

TAMTRON

WEIGH TO KNOW



GUIDE TO THE DESIGN OF SCALES AND WEIGHING SYSTEMS

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Design for more efficiency and savings over the life cycle of your weighing system

There is a wide range of issues to consider when choosing to implement a weighing system and manage weighing data. When designing the whole system, you need to be familiar with the technology involved, the different interfaces and the standards set by the various authorities. Amidst all the variables, the big picture will determine how reliable, accurate and efficient your system will ultimately be. A solid theoretical knowledge, an understanding of process and service requirements, and a partner with experience in weighing and dosing equipment will ensure an optimal system.

This guide will give you a good idea of what is essential to consider when designing and choosing a modern weighing system and how to get the most out of your weighing system.





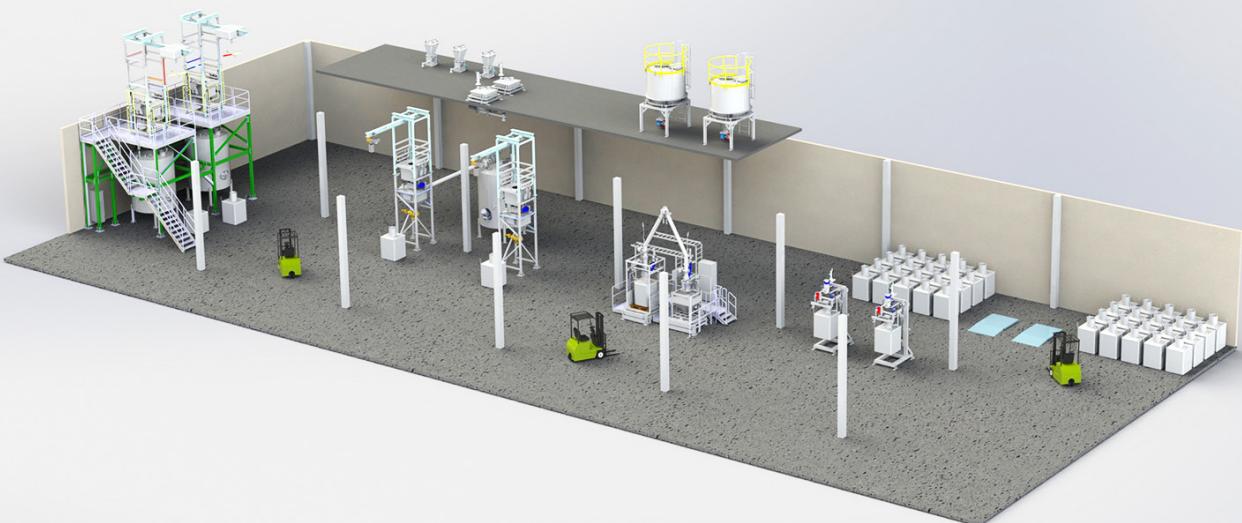
The intended use determines the system requirements

Commercial or non-commercial scales and the impact on the components to be selected

The requirements for the scale and the whole system may differ depending on whether the scale is required for commercial or non-commercial use. As regulations and technology are constantly evolving, it is essential to be up to date with the constraints imposed by laws, the opportunities offered by technology and the sum of these. The commercial use of a weighing instrument determines whether the weighing result determines the price of a product or service.

Requirements for the materials to be weighed

Different materials impose requirements on weighing instruments. Materials behave differently, and their characteristics challenge the design of weighing systems. The designer of a weighing system must have practical knowledge of materials, their characteristics, and their behaviour in different situations. Depending on the weighing application, the material's 'settling' or rolling can significantly impact achieving a reliable weighing result.



Weighing alone does not guarantee a functioning system. The materials must also be transported and/or dosed for weighing.



Dosing or conveying of materials for weighing on the scale with the chosen dosing technique

Weighing alone does not guarantee a functioning system. The materials must also be transported and/or dosed for weighing.

What steps can you take to increase the efficiency of your bulk material weighing system? Do you need a screw conveyor, fluidization, vibration feeder, or valve for your weighing system? A professional can find the most efficient and reliable solutions in many ways.

Modern solutions help

Modern digital solutions can enhance and stabilise the entire system, allowing technology to do the job more reliably and quickly than humans for various weighing and dosing applications. This allows us to focus our resources where human interaction and decision-making are needed.

