Dispensable Sealing Technologies For Industrial Lighting

IPG - In Place Gasketing

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Content

- What Is In Place Gasketing (IPG)
- Industrial Lighting Typical Environments and Applications
- Selecting The Right Solutions
- Dispense Equipment and Process Info
- IPG Processing

What Is In Place Gasketing (IPG)

What Is In Place Gasketing (IPG)

- IPG Types
  - CIPG – Cured In Place Gasketing
  - DFG – Dispensed Foam Gasketing
  - FIPG –Formed In Place Gasketing

What Is In Place Gasketing (IPG)

- IPG Types
- CIPG –
  - Cured In Place Gasketing, 2 part liquid silicone rubber materials that are dispensed onto one surface, cured, then compressed between the mating surface. Typically used where part will be serviceable.

What Is In Place Gasketing (IPG)

- IPG Types
- DFG –
  - Dispensed Foam Gasketing, 1 and 2 part liquid silicone rubber that are either mechanically blown or chemically blown, cured, and then compressed between the mating parts to give a low modulus sealing option when needed. Typically used where part will be serviceable.

What Is In Place Gasketing (IPG)

- IPG Types
- FIPG –
  - Formed In Place Gasketing, typically uses 1 part RTV products to provide an adhesive bond between two mating surfaces. Typically used where service is not intended. Could be a 2 part adhesive when a Faster Cure is needed

Industrial Lighting Typical Environements and Applications

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Typical Applications

- Waterproof Housings
- Access Covers –
- Exterior Lighting / Street – Area Lighting

Demanding Environments

- Freezer / low temperature
- Coastal / offshore areas
- High heat areas
- Wet areas

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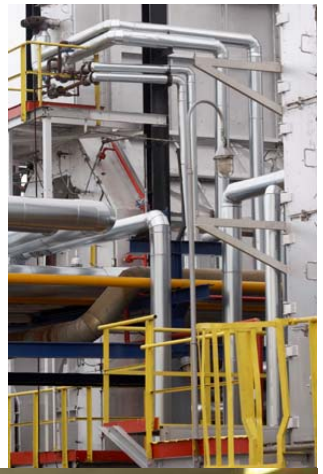
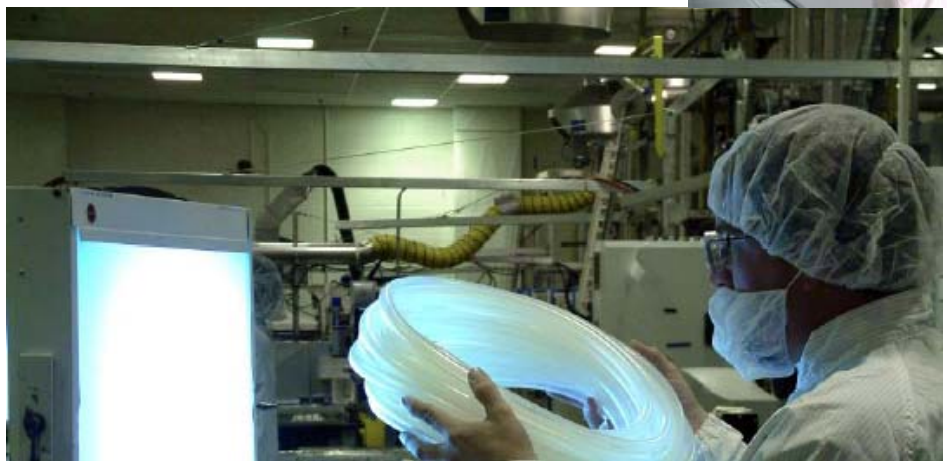
Example of Applications Areas

- Offshore Platforms
- Schools
- Chemical Plants
- Treatment Plants
- Animal Containment
- Healthcare
- Food Preparation and Processing

