



**GAS PIPING PRESSURE DROP CALCULATIONS**  
 GAS PIPING SIZED USING 2018 NORTH CAROLINA  
 BUILDING CODE: FUEL GAS CODE  
 SECTION 402.4, EQUATION (2) "HIGH-PRESSURE GAS"

$$D = \frac{Q^{0.85}}{18.93 \sqrt{C_p \left( \frac{P_1^2 - P_2^2}{L} \right)}}$$

WHERE:  
 D = PIPING ID (INCHES)  
 Q = GAS FLOW RATE (CFH) / (MBH)  
 P<sub>1</sub> = UPSTREAM PRESSURE (PSIG+14.7)  
 P<sub>2</sub> = DOWNSTREAM PRESSURE (PSIG+14.7)  
 L = EQUIVALENT LENGTH OF PIPING (FEET)  
 C<sub>p</sub> = EQUATION FACTOR FOR NAT. GAS (0.6094)  
 Y = EQUATION FACTOR FOR NAT. GAS (0.9992)

— SYSTEM DESIGN OPERATING PRESSURE = 10 PSIG  
 — SYSTEM DESIGN MAXIMUM ALLOWABLE PRESSURE  
 DROP = 3 PSIG  
 — CONTRACTOR MUST CONSULT WITH ENGINEER IF ANY  
 ROUTING DEVIATIONS CAUSE PIPING LENGTHS TO BE  
 EXTENDED  
 — PIPE SIZES SHOW ARE MINIMUMS. PIPE SIZE MAY BE  
 INCREASED AT CONTRACTORS OPTION  
 — ALL BUILDING REGULATORS SHALL BE LISTED FOR 10  
 PSIG INLET (REFER TO MECHANICAL PLANS FOR  
 ADDITIONAL REGULATOR REQUIREMENTS)

- GENERAL NOTES**
- THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SITE CONNECTION AND ALL PIPING IN THE BUILDING. REFER TO THE NEW BUILDING PLANS FOR GAS PIPING. THE MECHANICAL AND SITE PIPING CONTRACTOR SHALL COORDINATE AS REQUIRED TO COMPLETE THE ENTIRE SCOPE OF WORK. IN GENERAL, THE SITE CONTRACTOR IS RESPONSIBLE FOR GETTING THE GAS PIPING TO THE EXTERIOR OF EACH BUILDING AND THE TRANSITION TO STEEL PIPING WITH IN 5 FEET OF THE BUILDING OR WHERE INDICATED ON THE PLANS.
  - THE SITE CONTRACTOR SHALL LOCATE AND COORDINATE ALL ON SITE BURIED UTILITIES WITH NEW DIRECT BORED GAS PIPING.
  - THE SITE CONTRACTOR SHALL PROVIDE TRACER WIRE WITH ALL SITE GAS PIPING. FOR FUTURE LOCATING OF GAS LINE.
  - GAS PIPING SHALL BE TESTED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN NFPA 54. ANY OTHER TEST AS REQUIRED BY THE LOCAL INSPECTION DEPT. OR GAS CO. SHALL ALSO BE PERFORMED.
  - PAINT ALL EXPOSED GAS PIPING WITH 2 COATS OF ENAMEL (COORDINATE COLOR WITH OWNER AND CMTA) PROVIDE PIPING IDENTIFICATION MARKED "GAS" WITH YELLOW BACKGROUND AND BLACK LETTERS AT INTERVALS NOT TO EXCEED 5 FEET. IF SYSTEM PRESSURE IS GREATER THAN 0.5 PSI THE LABEL SHALL ALSO INCLUDE THE NOMINAL SYSTEM PRESSURE.

