

PREFACE BY AUTHOR

(notes for constructors and planners)

This specification template is designed to provide the author of the draft with instructions on the possible tendering of controlled pipe jacking ID 150 – ID 800. It contains only those RFQ items that are necessary for the actual pipe jacking tendering in view of the author of this guideline.

The most important standards, rulesets, accident prevention regulations, recommendations and contractual provisions to be observed and/or applied are listed under item 3.

This specifications template must be individually checked and customized for each case. The author of the draft must edit all points in section 0 „Notes on creating the RFQ specification of the general technical contractual provisions for building services DIN 18299 ff“ as per section 7 para. 1 no. 7 VOB/A (General Local Authorities Code for the Delegation of Building Services) For unmanned, controlled pipe jacking ID 150 – ID 800, this specifically means ATV DIN 18299 and ATV DIN 18319.

Various pipe jacking methods can be suitable for controlled pipe jacking ID 150 – ID 800. The applicability of a specific method is determined by the ground conditions. Notes on this are provided in this guide and in Annex B of worksheet DWA-A 125E. DIN 18319 assigns responsibility for selecting the pipe jacking method and construction sequence, as well as for providing the construction equipment to the contractor (section 3.1.2.). This approach means that the purchaser can benefit from the special civil engineering company's specific experience in this sector without unnecessarily restricting competition. For this reason, the following RFQ specification template does not use any method designations. However, in individual cases, it may be necessary for the purchaser to define the pipe jacking method. This approach is permissible as per section 0.3.2 DIN 18319. In such a case, the authors recommend calling an recognized expert in this sector to determine the pipe jacking method, or to call in such experts for support.

Surveying and describing the ground in the course of the planning process is a mandatory precondition for selecting a suitable pipe jacking method. The basic approach is regulated in sections 2.2 – 2.4 of DIN 18319. The notes in sections 0.2.2 – 0.2.6 and 0.2.8 of DIN 18319 must be observed in addition.



On publication of the supplementary volume 2015 for VOB 2012, the system of describing the ground in the RFQ documents was changed. The surveyed ground must now be broken down into homogeneous areas as per the respective maintenance group regulations. The properties and characteristics as well as the determined bandwidth must be specified for each ground condition area (homogeneous area). This can be done in the respective RFQ items. For a better overview, the recommendation is to only state the various homogeneous areas, possibly the depth graduations (as per DIN 18300 and 18303 for start, intermediate and target shafts) or length graduations (as per DIN 18319 for pipe jacking work) for each RFQ item, and to list the matching properties and characteristic values in a separate document, which must be marked as a part of the request for quotation.

In addition to performance and reliability, the professional suitability of the bidders for implementation of the pipe jacking work must be verified. RAL GZ 961 paragraph 3.5 or 3.6 can be referenced as criteria for this, depending on the quoted pipejacking method.

The items listed in the following relates directly to pipe jacking-specific work. Planners must formulate additional items, such as acceptance criteria, visual inspection, leakage testing of the components, etc.



TENDER FOR UNMANNED, CONTROLLED PIPE JACKING ID 150 TO ID 800

1. Service description

Preliminary remarks on the specifications

DWA-A 161, DWA-A 125 and DIN EN 14457, as well as the respective product standards must be observed for the design of the jacking pipes.

Design of the supporting structure for jacking pipes must be implemented in line with DWA-A 161E.

The planning of the supporting structure and evidence of suitability for purpose must be verified by a qualified test engineer where appropriate. The test report must be submitted to the purchaser two weeks before the scheduled start of the section of the building works in question at the latest. The test engineer's fees will be reimbursed on request.

DIN 18319, DIN EN 12889 and DWA-A 125E must be observed in the implementation of the pipe jacking work.

The contractor must have a quality assurance system (in-house and external auditing) in place for the pipe jacking work. Quality assurance in sewer construction RAL-GZ 961 contains a system of this type for implementation section V. The bidder must include the costs of this in the unit costs for controllable pipe jacking.

