



Guidelines for working

AROUND NATURAL GAS PIPELINES

MARCH 2015



About this Guide

This Guide is intended for anyone planning or carrying out work near a natural gas pipeline or near any other equipment that is part of Gaz Métro's natural gas network. It indicates the directives to be followed and specifies the technical requirements to be respected in order to protect natural gas installations and, consequently, ensure the safety of the public and workers.

The *Guide* contains the information needed so that those who are planning or carrying out the work can plan and schedule the operations and costs involved in meeting these requirements. However, the design of the work and the choice of methods and work practices that will ensure compliance with these requirements are the sole responsibility of those doing the work. Methods that call for specific approval from Gaz Métro are indicated later in this Guide.

The terms 'pipelines' and 'network' used throughout the texts in this Guide can apply equally to natural gas mains and service lines, as well as any other network equipment that belongs to Gaz Métro on either public or private land.

It is understood that all legal provisions applicable to work carried out near natural gas networks, especially those in Chapter II (Gas) of the *Construction Code* (L.R.Q., c. B-1.1, r. 2), in Chapter III (Gas) of the *Security Code* (L.R.Q., c. B-1.1, r. 3) and in the *Safety Code for the Construction Industry* (L.R.Q., c. S-2.1, r. 6) take precedence over this Guide.



About Gaz Métro

Gaz Métro is a leading energy provider. It is the largest natural gas distribution company in Québec, where its 10,000 km underground network of pipelines serves 300 municipalities and more than 195,000 customers.

The safety of the network and reliability of supply are priorities at Gaz Métro, which also endeavours to ensure that all involved are aware of the existence of natural gas installations and of the specific steps to be taken when near them.



About this publication

This is the 6th edition of the *Guidelines for working around natural gas pipelines* and it replaces the earlier edition published in September 2010. It is published in French and in English. You can consult the most recent version of the *Guide* at any time on the Gaz Métro website at:

gazmetro.com/security

Printed copies of the *Guide* are also available from Gaz Métro.

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IN CASE OF AN EMERGENCY

In case of a break in a natural gas pipeline or any other equipment that is part of the natural gas network:

1. Stop working.

Remove the trenching bucket or any other equipment likely to interfere with the emergency intervention or prevent the natural gas from escaping into the atmosphere. Shut off heavy machinery engines and turn off all other motorized or electrical equipment. Do not attempt to backfill or seal off the leak.

2. Avoid flames and sparks.

Eliminate all sources of ignition or sparks, including the use of switches, portable telephones and any other non-explosion-proof equipment.

3. Do not smoke.

4. Move rapidly away from the leak.

5. Call **911** immediately.

6. If the natural gas ignites:

- do not attempt to put out the flames;
- remain at a safe distance from the fire;
- wait for the arrival of the Fire Department.

NOTE: Advise Gaz Métro of any damage done or found on natural gas infrastructures (e.g., pipelines, coating, tracer wires, anodes, meter, regulator, etc.), even if the damage has not caused a natural gas leak. Also, advise Gaz Métro of any damage done to sewers by a natural gas pipeline.

In such situations, communicate with Gaz Métro's **Customer Service** by calling **1 844 780-4355**.

PLANNING THE WORK

1. Requesting plan

At the planning or submission step, it is important to check the possible presence of the natural gas network near your work in order to:

- avoid any unforeseen costs or delays during the work;
- plan all the precautionary measures needed;
- warn those involved of the risk of accidents.

You need to make your request for plan on the Info-Excavation website info-ex.com (Section: Request for plan) to obtain information on the Gaz Métro network. Allow ten (10) working days to receive the plan.



Only natural gas mains **in operation** are indicated on the plans. Service lines and other equipment do not appear, with some exceptions. However, the number of service lines connected to the mains is indicated.

In no way does obtaining this information exempt you from the obligation of making a locate request (valid) about underground natural gas infrastructures on the Info-Excavation website info-ex.com before beginning work. See “Section EXECUTING THE WORK/A – Locating natural gas lines” in this Guide.

2. Depth of installations

The depth (also called cover) of natural gas installations and other underground infrastructures varies depending on the location and may possibly only be determined by test cuts.

Depending on the nature of the work planned, it may be necessary to ascertain the depth of the natural gas installations when planning operations in order to avoid any setbacks.

If test cuts have to be made by Gaz Métro, please call our **Service Centre** at **1 844 780-4355**.

Test cuts are at the applicant’s expense.

3. Natural gas pipelines in a servitude

If your work (e.g. excavation, heavy traffic, etc.) is within a Gaz Métro servitude or right-of-way zone, you must first request a written authorization from Gaz Métro by calling our **Real Estate department** at **1 844 780-4355** or by sending an e-mail to servitude@gazmetro.com.

Allow twenty (20) working days from the date you send your request to Gaz Métro to receive the authorization. By doing this ahead of time, you can avoid delays and last-minute changes – even prevent accidents.

4. Consequences of your work on the natural gas network

It is important that you communicate with Gaz Métro in the early stages of planning a project that includes, for example, modifying the use or profile of land, or installing or moving underground or aboveground infrastructures.

