

Naval Application
Explosives
Learning Objectives

8.12.2022

To satisfy the minimum requirements for this course, you should be able to:

1. **Describe the characteristics of explosions and explosives**, and be able to:
 - identify the main causes of the destructive power of chemical explosives
 - distinguish between high and low explosives, and explain the uses of each
 - define the terms deflagrate, detonate, shock wave, and burning front
 - be able to apply the concepts of the VSEPR model to an explosive such as nitroglycerine and TNAZ
 - recognize that nitrogen and/or oxygen are found in most explosives as part of high-energy bonding arrangements such as nitro (-NO₂), nitrate (-O-NO₂) or nitramine (-N-NO₂) groups, and peroxides (-O-O-) or perchlorate (-O-ClO₃) groups
2. **Apply principles of thermochemistry and calorimetry to explosives and explosions.**
 - using bond enthalpies, recognize that the products from the explosion of nitroglycerine (or another explosive such as TNAZ) are relatively stable
 - approximate the energy change for an explosion by calculating the enthalpy change for the explosion reaction
 - calculate the temperature change of gases formed in an explosion
3. **Apply gas laws to calculate pressure and volume changes during an explosion.**
 - use the ideal-gas equation as a first approximation to determine the pressures and volumes of gases in explosions
 - explain the assumptions and limitations of using the ideal-gas equation in these calculations