

AN OVERALL PRESENTATION OF WP3 TASKS AND DELIVERABLES

# PROFILE



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METVET

JOINT HIGHER VET

COURSE IN THE METAL SECTOR

WP3 - Creation of Professional Profile



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## ABOUT METVET

Metal, machinery and related trades workers are engaged in a range of skilled activities. Those workers need to understand work organization, and the specialist materials and tools to be used in their jobs, as well as of the nature and purpose the final product they are engaged in making.

According to a survey from CEDEFOP with title European skills and jobs (ESJS), the **5 key skills** for metal, machinery and related trades workers are job-specific skills, problem solving, teamwork, learning and communication. These skills will support employees in this occupation to also tackle anticipated future skill challenges.

**METVET** project aims at a competence-based professional generic profile served as a basis for designing competence-based training programs. The underlying idea is that vocational education should enable trainees to acquire the competences needed in their future professions. While working as professionals, they should continue to develop competences in order to be able to react to and anticipate future developments in their work.

The project specifically aims at one hand designing, for **Aluminium & Metal Constructions technicians** including:

- **a professional (qualification) profile & a core curriculum (EQF 5)**
- **a corresponding VET program, including innovative teaching methods**
- **a qualification standard (according to ISO/IEC17024) for evaluation & certification.**

All the above will be achieved through the strengthening of the exchange of knowledge and practice between education and training institutions and the labor market. The METVET consortium complementarity will ensure a strong collaboration between the labor market (sectoral organizations) and the education and training institutions. The role of the sectoral organizations will be of ensuring that the developed training is in total adequacy with the employer's needs, supporting the implementation of the training for workers. The role of VET providers will be to develop an adapted, attractive and innovative VET program. The EU umbrella organization will promote the training in the other EU countries.

The purposes of this volume are to present all tasks carried out in Greece, Germany and Italy according to METEVT Project deliverables D3.1, D3.2 and D3.3 in order to develop a joint professional (qualification) profile.

**The Project Partners**

October 2019

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Wp3

Professional

**PROFILE**

Creation

## 1 ABOUT WP3 | CREATION OF PROFESSIONAL PROFILE

Work package 3 aimed to develop a Professional (Qualification<sup>1</sup>) Profile for Aluminium and Metal Construction Technician. To this end, the methodology followed identified, described and marked differences and common elements in a specific procedure so as to create a professional (qualification) profile in the participating countries. That allowed METVET to adopt a shared methodology for the development of the respective Profile, which in turn was a necessary precondition for providing common skills and curricula for Aluminium & Metal Constructions technicians.

In all cases, the Profile developed targets to fill the gap for the EQF level 5 and includes among others, the green skills already identified in METVET WP2.

The reason for underlying the importance of green skills is based on the fact that technicians in the Building Sector, as the ones that are under-study in the METVET Project, are expected to play a key role in the global energy sustainability scenario (ILO, 2019). More than 3.5 million vacancies are expected to arise worldwide in this sector, and more than 1 million in the metal one. This is also depicted in the following figure, which was extracted from a recent Report of the International Labour Organization -ILO (ILO, 2019). In order to meet the targets related to the Climate Change and Environmental degradation, this labour force requires reskilling and upskilling.

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<sup>1</sup> Qualifications are the formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards.

While definition of qualification helps us to understand some of the similarities and differences between national and international qualifications, a systematic review of qualifications developing outside national bodies' control is currently lacking. Therefore it is essential for a conceptual framework which can help identify and classify international qualifications to be developed. Furthermore, we need to establish a basis for better understanding the function and value of qualifications and provide concrete examples (cases) of international and non-State qualifications. [\(Cedefop \(2019\). International qualifications. Luxembourg: Publications Office of the European Union, 2012\)](#)



Figure 1: Most Occupations in demand across industries in a global energy sustainability scenario, 2030.

Figure extracted from the ILO Report “Skills for a greener future: key findings” (ILO, 2019)

In a recent study (CEDEFOP, 2019) it has been shown that there are around 128 million adults in the EU-28+ with potential for upskilling with significant variations among countries. The complexity of the low skill phenomenon calls for innovative and comprehensive methods to trigger synergies for upskilling and reskilling (Olsen & Thunqvist, 2018).

