

PILOT COKE OVENS



PILOT COKE OVENS WITH MOVABLE WALL

tool for simulation of carbonization process with oven wall pressure determination

Pilot oven is lab scale device:

- allowing to find out best and safe charge composition from different coals in respect to the coke oven battery, in respect to the final product (coke), in respect to the costs
- used for determination of the quality of coking coal and its behavior during carbonization process and influence on the quality of produced coke.



Quenching car
(from back)

Wet scrubber

Mixing chamber

Calibration system

Wet quenching

Charging / pushing car



Expansion pressure generated by different coking coals is an important attribute which can cause damages of the coke oven wall refractory. Thus knowledge of the coking pressure of respective coal blend is an important variable for coke oven operation especially with reference to significant variability in the composition of coal charging blends.

The principle of the coking pressure measurement in Pilot oven is based on measuring the force generated by expansion of the charge, which is transmitted through the suspended "free-hanging" heating wall onto the load cell mounted on the fixed frame located outside the coking chamber. During the entire coking process the internal gas pressure as well as temperature of the charge is simultaneously measured using a probe which is inserted through the oven door into the coal charge. Results of the measurement are collected and saved in the control system for further processing.

Pilot Oven construction:

- Suspended "free hanging" movable wall
- Sturdy, high load bearing capacity steel structure combined with water cooled anchoring rods
- Special aluminosilica heat resistant refractory with long lifetime
- Service machine with integrated stamping box, charging ram and pushing ram
- Sealed chamber doors
- Electrical heating by Kanthal rods with heating ramp options
- Forced raw gas afterburning system (by natural gas or LPG) followed by wet scrubbing
- Cleaned gas discharge via chimney
- Wet quenching car, manually pulled
- Suction hoods and fan for elimination of charging/pushing emissions
- Automatic control system integrated in power/control free standing cabinet





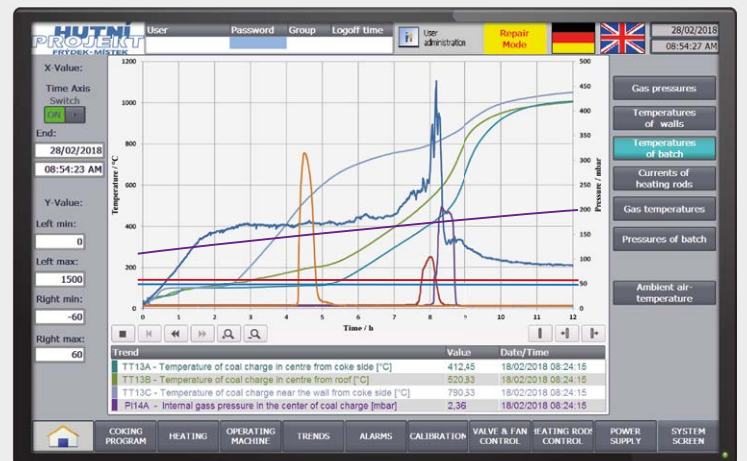
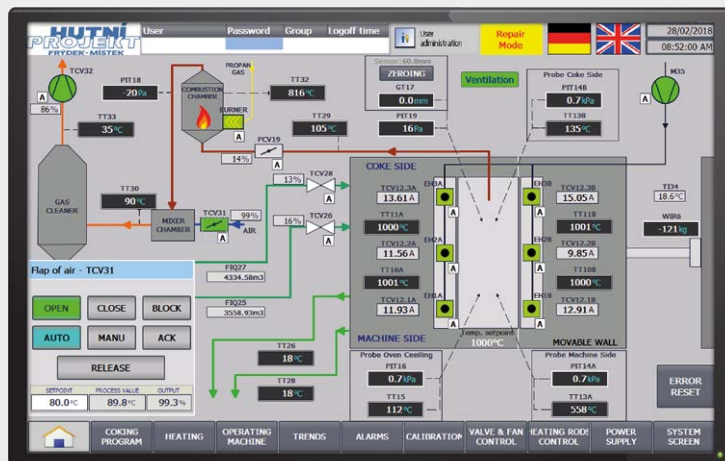
Pilot oven features:

- Continuous pressure measurement on the wall during entire coking process
- Shrinkage measurement from the top of the oven
- Coking temperature measurements during entire coking process
- Internal gas pressure measurement during entire coking process
- Adjustable coking temperature (max. 1200°C) with heating ramp option
- Coking time 8 – 20 hours
- Automatic control of overpressure in chamber
- Two replaceable load cells: 0-40 kPa for coal blends; 0-200 kPa for single coals or highly expandable blends
- IGP probes (0-400 kPa) with simultaneous temperature and internal gas pressure measurement in coal charge in optional insertion spots



Pilot oven Control system:

- Integrated in power/control free floor standing cabinet
- Control system based on PLC Simatic S7-1200
- Colour touchscreen Simatic HMI 1500 Comfort for control of Pilot oven operation and visualization of measured results
- Data storing and displaying
- Data transmission to external PC/network available



OVEN CHAMBER AND COAL CHARGE PARAMETERS

	P060-HP	P0250-HP	P0500-HP
Oven chamber Dimensions W x L x H [mm]	300 x 500 x 670	400 x 1060 x 785	450 x 1200 x 1040
Coal cake Dimensions W x L x H [mm]	280 x 480 x 500	380 x 1040 x 585	430 x 1180 x 840
Coal charge capacity [kg]	60	250	500
Charge bulk density (dry) ^{*)} [kg/m ³]	720 - 1000	720 - 1000	720 - 1000
Kanthal rods temperature (max) [°C]	1300	1300	1300
Heating wall temperature (max) [°C]	1200	1200	1200
Coking temperature [°C]	1050 - 1200	1050 - 1200	1050 - 1200
Temperature in tar seam [°C]	1050	1050	1050

^{*)} as per customer specification; stamp charge operation, simulation of top charge operation available

PILOT OVEN TECHNICAL DATA

	P060-HP	P0250-HP	P0500-HP
Pilot oven dimension W x L x H [mm]	1500 x 4050 x 2800	2100 x 5200 x 3800	2300 x 6000 x 4200
Required minimal area for Pilot oven installation W x L x H [mm]	6000 x 11000 x 5000	10000 x 15000 x 7000	10000 x 15000 x 8000
Max. power consumption [kW]	60	120	160
Natural gas consumption [m ³ /h]	0,4	0,6	0,9

OPTIONS:

Wet quenching box

- closed steel box with opening gate and small chimney
- incorporated water spraying nozzles

Coal charge preparation system

- coal crushing, milling
- coal charge mixing and moisturizing
- coal handling, storing

Coke stabilization

- equipment for coke test (fall test)

Dry quenching car

- dry quenching of coke by nitrogen in air closed dry quenching car available upon request

Pilot oven capacity and oven chamber dimensions

- other Pilot oven capacity as well as different oven chamber dimensions available upon individual request



P060-HP PILOT COKE OVEN installation in Třinecké Železárny a.s.

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