

## PROVISION OF TRAININGS / INNOVATOR CAMPS

16.06.2020 TERMIZO and Technical University of  
Liberec, Liberec, Czech Republic

Training about energetic use of waste in region for  
students and researchers



### 1. TERMIZO

Incinerator of municipal wastes of  
TERMIZO a.s.

The incinerator of municipal wastes of  
Liberec is a modern plant for energetic  
use of wastes. It is a prime modern  
technological plant with world  
parameters, complying with the strictest  
ecological standards. It is an appreciable  
technologic subject in relation to  
environment. It guarantees environment-  
friendly approach to waste disposal  
thanks to careful compliance with all  
standards, permanent improvement of all  
procedures and implementation of the  
newest scientific knowledge.



The location of the plant for thermal use  
of waste had to be chosen in close connection to the existing heating plant complex that had been built in  
Liberec in the past, in order to use maximally the synergetic effects of production of heat and electricity.

Although the Termizo management is unambiguously convinced that burning of wastes is much more  
considerate of the environment than processing of municipal wastes in other way, it invests funds into  
further improvement of the technology. Termizo initiated and continues the presentations explaining  
environmental favourableness of burning of wastes. The company invests also considerable funds into  
research and development of new methods of cleaning and use of burnt gases.

General Information:

Amount of waste taken in 96 000 tons/ year

Reduction of waste Weighed at 1/3, by volume 1/10

Operation time 8 000 hours/ year

## 2. Ecology

TERMIZO a.s. had had a positive attitude from the very beginning of preparations to the finish of incineration construction, and puts great emphasis on the compliance of operation with all regulations connected with environment. In addition it was important that the incineration plant filled the criteria of the European Union. For this reason the contractor was picked - Consortium company Von Roll (Switzerland) and SIEMENS. These two companies guaranteed the fulfillment of the criteria. Switzerland is considered to be in all aspects of environmental protection one of the most developed states in the world.



To reach an ecological way of disposing waste it is important to choose steps and priorities:

The minimization of the existence of waste using the proper legal steps.

The sorting of waste at the originator.

The recycling of usable raw material, it includes composting of biological waste.

Energetic usage of suited waste as fuel for burning in modern incinerator plants.

Usage of hard remnant materials after burning for eg. in the building industry.

The storage of technical waste, which can't be used in any other way.

In this scheme energetic usage of municipal waste of course finds its place, and this also means the technology of the incinerator. The final technology was chosen in the year 1991 by representatives of cities and regions of Liberec and Jablonec nad Nisou for its own waste management system.

The modern concept of the incinerator in Liberec uses certified steps in the treatment of waste gases and technological sewage and so it is matter of course that it should meet all current Czech and equivalent European limits for released pollutant compounds.

The facility now works reliably on full steam, this means it uses up energy from 96 000 tons of communal waste yearly, from which it produces heating energy and secures the needs of 13 000 households and supplies 3 000 households with electrical energy in the region of Liberec.

It is possible to say, that the modern incinerators for municipal waste have their's own irreplaceable room in the waste economy of a mature state. To stop the rise of waste above all is a definite necessity for example the cultivation of material that is less demanding for production and using a consequential recycling product. This procedure is however very time consuming and expensive. Doubtless every body's behavior is also important, the effort to sort personally produced waste and consideration towards nature can be of great help.