The nature and scope of the work planned may call for putting specific safety measures in place and may sometimes involve moving or replacing existing natural gas installations.

In such cases, Gaz Métro will conduct a study with you of the project's impact on its natural gas installations in order to determine possible options, estimate the costs of doing the work and evaluate the timeframe to be taken into consideration.

For all requests of this nature, communicate with our **Service Centre** at **1 844 780-4355**. The study is at the expense of the applicant.

EXECUTING THE WORK

Approved work methods

The work methods described below are methods approved by Gaz Métro and are designed to avoid damage to its natural gas infrastructures. Any company or individual complying with these methods does not need to obtain specific approval from Gaz Métro to carry out the work, as outlined in paragraph 2 of article 3.15.1 of the Safety Code for the Construction Industry (L.R.Q., c. S-2.1, r. 6)

A – Locating natural gas lines

Before beginning any kind of work in the ground (e.g. digging, drilling, sawing, vacuum excavation, cleaning trenches, pulverization¹, scarification¹, etc.) regardless of depth, you must:

- have had any natural gas pipelines (and other underground infrastructures) located;
- have your valid locate ticket² on hand.

To obtain your locate ticket, make a request to Info-Excavation on its website info-ex.com (Section: Locate request).



Allow three (3) complete working days from the date you place your request to Info-Excavation to obtain the information and the locate ticket. By doing this ahead of time, you can avoid delays and last-minute changes – even prevent accidents.

Note: The applicant is responsible for ensuring that the localized area corresponds exactly to the work area before beginning.

¹ Beyond the thickness of the solid paving (concrete and/or asphalt).

² A request is valid for thirty (30) days following the date the work is due to begin, as indicated on the request.

B – Prevention and protection measures depending on type of work

B.1 PREVENTION

The Worksite Manager must ensure that everyone on the worksite is aware of the presence of natural gas installations and that they have the documents related to the presence (or not) of Gaz Métro infrastructures in their possession at all times.

The Worksite Manager is responsible for taking all the measures needed to maintain the markings of underground infrastructures. In situations where there is a risk they may disappear during the course of the work (e.g. when the paving surface is being removed), the visual location markers provided by Gaz Métro and based on fixed points may be used to redo the markings.

During excavation work (including drilling, installing stakes for sidewalks, piles, posts, etc.) being done less than 3 m (10 ft) from a natural gas pipeline operating at a pressure of 1,000 kPa (150 psi) or more, it is mandatory that a Gaz Métro technician be onsite. Allow 48 hours for a technician to appear onsite. Gaz Métro may also decide, at its own discretion, that a technician needs to be present under other circumstances. This information will be indicated, if applicable, on the locate ticket.

B.2 PROTECTION OF NATURAL GAS INSTALLATIONS

It is important at all times to ensure the protection of exposed natural gas installations (uncovered during the course of the work) from any type of mistreatment (e.g. construction equipment, falling materials, vandalism, road accidents, exposure to the sun, etc.).

Recognized protective measures must be put in place such as: concrete barrier curbs (Jerseys), guard rails, plywood, encasements, tarps³, etc., depending on the particular worksite.

Pipelines and related equipment must not be used as steps, supports, or anchor points.

³ Generally used to protect the polyethylene (pipeline or coating) from the sun's UV rays.

Care must also be taken to avoid damaging any related equipment (e.g., wire, cables, anodes, road boxes, etc.) linked to Gaz Métro infrastructures.

Gaz Métro must be advised of any damage made or found on natural gas infrastructures (e.g. pipelines, coating, tracer wires, anodes, meter, regulator, etc.), even if the damage has not caused a natural gas leak. In such situations, communicate with Gaz Métro's **Customer Service** by calling **1 844 780-4355**.

Only Gaz Métro employees are qualified to check the condition of damaged natural gas infrastructures and make the necessary repairs.

C – Excavating

C.1 GENERAL

During excavation work near a natural gas pipeline, preventive measures need to be taken to protect the integrity of the natural gas installations (e.g. shoring, pipeline supports, etc.). Rigorous monitoring of the preventive measures adopted and strict control over the operation are essential.

Given the above, it is recommended that natural gas installations not be in the instability zone of slopes that depend, in particular, on the nature and level of saturation of the soil and the loads of traffic nearby.

C.2 EXCAVATING NEAR A NON-VISIBLE (BURIED) NATURAL GAS PIPELINE

Care needs to be taken throughout the excavation work to maintain soil support, both under and along the sides of the pipelines.

Shoring structures should be used where necessary. In addition, the length of the parallel trenches must be minimized and care needs to be taken to backfill excavations promptly in order to prevent the pipelines from shifting.

C.3 EXCAVATING NEAR AN UNCOVERED NATURAL GAS PIPELINE

If a natural gas pipeline is uncovered during the work, it must be supported by an appropriate support system in order to maintain its original level so the pipeline cannot shift either horizontally or vertically at any point or at any time.

The characteristics of steel and polyethylene pipelines to be used in designing the supports are shown in Appendix 1.

The design of the supports falls under the responsibility of the Worksite Manager and must be approved by a qualified worker.