- TAGGED NOTES**
- NEW NATURAL GAS METER LOCATION. METER SHALL BE INSTALLED BY PIEDMONT NATURAL GAS CO. CONTRACTORS SHALL COORDINATE WITH THE EXISTING LOCATION AND REQUIREMENTS WITH PIEDMONT NATURAL GAS CO. GAS PIPING SHALL EXTEND FROM THE METER TO SERVE CAMPUS LINES AS SHOWN.
  - CONTRACTOR SHALL SAW OUT ASPHALT AND EXCAVATE USING EXTREME CAUTION TO NOT DAMAGE EXISTING UTILITIES IN THIS VICINITY. CONTRACTOR SHALL BACKFILL WITH GRAVEL OR FLOWABLE FILL AS REQUIRED. PAVING PATCHING BY OTHERS.
  - CONTRACTOR SHALL EXCAVATE USING EXTREME CAUTION TO NOT DAMAGE EXISTING UTILITIES IN THIS VICINITY. CONTRACTOR SHALL BACKFILL AND LEVEL WITH SURROUNDING AREA. STRAW AND RESEEDING BY OTHERS.
  - TURN PIPING UP ONTO EXTERIOR OF BUILDING IN THIS VICINITY. ROUTE PIPING ALONG EXTERIOR OF BUILDING AS SHOWN. REFER TO GENERAL NOTES ON THIS SHEET FOR PAINTING AND LABELING REQUIREMENTS.
  - DASHED OUTLINED AREAS INDICATE AREAS OF OPEN TRENCH AS REQUIRED TO CONNECT BORED GAS LINES. CONTRACTOR SHALL BACKFILL AND LEVEL WITH SURROUNDING AREA. STRAW AND RESEEDING BY OTHERS (TYPICAL).
  - PROVIDE GAS SHUT OFF VALVES IN THIS LOCATION. REFER TO VALVE BOX DETAIL ON THIS SHEET.
  - DOT INDICATES LOCATIONS TO PROVIDE GAS LINE MARKER. REFER TO GAS PIPING TAG DETAIL. MARKER SHALL ALSO BE PLACED AT EVERY CHANGE IN DIRECTION AND JUNCTION POINT.
  - ROUTE GAS PIPING TO EXISTING BUILDING GAS ENTRANCE AS SHOWN. REMOVE EXISTING PIEDMONT NATURAL GAS METER AND INSTALL CMTA PROVIDED GAS PRESSURE REGULATOR. PROVIDE FLANGES AND SPOOL PIECE FOR OPG GAS METER. COORDINATE EXACT REQUIREMENTS WITH CMTA. REFER TO GAS METER DETAIL. COORDINATE WITH THE MECHANICAL CONTRACTOR. REFER TO APPROPRIATE BUILDING MECHANICAL DRAWINGS FOR GAS PIPING CONTINUATION. COORDINATE IS IN METER SHUTOFF PIEDMONT NATURAL GAS.
  - NOT IN SCOPE. EXISTING GAS SERVICE AND METER TO REMAIN.
  - NEW GAS SERVICE. INSTALL CMTA PROVIDED GAS PRESSURE REGULATOR. PROVIDE FLANGES AND SPOOL PIECE FOR OPG GAS METER. COORDINATE EXACT REQUIREMENTS WITH CMTA. REFER TO GAS METER DETAIL. COORDINATE WITH THE MECHANICAL CONTRACTOR. REFER TO APPROPRIATE BUILDING MECHANICAL DRAWINGS FOR GAS PIPING CONTINUATION.
  - EXISTING PIEDMONT NATURAL GAS METER TO BE DECOMMISSIONED. NATURAL GAS SHALL BE FED FROM NEW METER INSTALLED IN THIS PROJECT. REFER TO APPROPRIATE BUILDING MECHANICAL DRAWINGS FOR GAS PIPING CONTINUATION. COORDINATE IS IN METER SHUTOFF PIEDMONT NATURAL GAS.
  - SHADED AREA INDICATES FIBER OPTIC COMMUNICATION LINE CROSSING. ON-SITE COORDINATION AND IN PERSON REFERENCING MUST BE CONDUCTED WITH INSTALLING CONTRACTOR, CMTA CONSTRUCTION MANAGER, AND QUEENS UNIVERSITY IT DIRECTOR PRIOR TO INSTALLING ANY PIPING IN THIS AREA.
  - DOE TO HIGH DENSITY OF UNDERGROUND UTILITIES BETWEEN HOB HALL AND WRENN HALL PIPING SHALL BE HAND EXCAVATED IN SHADED AREA.

