

Flammability Issues Related to Natural Refrigerants

Source: *Yunus A. Cengel and Michale A. Boles, Thermodynamics, 6th Edition, SI Version* (Singapore: Mc Graw-Hill, 2007), p. 774 - 777

Question?

- What is Flammability?

- Visibility of Combustion.

- Conclusion

- Flammability is a result of Combustion.

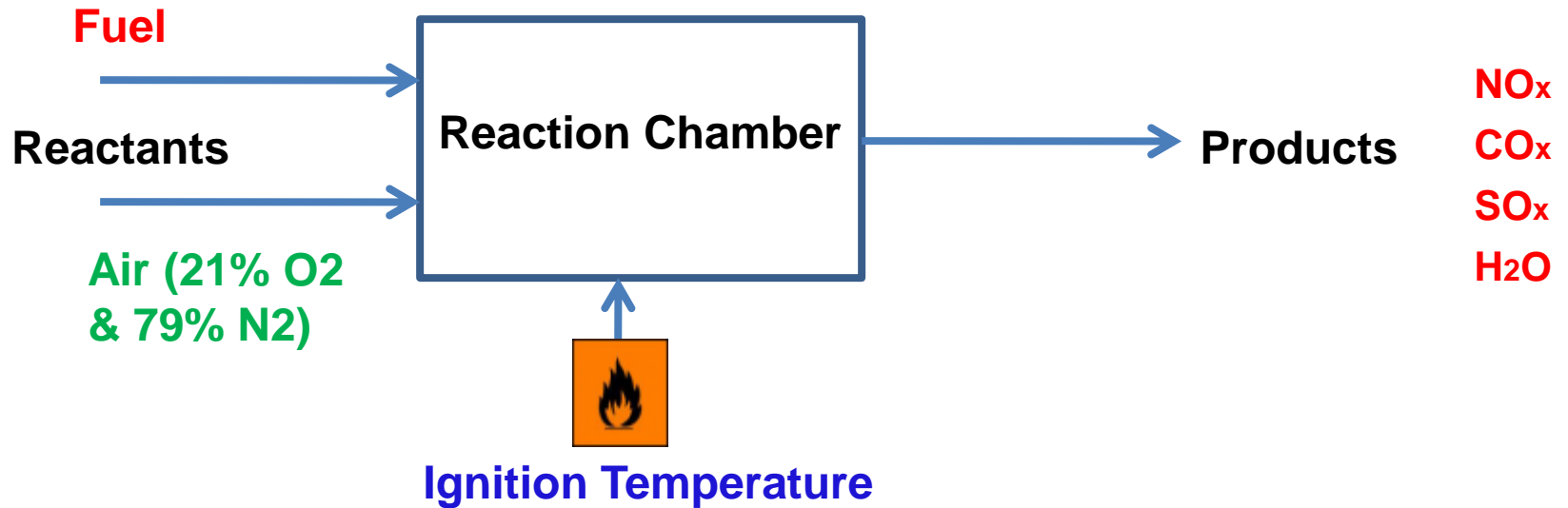
Combustion Takes Place Only when the following are present:

- Fuel
- Oxygen/Air
- Ignition Temperature



If not for this requirement the whole world be on fire

Steady-Flow Combustion Process



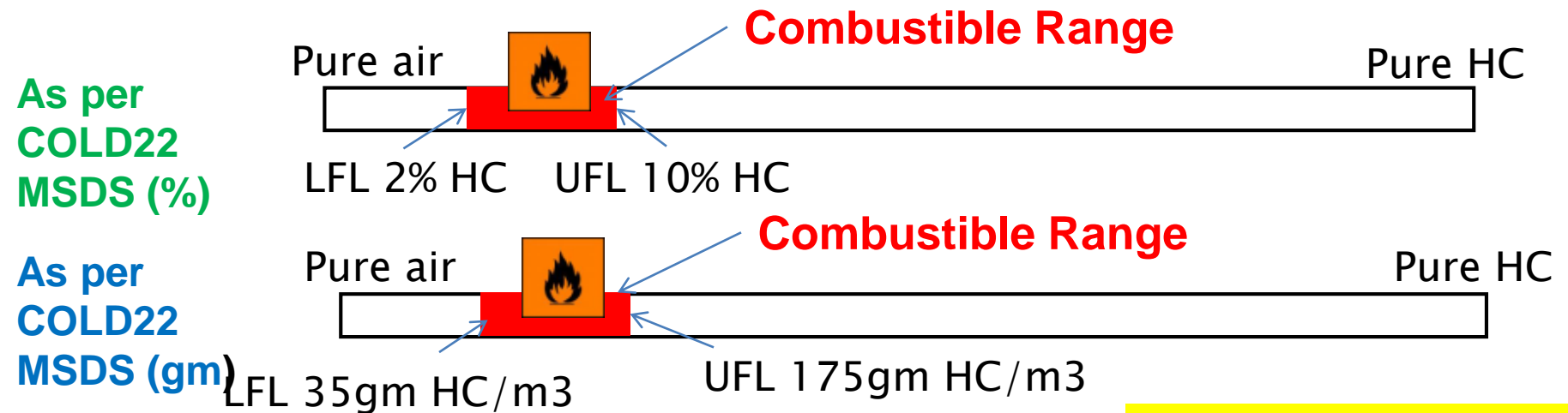
Important or Forgotten Fact



For combustion to begin the fuel and air must be in the **specified range**

E.g. For Natural Gas will not burn in concentration **<5% and >15%** and there must be an **Ignition Temperature**

Addressing COLD22 Flammability Issue



HP	Ref (gm)	Vol (m3)	Inc Vol (%)	Area (m2)
1	405	12		5
2	540	15	33	6
3	810	23	50	9
4	1300	37	60	15
5	2040	58	57	23
6	3200	91	57	37
7	3500	100	9	40
8	3600	103	3	41

Assumption

- Room Height: 2.5m
- Concentration: 20gm/m3



Weight of COLD22 in gm



Volume of Air Conditioned Room



% Volume Increase with HP of Air Conditioning Unit Increase