An overview of the inter-relation between the various METVET WPs is schematically depicted in the next Figure.



Figure 2: Overview of the information transport within the METVET Work Packages.

## 1.1 Description

Professional or Qualification Profiles are defined as professional outlines and include specifically:

*“all basic and individual professional functions that compose the professional object of a profession or a specialization but also all the relevant knowledge, skills and competences that are demanded for meeting those functions. The main objective of professional profiles is the systematized analysis and listing of professions’ content but also of all the possible ways for acquiring the qualifications needed for the profession’s practice”.*

The No. 30/ 2013 research paper (CEDEFOP, 2013) of The European Centre for the Development of Vocational Training (CEDEFOP), provides the definition of an Occupational Skills Profile (OSP):

*“An OSP summarizes essential characteristics required for a given job: the level of education and training required (and hence the complexity of the occupation); the field of education and training required; and other requirements in terms of knowledge, skills, competence, occupational interests, and work values. The approach developed in this study allows aggregation of OSPs of specific occupations into OSPs of occupational groups, of sectors, of national economies, and up to the pan-European level. As they are focused on job requirements, OSPs represent the demand side of skill needs and can be compared with the supply side focused on the number and qualification of job holders.*

It is worth mentioning that Occupational Profiles focus on the requirements of job, not on the qualification of job holders<sup>2</sup>.

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<sup>2</sup> CEDEFOP. (2013), pp. 34





Professional [Qualification]

**PROFILE**

Methodology

## **2 WP3 | METHODOLOGIES FOR THE CREATION OF PROFESSIONAL PROFILES**

The main objective of WP3 was to create the joint Professional (Qualification) Profile for the Aluminium & Metal Constructions technicians. In this WP3 METVET Project Deliverable, D3.1 “Methodologies for the creation of professional profiles”, we layout the ways that are typically being followed in order to create this Profile and illustrate the commonalities and differences in each of the countries participating in this Project, i.e. Germany, Italy and Greece.

### **2.1 Introduction**

The aim of METVET Project D3.1 Deliverable was to provide a concise common methodology, a roadmap, to be followed by the partners in order to develop the Professional Profile for Aluminum & Metal Constructions Technicians. This Deliverable is part of WP3, the objective of which is to create a professional profile that will be used as a base for producing a common curriculum among the participating countries for Aluminum & Metal constructions technicians. To this end, a holistic approach was followed in order to take into consideration all the concrete characteristics implemented within a national level. In addition, of outmost importance is the professional profile to be adjusted in real market needs and consequent educative prerequisites. Under this precondition, it was based both on the research findings of METVET WP2, as well as on in-depth interviews and a workshop that took place with stakeholders from the participating countries.

The creation of professional profiles follows a different methodology and reasoning in each country. The aim of this Deliverable was also to describe and mark differences and common elements in the specific procedure, given the fact that a shared methodology will be adopted as a necessary precondition for providing common skills and curricula for Aluminum & Metal constructions technicians.

In the following figure, an overview of METVET D3.1 completed tasks is illustrated.