For example, the mScales digital weighing service instantly connects existing industrial scales to a user-friendly digital platform as a single entity. The software includes ready-to-use solutions for all work steps, from individual weighing to data analysis and regulatory reporting.

What should be taken into account when designing a weighing system?

Purpose and objectives of the weighing system

Considering all the equipment and systems involved in the weighing chain, the "ecosystem" can become surprisingly large. What is the purpose of each part of the weighing system, and how can they be made to support the whole as well as possible so that the system works efficiently and reliably? Experience and insight in managing the whole are valuable assets for the designer of a weighing system.

Legal requirements and other standards

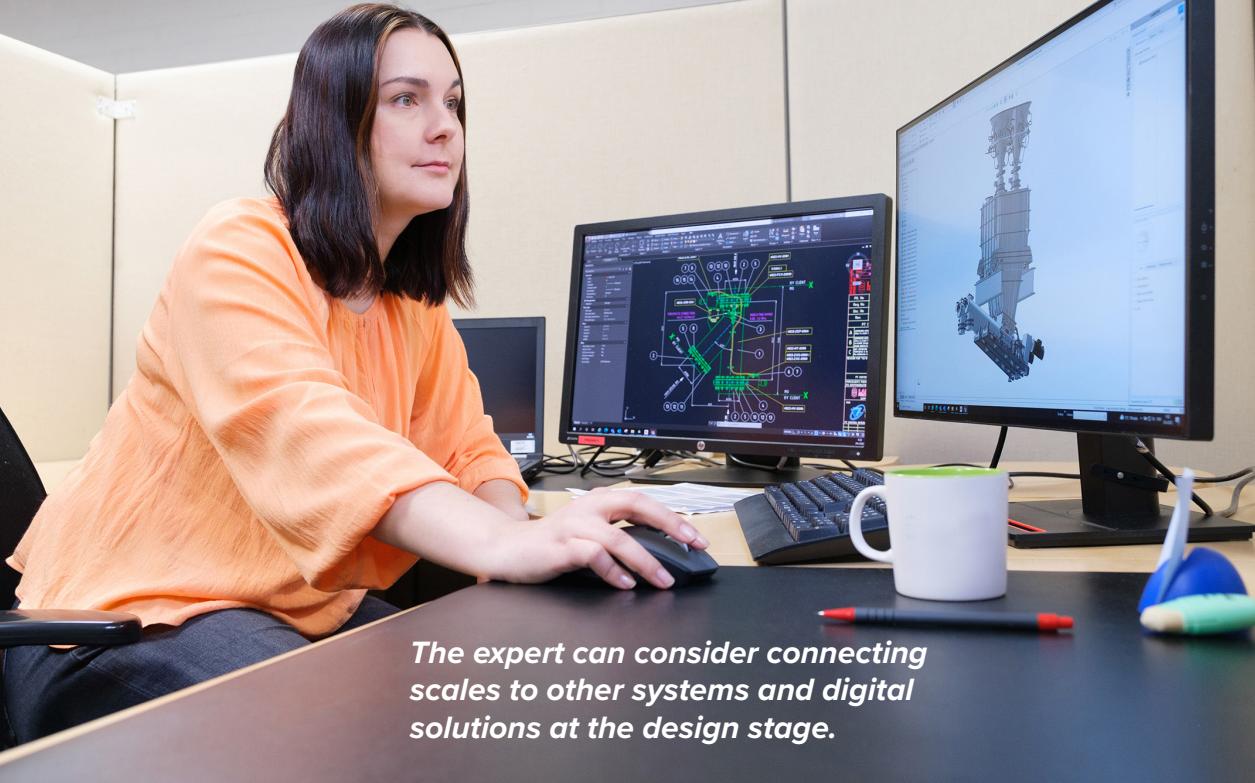
Finnish law, EU directives, sectoral rules, regulations and other standards - there are many different articles to consider, and it is important to consider them when designing a weighing system. It is more cost-effective to consider laws and regulations at the design stage than to make corrections later.



The OIML mark indicates that the measuring instrument conforms with the international metrological procedures on which the trade is based.



The crown stamp serves as a stamped mark of in-service certification.



The expert can consider connecting scales to other systems and digital solutions at the design stage.

