

Module 10 Infrared Drying

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❖ Introduction

❖ Basic principle

❖ Industrial Infrared drying applications

- Applications of Infrared radiations in Industry
- Industrial Infrared Dryers
 - ✓ Infrared Sections
 - ✓ Design of Infrared Dryers

Advantages of IR drying

1. High efficiency to convert electrical energy into heat for electrical IR.
2. Radiation penetrates directly into the product without heating the surroundings.
3. Uniform heating of the product.
4. Easy to program and manipulate the heating cycle for different products and to be adapted to changing conditions.
5. Leveling of the moisture profiles in the product and low product deterioration.
6. Ease of control.
7. IR sources are inexpensive compared to dielectric and microwave sources; have a long service life and low maintenance.
8. Directional characteristics that allow to dry selected parts of large objects.
9. Occupies little space and may easily be adapted to previously installed conventional dryers.
10. Low-cost technology.

Disadvantages

1. Scaling up of the heaters is not always straightforward.
2. Essentially surface dryers. Nevertheless, a great effort is done to improve this technology in order to adapt it to drying thick materials with successful results.
3. The testing of the equipment must be carried out in the plant to assure a successful design.
4. Potential fire hazards must be considered in design and operation.

Application of Infrared

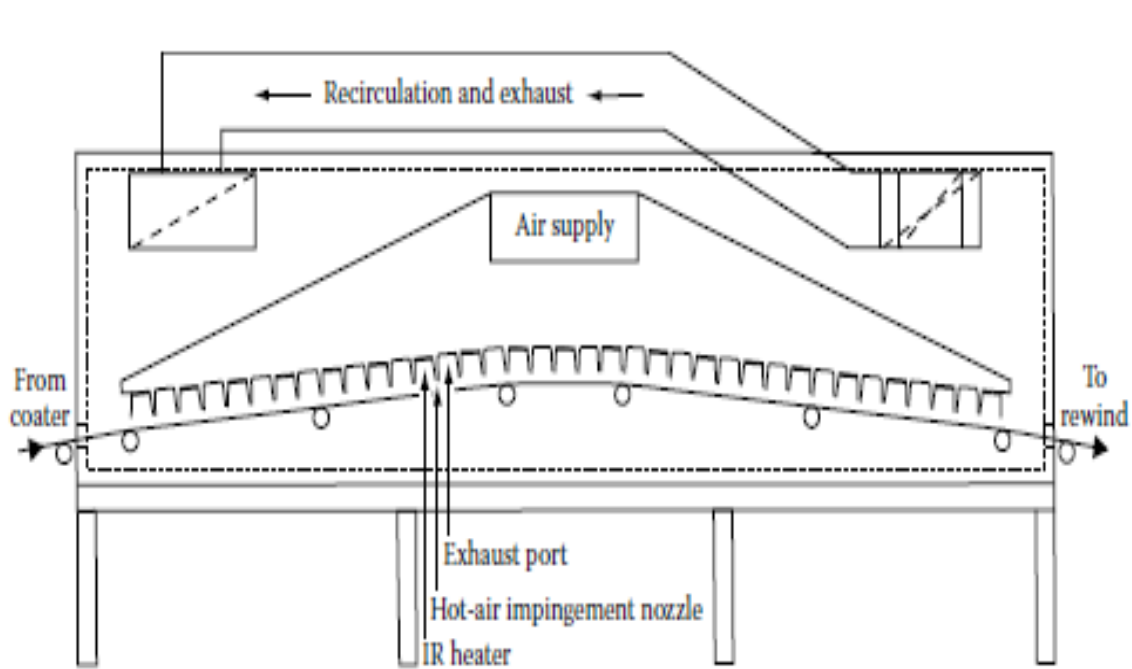
Radiation in Industry

Industrial Infrared dryers

Infrared sections

Design of Infrared dryers

- Although an IR dryer can be built using an existing convective dryer by putting in the appropriate number of radiators over the product to be dried so as to direct the radiation on it, this technology is under improvement and combinations of dryers have appeared in the market. As examples of these trends and applications.



Impingement IR dryer

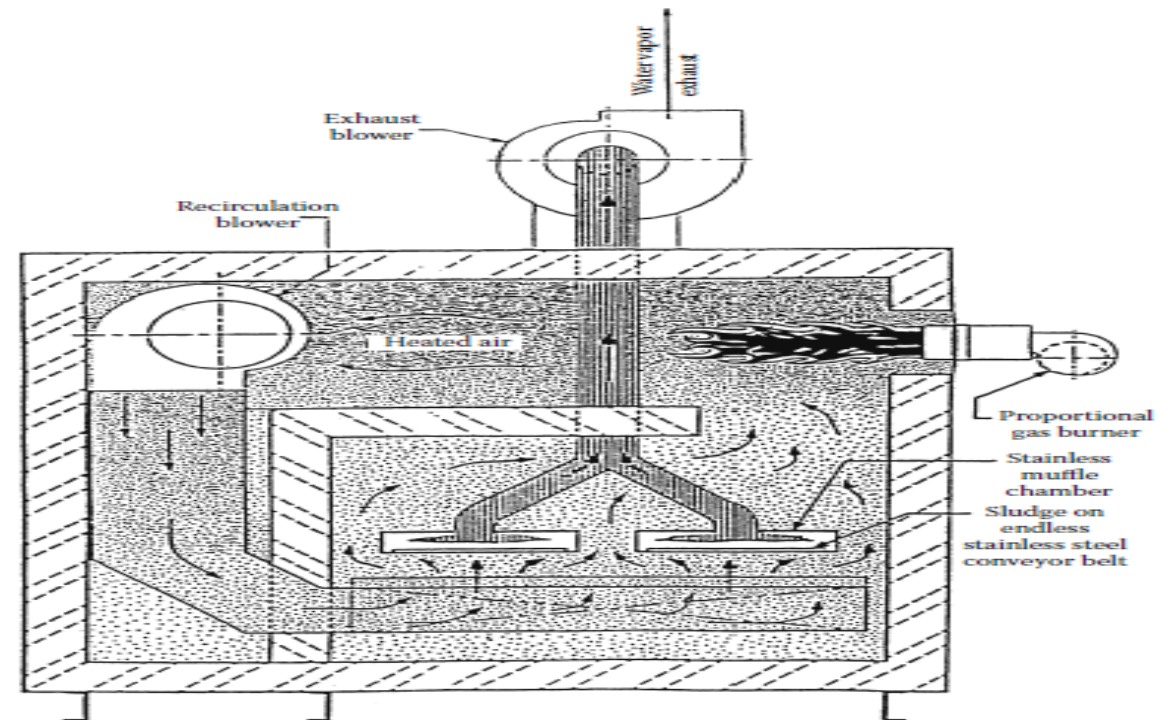


Fig IR dryer for treatment of sludge.

Thank you