# Ceramics Materials Manufacturing

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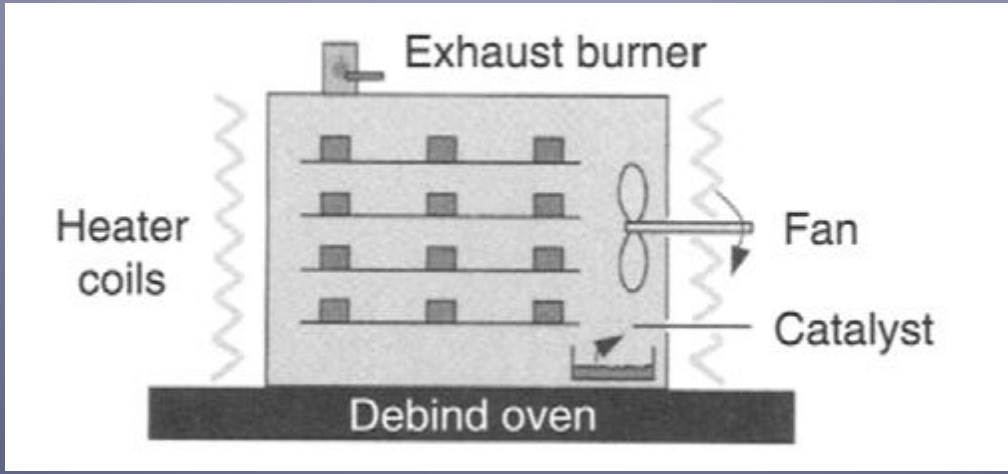
# Green Body Drying

# Drying System

Vapors leach out the binders without causing the part distortion, warping, or cracking that frequently occur in thermal debinding.
A Dislocation or carrier gas is circulated through the debinding cell to prevent binder deposit on cold chamber walls.




The vapors are condensed by passing them through **a distillation column** and reused. Solvent and thermal debinding are slow **(10 to over30 h)** processes, but catalytic debinding is faster and usually takes **2-4 hours for** completion.
*Large, bulky parts* present considerable difficulty in binder removal and are not good .

# QUANTITY OF HOT AIR REQUIRED FOR DRYING PROCESS,

From equation:

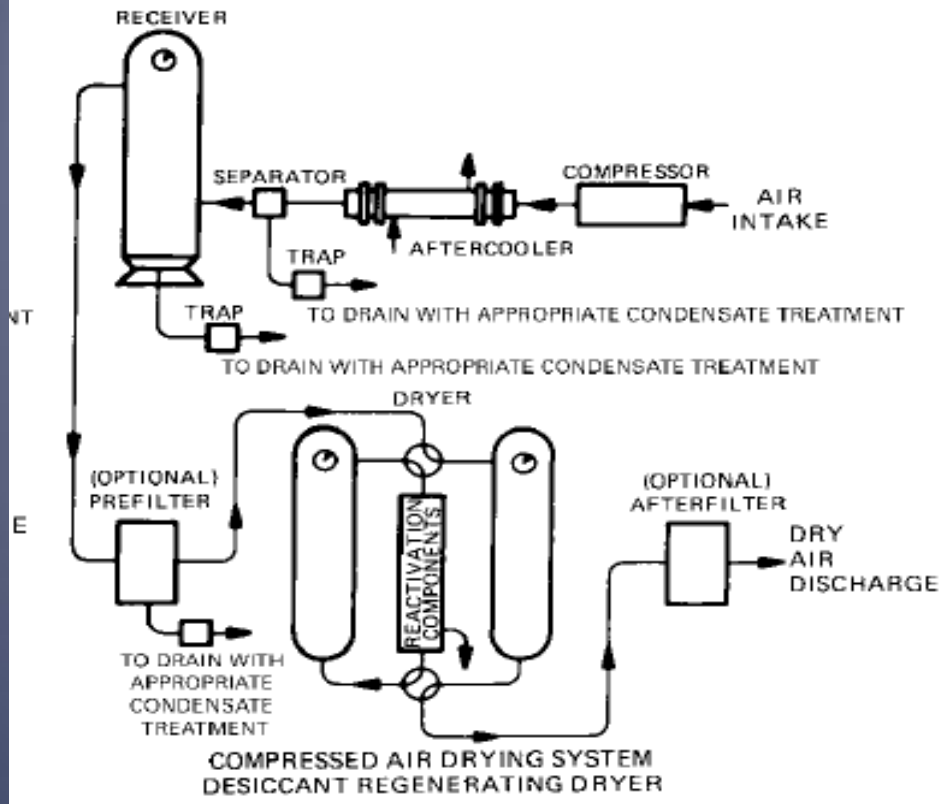
$$\mathbf{b\ P(s) + nO_2(g) \rightarrow vV(g) + sS(s) + \Delta H}$$