The maximum distance between the supports must comply with the following requirements (see Table A, and Figure 1).

TABLE A: MAXIMUM DISTANCE BETWEEN SUPPORTS

Pipeline diameter	Maximum distance between 2 supports
168.3 mm (6 in) and less	3 m (10 ft)
Over 168.3 mm (6 in)	5 m (16 ft)

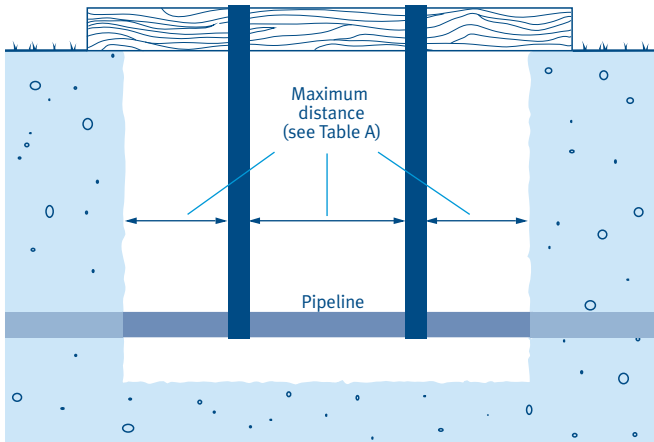


Figure 1

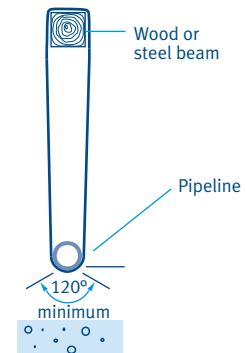


Figure 2

The pipelines must be supported by a smooth support with a width equal to at least half the diameter of the pipeline and support one-third of its circumference, as shown in Figure 2.

The pipeline may also rest directly on the supports (as shown in Figure 3), provided that they do not damage the pipeline itself or the coating. In this case, materials such as rubber or wood are required.

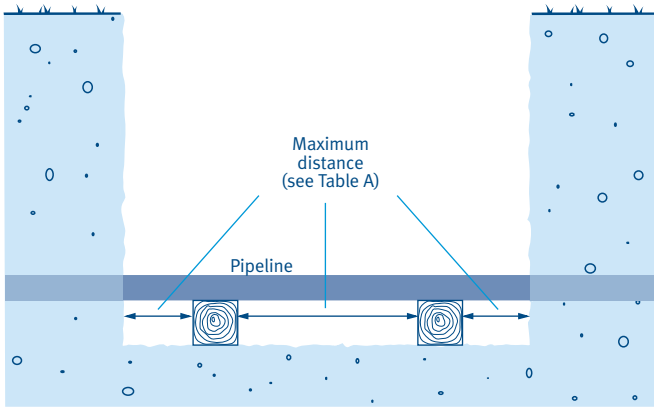


Figure 3

Where pipelines are inserted in a cast iron, steel or plastic casing, special precautions may be necessary. In such cases, communicate with the Gaz Métro's **district engineer** responsible for the sector concerned by calling **1 844 780-4355**.

D – Clearances

Clearance distances from a natural gas pipeline (see Table B) must be respected during any excavation work using mechanical equipment. Note: Reduced clearance is permitted when the pipeline is visible.

TABLE B: DISTANCES TO BE RESPECTED

Pressure class ⁽⁴⁾ (kPa)	Clearance to be respected (pipeline not visible)	Reduced clearance permitted once pipeline is visible	Additional obligations (indicated by a stamp on the locate ticket)
Cl-700 and less	1 m (3 ft)	300 mm (12 in)	Written authorization if pipeline is within a servitude or a right-of-way zone.
Cl-1,000 to Cl-2,900	1 m (3 ft)	600 mm (24 in)	Gaz Métro representative on site + written authorization if pipeline is within a servitude or a right-of-way zone.
Over Cl-2,900	3 m (10 ft)	1 m (3 ft)	Gaz Métro representative on site + written authorization if pipeline is within a servitude or a right-of-way zone.

FOR SURFACE MATERIALS:

Mechanical excavation is permitted to remove the solid layer of the paving surface (e.g. asphalt, concrete, paving stones, etc.) above the pipeline. Special attention must be paid so as not to damage the road boxes. However, it is strictly forbidden to mechanically dig deeper than the paving surface.

When it is impossible to respect these distances, then any excavation must be done either manually or by vacuum excavating equipment (e.g. hydro-excavation), in order to avoid damaging the underground infrastructures.

DITCH GRADING/CLEANING WORKS

Exceptionally, mechanical excavation is permitted directly above the natural gas pipeline, or within the distances indicated in Table B, to carry out grading/cleaning works, provided a Gaz Métro representative is onsite to ensure that the depth of the cover is sufficient.

⁴ The pressure class of the natural gas pipeline is indicated on the locate ticket.

In the case of excavation by hydro-excitation, the requirements outlined in Appendix 4 must be respected.

No matter what method of excavation, you must always have on hand the natural gas pipeline locate ticket issued by Gaz Métro.

