

# The Development of RDF Technology

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R & D Center

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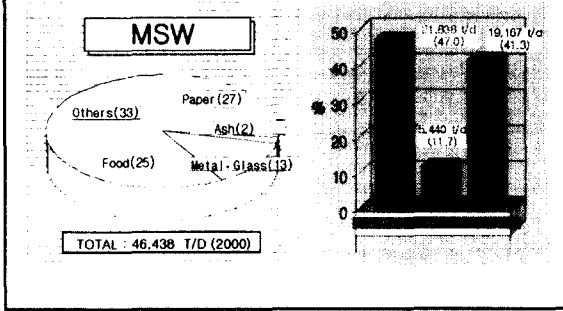
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## 1. Waste Generation & Management



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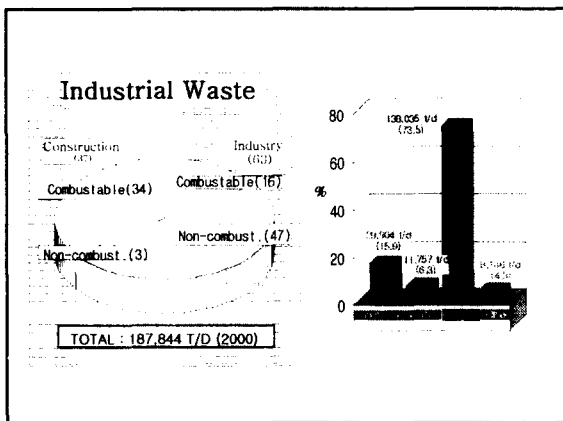
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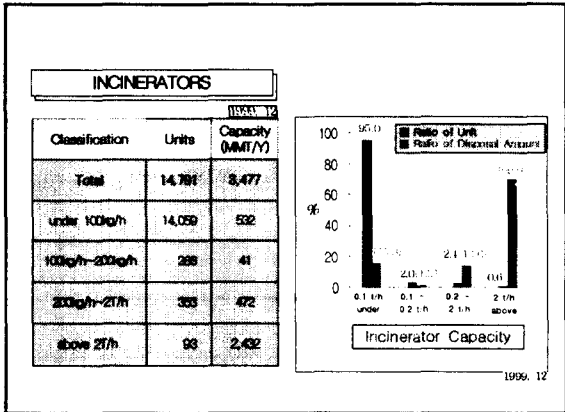
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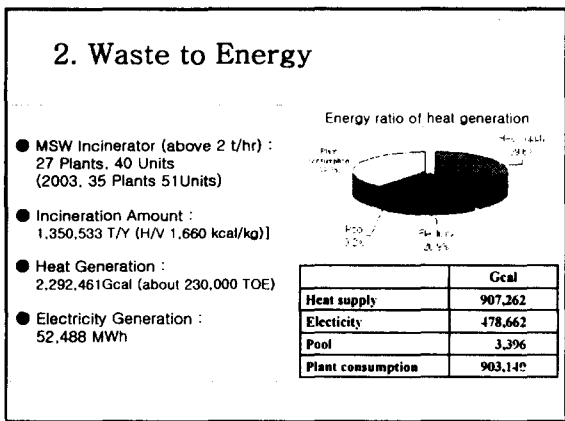
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## 3. Definition of RDF

- RDF : Refused Derived Fuel
  - fuel that is produced from solid waste that can be used as a primary or supplementary fuel in conjunction with or in place of fossil fuels. It can be in the form of raw (unprocessed) solid waste, shredded (or pulped) and classified solid waste, gas or oil derived from pyrolyzed solid waste, or gas derived from the biodegradation of solid waste.
  - product of a mixed waste processing system in which certain recyclable and non-combustible materials are removed, and the remaining combustible material is converted for use as a fuel to create energy.
- RPF : Refuse Paper & Plastic Fuel

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❖ RDF Shape




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❖ RDF Classification

Type	Description	Remarks
RDF-1	Wastes used as fuel in as-discarded form with only bulky wastes removed.	-
RDF-2	Wastes processed to coarse particle size - 95 % passing 6 inch square screening, with or without ferrous metal separation.	Final RDF
RDF-3	Combustible waste fraction processed to particle sizes - 95 % passing 2 inch square screening.	
RDF-4	Combustible waste fraction processed into powder form - 95 % passing 10 mesh screening.	Powder RDF
RDF-5	Combustible waste fraction densified (compressed) into the form of pellets, slugs, cubettes or briquettes.	Densified RDF
RDF-6	Combustible waste fraction processed into liquid fuel.	
RDF-7	Combustible waste fraction processed into gaseous fuel.	

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❖ Status of RDF Specification in Japan

- RDF Definition : Densified Refuse Derived Fuel
- Analysis : JIS and TR
- Raw Material : Waste from households and Industry
- Dimension : 5~50 mm Dia. X 10~100 mmL
- Quality :
  - Heating Value : above 12,500 kJ/kg
  - Moisture : under 10 %
  - Ash : under 20 %
  - Heavy metals and Others : very small