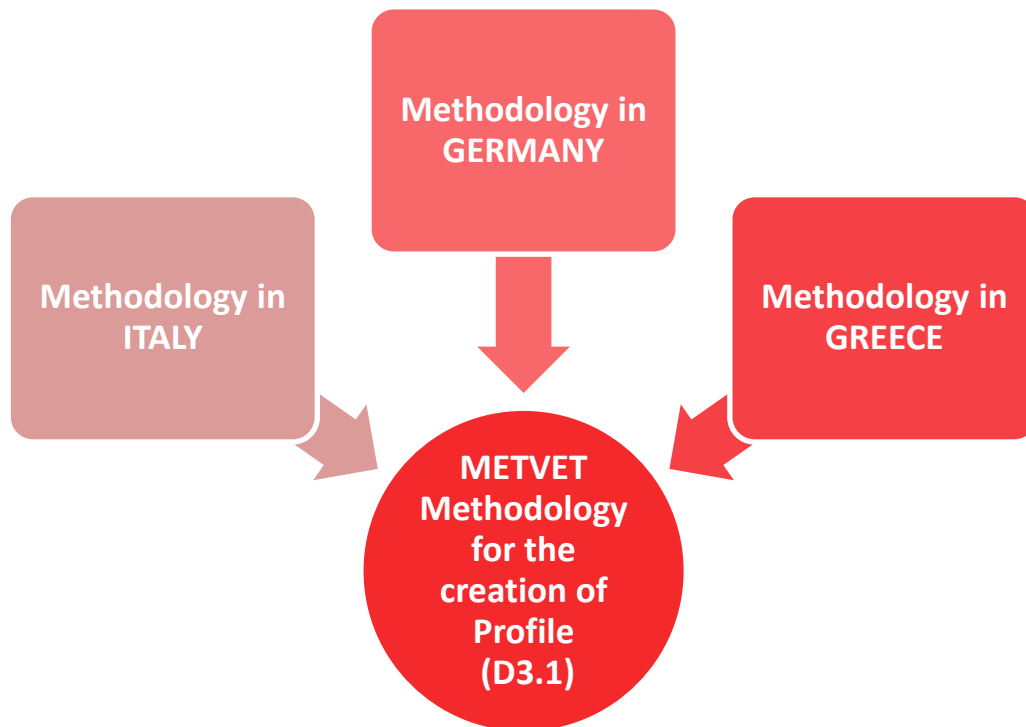


Figure 3: METVET D3.1 “Methodologies for the creation of Professional Profile” tasks. The development of a joint Methodology based on the respective ones in Italy, Germany and Greece will enable the creation of the common Professional Profile.

## 2.2 Current Status

Professional Profiles are being developed for analyzing, projecting and forecasting skill needs, for defining and measuring education/skills matches and mismatches in different countries, sectors or occupations and for comparing and monitoring differences among European countries. They also determine change over time, identifying past and future developments. Furthermore, professional profiles are strictly related to educational programs, constituting an important stage for giving extra value to the learning outcomes that derive from the different forms of learning.

Professional profiles are the means for connecting vocational training with employment as they “guarantee” that training programs will be able to follow the constantly changing needs of job market. Apart from the benefits of setting and certifying a professional profile

that is directly linked with the job market and the enforcement of the credibility of the vocational training, it should be taken into account that the role of social partners is also enhanced as a vital one to the system of lifelong vocational learning and training.

To define a methodological framework for creating or updating a professional profile based on practices adopted in Germany, Greece and Italy, one can point out three common elements that are directly related to this procedure:

- The presence of a statutory national body that leads/ coordinates the procedure from the beginning to the end
- The participation of social partners - employees' unions and employers' organizations/ trade unions (and sometimes Chambers) either in the beginning or in the middle of the procedure, acting as the liaison between society and job market
- The close interconnection of the professional profile to be created or updated with the corresponding Vocational Education Training (VET) Program. This is rather inevitable given that, as already pointed out above, professional profiles are the means for connecting a profession's qualifications with vocational training and employment according to the constantly changing needs of job market.

The phases identified for the development of a Professional Profile are:

- 1. Initial Phase.** In this phase, organization(s) responsible to take the initiative and kick off the process for the development of the Professional Profile were identified, so as to prepare the following phases, find and contact the stakeholders. The lead statutory national body was identified and committed.
- 2. Development Phase.** Under the coordination of the lead statutory national body, all stakeholders as described above (social partners- employees' unions and employers' organizations/ trade unions and sometimes Chambers), expressed their opinion and configured the Professional Profile. Actions to this end included interviews, meetings etc. with stakeholders, social partners etc.
- 3. Evaluation Phase.** In this phase the outcome of the Development phase was evaluated by the statutory national body.



Figure 1 General structure of the methodology followed to develop a Professional Profile.

Based on the structure above the commons and the differences will be highlighted hereafter and based on this the joint methodology will be extracted.