WARNING

The depth of service lines is different from that of the natural gas mains to which they are connected. Also, the depth of service lines on private land is often less than that of service lines on public land.

The illustration below is for information purposes only and does not necessarily reflect actual worksite conditions.

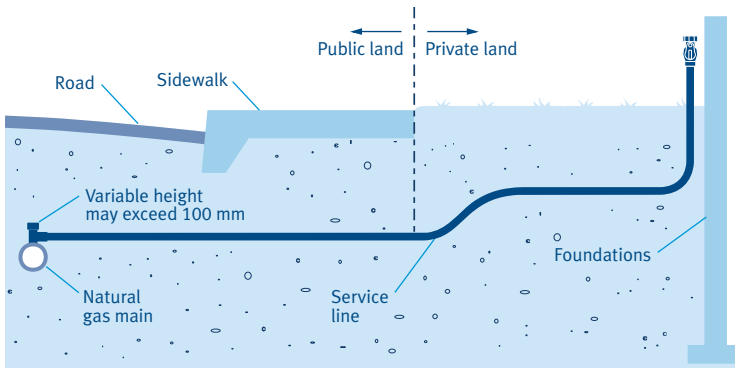


Figure 4

E – Trenchless excavation

In the case of work done using trenchless excavation equipment, the conditions to be respected are outlined in the following paragraphs.

E.1 USE OF TRENCHLESS EXCAVATION EQUIPMENT PARALLEL TO A NATURAL GAS PIPELINE

No trenchless excavation must be done at a distance of less than 1 m (3 ft) from the markers provided by Gaz Métro.

When the trenchless excavation path runs alongside a natural gas pipeline at a distance of between 1 m (3 ft) and 3 m (10 ft) from the markers, survey excavations must be dug at intervals not exceeding 10 m (32 ft) along the trenchless excavation path so that the precise location of the drilling head and backreamers (if any) can be checked visually.

The width of these survey excavations must be sufficient to allow viewing the trenchless excavation equipment from entry point to exit point along its entire length.

NOTE

If there are crossings along the trenchless excavation path, see Section **E.2. Use of trenchless excavation equipment perpendicular to a natural gas**

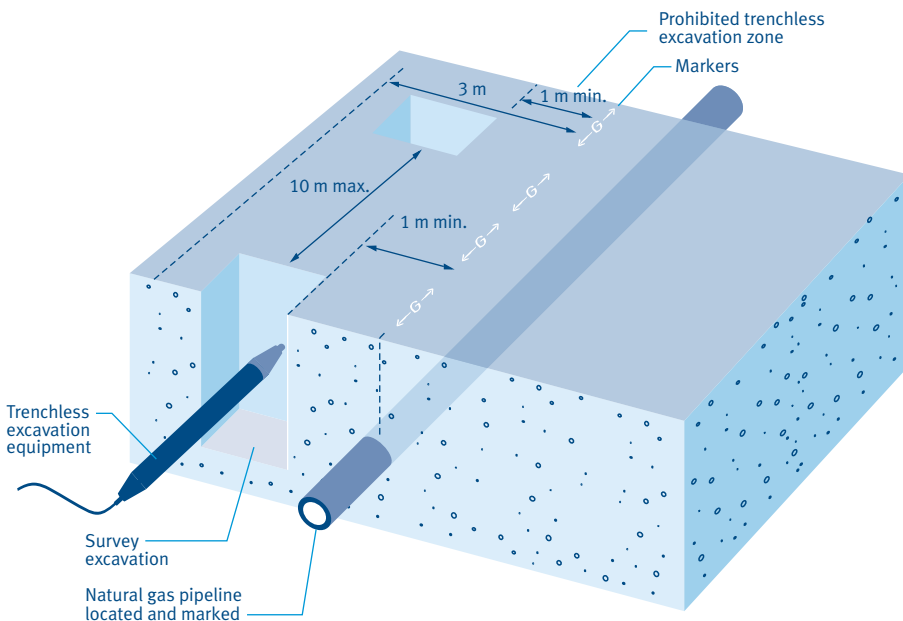


Figure 5: Trenchless excavation equipment parallel to a natural gas pipeline

E.2 USE OF TRENCHLESS EXCAVATION EQUIPMENT PERPENDICULAR TO A NATURAL GAS

When the trenchless excavation path crosses a natural gas pipeline, the pipeline must first be cleared to the planned depth of the crossing to ensure that the natural gas pipeline will not be affected and that the clearance required is respected (including when widening holes and putting the structure in place, if applicable).

The length of the survey excavation on either side of the pipeline must be sufficient (minimum 1 m or 3 ft) to permit the interruption of the trenchless excavation operation if an anomaly is detected and before any contact with the pipeline.