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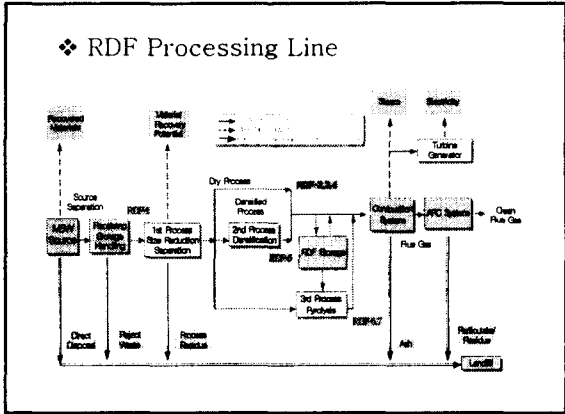
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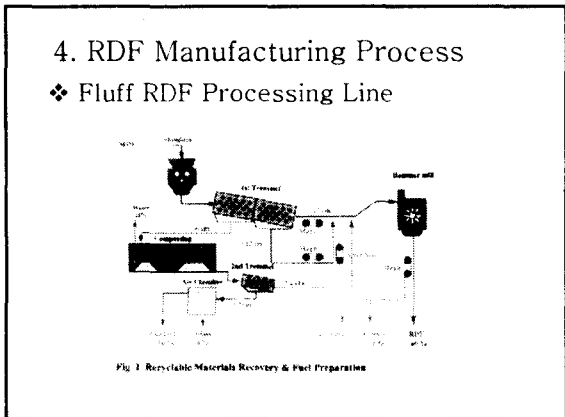
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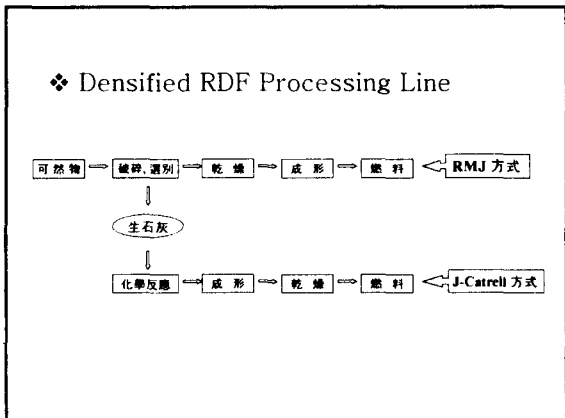
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## 5. Advantages as Energy Source





Items	RDF	MSW
Moisture (%)	9.8	40.0
Ash (%)	10.0	14.0
Volatiles (%)	76.4	46.0
H.V. (kcal/kg)	3,880 - 4,750	800 - 2,000
Apparent Density (kg/m <sup>3</sup> )	518	150 - 300
SpGr (g/cm <sup>3</sup> )	0.98	-
Dimension (mm)	Ø20 x 150 - 100	-

\* RDF from MWM by Korean K company.

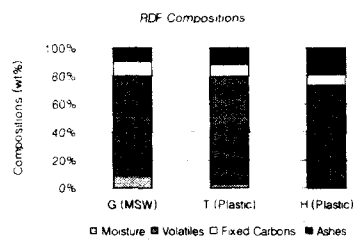
### Characteristics of RDF

○ Decomposition ○ Transport ○ Storage ○ Combustion ○ Flue Gas

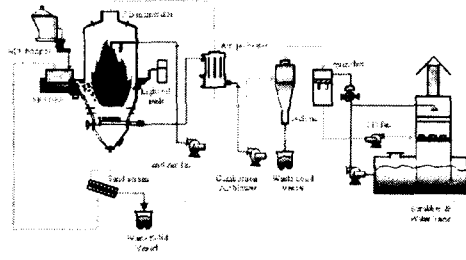
### ❖ Characteristics of Domestic RDF

				
	G	K	T	H
Shape	Cylindrical	Cylindrical	Rectangular	Rectangular
Dimension	20 mm	15 mm	30 x 40 mm	30 x 40 mm
H.V. (kcal/kg)	4,330	5,860	6,150	5,140
Features	-MSW -Under test -Boiler -Cement kiln	-Landfill waste -Under test -Boiler -Cement kiln	-Plastic waste -Under test -Cement kiln -Small boiler	-MSW -Under test -Cement kiln -Small boiler

### ❖ Compositions of Domestic RDF



## 6. Experimental Combustion for RDF




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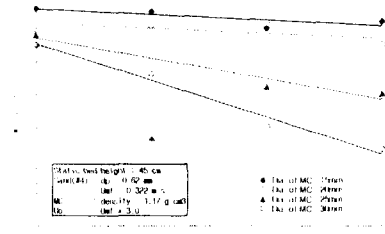
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### ❖ Mixing test between RDF and Sand




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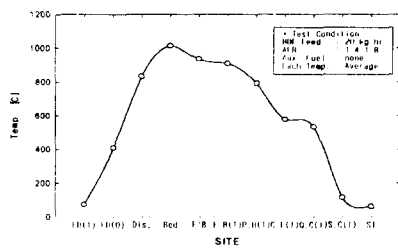
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### ❖ Temperature Profiles in FBC Pilot




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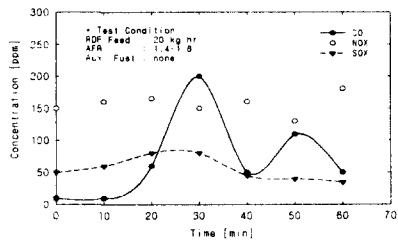
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### ❖ Air Pollutants in Flue Gas



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## 6. Conclusions

1. In 2000, the 46 thousands t/d of the municipal solid waste and the 166 thousands t/d of the industrial solid waste were generated. And we need to incinerate with the production of ENERGY in order to solve the shortage of the landfill and secure the renewal energy.
2. The municipal solid waste can be transformed into RDF that can be handled (transportation, temporarily storage, combustion) more readily than municipal solid waste itself.
3. It is a necessary to standardize the RDF in order to spread its usage.
4. The FBC is an attractive technology to incinerate the RDF because it can operate at lower excess air condition, stable combustion and lower air pollutants.

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