

# **SPECIALISED TRAINING ON PLASTIC PIPES INSTALLATION. AseTUB PROFESSIONAL INSTALLER CARD CONTRIBUTES TO QUALITY.**

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## **Abstract**

*As plastic pipes industry committed to quality it is important not only to offer quality certified pipes and fittings but also to ensure their installation is done properly. The skill of the operator is essential for the assurance of the quality of his work and to avoid deficiencies in the installation which could affect water, environment and the image of plastic pipes.*

*With the aim of improving quality in installation AseTUB (the Spanish association of plastic pipes and fittings manufacturers) established in 2004 an educational program through practical training courses to qualify installers on the installation of PVC-U, PVC-O, PE, PP and GPR piping systems for water supply, sewage and irrigation. Since then, more than 120 courses have been organised and over 1.200 installers have been qualified and accredited by AseTUB as specialised installers with a professional card.*

*This accreditation meets the need for skilled plastic pipes layers and it is highly requested by contractors and water authorities.*

*This initiative shows the important role the national trade association can play to contribute to the quality of the plastic piping networks.*

**KEYWORDS:** Installation, operator, card, skills, quality.

## **INTRODUCTION**

Sustainable water management is essential in our time. We are all responsible for preserving and protecting the water. This is even more important when we realize that water demand increases constantly and periods of drought are longer and more frequent, jeopardizing the water supply.

In water pipe networks is not only important the choice of materials and quality certified products, but the installation is done properly. A deficient installation can cause infiltrations, breaks, leakages... with the consequent damages to the water quality and network's good performance.

Plastic pipe industry, comprising resin, additives/compounds, machinery and pipe manufactures, is a modern, innovative and high-tech industry that offers integral piping solutions made of different plastic materials. The commitment to the quality of manufacturing and products has long been demonstrated.

A production quality system is implemented in manufacturing plans and products are subjected to a rigorous third-party testing program to guarantee the compliance with very stringent performance requirements established in the standards. The quality of the plastic pipes, fittings, joints, valves... is therefore well-recognised.

However, to gain the complete satisfaction of our clients and the end users, these quality products should be correctly installed. This is the only way to prove the excellent performance and reliability of plastic piping systems as well as the advantages they offer in the water network management.



Plastic pipes industry should actively work to transmit its knowhow on the right handling, jointing and installing of the products and the commitment to quality, to the next link in the chain, the pipe installer.

## **SPECIALISED INSTALLER TRAINING**

The Spanish association of plastic pipes and fittings manufacturers, AseTUB, is a professional non-profit trade association, founded in 1978, which groups the most important plastic pipes manufacturers in Spain. The fundamental aim of the association is to promote the advance and the expansion of this industry, and to uphold the highest quality standards of performance of the plastic piping systems in their different applications.

AseTUB's commitment to quality is supported by the fact that it's a requirement for a company to be a member of the association, the third-party certification of its products (AENOR's N product quality mark).

Moreover, AseTUB conscious of the importance of the correct installation of the plastic piping systems, and due to the lack of a specific qualification in Spain, decided to work on the implementation of an installer training program addressed to operators working at water pipeline construction sites.

Since 2004, specialised hands-on courses are being conducted in recognised training centres and implemented in collaboration with the main water companies in

Spain. The aim of these practical training courses is to provide with skilled-workers and so to improve the quality in the installation of plastic pipes systems in water supply, sewage and irrigation networks.

## Content of the training

When elaborating the content of the training and listing the skills the installer should have we realised that jointing is just one step of the installation process. In the underground pipeline networks there are other important factors affecting the performance of the piping system (bedding, backfilling,...) that they also have to be executed correctly.

So, the didactic program covers a comprehensive training on all aspects related to a proper installation of plastic pipes, from the reception of the material, the laying in the trench, the correct execution of different jointing techniques and up to the testing and commissioning of the pipeline.

The national legislation, reference standards [1], AseTUB technical publications [2] and the experience of the manufacturers have been taking into account in the preparation of the educational program, the contents of the theoretical and practical classes and in the elaboration of the installation handbook.

This technical handbook is a comprehensive and user-friendly document published by AseTUB. The handbook contains the knowledge we consider the installer should have to execute a correct installation of the different underground plastic piping systems such us PVC-U, PVC-O, PE, PP and GRP pipes for water supply, irrigation and sewage networks.

With the aim of being an easy reading and consultation document, its content has been split in 14 chapters with a total of nearly 250 pages. The handbook, given to installers attending the course, is full of pictures, detailed jointing steps explanations, graphs and it is written with a simple and familiar wording.

