

FESHM 5031.3: GAS REGULATORS FOR COMPRESSED GAS CYLINDERS

Revision History

Author	Description of Change	Revision Date
Dave Pushka	Minor update to chapter to meet 5-year review period. Clarified the CGA standard reference and requirements for pressure gauge repair and service.	June 2020
Terry E. Tope	Release Chapter 5031.3 using the new FESHM template. Some scope clarification added.	4-Dec-2014

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1.0 INTRODUCTION

This chapter covers general purpose gas regulators to be used with compressed gas cylinders.

2.0 SCOPE

This chapter applies to all gas regulators installed on compressed gas cylinders at Fermilab and Fermilab-leased spaces. Other gas regulators are beyond the scope of this chapter and should be reviewed by the appropriate system review.

3.0 DEFINITIONS

CGA: Compressed Gas Association.

4.0 SPECIAL RESPONSIBILITIES

The Division/Section/Project Head who controls the area of operation of the gas regulator is responsible for carrying out the requirements of this chapter.

The ES&H Section shall audit the Divisions, Sections, and Project on their compliance with this chapter.

The Mechanical Safety Subcommittee shall serve the Division/Section/Project Heads and ES&H Section in a consulting capacity with respect to gas regulators installed on compressed gas bottles.

5.0 POLICY AND REQUIREMENTS

1. *Inlet fitting*: Regulators shall be purchased specifically for the intended service with the appropriate inlet connection installed by the manufacture and shall be in accordance with CGA Standards. The use of inlet adapters or changing the inlet fitting is not permitted unless specific approval is obtained from the ES&H Section Head.
2. *Modification*: No regulator is to be altered in any fashion without specific approval of the ES&H Section Head. Rebuilds performed by qualified personnel using appropriate rebuild kits are allowed and not considered a modification.
3. *Pressure Gauges*: Pressure gauges may be replaced and or calibrated (removal, calibration, and reinstallation). Pressure gauge replacement or calibration is not a modification of the regulator.
4. *Inlet pressure range*: The user must review the regulator inlet pressure range to ensure that it is appropriate for the compressed gas cylinder to which the regulator will be attached.

5. *Delivery (outlet) pressure range:* The user must review the regulator delivery pressure range to ensure that it is appropriate for any connected piping or components. The outlet of the regulator's piping or components must be protected by proper pressure relief valve sized for the regulator flow capacity. Refer to FESHM 5031, 5031.1, and other chapters as appropriate for requirements.
6. *Vacuum:* Many regulators cannot withstand any degree of vacuum on the outlet side. An isolation valve must be used in the outlet line in such applications to protect the regulator from damage.
7. *Damaged regulators:* A damaged or malfunctioning regulator must be tagged out of service.

6.0 REFERENCES

Table 6.1: CGA fitting description for gases and regulators commonly used at Fermilab. See CGA V-1 for additional fittings.

Gas	Inlet Fitting CGA No.	Outlet Fitting Description (Typical)
Argon	580	5/8-18 RH Female
80% Argon 20% Carbon Dioxide	580	5/8-18 RH Female
50% Argon 50% Ethane	510	9/16-18 RH Male
Breathing Air	346	9/16-18 RH Male
Carbon Dioxide	320	5/8-18 RH Female
Helium	580	5/8-18 RH Female
Hydrogen	350	9/16-18 LH Male
Isobutane	510	9/16-18 LH Male
Methane	350	9/16-18 LH Male
Nitrogen	580	5/8-18 RH Female
Propane	510	9/16-18 LH Female
Sulfur Hexafluoride	590	5/8-18 LH Female
Welding and Brazing Regulators		
Oxygen	540	9/16-18 RH Male
Acetylene	510	9/16-18 RH Male