Points to note when installing scales

What are the requirements of the weighing system's operating environment for the equipment? A solution that works in one location may not work in another. Weighing operations are often linked in a chain, with each part affecting the efficiency and reliability of the whole chain. What is the optimum location for the system's components in terms of performance?

The coupling of scales and their connection to overhead systems and how to take this into account in the design

Weighing measures and individual sensors or scales are meaningless in themselves if the weighing data is not reliably and easily transferred to the business system or cannot be correctly interpreted. The use of the data, the statistical analysis, and the need for reporting, for example, are best considered at the design stage in terms of total cost of ownership.

Digitalisation makes a wide range of integrations and interoperability possible with modern solutions. These solutions significantly reduce the manual work required to transfer data, thereby increasing efficiency and reducing the potential for human error. Modern systems can also inform the user of the need for periodic maintenance, repairs, calibrations, etc.



Don't fall into the design trap

When designing a weighing system, it's crucial not to solely rely on calculations and theories. Practical experience and comprehensive expertise are equally vital. Some aspects of system design are not found in books or manuals but are gleaned from real-world encounters. Understanding the impact of individual components on the system as a whole is also key.

- When designing a scale system, consider the life cycle of the equipment. Weighing equipment will serve its users for decades.
- If you lack practical experience in the field of weighing and dosing systems, it's wise to seek the knowledge of an experienced expert. Their insights can be invaluable in guiding your design process and ensuring its accuracy and effectiveness.
- Don't look for savings in the wrong places. The true economic performance of long-life systems is often best achieved by careful planning that considers the whole life cycle of the system as much as possible.
- Where possible, all system components should be sourced from the same supplier. This makes it easy to verify responsibility for system performance and legal compliance.
- For dry, dusty materials, consider the potentially explosive atmosphere, i.e., the room's EX classification.



Typical problems can be prevented by good planning

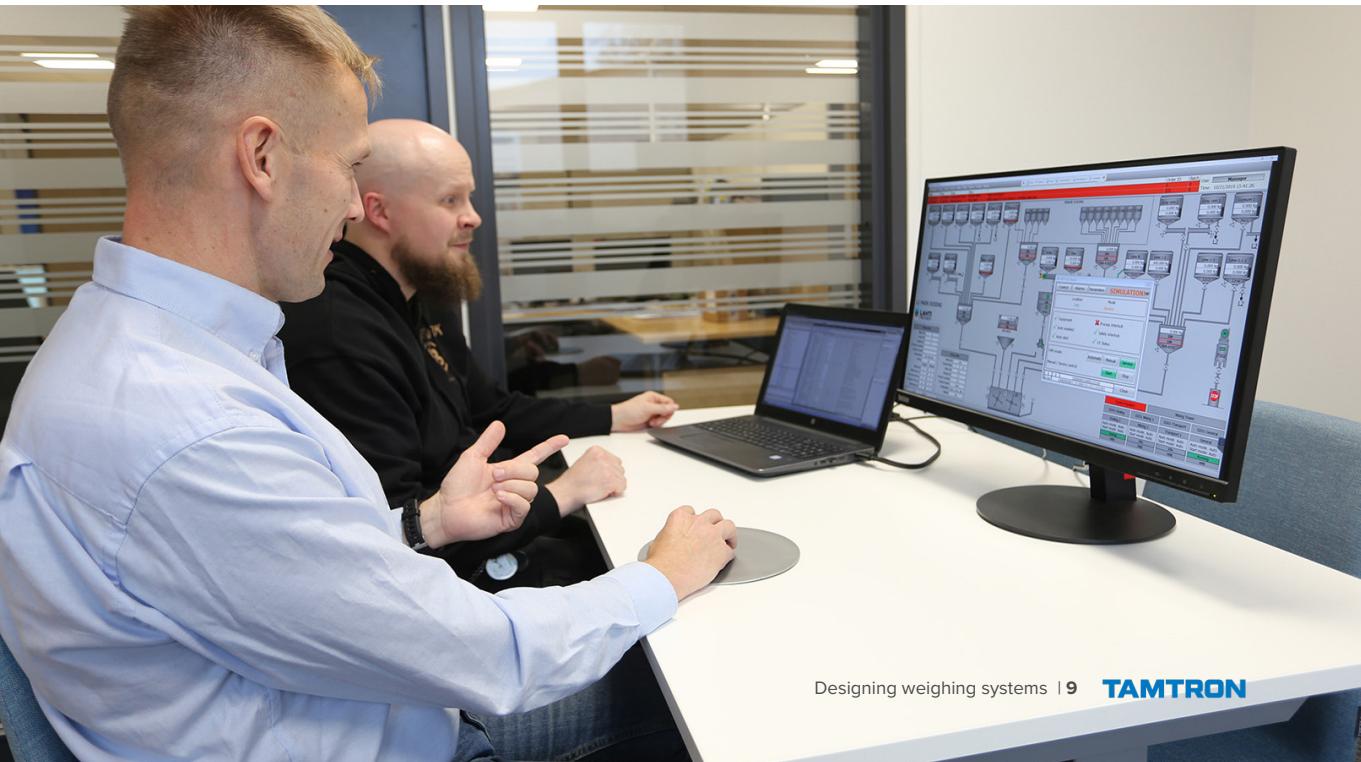
Expert planning can prevent potential problems while implementing scales and scale systems. The common denominator for the most typical problems encountered during commissioning is that the power transmission needs to be sufficiently uniformly internalised to all sensors. The tuning, in-service calibration and possible maintenance of the balance have not been considered with the necessary emphasis during the design phase.

