

INTRODUCTION

The purpose of this manual is to provide design professionals, contractors, and building officials with the information and guidance required to select and install seismic restraints for pipe and duct distribution systems. General procedures and methods for selecting and installing seismic restraints will be covered in this manual. The actual as built details for the installation of the seismic restraints must be the responsibility of the design professional of record or the installing contractor, because these are the people who have an intimate knowledge of the building as it is being designed and constructed.

This manual is divided into three parts.

1. Selection of seismic restraints. These sections are designated S1.0, S2.0... and so on.
2. Installation of the seismic restraints. These sections are marked as I1.0, I2.0... etc.
3. Appendices of pipe, duct, seismic restraint, and attachment hardware data. The appendices will be listed as A1.0, A2.0... and so forth.

Those who have the responsibility for selecting the seismic restraints for a project will need to be familiar with all three parts of this manual. Those responsible for installing the seismic restraints will need to be familiar with the part of the manual dealing with the installation of the seismic restraints, and with the appendices. The building officials responsible for inspecting the seismic restraints will need a working knowledge of all three parts of this manual.

The selection and installation of seismic restraints for pipe and duct is closely controlled by the building codes in force for the jurisdiction in which the building is located. This manual will be based on the International Building Code (IBC). The 2000 IBC and the 2003 IBC are very similar, and in fact are almost identical. When they are referenced in this manual, it will be as 2000/2003 IBC. The latest version of the IBC that is currently being adopted by the various states is 2009 IBC which is identical to 2006 IBC for seismic requirements. This is the version that will form the core basis for this manual. When appropriate the differences between the 2006/2009 IBC and the 2000/2003 IBC will be pointed out. The intent is to have a working manual that is based on the

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current 2006/2009 IBC, but is also relevant to the 2000/2003 IBC. The code based requirements for the restraint of pipe and duct are found in the following references.

1. 2000 International Building Code; International Code Council, 5203 Leesburg Pike, Suite 708, Falls Church, Virginia, 22041-3401; 2000.
2. ASCE 7-98 Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston Virginia 20191-4400, Chapter 9.
3. 2003 International Building Code; International Code Council, Inc., 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795; 2002.
4. ASCE/SEI 7-02 Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston Virginia 20191-4400, Chapter 9.
5. 2006 International Building Code; International Code Council, Inc., 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795; 2006.
6. 2009 International Building Code; International Code Council, Inc., 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795; 2009.
7. ASCE/SEI 7-05 Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston Virginia 20191-4400, Chapters 1, 2, 11, 13, 20, and 21.
8. 2008 ASHRAE Handbook – HVAC Systems and Equipment; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 1791 Tullie Circle NE, Atlanta, Georgia, 30329-2305; Chapter 45 – Pipes, Tubes, and Fittings, Pp 45.1-45.14.
9. NFPA 13 - Standard for the Installation of Sprinkler Systems 2007 Edition; National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02169-7471, 2006; Chapter 9 and Annex A.
10. SMACNA, Seismic Restraint Manual – Guidelines for Mechanical Systems 3rd Edition; Sheet Metal and Air Conditioning Contractors' National Association, Inc., 4201 Lafayette Center Drive, Chantilly, Virginia 20151-1209, March 2008.

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11. Tauby, James R.; Lloyd, Richard; Noce, Todd; and Tünnissen, Joep; A Practical Guide to Seismic Restraint; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle, N.E., Atlanta, Georgia 30329, 1999.

The selection and installation of the proper seismic restraints for a piping or duct system requires good coordination with the design professionals and contractors involved with the building project. A good spirit of cooperation and coordination is especially required for projects that have been designated as essential facilities, such as hospitals, emergency response centers, police and fire stations. Coordination between the various design professionals and contractors will be a constant theme throughout this manual. This coordination is vital for the following reasons.

1. The seismic restraints that are installed for a system can and will interfere with those of another unless restraint locations are well coordinated.
2. The space required for the installed restraints can cause problems if non-structural walls need to be penetrated, or other pipe and duct are in the designed load path for the restraints.
3. The building end of the seismic restraints must always be attached to structure that is adequate to carry the code mandated design seismic loads. It is the responsibility of the structural engineer of record to verify this.

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