WORKER SAFETY HANDBOOK
"Work at the Speed of Safety"
BASIC SAFETY REQUIREMENTS

This Worker Safety Handbook is an overview of basic safety requirements for **Testing Pressurized and Vacuum Systems** by contractors working on AMGEN sites. It is based on the AMGEN EHS Manual for Contractors.

The AMGEN EHS Manual for Contractors has been delivered to your company. It is your company's responsibility to ensure all the requirements contained in the manual are followed and to comply with all applicable laws and regulations.

This guide helps you, as a contractor's employee, to understand your responsibility and to perform your work at AMGEN following the requirements in the AMGEN EHS Manual for Contractors. This overview covers some of the most basic safety elements and is not intended, nor should it be construed as a summary of all those requirements.

The end goal is to provide a safe workplace and prevent injuries and property damage.
All injuries are preventable. Work at the Speed of Safety.

Start every day safely:

- Identify the hazards…what could go wrong.
- Make sure you have a safety plan and the right controls in place to work safely.
- If you're not sure…Stop and Ask – Do the Right Thing.

PURPOSE

- This booklet is a quick guide for contractors working at Amgen. If you need more information than given in this Handbook, contact your supervisor

EMERGENCY RESPONSE

- In the event of any emergency, contact AMGEN SECURITY at:
  (____) _____ – _____
- Security will call the local emergency number and facilitate the response and escort emergency responders to the location of the emergency.
- When you call, provide as much information as possible including what happened and the location of the incident.
- Emergencies may include life-threating and non-life-threatening medical emergencies, spills, fire, work-related injury, or illness.

INCIDENT REPORTING

- Report any incident to your supervisor no matter how minor, including near misses.
- An incident is anything that results in or could have resulted in an injury (even first aid) or property damage.

SMOKING

- AMGEN sites are 100% tobacco free, even in vehicles. Smoking or vaping is allowed only in the designated areas provided.

VEHICLE & PEDESTRIAN SAFETY / SPEED LIMIT

- Always yield to pedestrians and non-motorized cyclists.
- Obey all posted speed limit signs. Site wide speed limit is 10 mph (16 kph) if not posted.
- Private vehicles are not permitted on campus without specific permission from Amgen.

CELL PHONES

- Do not walk and text. If you need to look at your phone, stop walking.

- Do not talk on the phone while driving on Amgen property, even hands free. If you need to talk, pull over and stop the vehicle.

HOUSEKEEPING / SITE NEATNESS

- Maintain good housekeeping conditions while working on Amgen property.
- Do not place any waste in Amgen bins without approval from Amgen.
- Don't store any materials where they block doorways, utility panels, eyewash stations or other emergency equipment.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Follow site specific PPE requirements for the area and task being done. Example:
- Minimum PPE in a laboratory may include laboratory coats, shoe covers (booties), hair nets, latex gloves. Freezers may require insulated gloves and jacket.
- Minimum PPE for AMGEN construction sites: Safety Glasses, Hard Hat, Reflective Safety Vest or Brightly Colored Shirt (e.g. orange / lime), Work Boots with safety toe, Long Sleeve Shirts and Cut Resistant Gloves.
- Additional PPE may be required based on the task and tools used.
- Any reduction in PPE requires Amgen EHSS review and approval.

AMGEN EQUIPMENT

- Do not use Amgen owned equipment unless given specific permission in writing.

ENTRANCES AND EXITS

- Do not block any emergency exits or routes.

LOCK OUT / TAG OUT (LOTO)

- A LOTO PERMIT must be obtained prior to ANY work that requires de-energization

STOP WORK AUTHORITY

- If you recognize an unsafe condition, you can stop work and report it to your supervisor.
- If the scope of work changes, stop and report to your supervisor. Re-evaluate the risks and add new safe actions if needed.

