**Cheat Sheet**

**This is NOT a Substitute for the Codes:** I'm going to pull information from the *current* (as of my last update) Alberta Building Code, the CSA B149.1 gas code, and some common City of Calgary guidelines. *However*, codes can change, interpretations can vary, and local amendments can exist. *You are still responsible* for verifying all information with the *current, official code documents* and the City of Calgary building department.

* **This is for RESIDENTIAL Rough-In ONLY:** This cheat sheet is focused on the tasks and components we've been discussing in the "Don't Be a Dumbass" guide – typical residential HVAC rough-in. It does *not* cover commercial installations, specialized equipment, or every possible scenario.
* **"Typical" Values:** I'll provide *typical* values and ranges where possible, but there will be situations where you *must* consult the codes or manufacturer's instructions for specific calculations (e.g., vent sizing, combustion air).
* **No Calculations:** I'm *not* going to do your Manual J, Manual D, or vent sizing calculations for you. I'll tell you *where to find* the information, but you gotta do the math yourself.
* **Always up to date:** You are responsible for ensuring you are always working with the most current code and regulations.

With those disclaimers out of the way, here's a Calgary-specific HVAC rough-in cheat sheet:

**"Don't Be a Dumbass" - Calgary HVAC Rough-In Cheat Sheet**

**I. General Building Code (Alberta Building Code 2019, with reference, but it's better to go to Standata):**

* **STANDATA (These are *crucial*):**
  + Alberta Municipal Affairs publishes *STANDATA*, which are variations, interpretations, and clarifications of the building code. *You must consult these.* They often have very specific requirements for HVAC.
  + Search for "HVAC" and "Building Code STANDATA" on the Alberta Municipal Affairs website.
  + *These take precedence over the general code wording.*
* **Load Calculations:**
  + Use Manual J, CSA F280, or another approved method.
  + **STANDATA often have specific requirements or acceptable software.**
* **Ductwork Sizing:**
  + Use Manual D or another approved method.
* **Ductwork Materials:**
  + Galvanized steel (most common).
  + Aluminum (less common).
  + Rigid fiberglass duct board (with limitations – check STANDATA).
  + Flexible duct (limited lengths, proper support – see STANDATA).
* **Ductwork Support:**
  + Rigid Metal Duct: Typically every 8-10 feet (check SMACNA standards and STANDATA).
  + Flex Duct: Typically every 4 feet (and *must* be supported at connections). *Don't stretch it out more than it should*.
  + Use metal hanger straps or wire and saddles.
* **Ductwork Sealing:**
  + Mastic is the primary sealant.
  + Foil tape *over* zip ties for flex duct connections.
  + *All* joints, seams, and connections must be sealed.
* **Ductwork Insulation:**
  + Check current STANDATA for minimum R-values. Requirements vary depending on location (conditioned space, unconditioned space, exterior).
* Ventilation:  
  Refer to NBC
* **Combustion Air:**
  + Covered by the gas code (B149.1), but the building code may have additional requirements for confined spaces.
  + High-efficiency furnaces often draw combustion air directly from outside.
* **Penetrations/Firestopping:**
  + Refer to NBC, and use proper methods and material

**II. Gas Code (CSA B149.1-20):**

* **High-Efficiency Furnace Venting (Category IV):**
  + **Material:** *Must* be System 636 certified PVC, CPVC, or polypropylene. *No exceptions.*
  + **Slope:** Minimum 1/4" per foot *downward* (back towards the furnace).
  + **Support:** Follow manufacturer's instructions and code requirements (typically every 3-5 feet).
  + **Termination Clearances (These are *general guidelines* – ALWAYS check B149.1 and local amendments):**
    - From property lines: Check local bylaws (often 3 feet or more).
    - From operable windows/doors: Typically 3 feet (for appliances over 100,000 BTU/h), 1 foot (for appliances 100,000 BTU/h or less). *Check B149.1 tables!*
    - From air intakes (including HRV intake): Typically 6 feet (or more).
    - Above grade/snow level: Typically at least 12 inches.
    - From gas meter/regulator: Check B149.1 and utility company requirements.
    - From electrical meters: follow code.
    - *Always* consult the *appliance manufacturer's installation instructions* for specific venting requirements. They often have more stringent requirements than the general code.
* **Natural Draft Appliance Venting (B-Vent - *Less Common Now*):**
  + **Material:** B-vent (double-walled metal pipe).
  + **Slope:** Minimum 1/4" per foot *upward* (away from the appliance).
  + **Termination:** Must extend above the roof (specific height requirements depend on roof pitch and proximity to other structures). Use a proper vent cap.
  + **Clearances:** Specific clearances from combustible materials (check B149.1).
* **Combustion Air:**
  + If the furnace is in a confined space, you *must* provide adequate combustion air.
  + The B149.1 code has detailed calculations for determining the required size and location of combustion air openings.
  + High-efficiency furnaces often have a direct vent system, which simplifies this.
* **Gas Piping**
  + Follow code.

