



**Centurion**  
**UNIVERSITY**

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PRESENTATION ON

# TEMPERATURE, FORCE & PRESSURE OF EXPLOSION

CUFS 2416 EXPLOSIVE AND POST BLAST INVESTIGATION

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B.SC. FORENSIC SCIENCE (SEM 6)  
SCHOOL OF FORENSIC SCIENCES  
BHUBANESWAR CAMPUS

# CONTENT

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- Introduction
- Temperature
- Force and pressure
- Application and effects

# INTRODUCTION

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- The rapid increase in volume and release of energy in an extreme manner. It causes high temperature of gases.
- Forensic analysis of explosions consists of determining the point of origin, the explosive substance involved, and the charge mass.

# TEMPERATURE

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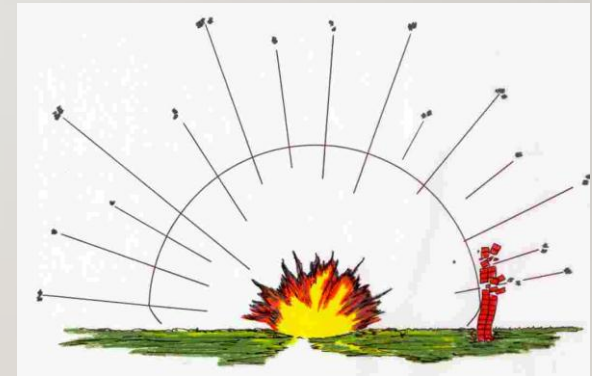
- When an explosive detonates the reaction is extremely fast and initially doesn't have time to expand to any greater extent. The heat liberated by the explosion will raise the temperature of the gases.

Effect of this heat energy on the gas be used to calculate the temperature of explosion( $T_e$ ).

The temperature explosion ( $T_e$ ) is the max temperature that the explosion product can attain under.

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- The explosive at an initial temperature is converted to gaseous product which are also at initial temperature( $T_i$ ).
  - Heat at explosion represented as (a).

$$\therefore Q = \sum_1^1 \int_{T_i}^{T_e} C_v \cdot dt$$



$C_v$  = molar heat constant

$\Sigma$  = Summation of heat capacity

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- The rise in temperature of gases is calculated by dividing the heat energy generated ( $Q$ ) by molar heat capacities, if the gases at constant volume summation of  $C_v$ .

$$\therefore T_e = \frac{Q}{\sum C_v} + T_i$$

Explosives	Explosion temperature ( °C )
TNT	3100
PETN	4230
RDX	3380
HMX	4031
NG	3158



# FORCE AND PRESSURE

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- The energy released when a chemical explosion takes place uniform Kinetic K.E. and heat over a short period at time.
- In a detonating explosive material the detonating wave power into the surrounding media into and extents a sudden intense pressure equivalent to violent mechanical flow.
- After the shock has moved away from the explosive composition products will being to expand and act upon the surrounding media.

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- The intensity of the gases explosion will depend upon the power (QXV) at the explosives.



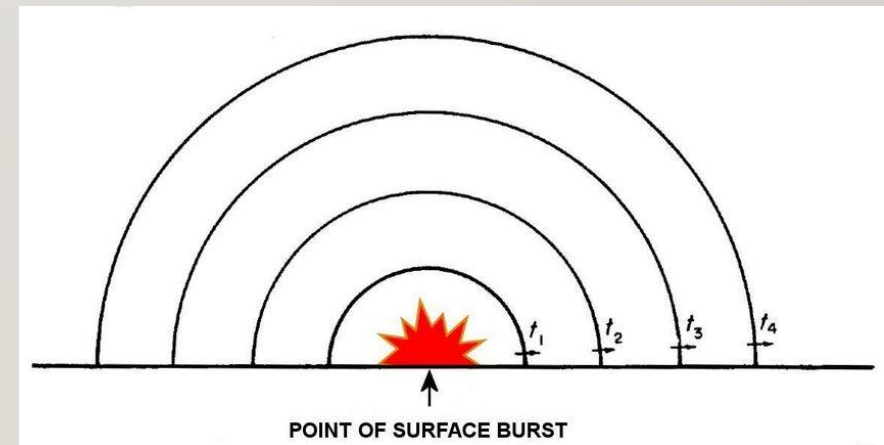


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- The force exerted by gases on the surroundings can be calculated by

$$F = nRT_e$$

Where,  $F$  = Force,  $n$  = number of molar of gaseous products,

$R$  = molar gas constant,  $T_e$  = Temperature of explosion.



# APPLICATION AND EFFECTS

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- Harm people and property.
- Mining
- Industrial uses.

**THANK YOU.**

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