GENERAL ELECTRICAL SAFETY

- Portable electric equipment and tools shall be powered through a Ground Fault Circuit Interrupter (GFCI) or a socket with integrated GFCI or RCBO. This applies to temporary lighting as well.
- Check extension cords and verify the ground pin is on the plug and there are no cuts on the outer cover.
- Only electricians are allowed to cut, remove, or otherwise alter wiring on circuits or equipment 50 volts or greater.

FALL PROTECTION / LADDERS

- Fall protection safety plan is required for any work at heights 6 feet (1.8 meters) or more above a lower level.
- Climbing an access ladder higher than 10 feet (3 meters) requires fall protection whether it has a protective cage or not.
- Working from a ladder at heights more than 10 feet (3 meters) requires fall protection and a working at height permit.
- Scissor lifts, aerial lifts, platforms, and scaffolds are the 1st choice for accessing work at height.
- If you must use a ladder, podium ladders are the 1st preference.
- Check if your site requires a ladder use permit or working at height permit and follow those requirements.

SAFETY UTILITY KNIVES

- Utility knives with self-retracting blades are preferred.
- Wear cut resistant gloves **plus** cut resistant sleeves with adequate cut level protection when using knives without a self-retracting feature. This applies to all cutting tools with exposed blades.
- Always use a sharp blade. They are safer than a dull blade.
- Hand a utility knife to a co-worker with the handle first.
- Consider using a rounded tip blade if the application allows for such.

TASK SPECIFIC SAFETY REQUIREMENTS
TESTING PRESSURIZED & VACUUM SYSTEMS

GENERAL SAFETY

Pressurized systems include equipment and piping, hoses, tubing, fittings, and clamps subjected to pressure. "Pressurized Systems" include both positive and negative (vacuum) pressures.
Stop and escalate all unsafe conditions / behaviors as well as any discrepancies in procedures that could lead to an incident.
You must have a safety plan Step-by-Step Procedure (e.g., JHA, JSA, Safe Method, Method of Procedure) that describes the actions, sequence and maximum pressures expected.
Always read and perform point-to-check confirmation of ratings/labels/markings on hose, pipes, and other critical system components.
Maximum pressure shall not exceed 80% of the rated pressure of the system
Stop if expected pressures are exceeded and re-evaluate the planned process.
Have an action/response plan in case of over-pressurization.
Ensure all pressure relief/release and vent devices (even if only installed temporarily as part of construction, testing and validation for new systems) are directed to a safe & clear path [toward ground, a proper drain, controlled release point, knockout pots, etc.] and NOT TOWARDS PEOPLE.

PPE

- Depending on the exposure, additional PPE may include hearing protection, respirators, chemical specific PPE, face shields or other PPE depending on the potential hazards and contents of the system you are interfacing with. Check the JHA for specifics.
- Always wear a face shield when you make the initial line break, even if the gauge reads zero.
- You may also require dust / liquid compatible safety glasses or goggles "under" face shield.

REPORTING

- Report any Pressure Incidents to your company supervisor, your Amgen hiring manager / point of contact and your local Amgen safety rep.
- A Pressure Incident is disconnecting something under pressure, over pressurization, or unexpected release of liquids or gases with potential to injure someone or cause equipment / property damage or and environmental release.

TRAINING

You must be trained by your company to work with type of pressure/vacuum system you are working on.
People working on or exposed to the system must have received Pressure Safety training within the last 3 years.

PREPARATION

- Make sure you have a LOTO Permit and everyone working on the system is part of the group LOTO.
- Close out the LOTO when testing is completed.
- Post a sign stating, **"Caution – Pressure Testing In Progress"** (or similar), include the Company, Responsible Person and all appropriate Contract Numbers.
- Put flagging on the piping being pressure tested to tell it from pipes that are not part of the test.
- Secure the work perimeter to prevent unwanted entry. Make sure the perimeter is appropriately established to protect anyone passing by. **Pressure = Projectiles !!!** Account for potential shrapnel / pressure wave.
- Only those doing the test should be inside the perimeter.
- Consider blast protection or a safe location for testing personnel during the tests. (Should be in the safety plan)
- Check the condition of ALL testing equipment and fittings and verify they are compatible with the system and correctly installed.
- Check that ALL the gauges were calibrated within the last 12 months.