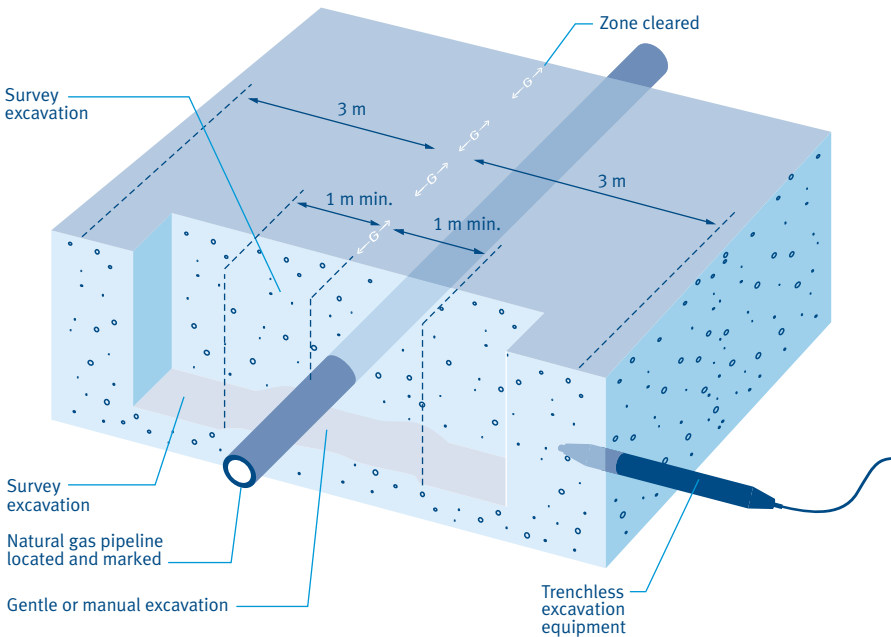


Figure 6: Trenchless excavation equipment perpendicular to a natural gas pipeline

See Section **C.3 Excavation work near an uncovered natural gas pipeline** and install the necessary supports, if applicable.

E.3 VERTICAL DRILLING (CORING)

No drilling is permitted less than 1 m (3 ft) from the markers provided by Gaz Métro.

F – Clearances from underground structures

F.1 UNDERGROUND STRUCTURES PARALLEL TO NATURAL GAS PIPELINES

Underground structures (e.g. sewer lines, water mains, cables, pillars, or any other type of underground structure) parallel to natural gas pipelines must be located at least 1 m (3 ft) from Gaz Métro installations to facilitate any future intervention.

When it is impossible to respect this distance, special measures need to be considered. In such situations, communicate with the Gaz Métro's **district engineer** responsible for the sector concerned by calling **1 844 780-4355** to propose an alternative solution for approval.

F.2 UNDERGROUND STRUCTURES CROSSING NATURAL GAS PIPELINES

Underground structures (e.g. sewer manholes, sewer lines, water mains, cables, pillars, etc.) that cross natural gas pipelines must be located at least 300 mm (12 in) to the side of, or below the Gaz Métro installations (see Figure 7). If possible, this distance should be maximized to facilitate any future intervention.

When it is impossible to respect a clearance of 300 mm (12 in), communicate with the Gaz Métro's **district engineer** responsible for the sector concerned by calling **1 844 780-4355** to find an acceptable solution to Gaz Métro.

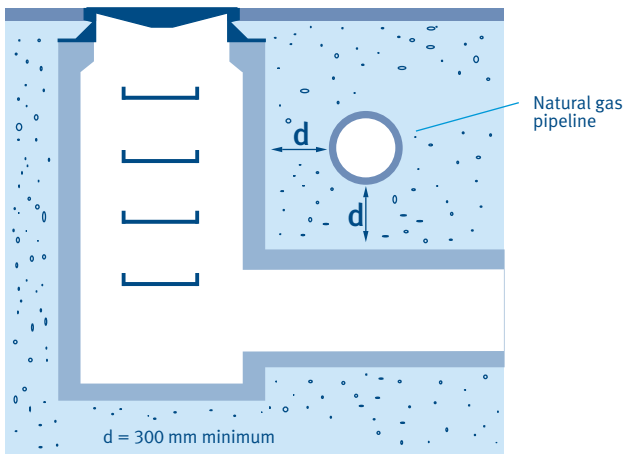


Figure 7

F.3 RUPTURING A SEWER LINE

If you discover that a natural gas pipeline has ruptured a sewer line, communicate immediately with Gaz Métro's **Customer Service** by calling **1 844 780-4355**.

F.4 PLANTING TREES AND SHRUBS

Trees must be planted at a minimum clearance distance of 1.5 m (5 ft) between the wall of the natural gas pipeline and the trunk of the tree at maturity.

Shrubs must be planted at a minimum clearance distance of 1 m (3 ft) between the wall of the natural gas pipeline and the trunk of the shrub at maturity.

When it is impossible to respect these clearances, communicate with the Gaz Métro's **district engineer** responsible for the sector concerned by calling **1 844 780-4355** to find a solution acceptable to Gaz Métro.

G – Backfilling and covering

G.1 BACKFILLING

To avoid damaging the coating on natural gas pipelines, the backfill material (covering around the pipeline) must comply with the granulometric requirements shown in Table C and Table D below. The types of granulate shown in Table C may be used, but they must meet the specifications shown in Table D.

