

# TRANSPORTABLE / MOBILE INCINERATOR UNITS

**ZANNI GROUP**

## TIU-8G+ 2016

 made  
in  
Germany



### Retrofittable modular system

TIU-8G+: 0 – 250 kg/hr

850/1100 °C



**Incinerators for hazardous materials**  
Safety and reliability with newest technology

**PATENTED  
TECHNOLOGY**

# TRANSPORTABLE / MOBILE INCINERATOR UNITS TIU-8G+ 2016

In the field of combustion technology, we have an extensive know-how, experience and references. We guarantee our customers high availability of **custom made equipment**.

## Incineration of hazardous materials

Incineration is an important procedure for waste treatment.

The critical waste will be burnt in a sterile incineration process and the amount of waste will be reduced that must go to waste landfills.

Especially in the field of clinical waste the transportable incinerators are an active instrument of and for disease control.

Basically there are no alternatives to modern incineration, because since 1 June 2005, the landfilling of untreated waste will be banned in Germany (acc. to TA Municipality Waste), in the European Union (EU) and in many other countries worldwide.

Waste may only go to a waste landfill as slag after its combustion. This reduces the need of landfill space, which is scarce and expensive, since the combustion residues need essentially less space.

Furthermore, during biodegradation processes of the untreated waste in the landfilling site, pollutants will be produced that burden the groundwater, the soil and the surrounding air of the landfill site.



Today, slag and combustion residues of a modern incinerator have a rest part of less than 3% carbon and usually they reduce the volume of garbage by 90 – 95%. Also, the allowable percentage of biodegradable components in landfills has been limited to 3% maximum by the EU Directive 1999/31/EC, to protect the environment.

Therefore, incineration of waste is in the EU Member States and many other countries worldwide a necessity to protect the environment.

## Our transportable solution

The TIU-8G solution can be put anywhere into operation and has an excellent combustion capacity. Capacity up to 250 kg/hr with a very big volume of the incineration chambers.

## PLANT CONCEPT

The whole plant is mounted on container sized frames and consists of four segments, where the basic unit consists of a combustion module with a chimney and supply module (both modules container sized). The plant concept based on durability to reduce maintenance efforts under site conditions which can be difficult for the operators at site.

### The two basic modules combine a stand-alone unit.

It has all necessary auxiliaries on board, like diesel pump and a compressor system. The incinerator can be delivered with a lance spray system for liquids, a power generator and a two-stage filling system (concrete gate valve with feeding hopper) for top loading of the waste as an option.

The refractory lining is based among others on extremely heat-resistant ceramic fiber and a wear-resistant fire concrete. The exact composition and its structure, is a part of protected expertise for high-temperature furnaces. The rigid construction and the easy operability improve the transportable usage under field conditions.

## Basic modules

The basic module consist of a 2 stage incineration module with a chimney and supply module.



*Pictures:*

*2 stage incineration module with front feeding system for batches and concrete gate valve on top with feeding hopper connection.*

*Exhaust outlet incinerator*

*Chimney and supply module*

### The incineration module

Standard execution

- 2 stage incineration module
  - Main combustion chamber up to 850 °C
  - Post combustion chamber up to 1100 °C
- Fix bed system
- Burner system with fuel pump
- Front feeding system with pneumatic actuator (one or two cylinder)
- 3 side doors for de-ashing

Options

- Two stage top filling system
- Lance spray system for liquids

### The chimney and supply module

(container sized)

Standard execution

- Compressor
  - Fan
  - Stack
- (First chimney module can be produced as an arch construction that can be directly mounted to the chimney connection. That is a great help for installation and operating at different sites!)

Option

- Generator

### The incineration process

The basic modules are made for the **THERMAL DESTRUCTION** that combines high temperature, long residence time and high turbulence together with an adequate fuel management system to ensure that hazardous materials are efficiently destroyed.

Hazardous materials, when heated to a very high temperature undergoes predictable physical and chemical changes.

The high temperature, that is over 1000°C prevents the formation of complex organic molecules and breaks down organics into gas. These primary molecules are stable at that temperature.

The oven of our system is capable of burning the waste at a standard temperature of 850 - 1100°C. The more toxic the material, the higher the burning temperature needs to be.

The incineration plant can be extended with two additional modules:

- a) an air cooling system (container size) and
  - b) a filter system (container size) for dust filtering and chemical neutralization due to an adsorption system,
- that combine the following advantages:

**CHEMICAL NEUTRALIZATION** has been done by use of a special additive that must be added to the waste. This is a very effective additive for SO<sub>2</sub>, HCl and HF, heavy metals, dioxins, etc.