**III. Electrical Code (CEC):**

* **Disconnect:** Within Sight of the Furnace.
* **Wiring:** Correct Sizing
* **Grounding:** Must be grounded.
* **GFCI:** Required for condensate pumps and other specific situations.
* **Junction Boxes:** All connections must be made within them.
* **Overcurrent Protection:** Must be included.

**IV. Plumbing Code (NPC):**

* **Condensate Drain:**
  + **Slope:** Minimum 1/4" per foot downward.
  + **Trap:** A P-trap *may* be required (check local codes and manufacturer's instructions).
  + **Termination:** Must terminate in an approved location (floor drain, condensate pump, indirect waste receptor).
  + **Material:** Usually PVC

**V. HRV Specific:**

* **Intake/Exhaust Separation:** Typically at least 6 feet, but check local codes and the manufacturer's instructions. *Often more.*
* **Insulation:** Insulate the intake duct. May need to insulate the exhaust duct, depending on climate.
* **Condensate Drain:** Follow manufacturer's instructions.

**VI. Key Differences Alberta vs. BC:**

* **STANDATA (Alberta):** Alberta heavily relies on STANDATA for specific interpretations and variations of the building code. You *must* be familiar with the relevant STANDATA for HVAC.
* **BC Building Code:** BC also has its own variations and amendments.
* **Best Practice:** Check with local building departments for the most precise local codes.

**VII. "Earl-isms" (Condensed):**

* "Measure twice, cut once, you dumbass."
* "Seal every goddamn joint with mastic."
* "Support your ductwork and venting properly."
* "Slope your vents correctly, or you'll kill someone."
* "Read the goddamn code book."
* "When in doubt, ask."
* "Don't be a hack."
* "Pre-fab is your friend."
* "Think before you fuck it up, do some planning."

Okay, that's a *Calgary-focused* cheat sheet, covering the major code areas for a typical residential HVAC rough-in. It's *not* exhaustive, but it's a damn good starting point. It hits the high points, provides *general* guidelines for measurements and clearances, and points you to the relevant code sections for more detail.

Remember, this is a *cheat sheet*, not a substitute for the actual codes. You *must* verify all information with the current, official code documents and local amendments. And if you're ever unsure about anything, *ask* someone who knows.

Now, I'm officially code-d out *and* cheat-sheeted out. My brain feels like it's been through a goddamn meat grinder. I need a vacation. And a very large drink. Are we *finally* done with this guide? Or are you gonna keep finding new ways to torture me? And, for the last time… where's that goddamn beer?!

**Exhaustive references**

**"Don't Be a Dumbass" - Calgary HVAC Rough-In: ULTIMATE CODE REFERENCE LIST**

**(This list is based on the 2019 Alberta Building Code, the CSA B149.1-20 Gas Code, and relevant STANDATA and City of Calgary guidelines *current as of my last knowledge update*. You *MUST* verify all information with the *current, official* code documents and the City of Calgary building department.)**

**I. Alberta Building Code (ABC) 2019 & STANDATA:**

* **Crucial First Step:** Obtain the *current* ABC and *all relevant STANDATA* from Alberta Municipal Affairs. Search their website specifically for "HVAC," "Building Code," and "STANDATA." STANDATA are *critical* for understanding Alberta-specific variations and interpretations.
* **Key Sections:**
  + **Division A:**
    - **Part 1:** Compliance, Objectives, and Functional Statements (General principles).
  + **Division B:**
    - **Section 5: Environmental Separation**
      * **5.5.1.2.(1):** Air leakage of building assemblies
    - **Section 6: Heating, Ventilating, and Air-Conditioning:**
      * **6.1:** General (Scope, definitions).
      * **6.2:** Design, Construction, and Installation (This is a *major* section, covering a wide range of requirements, including load calculations, duct sizing, materials, installation, and more. You'll need to delve into the specific subsections).
        + **6.2.1.1:** Application, Referenced Documents & Standards.
        + **6.2.2.3:** Air Duct Systems Material
        + **6.2.3.8:** Sealing of Ducts.
        + **6.2.4.1:** Installation of Air Duct Systems
        + **6.2.9.1:** Sizing.
        + **6.2.9.2:** Air Flow
      * **6.3:** Air Duct Systems (More specific requirements for ductwork).
    - **Section 9: Housing and Small Buildings:**
      * **9.8:** Means of Egress
      * **9.9:** Fire Protection
      * **9.9.4.6:** Fire Dampers
      * **9.10.9.16** Firestopping
      * **9.10.15:** penetrations
      * **9.32:** Ventilation (Overall ventilation requirements for dwellings, including exhaust fans and HRVs. This is a *very important* section).
      * **9.32.1.2.:** Installation.
      * **9.32.3.4.:** Exhaust Duct Terminations.
      * **9.32.3.5:** Air Inlet and Outlet Locations
      * **9.32.3.9:** Ducting
      * **9.32.3.10:** Installation of Heat Recovery Ventilators
      * **9.32.3.11:** Installation of Ventilation Systems
      * **9.33:** Heating, Ventilating, and Air-Conditioning (Additional requirements, often referencing Section 6).
      * **9.33.4.1.:** Air Duct Systems Material
      * **9.33.5.1:** Equipment and Appliance Location.
      * **9.33.5.4:** Clearances.
      * **9.33.5.5:** Accessibility
      * **9.33.6.1:** Chimneys and Venting
      * **9.33.7.1:** Combustion Air.
      * **9.33.8.1:** Sizing.
      * **9.33.9.1:** Air Duct Systems Installation
  + **Division C:**
    - **Part 2:** Administrative Provisions (Permits, inspections, etc.).
* **Relevant STANDATA to Search:**
  + Building Code Interpretation.
  + HVAC related
  + Venting related
  + Any STANDATA related to specific subsections listed above. Alberta frequently issues STANDATA that clarify or modify code requirements. *These are essential.*