TABLE C: APPROVED GRANULATES*

Type de granulate	Classification	Note
Backfill material for covering	BC 80 µm-5 mm	NQ 2560-114
	Concrete sand 0-5 mm	
	Manufactured sand 0-5 mm	
	Crushed gravel 0-5 mm	
	Granitic sand 0-5 mm	

* The materials shown in Table C must respect the granulometric requirements shown in Table D.

TABLE D: GRANULOMETRIC REQUIREMENTS FOR BACKFILL COVERING

	Sieve		
	20 mm	5 mm	80 µm
% Passing	100	90 – 100	0 – 10

The thickness of the backfill around the natural gas pipeline must be:

- 100 mm (4 in) below;
- 150 mm (6 in) on either side;
- 150 mm (6 in) above*.

* If unshrinkable backfill (concrete fill) is expected to be used above the pipeline, then the thickness of the granulometric backfill must be increased to 300 mm (12 in).

A warning tape (provided by Gaz Métro) indicating the presence of a natural gas pipeline must be placed at a distance varying between 300 and 400 mm (12 and 16 in) under the final surface (see Appendix 2).

No compaction equipment must be used until the backfill above the natural gas pipeline and connections (e.g. service line tee) has reached a depth of 300 mm (12 in).

Between 300 mm and 600 mm (12 in and 24 in), only manual or light compaction equipment (e.g. manual vibrating plate, handheld tamper) may be used. Also, refrain from driving over the pipeline to avoid subjecting it to excessive stress.

Once deeper than 600 mm (24 in) compacted, heavy compaction equipment (e.g. roller) may be used up to the final level.

TABLE E: COMPACTION EQUIPMENT

Thickness of backfill above natural gas pipeline	None	Light	Heavy
< 300 mm	X		
300 – 600 mm		X	
> 600 mm			X

In the case of natural gas pipelines operating at a pressure superior to 2,900 kPa (420 psi), the backfill required for the operations described in the preceding paragraphs must be specifically validated for each case. Communicate with the Gaz Métro’s **district engineer** responsible for the sector concerned by calling **1 844 780-4355**.

G.2 FINAL COVERING

The thickness and the nature of the final covering for natural gas pipelines must always comply with the minimum requirements described in Appendix 3. Also, they must comply with the requirements of the municipality or those of Transports Québec for lands that belong to them or that fall under their jurisdiction when their requirements are higher than those shown in Appendix 3.

H – Blasting, dynamic compaction and pile-driving

The use of one of these techniques near natural gas pipelines must be done with great care since they generate vibrations that are likely to impact the integrity of those natural gas pipelines.

Consequently, an authorization request must be submitted for analysis purposes to the Gaz Métro's **district engineer** responsible for the sector concerned at least twenty (20) working days before the start of work in the following situations:

- All blasting or dynamic compaction work to be done less than **60 metres (200 feet)** from a natural gas pipeline operating at a pressure superior to 2,900 kPa (420 psi), or less than **30 metres (100 feet)** from a natural gas pipeline operating at a pressure not exceeding 2,900 kPa (420 psi).
- All pile-driving work to be done less than **30 metres (100 feet)** from a natural gas pipeline operating at a pressure superior to 2,900 kPa (420 psi), or done less than **10 metres (30 feet)** from a natural gas pipeline operating at a pressure not exceeding 2,900 kPa (420 psi).
- All blasting, dynamic compaction or pile-driving work to be done at distances beyond those mentioned in the preceding paragraphs, but whose anticipated vibrations on the natural gas network exceed a speed of **25 mm/s** or an amplitude of **0.075 mm** for blasting and of **0.2 mm** for dynamic compaction or pile-driving (corresponding to 50% of the vibration limits described on the following page).

For analysis purposes, the request must include the following:

- Name of the contractor and the Worksite Manager;
- The dates when blasting work, dynamic compaction and/or pile-driving are planned;
- Construction plan showing the location of the worksite and the locate ticket showing any natural gas pipelines (Info-Excavation);

- Description of the blasting, dynamic compaction and/or pile-driving techniques to be used, including safety measures for the public and workers;
- Calculations of vibrations (anticipated speed and amplitude on natural gas pipelines) signed and sealed by an engineer;
- Method for measuring vibrations during the work (e.g. use of seismographs) in order to be able to confirm the calculations;
- Declaration indicating that the daily seismographic results will be sent to the Gaz Métro's **district engineer** responsible for the sector concerned within 24 hours following the work;
- Declaration indicating that any seismographic result that exceeds the vibration limits described below will lead to the immediate interruption of work, which work will not be resumed until after authorization by Gaz Métro.

VIBRATION LIMITS

For **blasting work**, the maximum vibration limits on the installations of the natural gas network are as follows:

- 50 mm/sec: maximum vibration speed (or speed of particles) measured in any one of the three (3) shock wave components (transversal, longitudinal or vertical) from the same detection point.
- 0.15 mm: maximum vibration amplitude (horizontal or vertical) measured from the same detection point.

For **dynamic compaction and/or pile-driving work**, the maximum vibration limits on the installations of the natural gas network are as follows:

- 50 mm/sec: maximum vibration speed (or speed of particles) measured in any one of the three (3) shock wave components (transversal, longitudinal or vertical) from the same detection point.
- 0.4 mm: maximum vibration amplitude (horizontal or vertical) measured from the same detection point.