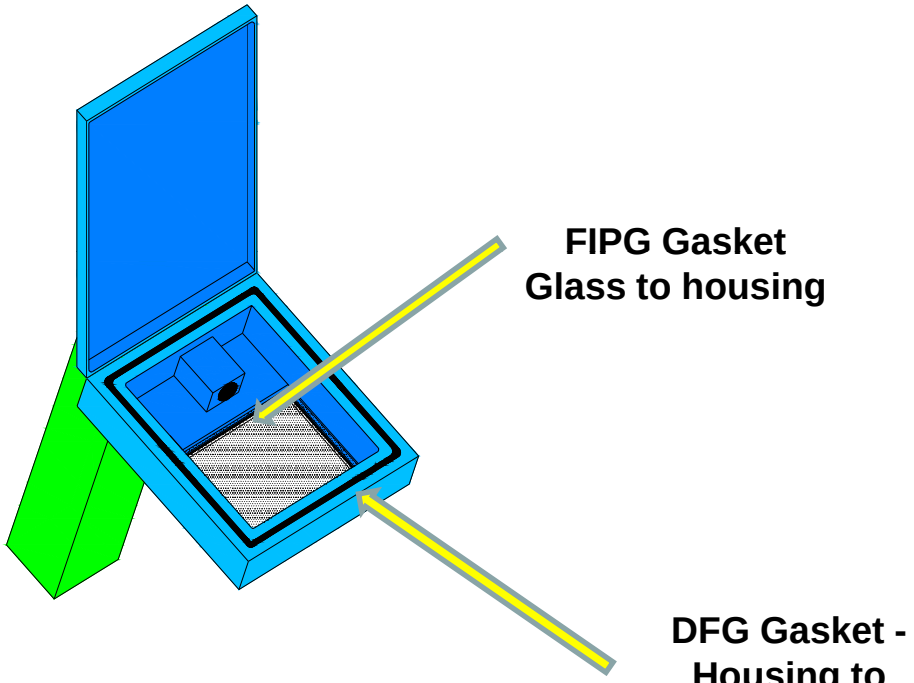


Example of Regulated Applications

- Hot, cold and hazardous locations with bio-safety levels of 1, 2 or 3 and clean rooms from class10 to 10,000.
  - Hospitals
  - Cannery / slaughterhouse
  - Laboratories
  - Clean rooms
  - Pharmaceutical



Example of Application Areas on Street and Area Lighting



Selecting The Right Solutions

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Select the right solutions

- Does this part need to be serviceable?
  - Yes → CIPG, DFG
  - No → FIPG
- Does this gasket need to seal out moisture
  - Yes → CIPG, FIPG

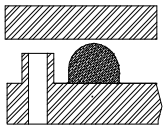
Select the right solutions

- Does the gasket need to seal in/out pressure?
  - Yes → CIPG, FIPG
  - No → CIPG, DFG, FIPG
- Is there capital for Equipment?
  - 100,000 or less → usually FIPG
  - 100,000 or more → CIPG, DFG

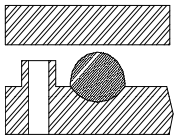
When to use CIPG

- Part needs to be serviceable, Compression gasket
- Sealing out oil, fluids, dust, bugs, etc.
- Need to reduce labor cost
- Part needs to be ready for assembly or shipping quickly.
- Part design can handle force necessary to compress the gasket.

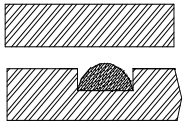
CIPG / Non-Slump DFG on flat surface with compression limiter.



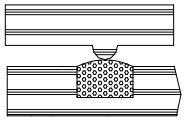
CIPG / Non Slump DFG in shallow groove with compression limiter



CIPG / Non slump DFG in void volume



Self leveling foam in void volume



When to use CIPG / DFG

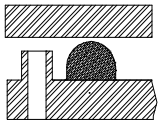
Application Requirements:

- Compression Gasket (CIPG / DFG)
- Gasket Bonded to Surface (CIPG / DFG)
- No Gasket Profile (CIPG / DFG / FIPG)
- Component Needs Servicing (CIPG / DFG)
- Fast Cure (CIPG / DFG / FIPG)
- Assembly Requirements Demand Automation (CIPG / DFG)
- Higher Durometer / Higher Loading (CIPG)
- Fluid Sealing (CIPG / FIPG)
- Air / Water / Dust (CIPG / DFG / FIPG)
- Low Sealing Force (DFG)
- Gap Filler / Seals Irregular Surfaces (DFG / FIPG)

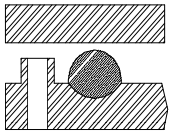
When to use DFG

- Part needs to be serviceable
- Seal in/out air, dust, dirt, water.
- Low modulus needed for plastic parts.
- Low compression set needed.
- Part needs to be ready for assembly or shipping quickly.
- High / low temperature performance.
- Squeak & Rattle elimination. (NVH)
- Extreme gap tolerances.

