





HOW ROTOPLASTIC PLACES IT IN THE PANORAMA OF ROTATIONAL MOLDING MACHINES









IN 2019 ROTOPLASTIC BEGAN TO DESIGN AND DESIGN A NEW GENERATION OF MACHINES, THE ADVANTAGE OF STARTING WITH EXPERIENCED TECHNICIANS BUT NO CONSTRAINTS OR DOGMA OF THE PAST HAS ALLOWED US TO DEVELOP A PRODUCT WITH THE MOST MODERN TECHNOLOGIES AND WITHOUT COMPROMISES.

B DEVELOPMENT POINTS







- IMPROVE THE PRODUCTION PROCESS
- REDUCE CONSUMPTION AND EMISSIONS
- PERFORM METICULOUS DATA COLLECTION FOR
 ANALYSIS
- MODERNIZING A MACHINERY SECTOR WITHOUT
 DEVELOPMENT FOR YEARS
- INCREASE PERFORMANCE
- REDUCE THE LEARNING CURVE FOR THE OPERATOR







IN THE PREVIOUS GENERATION, THE MACHINE WAS SEEN WITH A CONCEPT FROM THE 90S WHERE THERE WERE MANY CONTROL DEVICES, MAKING IT DIFFICULT TO LEARN THE MACHINE

Rotoplastic

OUR MACHINE IS DESIGNED TO BE SIMPLE TO USE WITH JUST A FEW CONTROLS TO SPEED UP DAILY USE







IN THE PREVIOUS GENERATION, THE EFFICIENCY NOT IN THE USE OF THE BURNER AND THE COMBUSTION PROCESS WAS LESS THAN **85%**, THE PURPOSE WAS AN ECONOMICAL MACHINE WITHOUT REGARD FOR CONSUMPTION AND THE ENVIRONMENT.

Rotoplastic

THANKS TO AN EXCHANGER SYSTEM AND THE CORRECT USE OF THE BURNER, WE OBTAIN UP TO **98%** EFFICIENCY WITH GREAT ATTENTION TO CONSUMPTION, REDUCED BY **-30%** AND EMISSIONS REDUCED BY **-70%**.









THE DATA IS ONLY SAVED IN THE PLC WITH SPACE LIMITATIONS, TO OBTAIN INFORMATION IT IS REQUIRED TO PURCHASE EXPENSIVE THIRD-PARTY SOFTWARE LICENSES.

Rotoplastic

THANKS TO THE MOST MODERN TECHNOLOGIES, THE DATA ARE AVAILABLE DIRECTLY THROUGH THE INTERFACE **PC**, ALL ON A SIMPLE **SQL DATABASE**.

IN ADDITION, THANKS TO THE **MQTT** PROTOCOL, IT IS POSSIBLE TO MONITOR THE MACHINE REMOTELY.









SLOW MACHINES WITH OUTDATED PROCESS MANAGEMENT AND HIGH PRODUCTION TIMES, POORLY PERFORMING INSULATING MATERIALS, POOR BURNER PERFORMANCE AND ANTIQUATED SOLUTIONS.

Rotoplastic

THANKS TO THE IMPROVEMENT OF INSULATION AND COMBUSTION AS WELL AS THE MODERN AND EXCLUSIVE AIR MANAGEMENT PROCESS, WE ACHIEVE A **40%** HIGHER PRODUCTIVITY.









HOW THE NEW INDUSTRY 5.0 DIRECTIVE CAN HELP US REDUCE EMISSIONS

R THE REVOLUTION OF LOW NOX EMISSION BURNERS







EFFICIENT AND LOW-EMISSION.

PLN IT IS THE ACRONYM FOR PREMIX LOW NOX, A SYSTEM THAT COMBINES PREMIXING WITH SURFACE-STABILIZED COMBUSTION. THIS ENSURES A HOMOGENEOUS GAS-AIR MIXTURE AND RELIABLE IGNITION BEHAVIOR

LOW EMISSIONS COMPLY WITH NOX EMISSION LIMITS WORLDWIDE.

HIGH-EFFICIENCY PERMANENT MAGNET SYNCHRONOUS MOTOR, COMPLETE WITH VSD (COMPLIANT WITH IE5 STANDARDS)





AFTER 2 YEARS OF RESEARCH AND DEVELOPMENT, ROTOPLASTIC PRESENTED THE FIRST BEEX MACHINE WITH AN OPEN HEAT EXCHANGER AND AN ELECTRIC NATURAL GAS HEATING SYSTEM IN APRIL 2023. IT'S TIME TO RELEASE THE CONSUMPTION DATA:

18:00	OVEN TIME
265 °C	K-Paq PEAK TEMPERATURE IN THE OVEN
250 °C	TEMPERATURE SETTING
128 °C	MOULD INTERNAL TEMPERATURE REACHED
155 °C	FINAL MOLD INTERNAL TEMPERATURE REACHED
1,7 m3	TOTAL GAS CONSUMED
<u>22,0</u>	Kw/h (MACHINE TOTAL)
5,6	m3/h MEDIA









