

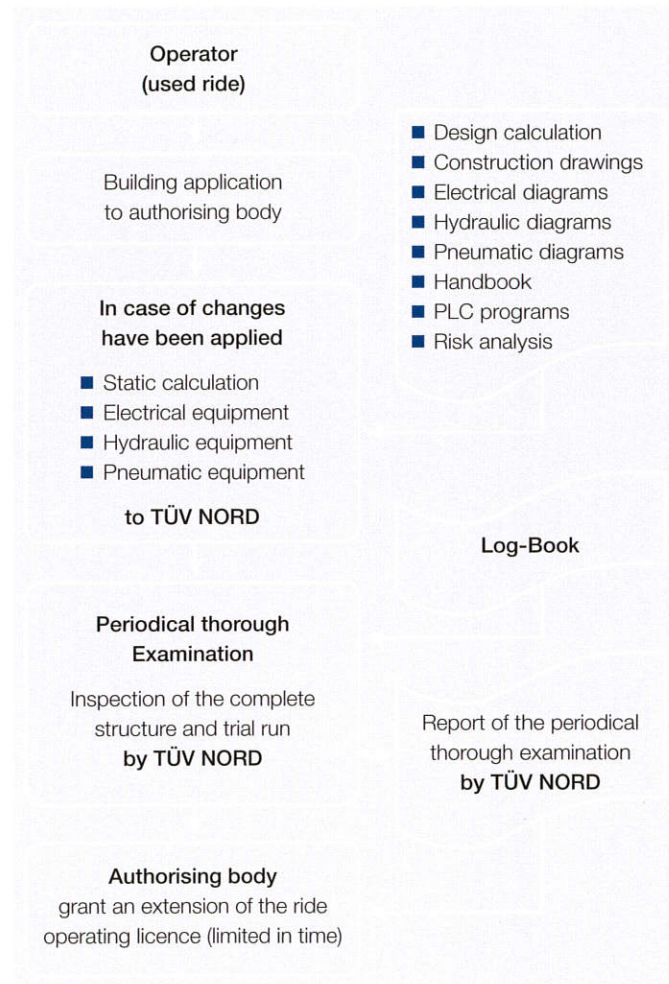
Promoting the spirit of safety and security

Local guidelines and standards

To obtain an extension of the ride operating licence an independent thorough examination has to be carried out. The opposite side flowchart shows the process of the examination. The examination mainly consists of inspection of the completed structure and a trial run. In case of construction changes it demands a review of design documents.

A positive result will lead to an assent for the extension of the ride operating licence again for a limited time. The frequency of inspection intervals depends on kind of amusement ride.

Using the manufacturer's knowhow and the operator's experience and the expert monitoring of our team above described approvals are a guarantee for safety of amusement rides. Safety is an essential characteristic of quality.



For more information please do not hesitate to contact the following TÜV NORD GROUP experts:

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Promoting the spirit of safety and security



Promoting the spirit of safety and security

For more than thirty years, TÜV NORD independent experts have been working worldwide in the business sector of the amusement rides and parks. The TÜV NORD inspection team is properly qualified and experienced in the fields of civil, mechanical, electrical and welding engineering. We accompany manufacturers and operators throughout the entire process of planning, production, installation and operation. In approving amusement rides and fairground attractions we establish an important contribution to ensure safety and quality.

TÜV NORD has been authorised by the German government as "Prüfamt" (authorized body) and thus experts for amusement rides are entitled to issue approvals according German Building Law. These approvals are in compliance with the requirements to obtain a licence permission issued by the authorising body.

