Tubes, Lines, Fittings

• Tubing

  o (Semi) Rigid Tubing
    • Wall Thickness
    • Material
    • Outside Diameter

  o Rules For Airworthiness
    • One Bend Minimum
    • Bend Radius
    • Flattening Rule
    • Dent Rule
    • Nick/Scratch Rule

  o Identification

  o Single Flare

  o Double Flare
- **Fittings (Plumbing Connectors)**
  
  - **Color Codes**
    - Black - An Steel
    - Blue - An Aluminum Alloy
    - No Color Or Silver - Stainless Steel
    - Gray - Ac Aluminum Alloy
    - Yellow - Ac Steel

- **Flared Fitting (Flared Tube Fitting)**
  
  - Ac And An

- **Flareless Fitting**

- **Bead And Clamp (Flexible Connector)**

- **Bending Semi-Rigid Tubing**
  
  - Hand Bending
  
  - Bending By Tool

  - Terminology
- **Bend Tangent Line (Btl)**
- **Flat**
- **Mold Point**
- **Setback**

- **Supporting/Installing Rigid Tubing**
  - **Clamp Distance Requirements - Aluminum**
    - **Steel: Intervals Are Greater**
  - **Flex Hose (Flex Line)**
    - **Described By Size, Pressure, And Compatibility**
      - **Size**
        - **Inside Diameter**
      - **Pressure**
        - **Low Pressure**
        - **Medium Pressure**
        - **High Pressure**
• **Very High Pressure**

  ▪ **Fluid Compatibility**

  o **Construction - Rubber Or Synthetic Liner (Compatibility)**

  ▪ **Materials**

  • **Natural Rubber - Vegetable Base Fluid**

  • **Synthetic**

    o **Buna N**

    o **Neoprene**

    o **Butyl Rubber**

    o **Teflon Lined Hose**

  o **Some Rules For Flex Hose**

    ▪ **Support : Support Intervals Must Be 24" Or Less**

    ▪ **Slack : Install Hose With 5-8% Slack By Length**

    ▪ **Twist : No Twist; Look At Painted Stripe (Lay Line)**

    ▪ **Bend Radius**
- Cold Flow
  - Hose Assembly Defects
    - Leakage
    - Separation Or Chafing Of Braid
    - Cracks
    - Hardening
    - Excessive Cold Flow
  - Swaged Connector (Flexible Connector)