TABLE F: REQUEST FOR AUTHORIZATION

Situation A		
Blasting or dynamic compaction	Distance	Request for authorization required
Pressure > 2 900 kPa	< 60 m	Yes
Pressure ≤ 2 900 kPa	< 30 m	Yes
Pile-driving	Distance	Request for authorization required
Pressure > 2 900 kPa	< 30 m	Yes
Pressure ≤ 2 900 kPa	< 10 m	Yes

OR

Situation B			
Blasting	Anticipated vibration speed	Anticipated vibration amplitude	Request for authorization required
All pressures	> 25 mm/s	–	Yes
All pressures	–	> 0,075 mm	Yes
Dynamic compaction or pile-driving	Anticipated vibration speed	Anticipated vibration amplitude	Request for authorization required
All pressures	> 25 mm/s	–	Yes
All pressures	–	> 0,2 mm	Yes

I – Contact us

If you have any questions about this Guide, please communicate with the Gaz Métro’s **district engineer** responsible for the sector concerned by calling **1 844 780-4355**.

APPENDIX 1: CHARACTERISTICS

CHARACTERISTICS OF NATURAL GAS STEEL PIPELINES

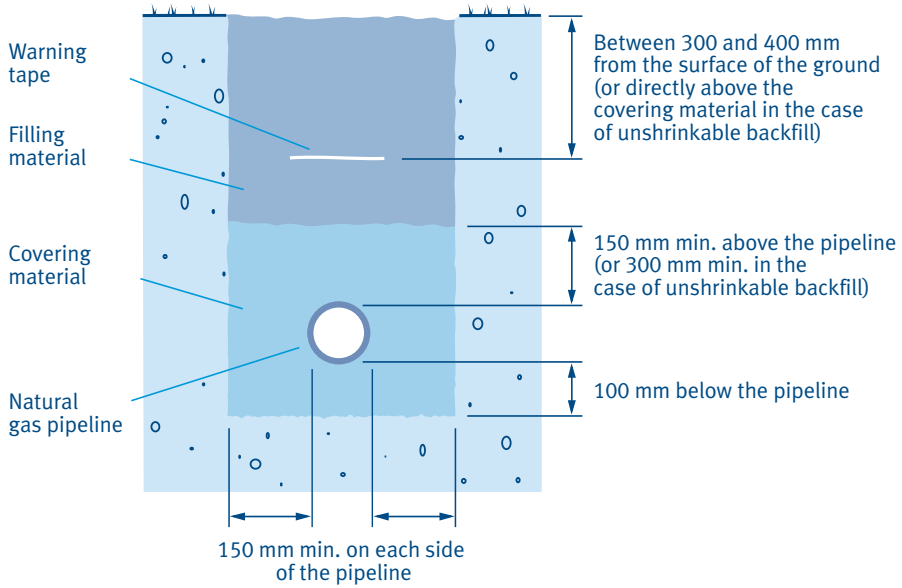
External diameter (mm)	Nominal diameter (in)	Mass (kg/m)	Mass (lb/ft)
26.7	3/4	1.7	1.14
42.2	1 1/4	3.4	2.28
60.3	2	5.4	3.63
114.3	4	10.9	7.32
168.3	6	19.4	13.04
219.1	8	25.4	17.07
273.1	10	36.9	24.80
323.9	12	50.1	33.67
406.4	16	77.6	52.14

CHARACTERISTICS OF NATURAL GAS POLYETHYLENE PIPELINES

Average external diameter (mm)	Nominal diameter (in)	DR*	Average mass (kg/m)	Average mass (lb/ft)
15.9	1/2	7	0.10	0.07
26.7	3/4	11	0.19	0.13
26.7	3/4	8.8	0.23	0.16
42.2	1 1/4	10	0.51	0.34
42.2	1 1/4	8.8	0.57	0.38
60.3	2	11	0.94	0.63
60.3	2	8.8	1.14	0.77
88.9	3	8.8	2.48	1.67
114.3	4	11	3.36	2.26
114.3	4	8.8	4.14	2.78
168.3	6	11	7.28	4.89
168.3	6	8.8	9.01	6.05
219.1	8	13.5	10.28	6.91

* DR: Ratio of average external diameter over minimum thickness of wall.

APPENDIX 2: BACKFILLING



The following drawing does not necessarily reflect actual worksite conditions.

APPENDIX 3: FINAL COVERING

Pressure class (kPa)	Nature of land (mm)								
	Water way	Farm land	Vacant lot	Ditch	Road (note 2)	Railroad right-of-way (note 4)			
						Direct	Inserted	Direct	Inserted
700 & less	1,500	1,000	700	1,000	700	1,830	1,000	3,050	1,680
1,000–2,900	1,500	1,000	800	1,000	1,000	1,830	1,000	3,050	1,680
over 2,900	1,500	1,200	900	1,200	1,200	1,830	1,200	3,050	1,680

The data in the above table do not necessarily reflect actual worksite conditions.