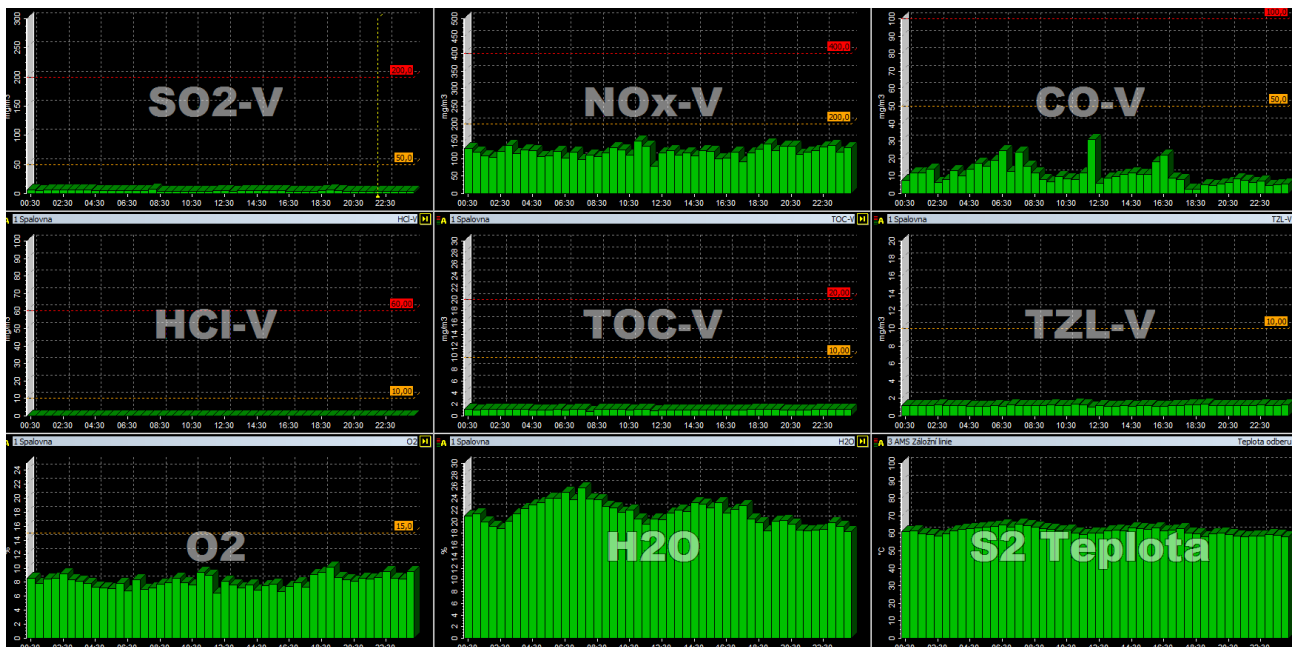
There is no doubt that an arrangement which is able to use 96 000 tons of problematic and difficult to cultivate municipal waste, and which only produces 1.5% of dangerous solid waste (in addition in the form of a less dangerous input waste) can be very useful. The process of energetic waste usage puts out yearly heating energy for 13 000 households, electric energy for 3 000 households in the region of Liberec alone, namely at a high working standard, even during consistent observance of the emission level to the atmosphere, waters and solid product. The municipal waste incinerator of Liberec TERMIZO was designed to fill all regulations and today is topping requirements integrated by the environmental antipollution measures.

### 3. Output of material flow and emissions

Purified waste gases, includes description of the „dioxine“ emission

For optimal course of burning and for the decrease of pollutant substances in waste gases systematic technical measures are used, these have been exemplified here.

To date the course of the incineration plant Termizo a.s. has proved that it is capable of properly cleaning waste gases. The quality of cleaned waste gases is measured both by a continual analytical apparatus, and in law abiding terminology authorized by laboratories which specialize in devices for measurement. The apparatus is attached only during the time of measuring in the stack of the incinerator. From the start of operation the incinerator has reached considerably lower levels of emission than the Czech and European limits.



In terms of execution of the graphical comparison, the outstanding cleaning power of the technology is bolder. In particular we need to take note of the very low emission rate of heavy metals thanks to the installation of the wet waste gas scrubber.

The incinerator of municipal waste replaces here the heat that is produced at its neighboring heating plant Teplárna Liberec. It also significantly reduces emissions with main pollutant gases that are let into the air (above all N-oxides and sulfur oxides). These components are especially dangerous in the city region of Liberec.

## Dioxines

A well-known question to the media is the much discussed emission question “dioxine“ (PCDD/F) from the incineration plant Termizo a.s. Review of the possible effects it could have on the townspeople of the Liberec region we can see the risk factor. The conclusions of the analysis are, that the impact of emitted substance PCDD/F is from the medical point of view completely fractional. The deciding load of PCDD/F is emitted from other larger sources. (Above all the local furnaces).