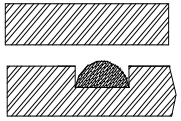
CIPG / Non-Slump DFG on flat surface with compression limiter.



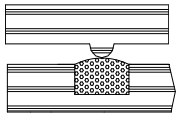
CIPG / Non Slump DFG in shallow groove with compression limiter



CIPG / Non slump DFG in void volume



Self leveling foam in void volume



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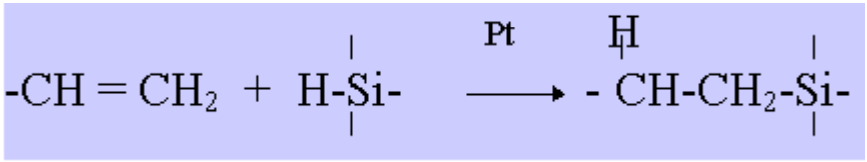
2-part CIPG/DFG: Addition Cure

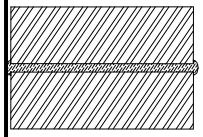


- Advantages
  - Excellent weather, UV and heat resistance
  - Fast cure at room temperature
  - These products need to be heat accelerated/activated (HAV)
  - Unprimed adhesion (must be tested first)
  - Fluid resistant
  - Non-corrosive
  - Low odor
  - No cure by-products
- Disadvantages/ Limitations
  - Pt catalyst can be poisoned by Sulfurs, amines, amides, urethanes, and many other compounds
  - Heat acceleration possibility can be substrate dependent

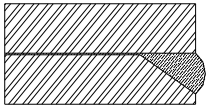
When to use RTV/FIPG

- Adhesive Seal (Glueing)
- Parts Assembled Wet / No Profile
- Room Temperature Cure / Moisture Dependent
- Little or No Servicing of Component
- Gap Filler / Seals Irregular Surfaces
- Fluid and Non-Fluid Exposure
- Blow-out Resistance Specified (Heavy-Body Version)
- Simple Process / Most Cost Effective

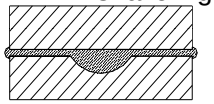
RTV with metal to metal design



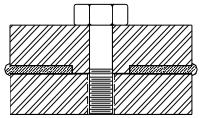
RTV in chamfered groove



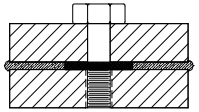
RTV in shallow groove



RTV with fastener and cast in standoff



RTV with fastener and spacer



When to use an RTV

Application Requirements:

- Adhesive Seal (Glueing)
- Parts Assembled Wet / No Profile
- Room Temperature Cure / Moisture Dependent
- Little or No Servicing of Component
- Gap Filler / Seals Irregular Surfaces
- Fluid and Non-Fluid Exposure
- Blow-out Resistance Specified (Heavy-Body Version)
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Cured-In-Place / Dispensed Foam Gasket
Dow Corning® Brand Products

Dow Corning® Product	Technology	Durometer	Mix Ratio	Description
D94-20P	CIPG	20	1:1	2-part, heat cure, non-slump liquid silicone rubber for compression sealing
D94-30P	CIPG	30	1:1	2-part, heat cure, non-slump liquid silicone rubber for compression sealing
D94-45M	CIPG	45	1:1	2-part, heat cure, non-slump liquid silicone rubber for compression sealing
3-8186 Thixotropic Foam	DFG	40 (Shore 00)	1:1	2-part, heat cure, thixotropic, 14 PCF density
3-8235 Silicone Foam	DFG	40 (Shore 00)	1:1	2-part, heat cure, non-thixotropic, 14 PCF density

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Dispensing Equipment and Process Information

Global Dispensing Equipment Suppliers

- Sealant Equipment & Engineering
- Liquid Control / Graco
- SCA Schucker
- Nordson
- PVA
- Rampf Group
- EDF

Contact Dow Corning for More Information

Dispense Equipment

- Standard CIPG DFG Equipment Requirements
  - Servo Driven
  - Rod or Piston Meter (No Gear Meter)
  - DC Static Foam Mixer (DFG)