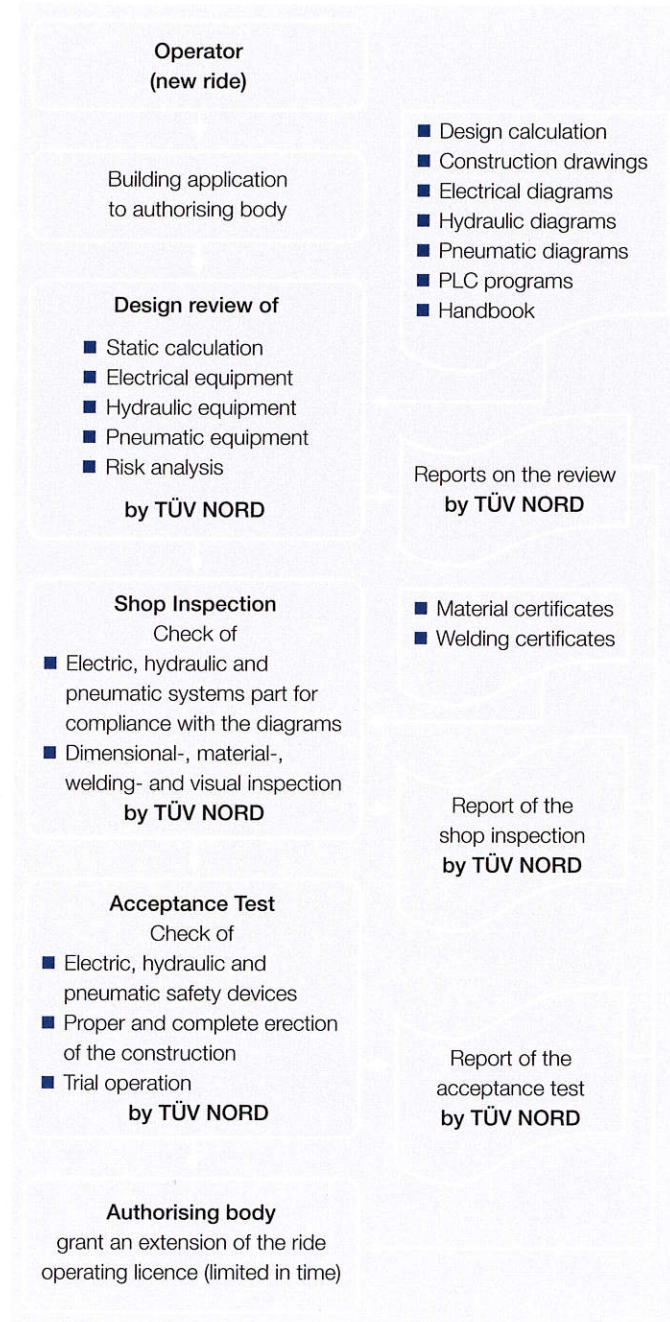
The flowchart opposite side describes the process of the approval. It is executed in three steps:

Step 1: Design Review

Step 2: Shop Inspection

Step 3: Acceptance Test.

The shown scheme is based on the German Building Law. In other countries the process is comparable or where there are no regulations defined the process is adopted in case the costumer requires an approval in order to achieve a high safety level. All can be covered and the approval can be put into execution by TÜV NORD.



First Step

In the first step the construction documents are reviewed. The construction documents shall comprise:

■ **Specification design, construction and operation:**

- ☞ information about features of design and construction
- ☞ possible variations of erection, type of use
- ☞ main dimensions
- ☞ velocity, acceleration, electrical, hydraulic
- ☞ pneumatic equipment and facilities
- ☞ assembly and maintenance
- ☞ risk analysis

■ **Drawings:**

- ☞ overview of the entire construction
- ☞ engineering and detail drawings containing all dimensions, cross-sections, basic materials and joining elements
- ☞ underpinning or anchoring plan with minimum bearing surfaces, thickness and type of anchoring
- ☞ principle circuit diagrams of the electrical, hydraulic and pneumatic systems and safety devices including PLC programming
- ☞ drawings showing the location and arrangement of escape routes including exits, necessary dimensions (width, length, height) and emergency facilities
- ☞ escape route plan

■ **Calculations:**

- ☞ verification of safety against overturning sliding and lifting
- ☞ verification of strength and stability
- ☞ verification of fatigue strength

Second Step

During the second step of the approval a construction inspection is conducted. The inspection should preferably be carried out at the manufacturer's plant. In this step the compliance of the amusement ride and its equipment with the reviewed design documents is checked. Furthermore the workmanship of welds, connecting surfaces, fasteners, etc. is inspected. Welding at amusement devices especially under fatigue conditions must only be conducted by manufacturers who are in possession of welding qualifications for fatigue loaded parts. The required qualifications are specified in the later named standards and shall be verified by certificates. In case manufacturer does not possess the welding qualification an inspection contract shall be concluded for the particular project employing an approved technical inspection agency like TÜV NORD. The scope of the shop inspection also includes a check for the existence of necessary material certificates, certificates of ropes and chains, etc. are checked.

Third Step

The third step of the approval comprises the initial test of the fully erected and ready for operation ride. During trial operation all motions shall be inspected without and with load (full load). In addition, part-load tests shall be carried out with all the asymmetrical loads used for the design calculation. Tests and inspections during the trial run shall cover the electrical, mechanical, hydraulic and pneumatic safety systems and performance thereof, the effectiveness and monitoring of passengers restraint systems, velocity, rotation speeds, start up, lifting, lowering, braking time, failsafe simulation, etc. The full scope of the initial test is laid down in the later named standards and regulations.

Positive approvals of all three steps will result in a limited operation permission for the tested amusement ride.

For the aforementioned approval process the following standards and regulations are applicable:

Germany:

DIN 4112	Temporary structures
DIN EN 13814*	Fairground and amusement park machinery and structures – safety <small>* only applicable if not regulated by DIN 4112</small>
VDTÜV-Code of practice 1507	Principles for the inspection and testing of non-permanent structures
German Building Law	Guidelines for the construction and operation of temporary structures (FLBauR)

All other Countries:

EN 13814	Fairground and amusement park machinery and structures – safety
VDTÜV-Code of practice 1507	Principles for the inspection and testing of non-permanent structures