**PHYSICAL FILTERING** will be applied by means of a special filter system. The particle removal creates a filter cake, which supports the removal efficiency. Depending on the differential pressure measured across the filter, the parts of the filter elements are cleaned by means of pressurized air impulses.

**ADSORPTION** is a part of the chemical neutralization, e.g. the binding of molecules or particles to a surface will be done by means of feeding the flue gas through an activated carbon mixture (additives NaHCO<sub>3</sub>). In this stage, the flue gas components with color or those that have taste or odor will be bound, so all these may-be-non-toxic-but disturbing gas components will be eliminated and a colorless, odorless flue gas will be emitted to the atmosphere.

As a result above destruction/separation systems in combination care for a very environmental friendly incineration.

## RANGE OF APPLICATION

The TIU-8G solution is suitable for hazardous materials.

## SOLID WASTE incineration

- No grate, absolutely sterile incineration and ash after complete combustion of waste. \*

*\* Depends on the operator at site*

## FEATURES

- Transportable / Mobile solution.
- Excellent combustion capacity with a very big volume of the incineration Chambers. Capacity up to 12 t per day depending on the incinerator type.
- Easy commissioning and easy maintenance.
- Low energy consumption and low operation cost.
- High performance and rapid start up after first commissioning.
- State of the Art means highest technology standards.
- Made in Germany Quality.

## KEY FIGURES (basic modules)

Type of Waste / Suitable for:	Domestic waste and hazardous waste like industrial waste, medical waste, chemical residues that are solid and paste-like up to 30% moisture content.	
Forbidden materials:	Ammunition and other explosives, lightning ammunition, Akkus and Batteries, mercury containing materials, PVC (only smaller amounts per feeding sequence allowed)	
Stiring up of waste:	Manual via the ash hole of the first chamber	
Model:	TIU-8G+	
Waste Capacity:	0 – 250	kg/hr
Calorific value:	1 – 45	MJ/kg
Density:	50 – 1.250	kg/m <sup>3</sup>
Burning temperature:	850/1100	°C
Burner's Thermal Capacity:	2 x 700	kW
Calorific value of waste:	12500	kJ/kg
Weight of basic modules:	18	t ~
Requirements:	Fuel (Diesel), Power (power generator as option available).	





## PROCESS

### Charging of the combustion chamber



Manual feeding and slag extraction.

The feeding will be done manually through a front feeding system with pneumatic actuator (one or two cylinder) side door for the solid wastes.

The ash extraction is done via 3 side doors for de-ashing.

The feeding is controlled by the operator.



### Incineration process and burner control



An automated burner serves for the heating of the combustion chamber subject to the temperature of the fire room. For heating the unit at start up the burner is in operation.

The feed opening should remain closed, as long as the necessary flue gas temperature is not reached. In the post combustion chamber the gas is heated up to a minimum of 1100 °C. The incineration process produces a sterile ash quality.

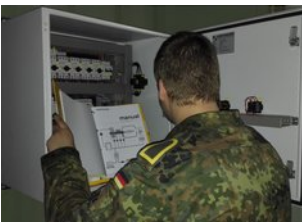
If the incinerator is used as a stand alone unit, the stack module will be mounted to it and the flue gas will be released mixed with fresh air for cooling down the hot flue gas before discharging to the atmosphere from the stack.

### Insulation / lining

The main combustion chamber is lined with a special ceramic fiber, which is surrounded by a concrete sheath. It is specially blended and very wear- and impact-resistant.

The bottom of the post combustion chamber (gas combustion) is lined with a special ceramic fiber, which is surrounded by a concrete sheath. The walls are insulated with a special ceramic fibre, which is heat-resistant up to 1300 °C. This fiber has a special coating as sealing surface that makes it insensitive to dust so that a wear protection is given. Maintenance and repair work are easy to perform.

### Control system



The unit will be furnished with a simple control system that enables easy and safe controlling the system, acc. to the German Electrical Norms and VDI.

### Standards

- Made in Germany
- Design DIN/EN, Control equipment VDE, Documentation DIN EN 746

## THE OPTIONAL modules

### Two-stage filling system

This system consist of a state of the art double gate semi-automatic door that do not allow leakage from inside of the fire room to the outside.