IPG Processing

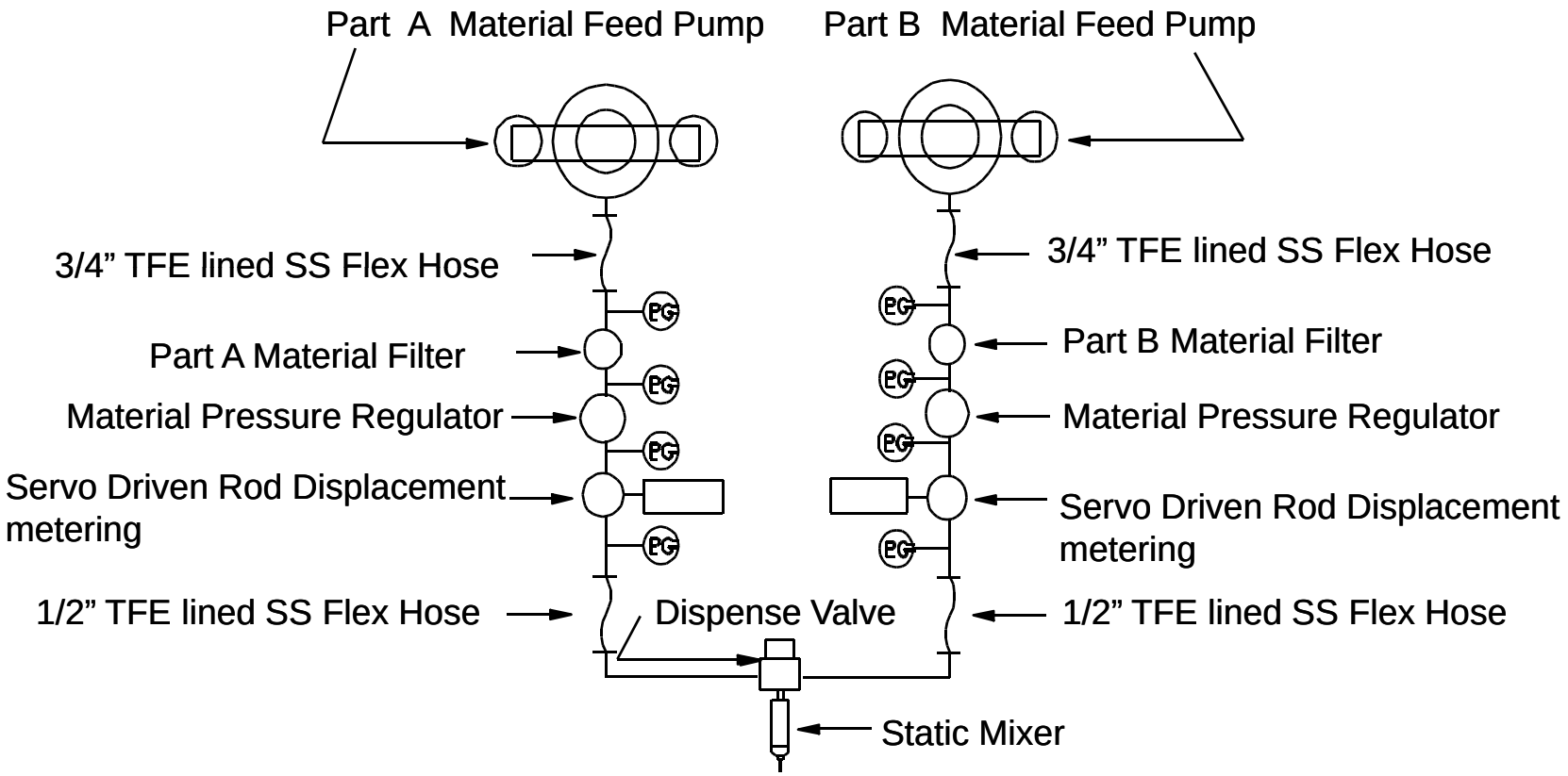
Processing

- CIPG and DFG typically require
  - Fixturing
  - Meter / Mixing
  - Robotic dispensing
  - Oven curing
- Can be manual or highly automated for mass production

Processing

- Typical Meter / Mix Dispensing System
  - Contains:
  - Material Feed Pumps
  - Teflon Lined Stainless Steel Flex Hoses
  - Material Filters
  - Pressure Regulators
  - DC Servo motor Rod Displacement Metering Preferred
  - Air Operated Dispensing Gun, and Static Mixer Elements