where **b** moles of polymer, **P**, react with **n** moles of **O2** to produce **v** moles of volatile(**g**), **V**, vapor, and **s** moles of solid residue(**s**), **S**, solid ; $\Delta$**H** is the enthalpy of reaction.

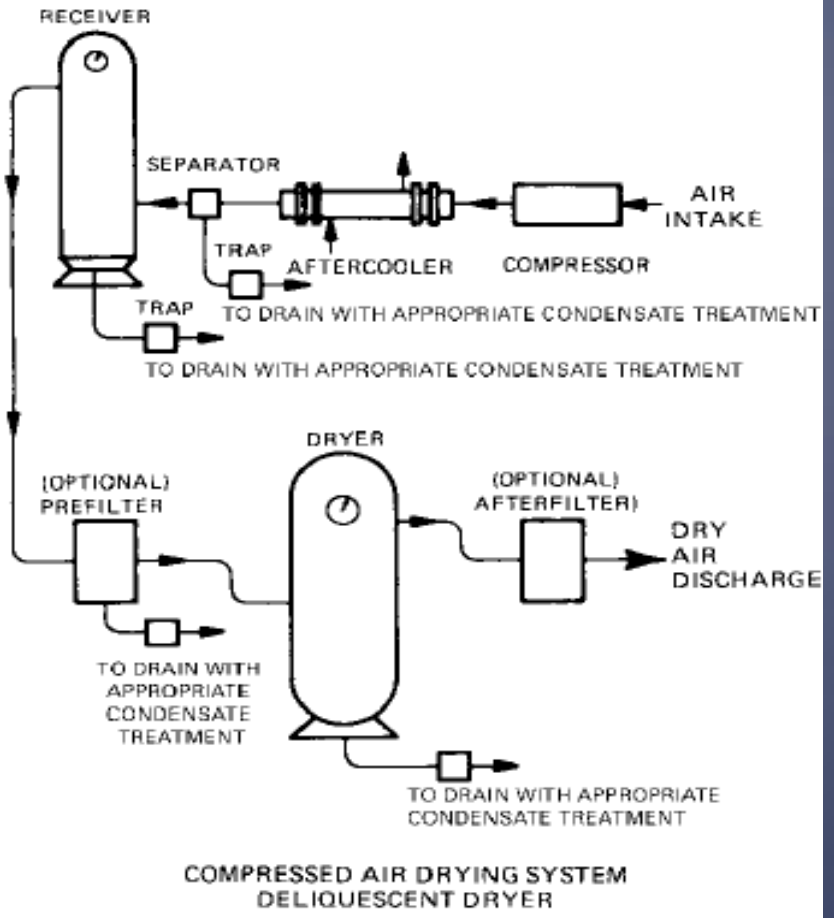
## Section 6

# TYPES OF COMPRESSED AIR for DRYERS

- Regenerative Type
- Single Tower Type
- Membrane Type

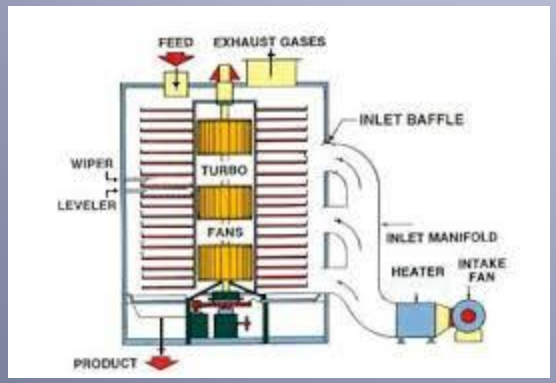



**REFRIGERANT**

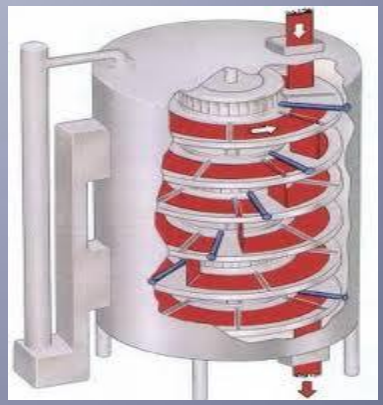