## 2.3 Initial Phase

### 2.3.1 Greece

In the Greek case, the initiative for the beginning of the procedure for creating a Professional Profile belongs to the relevant professional union by addressing its demand for professional certification to the relevant national body. No schooling side takes part in this initiative.

In the Greek case, EOPPEP, the National Organization for the Certification of Qualifications & Vocational Guidance, coordinates the professional profile's development procedure overall. It is an all-encompassing statutory (national) body, operating under the supervision of the Minister of Education, Research and Religious Affairs, and is seated in Athens. It has derived from the amalgamation of three national bodies, all under the supervision of the same Ministry: The National Centre for the Accreditation of Lifelong Learning Providers (EKEPIS), the National Organization for the Certification of Qualifications (EOPP) & the National Centre for Vocational Guidance (EKEP). It is one of the first organizations of the broad public sector in Greece **certified for excellence**, according to the internationally recognized **EFQM Excellence Model** (The European Foundation of Quality Management). It corresponds to the pressing need of creating and maintaining a holistic and interrelated policy framework for the development of lifelong learning and certification of qualifications in Greece (<https://eoppep.gr/index.php/en/>).

### **2.3.2 Germany**

In Germany, creating new professional profiles, or updating them, is regulated by two general legal systems. As vocational training in Germany in general has two sides, the company-side for the practical education and the school side for theoretical and more general education (“Dual System”), both sides must participate in the creation of VET profiles.

From the schools’ side there are the “Compulsory Schooling Acts” (Allgemeines Schulgesetz) and the “Educational Acts of the Federal States” (Schulgesetze der Länder). From companies’ side there are the German “Vocational Training Act” (Berufsbildungsgesetz), the “Crafts and Trades Regulations Code” (Handwerksordnung) and the “Youth Employment Protection Act” (Jugendarbeitsschutzgesetz).

When it is to create or update a new professional profile, a process is started and a “Joint Committee” is created, consisting of 8 members from entrepreneurial side, 8 members from unions, 8 members of the federal states (“Länder”) and 5 members of the federal government. Each side has the right to ask for the creation or improvement of professional profiles. There is a board of this Joint Committee, who decides to start the process.

### **2.3.3 Italy**

In the case of Italy, it should be initially noted that the national education system is regional. The professional profiles are organized into business sectors and areas of activity, which they mainly refer. Each professional figure represents a set of characteristics of professionalism; in this sense, it is defined as “broadband”, because it assumes a broad-spectrum value and constitutes a functional reference to the organization of the standard system. As part of the National Directory (art.8 Legislative Decree 13/2013), it is created and made operational a national framework of regional professional qualifications and related skills, which is a reference in terms of professional content (ERASMUS+, 2015).

It is expected that the specificity of the procedure concerning the professional profiles, their creation and their update rely on the fact that the Regional Authorities are the bodies entitled to monitor and agree on the request to update regularly the profiles according to specific processes each region has explained. Indeed, when describing the Italian scenario, regional differences should be considered regarding the local framework of qualifications.

Currently, 18 regional directories are in the national repository. An example from which good practices can be highlighted refers to the Friuli Venezia Giulia repository. In fact, the usage of “simplified format” (See SST below) arising from field-based experiences is one of the most effective tools developed, in support of the evaluation and assessment process of the learning process undertaken by the learner.

#### 2.3.4 Summary

The main characteristics of the methodology followed for the development of the Professional Profile during its initial phase by country, are described in the following Table.

**Table 1: Sum Up of the methodology characteristics, during the initial Phase, by country.**

	Greece	Germany	Italy
<b>Who is responsible for undertaking the initiative of creating a professional profile</b>	Relevant professional union	Joint committee (8 members from entrepreneurial side, 8 members from unions, 8 members of the federal states (“Länder”) and 5 members of the federal government)	
<b>Regional process (y/n)</b>	No	No	Yes
<b>What actions are taken during the Initial Phase</b>	Decision to start up the process	Decision to start up the process	

## 2.4 Development Phase

One common element among the three countries under research, is the existence of a national body that coordinates the procedure of a professional profile's development, which relates its function with the Ministry of Education. That way, the communication and the interaction with the relevant vocational education system is ensured, leading to the consequent indirect interaction with the job market.