- Check the condition ALL the existing system for signs of corrosion, cracks, misalignment of connective pieces or other damage.
- Verify what the maximum expected pressure will be and verify that all equipment added for testing, (e.g., pumps, gauges, fittings, hoses) are rated for that pressure or higher.
- If there will be “step/hold pressures” then check that each pressure and the hold time is in the safety plan or checklist.

DEPRESSURIZING

- Depressurize system before any line breaking or disconnecting hoses, fittings or gauges.
- Isolate the pressure source.
- If the system contains high hazard chemicals, use double isolation (block & bleed).
- Safely bleed the pressure using the pressure release or bleed valve. Make provisions to capture or contain system contents if required.
- DO NOT loosen flange bolts or end caps or any other shortcut to bleed the system. If there isn’t a bleed valve, then make sure the risk(s) for this method is captured in the Safety Plan and the safe actions are adequate.
- Verify zero-energy state before disconnecting any part of the system.
- Check the gauges. Do not assume the pressure gauge is accurate as the sole means. Check the vent valve for escaping fluid or gas leakage sound.
- When disconnecting pipes or fittings, be mindful of potential low points and u-bends that can have residual liquids.
- Don’t forget your face shield for the first “break”.

PRESSURE TESTING – GENERAL

- Before pressurizing the system, verify with Amgen Safety and validation, metrology, finite schedule, instrumentation, and other groups as necessary that no other Amgen equipment or systems will be affected. Isolate the system you are testing if there is a risk.
- Check that the valves at each end of the system are closed and the section being tested is isolated.
- When a system is under vacuum, allow air (or nitrogen) into the system to break the vacuum.
- Remove Pressure Safety Device(s) and cap the fitting if the set point will be exceeded. Don’t forget to put them back when testing is completed.
- PRV settings, during testing, shall not be set above 110% of the maximum test pressure OR 100% of Maximum Allowable Working Pressure (MAWP), whichever is LESS.
- Check that all fittings and connections are tightened before pressurizing the system.
- Some hoses or fittings may need whip checks or safety pins.
- Do not loosen, tighten or adjust any fittings until the system is depressurized and verified safe.
- Do not stand in the line-of-fire while pressurizing the system.
- If leaks/drips are discovered, stop the test. Do not tighten or manipulate fittings under pressure. Release pressure, tighten fitting then re-pressurize system.
- Consider including a pressure release/ bleed control point, even if only temporary, to allow controlled venting at the conclusion of pressure test.

PRESSURE TESTING – PNEUMATIC

- Avoid pneumatic testing on plastic piping. If you do, check that the test pressure does not exceed 80% of the safe pressure rating for the pipe and connections.
- Pneumatic testing must have at least one pressure relief valve.
- Consider setting the first pressure step <25psi and do a “soaping/snooping” test before the main pressure testing.
- Be aware that if a fitting or valve fails, the gas/air may vent/release for a long time depending on the volume, pipe lengths and pressure of the system.
- If using nitrogen or other oxygen displacing gas, have a gas meter and take continuous readings.
- Stop and evacuate the immediate area if oxygen drops below 19.5% or the meter reading exceeds any set limits.

- If the gas is toxic or poisonous have a calibrated meter specific to that gas of concern, to detect if any is leaking.

PRESSURE TESTING – HYDRAULIC

- Most of the same actions for Pneumatic testing apply to Hydraulic testing.
- Check that the fluids being used are compatible with the system (e.g., pipes, hoses, gaskets).
- Have a plan for collecting fluid when draining the system after testing. Be sure to account for the volume of the system and any extra used for flushing, neutralizing or sanitizing.
- If discharging to a floor drain, clear this with Amgen EHS first.