**SINGLE TOWER DELIQUESCENT**

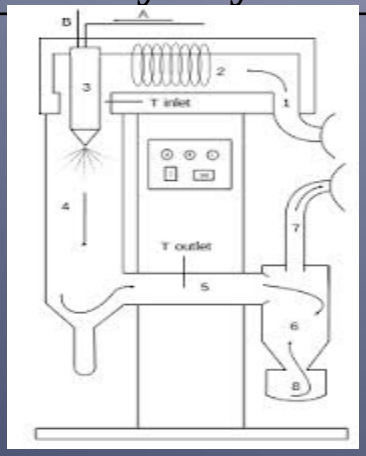
# TYPES OF DRYERS



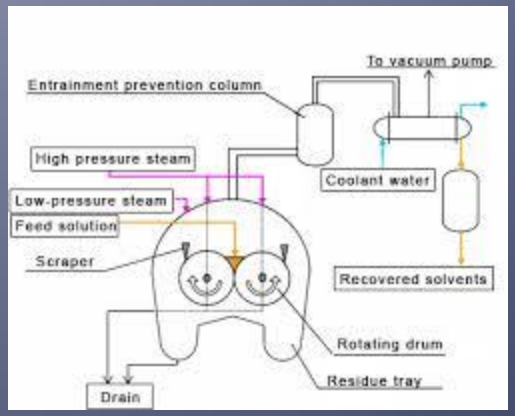

**Tray dryer**



**Turbo dryer**




**Spray dryer**




**Drum dryer**

# TYPES OF DRYERS

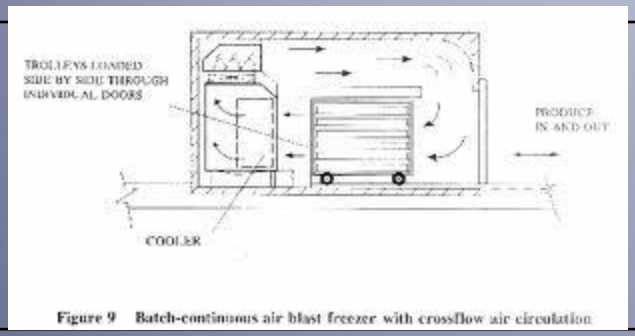
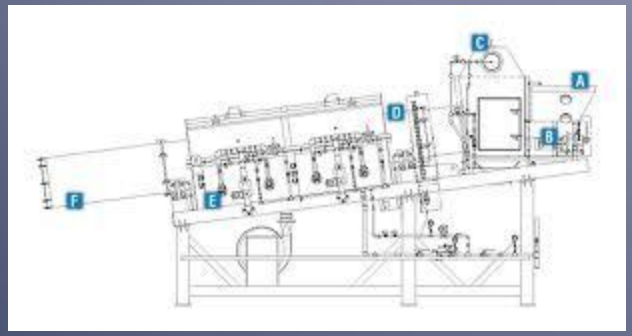


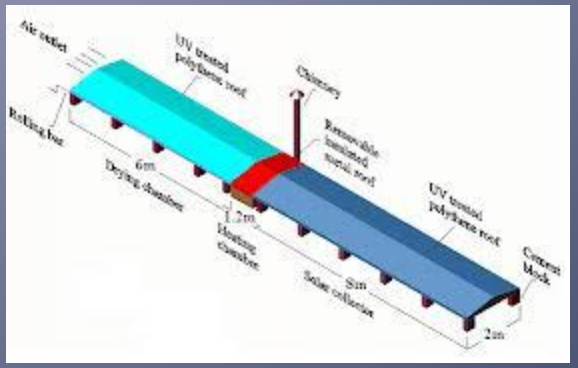
Figure 9 Batch-continuous air blast freezer with crossflow air circulation

**Tunnel dryer**

**Screen conveyor dryer**




**Rotary dryer**




**Continuous tunnel dryers**