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Excavation and quarrying works in the vicinity of a natural gas pipeline

Gasgrid is responsible for the functioning of the natural gas transfer network in Finland. To ensure safe use of the natural gas pipeline, a permission must be obtained from Gasgrid for any excavation work and quarrying work performed in the vicinity of the pipeline.

Act in good time

A permit must be applied for at the planning phase of the works. A permit is needed for excavation, quarrying and blasting works that take place closer than 30 metres from the natural gas pipeline. In ground and excavation works, a permit is needed for up to 30 metres, at which level the limiting value of vibration velocity is 8 mm/s.

A permit is also needed for extensive quarrying works that take place in the vicinity of natural gas pipelines, see the table for allowed vibration velocity.

The performer of blasting works is responsible for ensuring that the work is carried out in compliance with valid statutes and legislation, as well as Gasgrid's, the blasting sector's and local authorities' guidelines and regulations. The performer of blasting works must also, on the basis of his or her own experience, take into account any other possible danger and safety risks caused by the blasting works.

The permit applicant must be in contact with Gasgrid's expert or the central control station. Gasgrid's supervisor monitors the progress of the blasting work, and he or she must be notified of the start of blasting works at least 3 working days in advance.

Required plans

Master plan: Before starting blasting and quarrying works, the performer of the work must prepare a master plan for the site, as well as other plans required by the regulations.

In extensive quarrying, the location of the pipeline must be determined before the start of the works.

The performer of the works prepares all the plans required for the quarrying works and presents at least the master plan, the blasting plan and the quarrying vibration measuring plan to Gasgrid's contact person before starting the quarrying works.

Blasting plan: The performer of the work prepares a blasting plan before starting the drilling work in each field. If changes occur, the blasting plan is updated and Gasgrid's contact person is notified of the changes.



If the limiting values of vibration measuring are exceeded, this must be reported to Gasgrid without delay.

Prevent flyrock

When performing blasting works, the dangers created by stones flying and being thrown must be taken into account.

In the vicinity of the blasting works, also the possible damaging impact of blasting gases must be taken into account if the direction of joint is in an unfavourable direction. In this case, the work must be performed for example by pooling. Flyrock is prevented by covering the blasting fields. Particular attention to preventing flyrock is when performing grading works or when blasting individual rocks. The danger of splinters can, for example as a result of a drilling error, extend to an area of hundreds of metres from the blasting site.

When quarrying near a natural gas pipeline or a related compressor, valve and pressure-reduction stations, the breaking direction of the fields blasted should be away from the sites.

In quarrying permit matters, please contact:

Gasgrid Finland Oy

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Measuring vibration and limiting values

The protection, damping and vibration measuring plan for the buildings, constructions and equipment located in the vicinity of the blasting site is prepared separately for each work site. Vibration measuring must be performed if there is reason to suspect that the work may cause significant vibration. In addition, vibration measuring is always performed for extensive quarrying sites that are located under 100 metres from a natural gas pipeline.

In ground and excavation works, vibration measuring is performed for works that are located less than 30 metres from a natural gas pipeline or if there is reason to suspect that the work may cause significant vibration.

Vibration measuring must be performed using three-component vibration meters, whose measuring transducer is attached to the natural gas pipeline. If separately agreed, ground spikes can be used in the measuring. The use of ground spikes is suitable for heavy-textured soil and silt soil, where the pike can be installed in a sufficiently firmly in the immediate vicinity of the pipeline. With ground spikes, limiting values that are 50% of the limiting values in the guideline's table are used.

It is recommended that a person with the competence of a vibration expert (FISE) is used in the selection of the vibration measuring site and installation of the measuring equipment.

Vibration measuring values are continuously monitored during the work, and they are recorded in a vibration measuring field log, or alternatively, in an electronic measuring system. Measured values and the location data of the charged fields (distance to the measuring point) are delivered weekly to Gasgrid's contact person. A written end report on the results of the measurements must be prepared for Gasgrid's representative. If the limiting values allowed for blasting work are exceeded, the work is immediately halted and the reasons for the limiting values being exceeded are determined. If a single limiting value is exceeded by less than 20% and the reason is not systematic, the work can be continued in accordance with the plan.

If the limiting values of vibration measuring are exceeded, this must be reported to Gasgrid without delay.

If exceeding the values results from the plan or an error in working methods, the work can only be continued when the plans have been rectified and approved by Gasgrid.

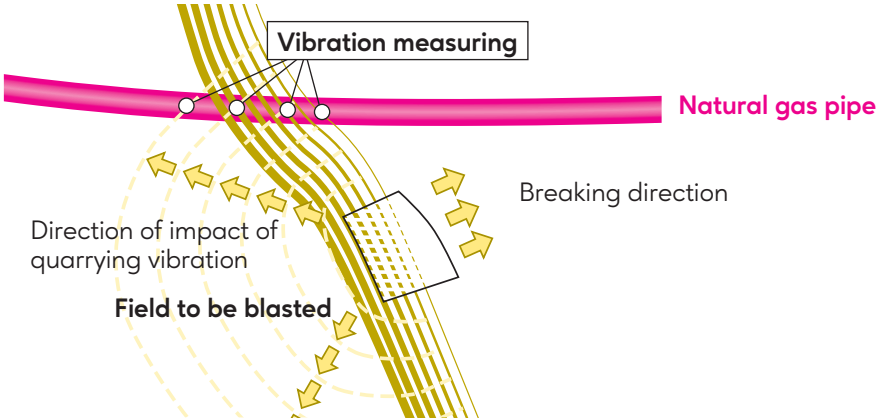
In excavation work, measuring and the monitoring of measurements must be planned in such a manner that events where the limiting values are exceeded do not occur. In the measuring, it is recommended that for example text messages to the performer and the supervisor of the work are used. Alternatively, if there is reason to suspect higher vibration levels, the results of the measurements must be read sufficiently often.