This door system is consisting of two gates: upper gate is a flap system opened and closed pneumatically. The lower gate is a horizontally sliding gate that is also actuated pneumatically. This gate moves into a closed room. If the feeding is done, the waste falling on to the lower gate. If the upper flap closes the lower gate will be slided horizontally and the waste fall down to the fire room. The lower gate is clad with fire resistant special concrete like inside the main combustion chamber.



Picture:  
Optionally a two-stage filling system.

## Environmental friendly cooling module

The optional heat exchanger can be a modular part of the whole incineration system. It will cool the flue gas down to a temperature of averagely 230 °C. The advantage is that this facility do not require water consumption. In contrast to a spray cooling system this facility saves approx. 1-4 tons of water per hour.

Key figures:

- Air cooler.
- Pipes made of carbon and stainless steel.
- Cooling air fan and blow-off pipe for cooling air.
- No water consumption.
- External insulation.
- 20 ' container size frame.

## Additive dosing system

On top of the cooling system near to the discharge side there is the special opening to feed an additive (see plant configuration table, next page). Via this opening an additive can be loaded manually, if needed.

The additive dosing system can be supplied in two types:  
Standard version for manual filling or optionally as an automated filling system.

The additive (NaHCO<sub>3</sub>) is needed if chemical substances like PVC, plastics, etc. shall be incinerated because that can cause emissions of dioxins and furans or heavy metals. The activated carbon added to the additive ensures that the flue gas will not have any color and odour.

## High temperature resistant filter module

This filter system can be a modular part of the whole incineration system. It can be connected to the outlet of the air-cooling module and filter the flue gas of the whole system.

Key figures:

- Filter with ceramic filter candles.
- Maximum temperature resistance 350 ° C.
- Dust discharge with a screw conveyor system.
- Induced draft fan.
- External insulation.
- 20 ' container size frame.

The filter system ensures cleaning of the flue gas from fly ash and all emissions, color and odor by means of the additive that is added from top of the cooling module above.

## Continuous Exhaust Gas Monitoring (CEGM) System

Envisaged analyses could be: HCL, CL<sub>2</sub>, NOX, SOX, CO and TOC.

The operation frequency can be either continuous operation or activation at a predefined frequency or upon demand. The CEGM system will be installed in the Chimney and Supply module.

## Diesel tank

PE combined 1000 VS  
Volume 1000 l.

Including:

- 10m fuel hose with fuel lance and foot valve
- Optical level indicator
- Content indicator
- Vent hood.

Please note: Transportable / Mobile Incinerator Units are special designs. Technical alterations reserved !

**PLANT CONFIGURATION****TIU-8G+****INCINERATION MODULE**

Capacity	0 – 250 kg/hr
Burning temperature (standard)	850 / 1100 °C
Max. Burning temperature (option)	950 / 1300 °C
Diesel burner system	standard
NG burner system	option
Manual feeding	standard
Manual slag extraction	standard
Steel tray for the protection of the fire concrete as a recommended wear part. Will prevent damages of chemical reactions by infiltration.	option
Liquid waste lance spray system	option
Type of Waste / Suitable for	
Domestic waste and hazardous waste like industrial waste, medical waste, chemical residues that are solid and paste-like up to 30% moisture content.	standard
Ammunition and other explosives, lightning ammunition, Akkus and Batteries, mercury containing materials, PVC (only smaller amounts per feeding sequence allowed)	forbidden

**COOLING MODULE**

Environmental friendly Air Cooling System	option
- Air cooler.	
- Pipes made of carbon and stainless steel.	
- Cooling air fan and blow-off pipe for cooling air.	
- No water consumption.	
- External insulation.	

**FLUE GAS CLEANING MODULE**

High temperature resistant flue gas cleaning system	option
- Filter with ceramic filter candles.	
- Maximum temperature resistance 350 ° C.	
- Dust discharge with a screw conveyor system.	
- Induced draft fan.	
- External insulation.	
Additive dosing system, manual	option
Additive dosing system, automatic	option

**CHIMNEY AND SUPPLY MODULE**

Compressor	standard
Fan (3-Ph/400V)	standard
Chimney with a standard height from ground +5,6 m	standard
Generator (3-Ph/400V)	option
Control box	standard
Continuous Exhaust Gas Monitoring System CEGM (Continuous Exhaust Gas Monitoring) System Envisaged analyses could be Chlorides (Hcl, Cl2), NOx, SO2 as Sox, Carbons as TOC, CO and TSP (total suspended particles) etc.	option
Diesel tank PE combined 1000 VS Volume 1000 l	option

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