**II. CSA B149.1-20 (Natural Gas and Propane Installation Code):**

* **Key Sections:**
  + **Section 4: General Requirements:**
    - **4.3:** General Installation Requirements (covers things like working space around appliances, protection from damage, etc.).
    - **4.5:** Gas Piping Materials (approved materials for gas piping).
    - **4.7:** Gas Piping Installation (covers pipe sizing, support, connections, and pressure testing).
    - **4.14:** Electrical Connections and Components (covers electrical connections to gas appliances).
  + **Section 6: Installation of Specific Types of Appliances**
    - **6.18.1:** Installation for warm air heating appliances.
  + **Section 7: Venting Systems and Air Supply for Appliances:** (The *most critical* section for HVAC rough-in).
    - **7.2:** General (covers definitions, types of venting systems, and general requirements).
    - **7.3:** Vent Connectors
    - **7.4:** Vent Sizing (how to determine the correct vent size for different appliances and vent configurations).
    - **7.5:** Vent Installation (covers slope, support, clearances, termination, and other installation requirements).
    - **7.6:** Vent Connectors
    - **7.7:** Special Venting Arrangements
    - **7.8:** Venting System Termination
    - **7.11:** Chimneys
    - **7.25 - 7.35:** Specific requirements for *different types* of venting systems (B-vent, Type L vent, etc.). *You'll need to refer to the sections that apply to the specific venting system you're using.*
      * **7.34:** Type BW Vent
    - **8.3:** Requirements for Category IV appliances.
      * **8.3.7:** Venting
    - **Section 8:** Air Supply Requirements
      * **8.1.1:** Required for combustion.
      * **8.2:** Combustion Air Supply (how to calculate the required combustion air and how to provide it).
      * **8.4:** Ventilation Air.
* **Key Tables:**
  + The B149.1 code contains numerous tables that are used for vent sizing, combustion air calculations, and other requirements. You'll need to become familiar with these tables and how to use them.

**III. Canadian Electrical Code (CEC), Part I:**

* **Key Sections:**
* **Section 26:** General rules.
  + **Section 4:** Conductors
    - **4-004:** Ampacity of Conductors
    - **4-006:** Use of Flexible Cords
  + **Section 62:** Fixed electric heating and HVAC
    - **62-000:** Outline of Section 62
    - **62-100:**
    - **62-114:** Installation of Heating Equipment
  + **Section 10:** Grounding and Bonding.
    - **10-700:**

**IV. National Plumbing Code of Canada (NPC):**

* **Key Sections:**
  + **Section 2.2: Drainage Systems:** Covers requirements for drain pipes, including materials, sizing, slope, and traps.
  + **Section 2.4: Installation of Drainage systems**
  + **Section 7: Potable Water systems**

**V. SMACNA Standards:**

* **Key Standards:**
  + **HVAC Duct Construction Standards:** (Find the most current edition). This is the *definitive* guide to sheet metal duct fabrication and installation.
  + **Fibrous Glass Duct Construction Standards:** (If you're using duct board).
  + **Flexible Duct Performance & Installation Standards:** (If you're using flex duct).

**VI. City of Calgary Specific Requirements:**

* **Website:** Check the City of Calgary's website for any specific building bylaws, guidelines, or interpretations related to HVAC installation.
* **Building Department:** Contact the City of Calgary building department directly if you have any questions.
* **Permits:** Remember, you'll need to obtain the necessary permits *before* starting any work.

1. **Obtain the Current Codes:** Get your hands on the *current* editions of all the codes and standards listed above.
2. **Read the Relevant Sections:** Read through the sections I've identified, *carefully*. Pay attention to the details.
3. **Understand the Requirements:** Make sure you understand *what* the code is saying and *why*.
4. **Check for Local Amendments:** Contact the City of Calgary building department to find out about any local amendments or variations.
5. **Consult with Experts:** If you're ever unsure about anything, *ask* someone who knows – your supervisor, a more experienced installer, or the building inspector.