With respect to occupational and health protection of the staff employed, reference is made to DGUV Information Sheet 201-020.

Note for the planner: You may need to add further preliminary remarks here!



2. Applied German standards and directives

The current versions of the following standards and directives must be applied. The list does not claim to be complete.

DIN EN 1610: Construction and testing of drains and sewers
 DIN EN 12889: Trenchless construction and testing of drains and sewers
 DIN EN 14457: General requirements for components specifically designed for use in trenchless construction of drains and sewers
 DIN 18299: General regulations for construction work of all types
 DIN 18300: Earthworks
 DIN 18303: Building works
 DIN 18319: Pipe jacking works
 Worksheet DWA-A 125E: Pipe jacking and related methods
 Worksheet DWA-A 139: Construction and testing of drains and sewers
 Worksheet DWA-A 161E: Static computation of thrust pipes
 DGUV Information Sheet 201-020: Safety instructions for trenchless construction, revised
 quality and testing provisions RAL-GZ 961: Manufacture and maintenance of drains and sewers

DWA : German Association for Water, Wastewater and Waste; 53773 Bad Hennef, Germany

3. Specifications

Item	Text	Unit price	Total price
1	General installation of the jobsite , such as transporting to the site, setting up, moving, removing and transportation of equipment from the site, devices, machines, construction containers, site caravans, accommodation, sanitation storage and workshop containers; additionally the materials for lining construction shafts and reinforcements, as well as barriers, signage and lighting Billing 60 % after setting up, 40 % after clearing Lump sum	_____ €	_____ €
2	Providing the general jobsite installations , required machines, devices and equipment during the contractually agreed construction period Months	_____ €	_____ €
3	Transportation to the jobsite, transportation from the jobsite and installation and removal of the machines, devices and equipment required for performing the pipe jacking works Billing 60 % after setting up, 40 % after clearing Lump sum	_____ €	_____ €



Item	Text	Unit price	Total price
4	<p>Constructing the start shaft in ...¹⁾ design, watertight²⁾, including stiffening, watertight²⁾ reinforced²⁾ concrete bottom and the required installations such as ladders, fall protection, etc. The unit cost includes the following services:</p> <ul style="list-style-type: none"> a) Manufacturing the shaft lining b) Delivering and providing all required materials c) Breaking out, loading and conveying soil and rock, also underwater where necessary d) Setting up and operating the water retention system²⁾ e) Setting up and operating the residual water retention system²⁾ f) Converting the launch shaft in case of tunnelling in multiple directions²⁾ g) Backfilling and compaction h) Remaining of the shoring²⁾ i) Removal of the shoring²⁾ j) Removal of the shoring from upper edge of terrain to ...¹⁾ m below at the edge of terrain²⁾ k) Implementation planning²⁾ l) Structural planning²⁾ <p>The dimensions¹⁾ of the start shaft are: Length: ... m Width: ... m Depth: ... m or Diameter: ... m²⁾</p> <p>The dimensions of any shaft construction to be installed at a later time must be taken into consideration here as per the specifications of the implementation planning.</p> <p>Construction in the ground condition areas with the following properties and characteristic values:³⁾</p> <p>... % in ground condition, area A:</p> <hr/> <p>... % in ground condition, area B:</p> <hr/> <p>... % in ground condition, area C:</p> <hr/> <p>Billing 70 % on completion, 30 % after deconstruction</p> <p>... pieces</p> <p>¹⁾ Details provided by planner or bidder ²⁾ Please delete if non-applicable ³⁾ Details by planner; percentage of thickness of the respective ground condition area related to the maximum excavation depth of the construction shaft</p>	<p>_____ €</p>	<p>_____ €</p>



