

Would you like to buy a used ride for use in Germany, Switzerland or the Netherlands? Most of the used rides available in Europe do not have the necessary technical documents to complete the TUV certification process.



MINIMUM REQUIREMENTS FOR USED RIDES THAT CAN BE CERTIFIED BY TUV FOR USE IN GERMANY, SWITZERLAND AND THE NETHERLANDS

by Enrico Fabbri

Many operators from Germany, Switzerland and the Netherlands contact me every week to ask the price of various used rides and ask if these rides have the necessary documents for the TUV certification process required in all these countries. In most cases my answer is negative. This article is a simplified guideline to understand which used rides are most likely to be certified by TUV and why others cannot be certified.

In the European Union, each ride must be certified in the country in which it is to be used by following the certification process in that country. The TUV certification process is the one most concerned with full compliance with EN13814, while the certification process in other countries is simpler.

When a used ride enters one of these countries, it must be certified by the TUV with the same procedure required for the certification of new rides, i.e. in accordance with the latest technical standards set out in EN13814 published in the year 2019.

If you are interested in this topic, we recommend that you read this article very carefully and try to understand the meaning of each paragraph.

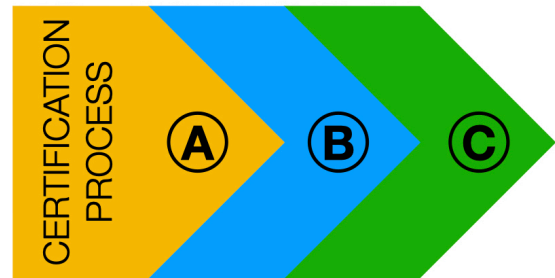
The three steps to Certification

To simplify, the procedure for obtaining TUV certification of a used ride can be divided into three main steps: (A) verification of the design and strength calculation of the structure; (B) verification of the quality of the production process; (C) verification of the assembled ride and function test. The first two

phases are the most important and determine the actual possibility of successful completion.

The procedure required by TUV is the same as that used to certify any other product, such as lifts and cranes. Over time, many related technical standards are updated but the concept remains the same.

It is necessary to successfully complete all three steps to obtain certification, the first two being the most important ones.



(A) Design and strength calculation of structures, fatigue strength verification

Depending on the year of construction of the ride and the technical standards applied by the manufacturer at the time, we can identify the following hypotheses.

(A1) Calculation of the strength of the structure performed in accordance with EN13814 with the fatigue strength calculation code in accordance with EUROCODE. From the date of publication of the latest version of EN13814 in the year 2019, these requirements are mandatory. Approval of the used ride for this phase is considered "possible".

(A2) Calculation of the strength of the structure performed according to EN13814 with the fatigue strength calculation code according to DIN15018. These requirements were required in the first publication of EN13814 in the year 2004. Approval of the used ride for this step is considered "possible" but conditional on further information from the manufacturer that may require additional analyses.

(A3) Calculation of the structure's strength according to DIN4112 with the fatigue strength calculation code according to DIN15018. These requirements were demanded in the last version of DIN4112 from the year 1982. Approval of the used ride for this stage is considered "difficult". You will have to contact the manufacturer of the ride to ask for more information; additional analyses and modifications of the ride may be necessary with very high economic investments, which are often not worthwhile compared to the value of the ride.

(A4) Calculation of the strength of the structure performed in accordance with other standards (i), or

the document does not contain the fatigue strength analysis (ii), or the document is not available from the seller or from the manufacturer of the ride (iii). The approval of the used ride for this step is considered "impossible".

Based on the possible errors and missing parts identified by TUV during the documentation check, the cost of certification may increase or become impossible. The quality of the documentation prepared by the manufacturer and their engineer is an important aspect that many small and medium-sized manufacturers overlook. Checks of the welds of a ride carried out, for example, by TUV engineers in the Czech Republic or Italy, are only a part of the required work and alone do not count as the overall certification of the ride indicated at this stage.

(B) Quality of the production process

The purpose of this activity is to verify that the ride's construction procedures are in accordance with the design already verified by the TUV and in accordance with the quality requirements specified by industry technical standards. Depending on the year of construction of the ride and the procedures applied by the manufacturer at that time, we can identify the following hypotheses.

(B1) The manufacturer had a company quality certificate in accordance with EN1090 (published in the year 2014), or in accordance with the previous standard EN3834 (published in the year 2005), and the TUV had verified the quality of the production process of this ride with technical visits and by issuing a specific certificate. The TUV verification can only be carried out when the ride is assembled and completed, it cannot be carried out afterwards. Approval of the used ride for this stage is considered "possible".

(B2) The manufacturer had a company quality certificate according to EN1090 and the TUV had not verified the production process of that ride with technical visits. The approval of the used ride for this stage is considered "difficult" and conditioned by a derogation of the TUV that takes into account both the documentation prepared by the manufacturer and the type of ride to be certified.

(B3) The manufacturer did not have a company quality certificate and the TUV had not verified the production process of that ride with technical visits. The approval of the used ride for this stage is considered "impossible".

A company quality certificate certifies that the manufacturer follows the procedures laid down in the technical standards to obtain a quality product with qualified personnel and the tracking and archiving of material quality certificates and weld checks carried out.

(C) Final inspection of the assembled ride and final function tests

These activities include the verification of the correct assembly and operation of the ride with particular attention to the passenger safety systems. TUV technicians measure the speed and maximum accelerations of the ride in operation; the results should coincide with the theoretical assumptions contained in the structure's strength calculation.

(D) Other types of TUV certifications

Some European rides put into operation until a few years ago in Dubai (United Arab Emirates) and Hong Kong had obtained provisional certifications from TUV, which were finalized without a verification of the structure's strength calculation and without a verification of the quality of the manufacturing process under the local laws applicable in those countries. The TUV technicians certified that the rides were safe for use with the public based on an on-site verification and for a period of time limited to the duration of the event. These certificates have no validity for the use described in the previous paragraphs.

Conclusions

If you wish to purchase a used ride, it is first necessary to check which production quality process was adopted by the manufacturer when the ride was manufactured and compare it with what we have written in Chapter (B) of this article.

STRESS ANALYSIS OF THE STRUCTURES

		(A1)	(A2)	(A3)	(A4)
QUALITY PRODUCTIONS	(B1)				
	(B2)				
	(B3)				

This table represents in the upper part the four documentation hypotheses concerning the calculation of the strength of the structure (A1 to A4), in the left part it represents the three documentation hypotheses concerning the quality of the production process (B1 to B3). In the central part the different colours summarise our overall opinion. The green colour represents that certification is "possible", the

red colour represents that certification is "difficult" and the black colour represents that certification is "impossible".

Most of the used rides available on the market at the moment fall into category (B3), corresponding to black boxes in our table; this ride may not be TUV approved.

The passenger safety system and the electrical system must be in accordance with current technical standards, so in principle, the older the used ride, the greater the modifications and thus the investments to be made to obtain certification.

Note

This article provides a simplified explanation of the certification process of a used ride for educational training purposes only and intended for non-specialists. The analysis of the technical documentation of the ride requires a good professional background to assess variables that could be decisive for the outcome of the procedure.

If you would like a more in-depth explanation of the contents of this article, please contact your engineer or the manufacturer who produced the ride you are interested in.

Translations into languages other than Italian and English are made with Google and may contain errors.

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