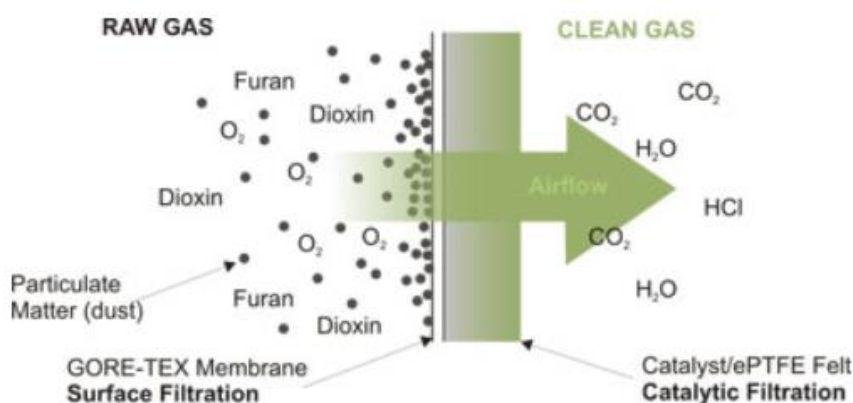
Some information from eco-activist organizations are doubtful and shouldn't be taken into consideration. The issue of cleaning burned gases in modern incinerators are well managed and this is the same for the incineration plant Termizo a.s.

## 4. Deeper look into the process

Lately there has been a meaningful scientific progress in the development of new catalytic methods which eliminate harmful organic substances from waste gases on a filter made from special fabric.

### Gore Tex filter

The principle of this method is systematically shown in the picture. We studied on the site two incinerators in Belgium, each of them has a comparable capacity like the incinerator TERMIZO a.s. In one incinerator there these special catalytic fabric filters work for almost 5 years and input value of emission PCDD/F now reach 30-50% of the requirements. These filters were introduced into the operation of our incinerator in the year 2003. The first results affirmed expectations and less than 50% of the limit of 0.1 ng TEQ was reached.



### Purified processed waters

This water is the product of technological waste water, which occurs during the treatment of waste gases with chemicals (demineralised water, sodium hydroxide) and also in the process of washing. Originated residue is thickened deposit and is later extracted on a filter. The thickened product, otherwise known as a filter cake, is then processed as dangerous waste according to the conditions given by the legislative laws.

Cleaned water is drained into public sewage and together with other sludge is then cleaned in the town sewage disposal plant.

Cleaned water pass through another sewage disposal plant and then finally the waste water is released into a river with a larger current.

#### **Solid waste including solid products used as materials**

A mixture of burnt out slag rising from the boiler and cleaned light ash separated from waste gases. The main portion of solid waste is made up of burnt out slag, rising from its boiler together with cleaned light ash separated from waste gases. This waste does not have dangerous characteristics, but earlier it had to be stored with other waste. In compliance with the regulations of antipollution measures we looked for a way to decrease the quantity of waste produced by this way. To minimize the quantity of produced solid waste a mixture of slag and cleaned light ash was chosen for these reasons:

It has a favorable constitution, which fits to the building industry.

Chemical analysis prove a possibility of achieving the legislative limit.

Burned out scrap metal fits to recycling in smelting works.

Goal directed procreation of engaged purposes concurrently transacted on a variety of levels:

Technological procreation notably increased the quality of ash matter produced (the improvement of quality in the course of burning and the optimalisation related to technical flow, introduction of outgoing intermediate wash with water).

Research has shown evidence of utilization in the building industry.

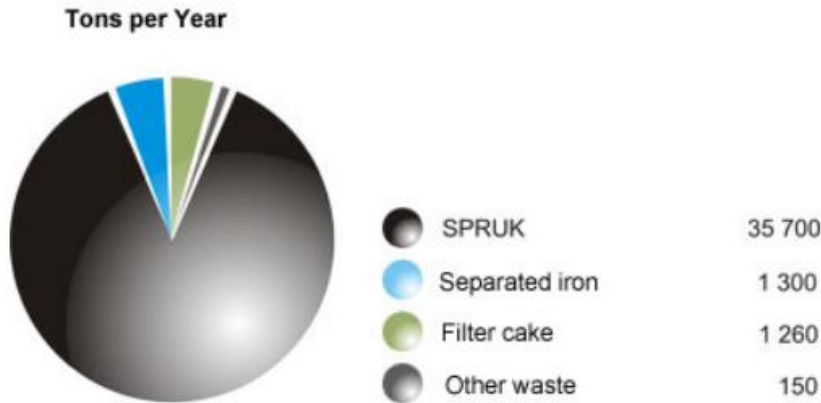
A certification process on the product went ahead according to the law No. 22/1997 Coll. (technical requirements on products).

The running of magnetic separation of steel from mixtures of ash matter was successful.