Item	Text	Unit price	Total price
5	<p>Target shaft, however, services described as in item ³⁾,</p> <p>The dimensions¹⁾ of the target shaft are:</p> <p>Length: ... m</p> <p>Width: ... m</p> <p>Depth: ... m or</p> <p>Diameter: ... m²⁾</p> <p>Construction in the ground condition areas with the following properties and characteristic values:³⁾</p> <p>... % in ground condition, area A:</p> <p>.....</p> <p>... % in ground condition, area B:</p> <p>.....</p> <p>... % in ground condition, area C:</p> <p>.....</p> <p>Billing 70 % on completion, 30 % after removal</p> <p>... pieces</p> <p>¹⁾ Details provided by planner or bidder ²⁾ Please delete if non-applicable ³⁾ Details by planner; percentage of thickness of the respective ground condition area related to the maximum excavation depth of the construction shaft</p>	<p>_____ €</p>	<p>_____ €</p>



Item	Text	Unit price	Total price
6	<p>Intermediate shaft, however, services described as in item ³, (for construction of connecting sewers). The dimensions¹⁾ of the intermediate shaft are:</p> <p>Length: ... m</p> <p>Width: ... m</p> <p>Depth: ... m or</p> <p>Diameter: ... m²⁾</p> <p>If the intermediate shaft is used as a connecting shaft, any required intermediate backfilling and re-excavation must be included in the unit cost.</p> <p>Construction in the ground condition areas with the following properties and characteristic values:³⁾</p> <p>... % in ground condition, area A:</p> <hr/> <p>... % in ground condition, area B:</p> <hr/> <p>... % in ground condition, area C:</p> <hr/> <p>Billing 70 % on completion, 30 % after removal</p> <p>... pieces</p> <p>¹⁾ Details provided by planner or bidder ²⁾ Please delete if non-applicable ³⁾ Details by planner; percentage of thickness of the respective ground condition area related to the maximum excavation depth of the construction shaft</p>	<p>_____ €</p>	<p>_____ €</p>



Item	Text	Unit price	Total price
7	Disposal of soil , removing and disposing of material excavated from the start, intermediate, target or recovery shafts. Landfill fees will be reimbursed on request. ... t	_____ €	_____ €
8	Delivering soil free of stones and capable of compaction for backfilling the start, intermediate, target and recovery shafts. ... t	_____ €	_____ €
9	Start seal , measures to prevent water and soil ingress as per the purchaser's planning when moving the tunnelling machine out of the start shaft. The unit price must also include the expenditures for one, or a combination of multiple, ground safeguarding measures, compaction of the annular space between the tunnelling machine and/or thrust pipe and the shaft shoring during all phases of the outward move, and final sealing of the annular space between the jacking pipe and the shaft lining. All costs for planning and any required numerical simulations and their verification must be included. Remuneration will be on a one-off basis for each tunnelling length. Selected measures:..... ... pieces	_____ €	_____ €
10	Target joint , services as described previously, however, for moving into the target shaft. Selected measures:..... ... pieces	_____ €	_____ €
11	Intermediate shaft joint , services as described previously, however, for passing through an intermediate shaft. Remuneration will be on a one-off basis for each intermediate shaft. Selected measures:..... ... pieces	_____ €	_____ €



Item	Text	Unit price	Total price
12	<p>Jacking pipes ID ...¹⁾ made of vitrified clay, reinforced concrete, ...^{1) 2)} as per DIN ...¹⁾ including seals³⁾, joints³⁾ and pressure transfer devices³⁾ delivering and unloading. As for ID 800 the thrust pipes may need to be equipped with injection ports for injecting a lubricant and support agent into the annular gap between the jacking pipe and the ground. All costs for delivering launch pipes, adapting tailskins, delivering fit pipes and shortening thrust pipes must be included in the unit price. Structure of the jacking pipes and their design, taking into consideration the anticipated and permissible thrust forces and the purchaser's specifications, is the responsibility of the contractor. The costs of this must be included in the unit price.</p> <p>Tests of the jacking pipes, seals, joints and pressure transfer devices required as per DIN EN 12889 and DWA -A 125E must be documented. Pipes and components that fail the test must not be installed. The expenditures this involves must be included in the unit price.</p> <p>... m</p> <p>¹⁾ Details provided by planner ²⁾ For reinforced concrete jacking pipes, the exposure class and any internal and/or external corrosion protection must be specified by the planner or designer. ³⁾ Specific requirements for seals, joints or pressure transfer components must be specified by the planner.</p>	<p>_____ €</p>	<p>_____ €</p>



