



## Development of activated carbon auto-regeneration system for water treatment filtration

Sang-Hoon Lee<sup>a</sup>, Dae-Young Kwon<sup>b,\*</sup>

<sup>a</sup>Wintec Glovis Co. Ltd, 150 Jojeong-daero, Hanam-si, Gyeonggi-do, Korea, email: [winpat@naver.com](mailto:winpat@naver.com)

<sup>b</sup>Department of Civil & Urban Engineering, Inje University, 607 Eobang-dong, Gimhae 621-749, Gyeongnam, Korea, email: [dykwon@inje.ac.kr](mailto:dykwon@inje.ac.kr)

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### ABSTRACT

Activated carbon facilities for water treatment should be regenerated or changed because their adsorption capacities decrease with the passage of operating time. A novel system of activated carbon auto-regeneration system for water treatment filtration (ARWF), which has been recently developed, is capable of both operations of adsorption treatment and activated carbon regeneration simultaneously. Upon the adsorption, capacity of activated carbon has decreased to a certain level, the process of regeneration starts automatically. Regenerating process is operated by boiler, line heater, and spray which are located at nozzle pipe inside column. The process uses a super-heated steam of which temperature is 400–600°C. Steam of 100–110°C is generated by steam boiler and then super-heated steam of 400–600°C is created by line heater. Super-heated steam is sprayed with activated carbon through spray nozzle pipe. A series of experiments were performed to evaluate the ARWF on the capacity of regeneration. The result showed that the ARWF was able to regenerate a used activated carbon almost same (98%) as a new carbon in terms of iodine adsorption. The values of iodine adsorption for original and 10 times regenerated carbons were 1,074 and 1,046 mg/g, respectively. In the removal of COD and BOD, the removal rate of new activated carbon was 80%, which was 5–10% higher than that of the first and second regenerated ones. The chromaticity and turbidity removal rate was higher in the regenerated carbon than in the new carbon.

*Keywords:* Activated carbon; Regeneration; Adsorption capacity; Super-heated steam; Iodine adsorption capacity

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\*Corresponding author.

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