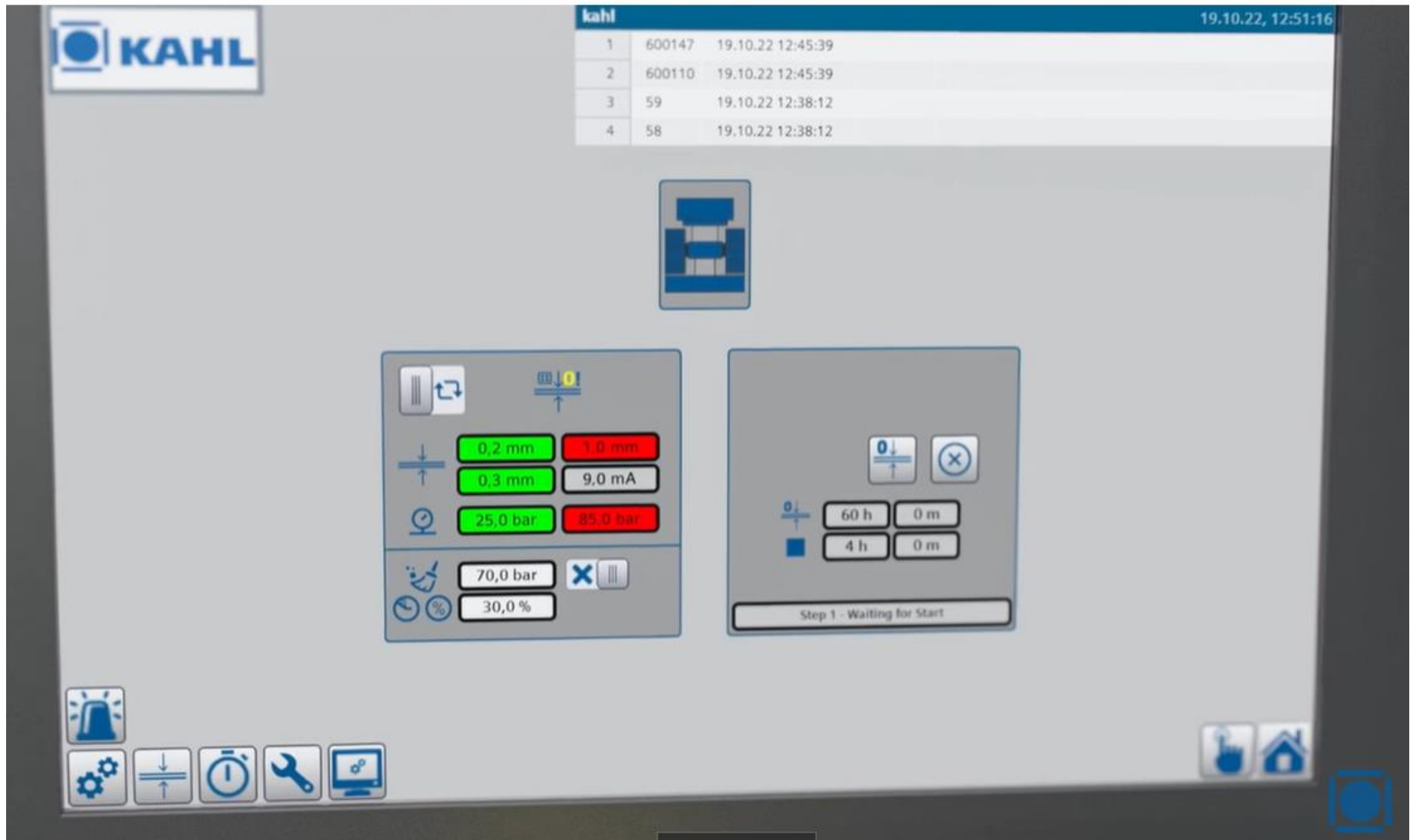
Reduced efficiency

DISTAMAT – Automatic control of roller gap



Self-Taring System with
automatic „ZERO “ calibration
during operation

DISTAMAT – Automatic Control of roller gap



KAHL

19.10.22, 12:51:16

kahl		
1	600147	19.10.22 12:45:39
2	600110	19.10.22 12:45:39
3	59	19.10.22 12:38:12
4	58	19.10.22 12:38:12

Roller Diagram: A schematic diagram of a roller assembly with two rollers and a central gap.

Control Panel (Left):

- Buttons for 0,2 mm (green), 3,0 mm (red), 0,3 mm (green), 9,0 mA (white), 25,0 bar (green), 85,0 bar (red), 70,0 bar (white), 30,0 % (white).
- Icons for a bell, a double arrow, a clock, a wrench, and a computer monitor.

Control Panel (Right):

- Buttons for 0 (white), 60 h (white), 0 m (white), 4 h (white), 0 m (white).
- Icon for a blue square.
- Text: "Step 1 - Waiting for Start"

Bottom Bar:

- Icons for a bell, a double arrow, a clock, a wrench, and a computer monitor.
- Icon for a blue square.
- Icon for a house.
- Icon for a blue square.

KAHL flat die pellet mill – longest resetting Intervalls



For Kahl flat die pellet mill,
depending on ash content, e.g.

North America: up to 150 h

Eastern Europe: up to 500 h

KAHL DISTMAT roller gap control
increases these intervalls further
at least 2 - 3 times

End of Presentation

Summary

- High capacity, high efficiency wood pellet mills, like Kahl 65-1500 / 630 kW with up to 10 - 12 t/h
- NEW KAHL 75-1800 for up to 15 t/h
- Highest Energy Saving Potential in Wood Pelleting
- Production of EN PLUS A1 pellets AND post torrefaction pellets without hammer mill, e.g. with Kahl pan grinder mill and Kahl flat die pellet mill
- Automatic gap control between rollers and die for extended operation time and higher availability and lower energy consumption



THANK YOU
FOR YOUR ATTENTION

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