Mechanical disturbances in weighing

In any measurement, disturbances are introduced and, depending on the approach taken, are controlled by various error margins or uncertainties. In the design phase, it is essential to consider the most critical error components for weighing. Since the direction of measurement in weighing is usually the direction of gravity of the earth, it is essential to minimise the forces acting in this direction. This places demands on the foundations, structures and force transmission components, i.e. sensor adaptors.

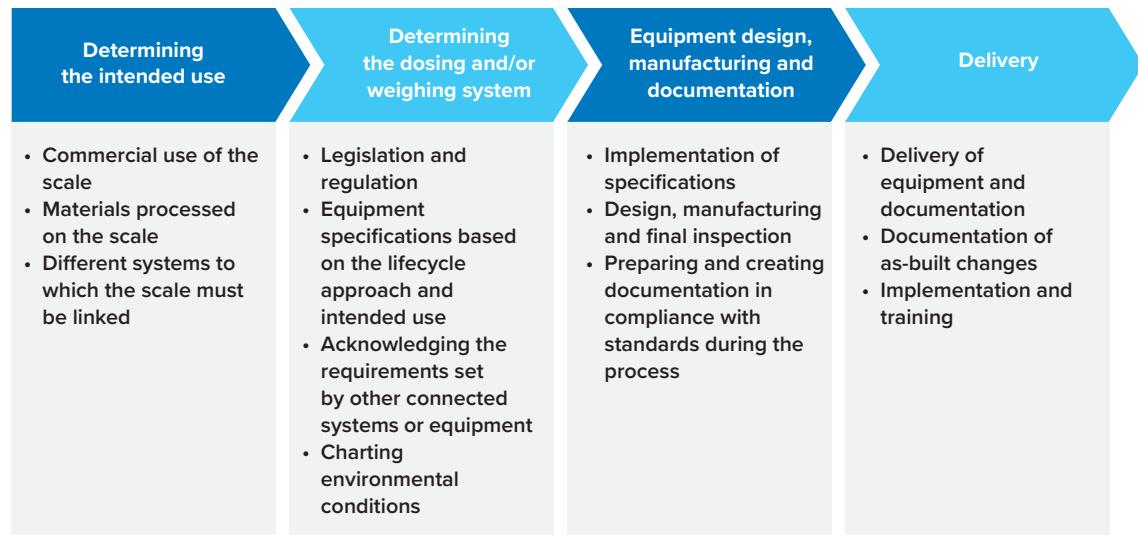
Practical examples of disturbances:

- Vibrations
- Rigid connections
- Flexible joints, e.g. in a silo
- Flexures
- Rigid cabling or other structures connecting the bridge to the hull



What are your competencies in designing weighing systems?

The primary role is to comprehensively understand weighing systems and their relevance to system design.



What competencies are needed to ensure that all the necessary aspects are considered at the design stage of a weighing system?

- Knowledge and understanding of weighing technology and components.
- The ability to take into account the life cycle costs of the scales and the impact of regular maintenance of the scales on their operation.
- Understand the weighing equipment's functionality and the different components' contribution to the overall system.
- Knowledge of laws, regulations, and directives and understanding their impact.
- Ability to consider the constraints and opportunities of the surrounding environment about the weighing system.
- Understanding of the behavior and handling of different materials.