- 1 The burial depth must always be calculated based on the nature of the land and the final elevation planned.
- 2 The minimum coverage of pipelines in a pressure class superior to 2 900 kPa (420 psi) under road must be verified specifically for each case. Communicate with the Gaz Métro's **district engineer** responsible for the sector concerned by calling **1 844 780-4355**.
- 3 A temporary or a permanent covering of more than 3 m (10 ft) over a pipeline is not permitted at any time.
- 4 If a pipeline has to run alongside a railroad right-of-way at a distance of 15 m (50 ft) or less from the centreline of the closest track, the pipeline must be buried at a greater depth. Communicate with the Gaz Métro's **district engineer** responsible for the sector concerned by calling **1 844 780-4355**.

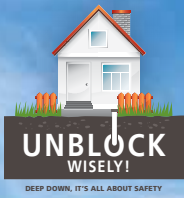
APPENDIX 4: HYDRO-EXCAVATION

The following procedure must be followed at all times when excavating by hydro-excitation within less than 1 m (3 ft) from a natural gas pipeline.

- 1 Obtain locates of natural gas pipelines and other underground structures.
- 2 Only a competent, qualified worker must operate the hydro-excitation equipment.
- 3 The maximum water pressure to be used at any time during excavation with a straight tip nozzle⁵ is 17,250 kPa (2,500 psi). At a depth of more than 45 cm (18 in), the water pressure must be reduced to a maximum of 10,350 kPa (1,500 psi) at all times when using a straight tip nozzle. All pressure measurements must be taken from the hydro-excavator (truck, pump).
- 4 The maximum water pressure to be used at any time during excavation with a spinning tip nozzle⁶ is 20,700 kPa (3,000 psi). When a spinning tip nozzle⁶ is used, pressure measurements must be monitored constantly using a calibrating device mounted on the hydro-excavator (truck, pump) or on the wand.
- 5 The wand must never remain motionless during an excavation. Always avoid aiming directly at the natural gas pipeline.
- 6 Maintain a distance of 20 cm (8 in) between the nozzle end of the wand and the natural gas pipeline or the bottom of the excavation. Never insert the nozzle in the bottom of the excavation when excavating above a natural gas pipeline.
- 7 Only use hydro-excitation equipment and nozzles designed expressly for use above buried natural gas pipelines or other underground structures.
- 8 The wand must be fitted with a device capable of stopping the excavation on demand, such as an automatic trigger or a safety valve.
- 9 If the excavation is using hot water, the temperature and pressure of the water must never exceed 45°C (115°F) and 17,250 kPa (2,500 psi) respectively.
- 10 If the natural gas pipeline is damaged when using hydro-excitation or any other method of excavation, the excavator must communicate with Gaz Metro's **Customer Service** by calling **1 844 780-4355**.

⁵ **Straight tip nozzle:** A straight tip nozzle is a single orifice that can be inserted into the end of the wand used with hydro-excavator in such a way as to produce a single concentrated jet of water exiting from the nozzle.

⁶ **Spinning tip nozzle:** A spinning tip nozzle consists of a conically shaped housing that contains a single exit orifice (to facilitate the flow of the liquid) and a rotor insert. The rotor insert has a series of blades that, when the liquid flows, are forced to spin around the longitudinal axis of the nozzle. The rotor insert also contains three (3) or more channels that force the liquid to flow in different paths through the insert which, because of the high pressure of the liquid, is forced into contact with the nozzle housing. The liquid flowing through the nozzle is dispersed through the tip of the nozzle housing in a conical shape, at an angle of at least 20°.

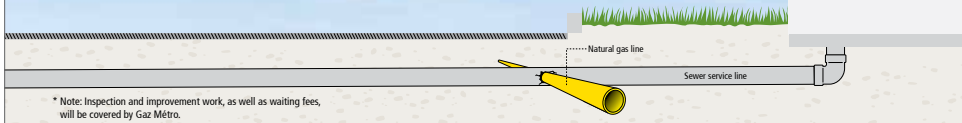


CALL BEFORE YOU CLEAR!

Before you attempt to clear a blocked sewer line using mechanical tools or a high-pressure water jet, make sure you take all the necessary safety precautions.

SAFETY MEASURES TO BE RESPECTED

- 1 Call Info-Excavation at 1 800 663-9228 and select the emergency option.
- 2 If Info-Excavation can confirm that there is no interference between the natural gas and sewer service lines, you will be given verbal authorization and a file number indicating you can proceed.
- 3 If there are natural gas lines, a crew will be sent to the site to locate the natural gas and the sewer service lines.
- 4 If a natural gas line does interfere with the blocked sewer service line, the situation will be corrected immediately and a document will be issued subsequently, allowing you to proceed with the work.



* Note: Inspection and improvement work, as well as waiting fees, will be covered by Gaz Métro.

It's easy, it's fast, and it's free!
 1 800 663-9228 | info-ex.com



Budget: Excavation project	\$342,650
Materials & labour	- \$295,314
Breakage of underground lines	- \$98,252
TOTAL	(\$50,916)



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