HOW CHARTHERM WORKS?

The "Chartherm Process" is basically a "wood waste recycling system", able to operate with every contaminated wood waste, whatever be the kind of toxic contaminating the wood and the concentration level of these contaminants. This means "Chartherm Process" is able to recycle wood even if it is contaminated with different toxins at the same time, like a painted CCA and Creosote treated wood piece.

"Chartherm Process" is a wood waste recycling system which doesn’t need a previous sorting to classify the wood by type of contamination. It does not either requires a previous withdraw of the eventual metallic inclusion the wood may hold.

Three steps complete the Chartherm process:
- Wood crushing
- Thermal treatment
- Separation.

1. THE CRUSHING

We have developed our own crusher to be able to work with all kinds of wood, whatever be their length or hardness, even if they include small metallic parts like bolts, screws or small metal plates. In only one step, the crusher reduces the wood from its original size to two inch long splinters, able to be introduced in the thermal processor.

2. THE THERMAL PROCESS

Casting from a heat generator, hot gases (1700°C), with a low oxygen content (<1.5%), are continuously injected through a grid at the bottom of a thermal reactor column, full of crushed wood.

By struggling the exit of the gases at the top of the reactor column, a decreasing stratified gradient of pressures and temperatures is obtained from bottom to top of that column.

The different pressure from the top to the bottom of the columns being maintained, the heat exchange being done at the bottom of the column, the temperature at the top of the column is always below 65°C.

The thermal choc produced by the contact of hot gases on to the crushed wood, at the bottom of the columns, breaks the hydrogen bonds, which dissociates groups of organic molecules and causes the expropriation of the organic of the wood. These mix of gases and vapors of organic molecular groups are pushed up thru the columns, where the crushed wood cools them and provokes their condensation.

When all the organics are evaporated from the mineral matrix of the wood, it only remains at the bottom of the columns, a mineral residue with a high content of carbon (95 to 99%), which holds all the other minerals present in the wood at the beginning of the process, including heavy metals and other toxic minerals.

This mineral residue is recuperated thru a grid at the bottom of the columns, as the top of the columns is refilled with more crushed wood.

No progressing in its way down into the columns, the crushed wood heats and part of the organics, already condensed on it, crack and recondense to condense again at a higher step in the column. This phenomenon is repeated and repeated again until the organics become so light they do not condense again and make their way up to the top of the columns through why, only the lighter organic gases, with a high content of hydrocarbons, can reach the top of the column.

From the top of the columns the hydrocarbon gases are dried and sent back to the heat generator. That way the wood generates enough hydrocarbon gases to maintain the system in auto-combustion.

3. THE SEPARATION STEP

The clean charcoal is packed into airtight big-bags of 800 kg, while the other minerals are put into metallic drums.

Charcoal output
Hot gas input
Coal extractor and conveyor
8. Compressor
6. Venting drum
10. Coal extractor and conveyor
9. Fumes washer and chimney
7. Burner
6. Hot gas generator
5. Reactor
3. Shreded wood silo
2. Crusher
1. Chain conveyor

Extraction - Separation
11. Pendular roller mill
12. Pneumatic centrifuge
13. Carbon collector
14. Carbon storage
15. Minerals
16. Heavy metals conditioning