### 2.4.1 Greece

It is of interest that employees' unions take part in the whole procedure as, once the demand has been formulated, EOPPEP sends an informative written document to the tertiary employers' and employees' organizations concerning the demand for professional certification. The Greek General Confederation of Labour (GSEE), the supreme private employees' trade union in Greece (<https://gsee.gr/>), as the unique private employees' representation body in country, takes on the responsibility of submitting the Professional Profile's draft for certification.

An official Guide for Developing Professional Profiles (Odigos Anaptyxis Epaggelmatikon Perigrammaton), was initially drafted by a consortium of employees' and employers' representatives and a template for creating professional profiles was used throughout the whole procedure mainly as guidelines.

For the process of creating or updating a Professional Profile, the following process takes place. Four employers' organizations, namely the Hellenic Confederation of Professionals, Craftsmen and Merchants (GSEVEE, <https://www.gsevee.gr/en/organisation>), which is engaged in METVET Project, the Hellenic Confederation of Commerce and Entrepreneurship (ESEE, <https://esee.gr/en/>), the Hellenic Federation of Enterprises (SEV, <https://en.sev.org.gr/>) and the Greek Tourism Confederation (SETE, <https://sete.gr/en/>), jointly decide which one is going to participate in the certification procedure representing employers' side.



Once the representatives are defined, they meet with the professional union in order to be informed on the procedures needed for the development/updating of the Professional Profile. Consequently, the team working on Professional Profile's development consists of representatives of the professional union requesting the certification, of the employees' trade union and one of the four employers' organizations. Professional Profile's writing is funded by the professional union that motivated the whole procedure in the first place and always in close cooperation with the tertiary organizations mentioned before. In the past, the team members (experts and coordinator) were compensated with a predefined budget for their services, but for the last few years, this is no longer the case since none of the participants is being paid.

Regarding the research methodology applied for the Professional Profile's development, it is commonly accepted that a multi-methodological approach would be used as the most accurate one, in order to evaluate the "wealth" of different professions in a fair way. The participation of contextual profession's experts and specialists in the collection and evaluation of information but also the consent of the profession's environment was deemed as prerequisites for the whole procedure. The methods of in-depth interviews, the "Delfi" technique and bibliographic research were combined in different stages of the procedure.

A "dual-stage" procedure is being followed. In the first stage, each expert fills-in the "Profession's Description Questionnaire" by carrying out at least ten in-depth interviews with profession's employees, employers, supervisors or representatives of closely relevant professions. Emphasis is given on the profession's tasks, the standards that must be covered for their execution and the knowledge, skills and competences needed for the profession's successful practice (Brockmann, Clarke, & Winch, 2011). In terms of interaction, the interviews' results are being produced in a week and are sent back to the interviewee for him/her to comment within five days.

In the second stage, once experts gathered the final information from the interviews, they sent it to the team Coordinator who took on the drafting of the profession's basic knowledge, skills and competences catalogue based not only on experts' saying but also on his own bibliographic research.

The team not only drafts this catalogue, but it also classifies the knowledge based on the international system ISCED (International Standard Classification of Education) and on the eight EQF (European Qualifications Framework) levels. After the completion of the drafting, there is an overview and an interaction phase with the professional unions of the relevant employees' and employers' organizations. The final text refers on the:

- Definition of the profession
- Analysis of the profession-job profile
- Primary-secondary-individual job functions
- Job tasks
- Required knowledge, skills and competences
- Ways of acquiring the knowledge, skills and competences required
- Skills' and competences' assessment procedure
- Adopted criteria in order to consider a professional profile as being successfully exercised
- Professional profile follows transnational standards (e.g. ECVET points allocated).

#### **2.4.2 Germany**

In Germany, the Federal Institute for Vocational Education Training (Bundesinstitut für Berufsbildung- BiBB) leads the development of new professional profiles on behalf of the Federal Ministry for Education (<https://www.bibb.de/en/index.php>). The first task for BiBB is to research on the needs and goals for this new profile. These goals are mostly new technical developments such as ICT or new materials where VET must react on. The results of this research stand on the beginning of the process. The Joint Committee outlines, which content, which level and which means to the goals must be chosen, i.e. the improvement and amelioration of existing professional profiles or the creation of an entire new occupation, answering on new challenges of market and of the world of work.