Ultra-Low NO_x

NO_x comparison of different burner versions















THE USE OF A NEW FIBERGLASS-BASED INSULATION SYSTEM SPECIALLY MADE FOR OUR FURNACES ALLOWS US TO REDUCE THE DISPERSION OF THE 24% COMPARED TO THE CERAMIC FIBER USED IN THE PREVIOUS GENERATION ROTOPLASTIC AND THE 37% COMPARED TO THE USE OF MINERAL FIBER TRADITIONAL MACHINES ON THE MARKET





THE FOLLOWING PARAMETERS MUST BE MEASURED

- 1. TEMPERATURE OF COMBUSTION PRODUCTS
- 2. COMBUSTION AIR TEMPERATURE
- 3. CONCENTRATION OF OXYGEN, OR ALTERNATIVELY, OF CARBON DIOXIDE IN THE PRODUCTS OF COMBUSTION
- 4. CONCENTRATION OF CARBON MONOXIDE IN COMBUSTION PRODUCTS









IF THE CONCENTRATION OF CO RETURNED TO THE CONDITION OF AIRLESS COMBUSTION PRODUCTS IS GREATER THAN THE **0,1%** (*1000 PPM*) AND CANNOT BE TRACED BELOW THAT VALUE, THE RESULT OF THE COMBUSTION TEST IS TO BE CONSIDERED NEGATIVE, REGARDLESS OF THE MEASURED VALUE OF THE COMBUSTION EFFICIENCY.

THE ALLOWED LIMIT OF **CO2** IN FUMES WITH METHANE FUEL IS **11,7**





AS THE **CO**, OXYGEN **O2** IT IS A COMPONENT OF THE COMBUSTION RESULT, THE WORSE THE COMBUSTION, THE GREATER THE QUANTITIES OF THE TWO GASES IN THE EMISSIONS

BASED ON THE WISHAUPT DOCUMENT: (O2 AND CO2 CONTENT IN FLUE GAS AS A FUNCTION OF AIR COEFFICIENT) THE O2 LIMITS WITH AN AIR COEFFICIENT BETWEEN1,0 and 1,99 THE <u>HIGHER</u> THE COEFFICIENT, THE <u>WORSE</u> THE COMBUSTION AND THEREFORE THE EFFICIENCY OF THE BURNER





R CONSIDERATIONS

WHY THE OLDER GENERATION IS OBSOLETE

EXCESS AIR GREATER THAN **6%** IT IS NEEDED TO MAINTAIN CARBON MONOXIDE (CO) THAT WOULD OTHERWISE EXCEED **200 PPM**. EXCESS AIR REDUCES THE EFFICIENCY OF THE FLAME WHICH WILL HAVE A MUCH LOWER INTERNAL TEMPERATURE, SO IT INCREASES THE GAS CONSUMPTION FOR GENERATING THE SAME CONVERSION ENERGY THE INCREASE IN CONSUMPTION ALSO GENERATES AN INCREASE IN THE NEED FOR GAS WHICH, FOR THE SAME PROCESSING, INCREASES THE QUANTITY OF **CO2** ISSUED AS A PERCENTAGE OF DAILY PRODUCTION





HYBRID GENERATION 2023 ROTOPLASTIC MAXIMUM RESIDUAL OXYGEN FROM COMBUSTION ON AVERAGE **4,6%**

KEEPING EXCESS AIR LOW ALLOWS YOU TO KEEP CARBON MONOXIDE UNDER CONTROL BUT AT THE SAME TIME TO SIGNIFICANTLY INCREASE THE FLAME YIELD AND THEREFORE THE OPTIMIZATION OF CONSUMPTION

Coefficient Maximum emission of Average CO emissions Average NOx emission Average air pressure at Pu



OLD GENERATION MAXIMUM RESIDUAL OXYGEN FROM COMBUSTION ON AVERAGE **6,48%**

EXCESS AIR ABOVE 6% IS REQUIRED TO MAINTAIN CARBON MONOXIDE (CO) WHICH WOULD OTHERWISE EXCEED 200PPM OF EXCESS AIR REDUCES THE EFFICIENCY OF THE FLAME WHICH WILL HAVE A MUCH LOWER INTERNAL TEMPERATURE, THUS INCREASING GAS CONSUMPTION

Coefficient	1,48%	
Maximum emission of		Co2 7,9%
Average CO emissions		33 PPM
Average NOx emission		54,9 PPM
Average air pressure at Pu		13,55 mBar



WITH TRADITIONAL MACHINES, THE DATA ARE READ OVER AN OPEN FLAME, AND THEN DILUTED BY THE PROCESS AIR THAT HITS THE PROBE, THE DATA COLLECTED ARE NOT VERY TRUTHFUL BUT WE WILL STILL USE THE DATA COLLECTED AS A SAMPLE.

