



BỘ TÀI NGUYÊN VÀ MÔI TRƯỜNG

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT OF THE SOCIALIST REPUBLIC OF VIETNAM

POLICIES AND LAW ON WASTE CO-PROCESSING IN VIETNAMESE CEMENT INDUSTRY AND THE ORIENTATION

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- 2. Current status of hazardous waste co-processing in Vietnam**
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1. REGULATIONS (1)

Law on Environmental Protection 2020

- *Waste co-processing*: Means the utilization of one available manufacturing process for the purpose of recycling, treating or recovering energy from waste in which waste is used as alternative raw material and fuel or is processed.
- The State adopts policies to encourage waste co-processing, using waste as raw materials, fuel and alternative materials; encourage co-processing of domestic solid waste.

Decree No. 08/2022/NĐ-CP:

- Waste treatment service provider means an establishment that conducts waste treatment activities (including recycling and co-processing) for households, individuals, agencies, organizations, production, business and service establishments, concentrated production, business and service zones, industrial clusters.



1. REGULATIONS (2)

Clause 3, Article 84 of Law on Environmental Protection 2020:
Every hazardous waste treatment service provider must satisfy the following requirements:

- The national environmental protection planning or planning containing contents regarding hazardous waste treatment is conformed to, except for the case of hazardous waste co-processing;
- Safe environmental distance is maintained as prescribed;
- It is required to appraise and comment on the hazardous waste treatment technology in accordance with regulations of law on technology transfer; the application of environmentally-friendly technologies, best available techniques and combined waste treatment and waste-to-energy technologies is encouraged.



1. REGULATIONS (3)

Law on Environmental Protection 2020 and Decree No. 08/2022/NĐ-CP: Organizations and individuals that generate ordinary industrial solid wastes and hazardous wastes may recycle, treat, co-processing and recover energy by themselves when meeting the requirements:

- Implementation of technology, environmental protection works, production equipment available in the premises of the waste-generating facility and must meet the requirements for environmental protection as prescribed;
- Must be consistent with the decision approving the appraisal results of environmental impact assessment reports and environmental permits.



1. REGULATIONS - QCVN 41:2011/BTNMT (1)

Regulation of maximum allowable concentration in cement kiln flue gas when co-processing HW:

No	Parameter	Concentration C (mg/Nm ³)
1	TSS	100
2	CO	500
3	NO _x (calculated according to NO ₂)	1.000
4	SO ₂	500

No	Parameter	Unit	Maximum allowable concentration
1	HF	mg/Nm ³	5
2	HCl	mg/Nm ³	50
3	Mercury and compounds, calculated according to Hg	mg/Nm ³	0,55
4	Cadimi and compounds, calculated according to Cd	mg/Nm ³	0,16
5	Total other heavy metals: As, Sb, Ni, Co, Cu, Cr, Pb, V, Sn, Mn, Tl, Zn	mg/Nm ³	2
6	Total Dioxin/Furan (PCDD/PCDF)	ng-TEQ/Nm ³	0,6



1. REGULATIONS - QCVN 41:2011/BTNMT (2)

Regulations on loading points for different types of hazardous waste:

- Do not load waste containing halogens into the preheat or precalcification unit;
- Do not load organic waste (hazardous and common) into the preheater; HW in liquid form such as wastewater must use the filling nozzle.;
- Non-volatile hazardous waste (solid, liquid, slurry) is mixed with raw materials and additives to be supplied through the normal feed line;
- HW containing organic halogen components exceeding the hazardous waste threshold according to QCVN 07: 2009/BTNMT or volatile organic compounds must be loaded into the main burner area at the end of the kiln..



1. REGULATIONS - QCVN 41:2011/BTNMT (3)

Hazardous wastes that are not co-treated in cement kilns:

- Infectious or mercury-containing wastes from the medical and veterinary industries;
- Waste containing asbestos;
- Electrical and electronic equipment that has not been classified or dismantled;
- Explosive waste; radioactive waste; and other wastes of unknown composition or not yet identified and classified.



1. REGULATIONS - QCVN 41:2011/BTNMT (4)

Limit values for different types of hazardous waste when put into co-processing.

Parameter	Unit	Limit value
pH	-	4-12
Cl	%	≤ 3
S	%	≤ 3
F	%	≤ 1
PCB	ppm	≤ 500
As	ppm	≤ 100
Cr	ppm	≤ 1.000
Cu	ppm	≤ 1.000
Hg	ppm	≤ 30
Pb	ppm	≤ 1.000
Sb	ppm	≤ 1.000
Tl	ppm	≤ 50
Zn	ppm	≤ 15.000



2. CURRENT SITUATION IN VIETNAM (1)

117 licensed hazardous waste treatment facilities, including 3 co-processing units in cement kilns, some other co-processing units

- Siam City Cement Vietnam Co., Ltd: Holcim Hon Chong Cement Factory, Binh An Commune, Kien Luong District, Kien Giang Province, with a capacity of about 230 thousand tons of hazardous waste co-treatment per year;
- Thanh Cong Group Joint Stock Company: Hiep Son commune, Kinh Mon district, Hai Duong province, with a capacity of about 190 thousand tons of hazardous waste co-treatment;
- Nghi Son Cement Company: Hai Thuong commune, Tinh Gia district, Thanh Hoa province: operating area in the province.



2. CURRENT SITUATION IN VIETNAM (2)

- VICEM Ha Tien Cement Joint Stock Company: (co-processing of common waste; phase 2 will co-processing hazardous waste)
 - Binh Phuoc Cement company,
 - Kien Luong Cement company
- Some companies are in the process of getting a License:
 - Vicem But Son Cement Joint Stock Company in Thanh Son commune, Kim Bang district, Ha Nam province;
 - Fico Tay Ninh company;
 - Some other companies.



2. CURRENT SITUATION IN VIETNAM (3)

Technology and exhaust gas treatment system are currently not unified:

- **Technology:** Some units manufacture an additional combustion unit (similar to the primary combustion chamber of an incinerator, some improve the supply system, feed directly into the cement kiln)
- *Exhaust gas treatment system:*
 - With or without NO_x gas handling system (usually SNCR);
 - Dust filter (cloth bag or static electricity).



3. Points to note when deploying (1)

Regulations:

- Determine whether to be subject to adjustment of investment policy or investment certificate: subject to EIA report;
- Having opinions or appraisals on technology according to the Law on Technology Transfer;
- Not under the planning on waste treatment (compliance with the planning of the cement industry);
- Additional means of transport if appropriate, ensure business.



3. Points to note when deploying (2)

Technique:

- Clarifying the ratio of waste feeding compare to the capacity or raw materials and fuel;
- The quality control of input waste to meet the regulations of QCVN 41: 2011/BTNMT;
- The process of receiving, storing, sorting, mixing, pre-treatment before co-processing needs to be synchronized and unified.;
- Prevention, response, and remediation the incidents related to the co-processing.



4. Orientation in the future

Revise QCVN 41: 2011/BTNMT, including:

- Promulgating general waste co-treatment standards (including general waste, plastic waste, etc.);
- Promulgating specific and uniform regulations for the exhaust gas treatment system in cement kilns: there is a NO_x reduction stage.;
- Regulating the maximum ratio of waste feeds into the co-processing compared to the input capacity or raw materials and fuel;
- More specific requirements about
 - Quality control of input waste;
 - The process of receiving, storing, sorting, mixing, pre-treatment before co-processing needs to be synchronized and unified.



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THANK YOU FOR YOUR ATTENTION!