Item	Text	Unit price	Total price
13	<p>Unmanned, controlled pipe jacking ID ...¹⁾ using the microtunnelling or pilot pipe jacking method as per worksheet DWA-A 125, section 6.1.3.1 or 6.1.3.2.</p> <p>Selected method:.....²⁾</p> <p>The unit cost also includes the following services:</p> <p>a) Planning, structural design, construction and removal of the thrust walls a) Planning, structural design, construction and removal of working bases or working platforms c) Providing and removing electricity and water connections d) Provide, setup, operate and removal of power generators e) Loading, transportation away and disposal of excavated material (including landfill costs) f) Providing all required materials</p> <p>Construction in the homogeneous areas with the following properties and characteristic values:³⁾</p> <p>... % in ground condition, area A:</p> <p>.....</p> <p>... % in ground condition, area B:</p> <p>.....</p> <p>... % in ground condition, area C:</p> <p>.....</p> <p>... m</p> <p>¹⁾ Details provided by planner ²⁾ Details provided by planner or bidder ³⁾ Details by planner; percentage of thickness of the respective homogeneous area related to the maximum excavation depth of the construction shaft</p>	<p>_____ €</p>	<p>_____ €</p>



Item	Text	Unit price	Total price
14	<p>Construction of the recovery shaft for removing obstacles²⁾ in ...¹⁾ design, including stiffening and the required installations such as ladders, fall protection, etc. The unit cost includes the following services:</p> <ul style="list-style-type: none"> a) Manufacturing the shoring b) Delivering and providing all required materials c) Breaking out, loading and conveying soil and rock, also underwater where necessary d) Setting up and operating the water retention system²⁾ e) Backfilling and compaction f) Removal of the shoring g) Implementation planning h) Structural planning <p>The dimensions¹⁾ of the recovery shaft are:</p> <p>Length: ... m</p> <p>Width: ... m</p> <p>Depth: ... m or</p> <p>Diameter: ... m¹⁾</p> <p>Construction in the ground condition areas with the following properties and characteristic values:³⁾</p> <p>... % in ground condition, area A:</p> <hr/> <p>... % in ground condition, area B:</p> <hr/> <p>... % in ground condition, area C:</p> <hr/> <p>This item is only reimbursed in the case of removal of an obstacle for which the purchaser is responsible.</p> <p>... pieces</p> <p>_____ € _____ €</p> <p>¹⁾ Details provided by bidder ²⁾ Details by planner; statement of dimensions (length, width) ³⁾ Details by planner; percentage of thickness of the respective ground condition area related to the maximum excavation depth of the construction shaft</p>		
15	<p>Removal of obstacles from the tunnel cross section in the recovery shaft. Remuneration will be from the start of exposure to completion of removal of the obstacle. This item is only reimbursed in the case of removal of an obstacle for which the purchaser is responsible.</p> <p>... h</p>	_____ €	_____ €



Item	Text	Unit price	Total price
16	Idle time for the tunnelling- and all associated equipment, e.g., during removal of obstacles through a recovery shaft. A max. of 8 waiting hours per working day will be reimbursed. This item is only reimbursed in the case of removal of an obstacle for which the purchaser is responsible. ... h	 _____ €	 _____ €
17	Removal of obstacles from the tunnel cross section by means of a tunnelling device. Reimbursement is for the reduction in tunnelling performance demonstrated by the contractor only. This item is only reimbursed in case of removal of an obstacle for which the purchaser is responsible. ... h	 _____ €	 _____ €