If the excavation work cannot be performed within the boundaries of the limiting values, Gasgrid's supervisor must be notified of the situation.

In excavation works and blasting works, the condition of the meter must be monitored daily. The work may not be continued if vibration levels cannot be verified by measuring.

The general guideline value provided for structures and buildings are found in the Finnish Association of Civil Engineers RIL's publication RIL253-2010 "Vibration caused by construction".

Placing of vibration measuring points



If the end filling of the pipe is for example peat, the breaking direction must be changed because of flyrock risk.

At a distance of 100–500 m and when the quarrying area is in excess of 3,000 k-m³, the vibration damage impact and the need for measuring must be determined.

In ground and excavation works, a permit is needed for up to 30 metres. The limiting value of vibration velocity is 8 mm/s. The pipe's overall migration limit is 1 mm.

Allowed vibration velocity of natural gas pipelines

Distance	Limiting value	Procedure
10 m	56 mm/s	permit is needed for up to 30 metres
20 m	44 mm/s	permit is needed for up to 30 metres
30 m	36 mm/s	permit is needed for up to 30 metres
40 m	34 mm/s	notification, in addition a permit if $Q_m > 4.0$ kg
50 m	30 mm/s	notification, in addition a permit if $Q_m > 5.5$ kg
100 m	22 mm/s	notification, in addition a permit if $Q_m > 16.5$ kg

The instantaneous amount of explosive in the table (Q_m) determines the guidelines for extensive quarrying work at a distance of 30–100 metres. The table is in accordance with table 1 in Appendix 5 of the guideline RIL 253-2010.

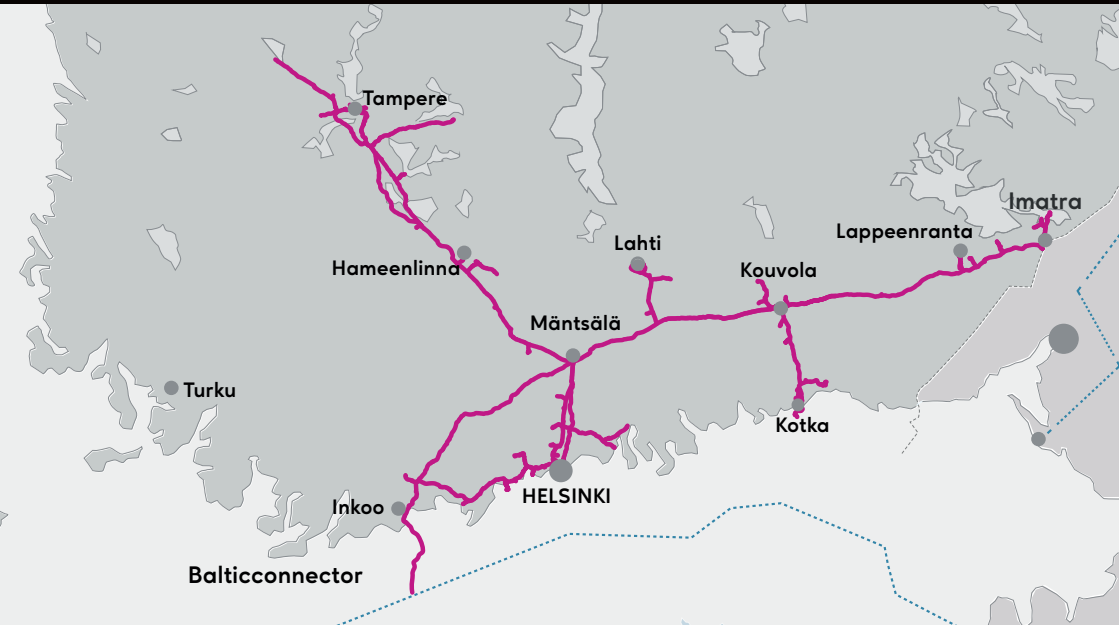
When measuring with ground spikes, limiting values that are 50% of the table's limiting values are used.

Remember!

In quarrying permit matters, please contact:

Gasgrid Finland Oy • Dispatching Center +358 20 447 8713

- 1 Plan the blasting work carefully, comply with the guidelines and regulations.
- 2 Obtain a permit from Gasgrid at the planning phase of the works.
- 3 Remember safety; prevent stones flying toward natural gas equipment.
- 4 Monitor the vibration caused by quarrying or excavation work, report regularly.



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