

Flare Applications

- Ammonia Plants / Terminals
- Chemical Plants
- Coal Gasification
- Fuel Cells / Alternate Energy
- Landfills & Digestors
- Methane Recovery & Mines
- Oil Exploration & Production
- Pipeline Emergency & Service
- Rocket Testing & Recovery
- Steel Production
- Storage Terminals

Where NOT Used

Very Low Btu Gases
Highly Inerted Gases
Liquids
SPECIAL SOLUTIONS
NEEDED – Contact NAO

Flare Uses

- Emergencies (Fire/Explosion)
- Equipment Failures
- Power Failures
- Loss of Cooling Water
- Plant Maintenance
- Vapor / Odor / VOC Control

• Caution: SAFETY POINT
Can FLARE become ignition point
For gas or vapor leak ?

• Caution: SAFETY POINT
Watch out for flare ignitor & controls
Do you need backup ?

• Caution: SAFETY POINT
Plan Ahead – What about FLARE
MAINTENANCE ?
RENTAL FLARE
– Trailer(s) or Stack

• Caution: SAFETY POINT
Watch out for air in the flare gas

Design Input

- **Loading Rate** (Maximum)
Lb/Hr, SCFH, MM SCFD, Kg/Hr, Nm³/Hr
- **Composition** (MW) Air or O₂ Present?
- **Temperature** (Max.& Min.) °F, °C
- **Available Pressure**
(Maximum) "WC, PSI, mm WG, Kpa, Kg/cm²
- **Entrained Liquid / Condensate**
- **Plot Area & Elevations**
- **Noise & Neighbors**

Design Output

- **Tip Type & Diameter**
Emergency, Smokeless, Endothermic
- **Stack Type & Height (Elevated)**
Self-Supporting, Guyed, Derrick, Tripod
or **Enclosed, Earthen, Fenced, Pit**
- **Safety** Air Entry, Air Present, Liquid Carryover,
Thermal Radiation, Noise, Monitors & Controls

Size Vs Flow

Tip Size (Inches)	Flow		Flow	
	(Lb/Hr*)	(MM SCFD**)	(Kg/Hr*)	(MM NCMD**)
4"	14,000	6	6,500	0.16
8"	54,800	24	24,900	0.65
12"	125,000	55	56,700	1.50
24"	494,200	220	224,100	5.82
36"	1,112,000	495	504,300	13.1
54"	2,502,000	1,110	1,134,700	29.5
72"	4,486,000	1,978	2,034,500	52.5
96"	7,907,500	3,520	3,586,100	95.2

ENGLISH * -- Typical Refinery Application Pressure 2 psig MW 54 Temp 200°F
** -- Typical Oil Production Application Pressure 5 psig MW 24 Temp 100°F

METRIC * -- Typical Refinery Application Pressure .14 bars MW 54 Temp 90°C
** -- Typical Oil Production Application Pressure .34 bars MW 24 Temp 38°C

Flare Height

- Thermal Radiation
- Dispersion – *flame out*

Important Design Factors

- Safety – People, Equipment
 - Exposure Level/Time
 - Neighbor Safety

Important: Need Plot
Plan with Elevations of Nearby
Equipment – Where People Present



Thermal Radiation

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Levels* Time**

	(Btu/Hr Ft ²)	(Kwatts/M ²)	(Seconds)
Equipment --	3,000	9.46	5
Run Clear --	2,000	6.31	30
Walk Clear --	1,500	4.73	60
Work --	500	1.58	Hours

Note: * Solar radiation and windchill
are NOT included -- (Net).

** Typical time for pain on BARE SKIN

See Counter Measures
Contact NAO for more details.

Counter Measures

- Higher Stack
- Longer Boom
- Floating Flare
- Enclosed Flare
- Clothing
- Shielding
- Misting