**Table I: Content of the *Plastic piping systems installation handbook***

Chapter 1	Introduction
Chapter 2	Plastic piping systems
Chapter 3	Basic hydraulics and plan interpretation
Chapter 4	Standardisation, testing and product certification
Chapter 5	PVC-U piping systems
Chapter 6	PVC-O piping systems
Chapter 7	PE piping systems
Chapter 8	Structured-wall piping systems (PVC, PE, PP)
Chapter 9	GRP piping systems
Chapter 10	Other elements: valves, manholes, ...
Chapter 11	Installation (underground)
Chapter 12	Pipeline testing and commissioning
Chapter 13	Repairing operations
Chapter 14	Professional commitment

The training starts providing a general knowledge on plastic materials, hydraulics, and standardisation and certification of products.

Details of the different plastic pipes, fittings, reference standards and jointing techniques are taught to ensure the installer acquires the knowledge and the practice for the right jointing of the elements. This is a very important part of the training. Common installation defects are presented and explained to be avoided in the future. All different jointing techniques (solvent cement, elastomeric ring, electrofusion, buttfusion, compression and mechanical jointing) are performed on pipes and fittings, as well as connexions to valves, manholes and new inlets from the mains.

Most of the water plastic piping systems are installed underground. Guidelines for best practices are an essential part of the training. This part covers:

- transport, handling, storage at depots and site
- trench types, width, depth and bedding
- pipe laying, jointing and anchoring
- backfilling and compacting
- field testing and commissioning

A trench is a confined space with many special problems and risks. Sometimes time pressure could lead to work without taking safety measures. Operators are also trained on safe working practices.

At the end of the course the trained installer is more conscious and concerned that his professional commitment makes him responsible for his work and for ensuring the quality of the installation done.

## **TRAINING CENTRES AND WATER MANAGEMENT ENTITIES**

For the development of the courses, AseTUB has signed collaboration agreements with recognised training centres and water management entities.

Training program and its concept is property of AseTUB and is freely handed over as well as the training of the teachers and the material used during the course (pipe, fittings, machinery, adhesives,...) which is provided by AseTUB member companies.

A close relationship between all parties is established in order to keep the training and trainers up-to-date

### **Training centres**

The course takes place at recognised training centres which are in charge of the calendar of the courses, the registration fees and the training and qualification of the installers.

The course is carried out by professional teachers. Their training is given by AseTUB and consists in different production plants visits, meetings with manufacturers and a special training session carried out by AseTUB technical experts.

With the aim to achieve the best professional training and considering the installers' profile the course is very practical. Nearly 2/3 of the training take place in a workshop and in a trench.

Centres are fully prepared for the development of the course in terms of facilities, equipment and have a civil liability cover, to insure the trainees.



**Image I: Classroom, workshop and training trench**

Before launching the first course in a training centre, AseTUB supervises the installations, the material, documentation and all the requirements to guarantee the quality of the training.

### **Water management entities**

The collaboration of the water entities has contributed to the success of this initiative. Water companies have seen clearly the benefits of having pipeline works done by professional and skilled operators. Therefore their own personnel are trained and this qualification is requested to other external workers.

In many cases, the water entity takes an active role in the training program. Own technical personnel act as teachers in these courses.

## Training places

The first courses took place in 2004 in Madrid and Seville. Nowadays, seven centres offer this type of training all over Spain.

The course can take place not only at the training centres endorsed by AseTUB, but also on demand, at the client facilities on condition that the course is completely developed as in the training centre and the same education quality is maintained.



**Imagen II: Training entities and place where courses have been organised**

### Duration

The duration of the training course is 36 hours divided generally in 5 days. But to facilitate the attendance of employed workers some courses are on demand split in more days in afternoon shift.

In order to guarantee the quality of the training and a closer monitoring, the number of attendees is also fixed to a maximum of 12 people.

### Qualification tests

At the end of the course, the installer should pass 2 tests (theoretical and practical) to demonstrate he has gained the proper theoretical knowledge and practical skill.

The installer's knowledge of the practical working rules is evaluated in the theoretical test. To pass the exam, the operator must answer correctly a minimum of 21 questions of a 30 multiple-choice question test.

In the practical test the installer must show his skills by executing correctly 2 jointing practices (electrofusion and solvent cement welding or buttfusion welding and elastomeric seal jointing).

Tests are supervised and evaluated by the training teachers. The result of the qualification test is communicated to AseTUB. Only by passing both tests (theoretical and practical) the installer will be entitled to obtain his AseTUB specialised installer card.

### Installer's card

The installer, who has passed the corresponding examinations, will be accredited as *specialised plastic piping systems installer* and AseTUB will issue his operator's card.

The card guarantees that the holder has the knowledge and skills for the correct handling and installation of PVC-U, PVC-O, PE, PP and GRP piping systems for water supply, irrigation and sewage.