Do you think the overall service is worthwhile?

Digital services have enabled companies to modernise their processes and improve customer service rapidly. New solutions and tools bring a new competitive advantage. Services need to be integrated into a seamless whole. Today's weighing service provider must also understand the bigger picture and integration.

Responsibility

With only one supplier responsible, the process is more straightforward, saving time and money.

Technology

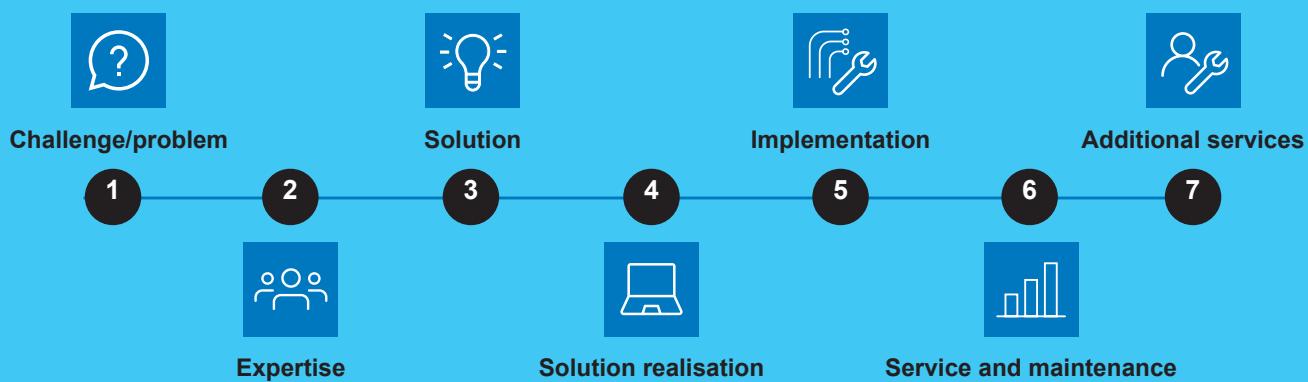
The design, implementation, maintenance, and upkeep of a system often require the assistance of an expert who can see the big picture. Centralising your operations will streamline your processes and bring you other significant benefits.

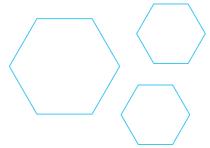
Certainty

When you buy a weighing system from a single supplier, the most significant advantage is a reliable package. You know what you are getting, how and on what schedule. You also know who to turn to when you have a question.

Service

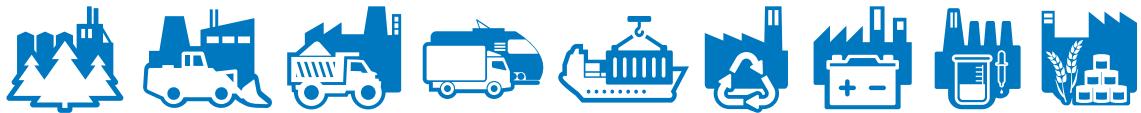
Scheduled and statutory maintenance, calibration, and certification must be completed on time. They can also be part of the service, ensuring a reliable weighing system with the most modern equipment and up-to-date technology.





Ask more about the benefits of a full service for your project!

Tamtron has over 100 years of experience in designing and supplying weighing equipment and weighing systems, and we have a strong vision for the industry. We would be happy to tell you more about how we can help you with comprehensive weighing solutions and services tailored to your needs.



Our experts help!

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Tamtron is a leading provider of advanced weighing solutions consisting of innovative weighing and dosing technologies, lifecycle services and modern cloud-based digital services. Tamtron's solutions help customers in more than 60 countries work more efficiently in all major industries, including construction, mining, wood processing, waste treatment and recycling, ports, transport and logistics, process and manufacturing. In addition, Tamtron offers its customers comprehensive lifecycle services, including verification and calibration services, maintenance, repair and spare parts for scales.

Tamtron has two offices in Finland, a head office in Tampere and a unit in Lahti, as well as subsidiaries in eight European countries. In addition, the Group's solutions are provided through a global network of partners in more than 50 countries. The Tamtron Group employs approximately 270 people in Finland, Sweden, Norway, Denmark, Germany, the Czech Republic, Slovakia, Poland and Estonia.