Meter / Mix Dispensing System



Processing

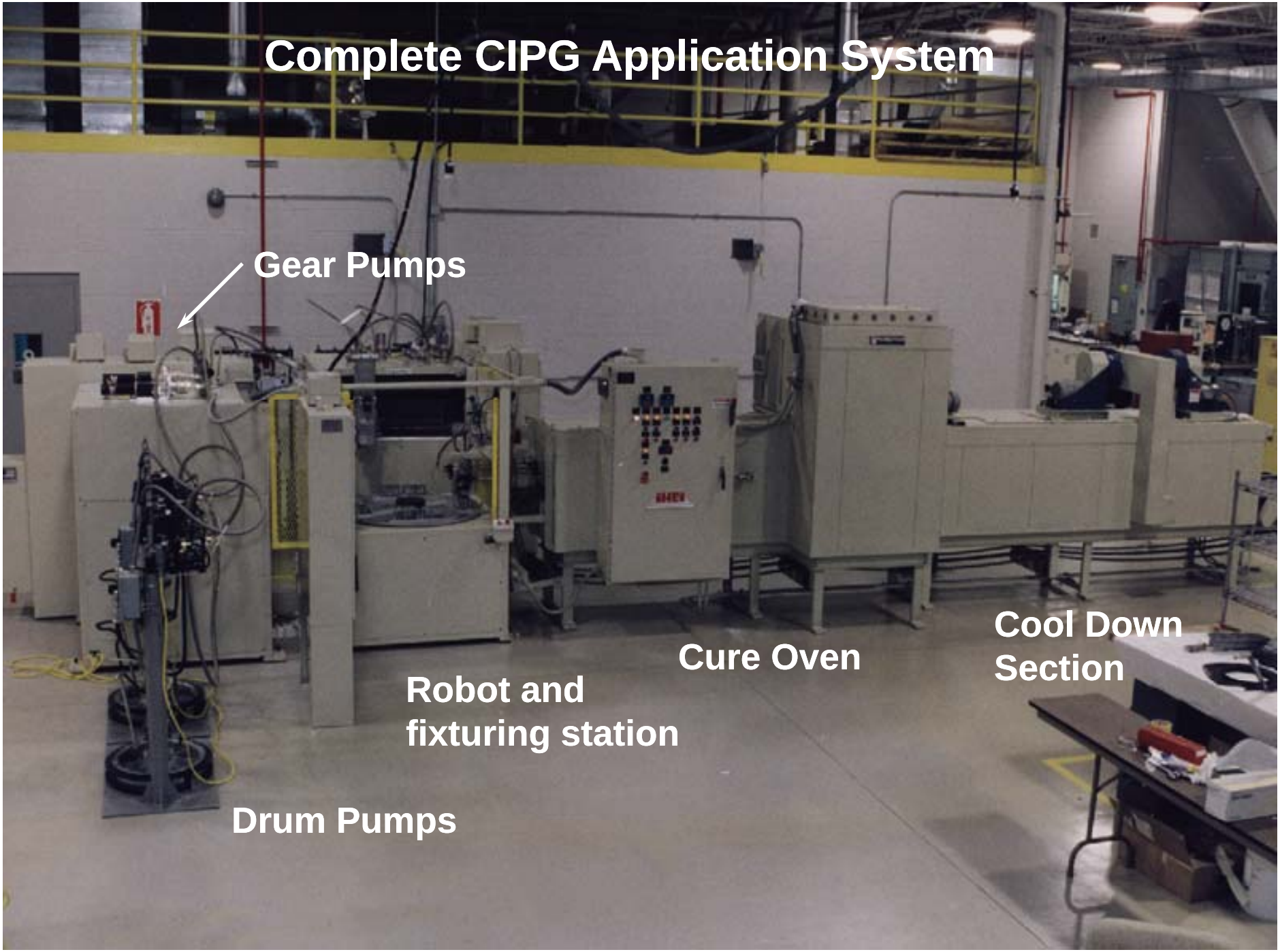
- CIPG and DFG are not recommended in air powered TIME/SHOT type dispensing systems.
- TIME/SHOT systems although simpler than Meter/Mix dispensing systems do not allow for accurate gasket control, or good knit lines.

