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THE DATABASE OF WASTES AND WASTE INCINERATION OPTIMIZATION

This paper deals with determination of fundamental thermo-chemical properties of combustible industrial wastes and individual components of municipal waste. Values of these parameters essentially influence the course of the combustion process. The research objective is to create the basis for possibility of preparation of energy menu for waste incineration plants and thereby to widely promote energy production from waste.

Рассмотрены вопросы определения базовых термохимических свойств горючих промышленных отходов и отдельных компонентов бытовых отходов. Данные параметров оказывают значительное влияние на протекание процесса горения. Целью исследования явилось создание основы для разработки «энергетического меню» для мусоросжигательных предприятий, которое могло бы способствовать широкому распространению производства энергии из отходов.

According to the valid Waste Act no. 185/2001 [1] is the priority of waste management particularly the minimization of arising waste amount and reduction of its hazardous properties. The waste has to be in preference to utilize before ist disposal. Therefore the combustible wastes containing specific proportion of combustible matter is necessary to energy utilize.

The thermal waste processing is according the above mentioned Act possible to consider as an energy recovery only when the waste after reaching the point of ignition is able to individual burning without usage of supporting fuel. This waste should according the current knowledge show minimun net caloric value 5000 kJ/kg [2, 3]. In the operational practices it will be possible to create conditions for the individual burning in the case, that the optimum waste mixture into combustion furnaces will be created on the base of known properties of individual components, from which the waste batch will be composed. Due to fact that in the literature sources there are not satisfactory amount of information about the properties significantly effected the combustion process it was carried out the research of combustible solid waste properties in the framework of research project [4].

Research of combustible waste properties was focused on the following parameters:

Property	Dimension
Total caloric value	$kJ \cdot kg^{-1}$
Net caloric value	$kJ \cdot kg^{-1}$
Elemental composition (C, H, S, N, O)	% by weight
Point of ignition	°C
Combustible matter, ash and moisture	% by weight
Chlorine contents	% by weight
Adiabatic heat temterature	°C
Flue gas amount (for $n = 1$)	$m^3_N \cdot kg^{-1}$
Flue gas composition (CO_2, SO_2, N_2, H_2O)	% by volume
Combustion air consumption (for $n = 1$)	$m^3_N \cdot kg^{-1}$

Waste sampling and laboratory analysis. It was sampled and analyzed completely 392 samples of solid combustible industrial, agricultural wastes and components of municipal solid wastes for the determination of selected termochemical waste characteristics (see table).

The samples were analysed for above mentioned parameters and so it was obtained almost 8000 new data about thermochemical properties of combustible waste (saved in tables and available in research project workplace) which was not avaible in literature sources before the research project was carried out.

The analysis results are in the conclusion assessed particularly from the point of view of the possibility of energy utilization of each observed combustible waste, from the standpoint of possibilitiy of sulphur oxides creation, and from the standpoint of chlorine contents. Due to great amoun of obtained data these have been saved to electronically operated database.

The database of waste properties. The obtained data about thermochemical properties of solid combustible wastes are serving as an imput data of the programmes for the creation of optimum waste mixtures to the combustion furnaces on the base of knowledge of induvidual components properties of this mixture. To use operatively the great amount of reach data it was necessary to create the suitable database field. Primarily it was created data model and on its base the algorithm for creation of database programme called «The Database of Wastes».

The reach data abouth thermochemical properties of observed waste including protocol about sampling were subsequently loaded into the above mentioned PC programme created in programme language Delphi 6. The user of this programme at first chooses the area of the waste generation and then it is displayed the waste kind, its obtained data and the protocol about waste sampling

Conclusion. The results assessment is realized from the standpoint of energy utilization possibility and from the standpoint of possibility of harmful substances emissions creation during the incineration of such wastes. The assessment of great number of results is mentioned in the report [4].

The «Database of Wastes» contains the results of laboratory analysis and calculated data of 392 samples of solid combustible waste material, whereas for each sample was gained 20 parameters. The database contains almost 8000 new data, which substantionaly extend available data in literature sources. The meaning of the database consist in the simple access to considerable amount of data about thermochemical properties of solid combustible wastes. These data are serving as an imput data of the programmes for the creation of optimum waste mixtures to the combustion furnaces on the base of knowledge of induvidual components properties of this mixture.

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