The whole process was concluded by a conferment certificate No. 040-014253 (Technical and Trial Institute of building Prague, extension 0400 Teplice - Technický a zkušební ústav stavební Praha, pobočka 0400 Teplice) for the product marked "Mixture of ash matter for reclamation and the adjustment of landscapes" (SPRUK). This product embodies similar characteristics as poor concrete. After three days this mixture proceeds to set so that it is fit for constructional building banks and fill.

Therefore there has been a dramatic fall in waste produced in order to produce new products, as indicated on the following graph.

**AMiCE**



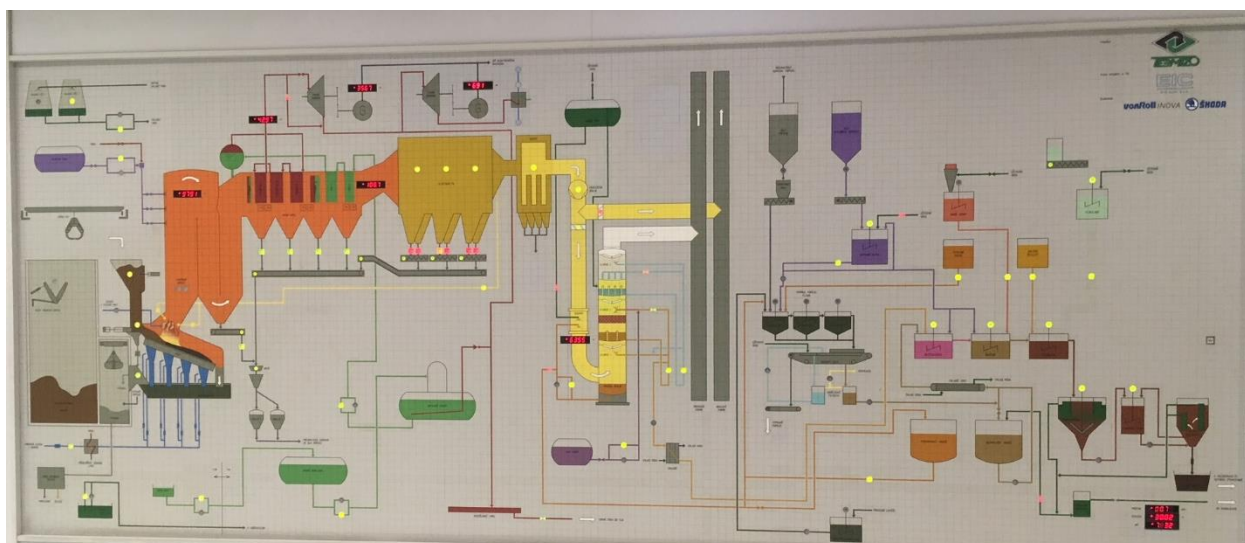
From the graph it is evident to see that it is possible to achieve the decrease of produced waste by approximately 96%. With the application of this project the yearly usage of recultivated material could roughly reach around 36 000 tons as a replacement for raw building materials. Another 1 300 tons of scrap metal could be possibly recycled at smelting works. This array of original technology meets all priorities of environmental antipollution measures, that is, the maximum quantity of waste (if already came into being) can be benefited from and thus save prime natural resources.

#### Filter cake

Another major kind of waste which is produced is the filter cake coming from the cleaning of gases. This originates in the technology of process water cleaning and contains dangerous components which are parts of waste gases (heavy metals, further sulfur dioxide in the form of sulfites and sulfates). This material exit transfer is commissioned to a company that specializes in the overworking of dangerous waste in such a way so that it can be safely put away in a landfill for dangerous waste. In our particular case this waste goes through a solidification process. Here you can find the average composition of the filter cake. It has a dampness of roughly around 70% and besides that it can be utilized to produce zinc, as in Switzerland or as in Germany.

#### Other waste

During periodic cleaning of the boilers and space consequential to the incineration boiler waste like unrefined light ash occurs during the regular dead plate facility breaks. This light ash namely isn't purified by the technology in the incinerating plant. Therefore after overworking into solidified substance, a company that specializes in safeguard dumps and the unloading of dangerous waste puts it away. Surplus waste originates similarly as in any other large businesses. For example waste oil is transferred into material exploitation and recycling, damaged fluorescent tubes, cloth for cleaning and so on. Every sort of dangerous waste is disposed of in accordance to the law and all dangerous waste is given to a competent company for deactivation.



## 5. Impact on the environment

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