**Image III: AseTUB's installer card. Front and backside (example)**

Front side: Picture. Installer's card number. Validity

Back side: Materials. Applications. AseTUB and training entities' logo(s). Bar code.

The backside of the card includes the logos of the training/water entities where the installer was trained.

Since 2011 all the operator's badge include a bar code conforming the ISO 12176-3 standard, so it can be read by fusion-jointing PE system equipments contributing to traceability. This bar code includes the following encoded data fields: entrance code, operator's card number, expiry date, country, competent organisation, skill, language and identifier.

A complete list of qualified plastic pipes installers can be found in AseTUB website. A searching engine by name, card number or province provides the contact details of specialised installers.

### Period of validity and card renewal

The validity of the installer's card begins from the date of the qualification test was passed. This qualification remains valid for a period of 5 years. During this time, the installer should register in the RIR (Installation record book) all the works done. Each report includes the following data: work identification name, place and date, duration, pipe material, DN, meters, and has to be signed by the installer and the contractor.



Before the end of the 5 year validity period, the installer can request the renewal of the card by sending the proper form and the RIR to AseTUB. The work experience registered in the RIR is evaluated by the Evaluation and Monitoring Committee.

There is an automatic renewal if the installer's skills and knowledge are unquestioned and proven by a number enough of works with different plastic materials. Otherwise the requalification of the installer is required for the renewal of his card.

### **EVOLUTION OF THE ASETUB SPECIALISED INSTALLER'S CARD**

This initiative gave birth in 2004. The beginnings required strong support from the national plastics industry (AseTUB) to establish and promote the training courses. Only 2 years later, most important water companies in Spain contacted AseTUB to initiate a collaboration to establish this training program in their region. Nowadays, operators from more than 250 different entities (councils, water management entities, construction companies,...) have been trained. And, despite of being a voluntary qualification, many other entities are requiring AseTUB installer card.

AseTUB believes in the relevance of this initiative and the importance of transmitting to the installers the right handling, jointing and installation practices of our plastic pipes. Every promotion of the plastic piping systems and their benefits and quality is always accompanied by the promotion of this training and qualified plastic pipes specialised installers.

More than 120 courses have been conducted and over 1.200 professionals hold the AseTUB specialised installer card.

In spite of the current situation of the Spanish building and construction sector, around 20 sessions are organised per year and nearly 200 new installers are qualified. It shows the great acceptance of this accreditation in the sector.

These courses are under the scope of the educational program of the Spanish tripartite foundation for training in employment. Therefore the course attendees can have defrayed their attendance fee.



Although this course is designed for pipe installers, some head of network maintenance, site managers, work inspectors, project managers... have come to the courses to know more details about plastic piping systems and their correct installation.

The great success of this initiative has made AseTUB to work on a similar training program to qualify plumbers on plastic piping systems in building applications (hot and cold water, heating, floor-heating, soil and waste...). Three training centres have been prepared to start up this training in October 2012.

**THE TRAINING ON IMAGES**



## CONCLUSIONS

A quality certified plastic piping system installed by a qualified professional offers a valuable guarantee for the contractor and contributes to a more effective management and maintenance of the networks, increasing the confidence and satisfaction of the clients.

This initiative shows the important role the national associations can play to contribute to the quality of the plastic piping networks.

**Water entities** highly value this qualification because they realize the benefits from having skilled and trained operators working in their pipeline networks. The installer's card is a tool to distinguish skilled operators, to guarantee the quality of the labour and the safety at work and to get reduced the number of incidences (due to a bad installation) and therefore the number of reparations (time, costs and final user claims).

For the **installers** this card is a way to accredit their skill, knowledge, professionalism and their commitment to the quality of the work they execute.

And for the **plastic piping industry** this training is a duty. Plastic pipe manufacturers are committed to the quality of their manufacturing processes and products; accordingly, the national association fosters the quality of the installation by transmitting the knowhow of the sector, especially by training plastic pipe installers.

All of this contributes to improve the image of plastic piping systems, to gain knowledge and confidence on our products.

Besides, the courses involve an extra benefit for the plastic pipes industry, since they are a very good promotion platform to show new products and solutions, especially useful for a continuously developing industry.

Adapting the popular English saying "one apple a day keeps the doctor away" we would say "**one installation OK keeps the problems away**".

## List of References

- [1] CEN/TR 1046, CEN/TS 14578, EN 805, EN 1610, UNE 53394 IN and product/system standards.
- [2] *"PVC-U piping systems technical handbook"*, AseTUB, 2007 edition.  
*"PE piping systems technical handbook"*, AseTUB, 2008 edition.  
*"GRP piping systems technical guide"*, AseTUB, 2008 edition.