WITH THE EXCHANGER CLOSED, THE DATA READ ARE REAL AND PRECISE, IT IS CLEAR THAT:

THE COMBUSTION RATIO IMPROVES FROM **1,48%** TO **1,31%**

CHAMBER PRESSURE INCREASES BY **28%** INCREASING THE MASS OF **1,28%**

THE PROCESS IS MORE EFFICIENT: WE TALK ABOUT IMPROVING THE **12%**

CO EMISSIONS WILL BE REDUCED BY -76% COMPARED TO THE BASE 1,28 SO: AT CONSTANT PRESSURE -83%

CO2 EMISSIONS WILL INCREASE BY 14% COMPARED TO THE BASE 1,28 SO: AT CONSTANT PRESSURE -10%

NOX EMISSIONS WILL BE REDUCED BY **48%** BASED **1,28** SO: AT CONSTANT PRESSURE -70%







TECHNOLOGY

B CONTROL ELECTRONICS







- DRIVES WITH REGENERATION FORGET ABOUT
 BREAKING STRENGTH
- DECENTRALIZED DRIVES FOR MOTOR CONTROL
- PROFINET TECHNOLOGY
- REMOTE SUPPORT WITHOUT ADDITIONAL
 HARDWARE AND LICENSE

B MECHANICAL INNOVATION







- GEARBOX HEAD CHANGED WITH THE BEST MODERN
 TECHNOLOGY
- NO WELDED PARTS ON SHAFTS AND JOINTS
- 3 AIR PASSAGES WITH PTFE SEALS FOR UP TO 10 BAR
- EXTRA LOAD ON THE MARKET
- SPECIAL ARMS FOR EVERY NEED
- ONLY EUROPEAN CERTIFIED STEEL
- PASSAGE OF WATER INSIDE THE ARM







REMOTE CONTROL FOR USING THE UNLOADING AND LOADING STATION

EASY-TO-USE CONTROL PANEL

EXTRA CONTROL PANEL AS PLUG AND PLAY OPTION FOR POST-COOLING AND PRE-OVEN











9. Rotopol Meeting



REMOTE ACCESS TO REAL-TIME PRODUCTION INFORMATION ANYWHERE IN THE WORLD



REMOTE ENERGY DATA AND CONSUMPTION ANALYSIS











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R DIAGNOSTIC DATA



MACHINE DIAGNOSTIC DATA











Lenze

REMOTE DEVICE DIGITAL CONTACTORS FOR MOTORS

BUILT-IN ENERGY SAVING

MOTOR-MOUNTED REMOTE DRIVE INTEGRATED SECURITY LOW ELECTROMAGNETIC EMISSION ENCODER FEEDBACK CONTROL

INTEGRATED ENERGY REGENERATION







ZERO WIRE CONNECTION **REMOTE EVALUATION CONTROL**

IO-LINK SMART SENSORS



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MES INTEGRATED PRODUCTION CONTROL



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FOUR SETTABLE STATES

FOUR SETTABLE STATES TO BE ABLE TO PROGRAM AND BETTER MANAGE PRODUCTION

COLOR CODES FOR DELAYS

PRODUCTION ORDERS THAT ARE LATE ON THE EXPECTED DATE THEY ARE HIGHLIGHTED WITH DIFFERENT COLORS DEPENDING ON THE EXTENT OF THE DELAY

AUTOMATIC COUNTING

PRODUCTION COUNTING TO UPDATE AND TRACK PROGRESS OF THE PRODUCTION ORDER

COMPLETION NOTIFICATIONS

SYSTEM OF NOTIFICATIONS FOR COMPLETION OF PRODUCTION ORDER AND NOTIFICATIONS FOR REACHING THE QUANTITY TO BE PRODUCED FOR A GIVEN MOLD REGARDLESS OF THE PAGE DISPLAYED IN THE OPERATOR PANEL

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TARGET INIZIO	TARGET FINE	DATA INIZIO	DATA FINE	STATO	PROGRESSO
25/08/2024	05/09/2024	06/09/2024 12:28	-	IN PRODUZIONE	0/5 (0.00%)
28/08/2024	08/09/2024	06/09/2024 12:31	-	IN PRODUZIONE	1/5 (20.00%)
22/08/2024	06/09/2024	-	-	IN CODA	0/5 (0.00%)
26/08/2024	06/09/2024	-	-	NUOVO	0/5 (0.00%)
27/08/2024	07/09/2024	-	-	NUOVO	0/5 (0.00%)

ATTENZIONE

L'ORDINE DI PRODUZIONE PROD005 CON CODICE DI RIFERIMENTO REF003 E' STATO COMPLETATO. VUOI CONFERMARE IL SUO COMPLETAMENTO?







9th Rotopol Meeting





IL CONTENUTO INFORMATIVO E TECNICO DI QUESTA PRESENTAZIONE E' DI ESCLUSIVA PROPRIETA' DI ROTOPLASTIC SRL LE NOZIONI INSERITE E LE IMMAGINI NON POSSONO ESSERE RIPRODOTTE SENZA L'ESPRESSA AUTORIZZAZIONE SCRITTA DI ROTOPLASTIC SRL.