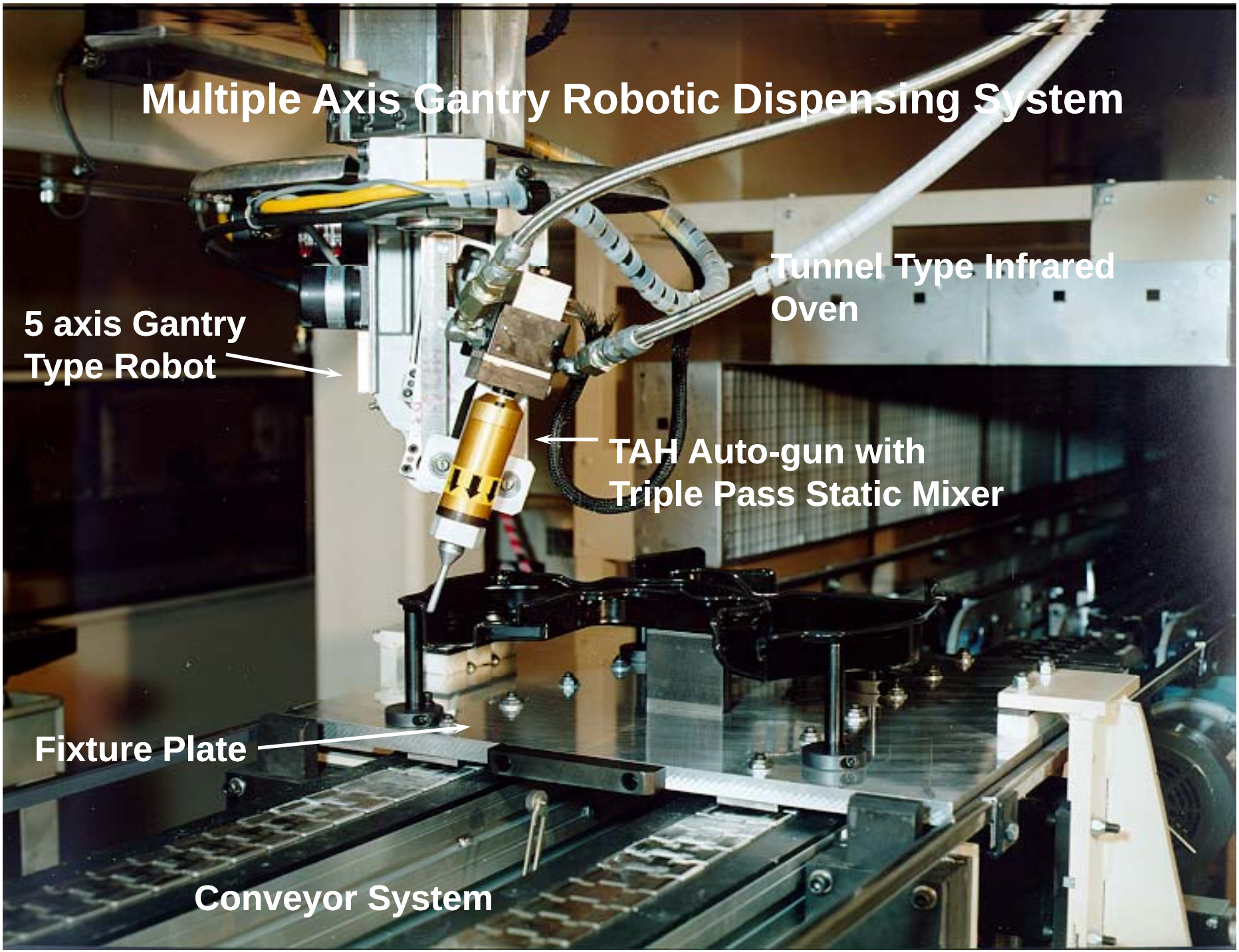
Processing

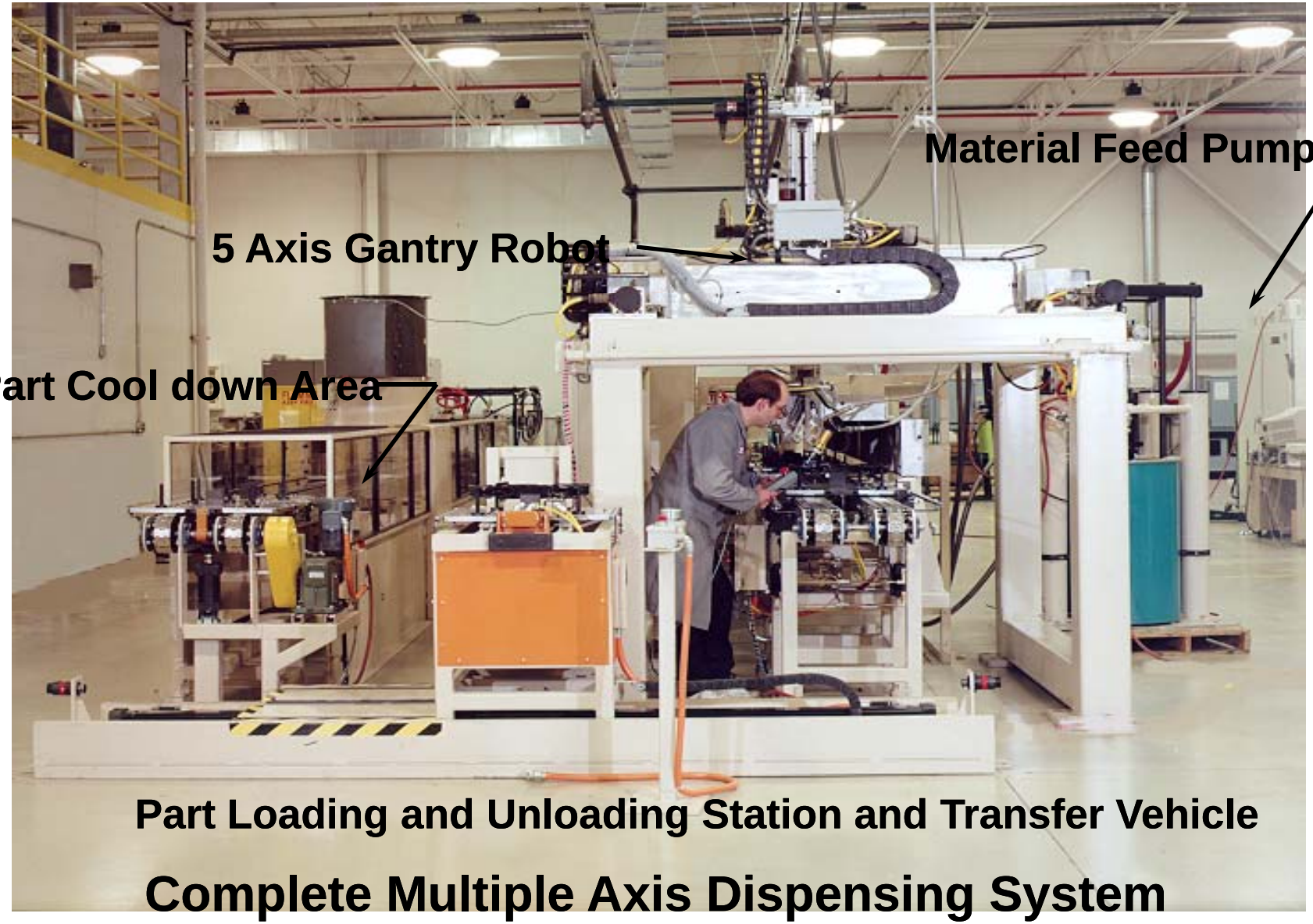
- Robotic Dispensing
  - Multiple dispensing axis depending on part complexity. Robot provides an even, accurate, and repeatable gasket bead with high throughput.
  - Types
  - Articulated Arm
  - Cylindrical (SCARA)
  - XYZ Gantry

Processing

- Oven Curing -Used to cure the seal materials
  - Basic Oven Types
  - Infrared
  - Gas Fired
  - Electric heated
- Any method that heats the seal material is acceptable, heat is the important factor.


Complete CIPG Application System
Gear Pumps
Drum Pumps
Robot and
fixturing station
Cure Oven
Cool Down
Section


Multiple Axis Gantry Robotic Dispensing System
Tunnel Type Infrared Oven
5 axis Gantry Type Robot
TAH Auto-gun with Triple Pass Static Mixer
Fixture Plate
Conveyor System



Complete Multiple Axis Dispensing System

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