The Joint Committee discussed the different aspects of a professional profile's development procedure. Entrepreneurial side was represented by the Industrie und Handelskammer (IHK– Chamber of Commerce and Industry), Handwerkskammer (HK– Chamber of Crafts), and, depending on the subject, other chambers, i.e. of advocates, of taxation consultants etc. Unions went to their concerned substructures to do the same. Representatives of the federal countries discussed it in the “Conference of ministries for culture and education”. After a while, they came together and tried to find a common version of the new/revised occupation. The principle of common sense is constitutive for the creation of new occupational/ professional profiles and it is setup in the vocational training act, which is legally binding for all concerned partners. It is important to include experience and needs from companies' practice and to raise acceptance from all concerned partners in the process.

In order to start up the process of creating a new or an updated version of a professional profile, a “Joint Committee” was created, consisting of 8 members from entrepreneurial side, 8 members from unions, 8 members of the federal states (“Länder”) and 5 members of the federal government, as described above. Each side has the right to ask for the creation or improvement of professional profiles. There is a board of this Joint Committee, who decides to start the process. This board also monitored the process until it was finalized.

### **2.4.3 Italy**

In the case of Italy, the National Directory of Education, Training Titles and Professional Qualifications was established with Legislative Decree No. 13/ 16.01.2013. According to the Decree, the Directory “... *constitutes the unitary reference framework for the certification of competences, through the progressive standardization of the essential elements, even descriptive, of education and training titles, including those of vocational education and training, and professional qualifications through their correlation with a shared system of recognition of educational credits in a European key*”. The National Directory consists in four different sections, although now only two out of four sections can be consulted, in particular:

- Education and professional training, which includes Education and Professional Training for three and four years (VET)
- Higher Technical Education and Training (IFTTS)
- Education Superior Technique (ITS).

For the process to start, in Italy, the following steps are taken. The national repertoire consists of all the repertoires of education and training titles and professional qualifications issued in Italy by an officially entitled body, namely the Ministry of Education, University and Research; the Regions and the autonomous provinces of Trento and Bolzano; the Ministry of Labor and Social Policies; the Ministry of Economic Development and the other competent authorities in matters of certification of competences related to the qualifications of the regulated professions (Article 5 of Legislative Decree No. 206 of 9 November 2007).

The National Technical Committee (CTN) has collected all the qualifications contained in the Directories of Education and Vocational Training and in the Regional Directories, in collaboration with the Technical Group, composed of representatives of the Coordination of Regions, Regions and the Ministry of Labor.

The Technical Group operated under the mandate of the Regional Councilors of the IX Commission, based on an experimental work plan signed in July 2013 and definitively approved in January 2014. The Technical Group was subsequently institutionalized with the inter-ministerial decree of June 30, 2015 by adding the Ministry of University Education and Research to the existing Administrations.

There is limited information on the methodology used for investigating the need for the professional profile's development procedure and for gathering all relevant information. Nevertheless, in the framework of setting qualifications for vocational education programs, regional differences should be considered regarding the local framework of qualifications. Currently, in the national repository can be consulted 18 regional directories.

An example from which good practices can be highlighted refers to the “Friuli Venezia Giulia” repository. In fact, the usage of “simplified format” (See SST below) arising from field-based experiences is one of the most effective tools developed, in support of the evaluation and assessment process of the learning process undertaken by the learner.

In preparing the Repertory of regional qualifications, the results of the work of the Technical Group, still in course, MLS-ISFOL-Tecnostruttura-Regions (GTN) which operates for the implementation of the "Plan of work for the implementation of the National Directory of Education and Training Titles and Professional Qualifications", art. 8 of the legislative decree n. 13/2013, towards the implementation of the national system for the certification of competences approved on 10 July 2013 in IX Commission - Education, Training and Work - of the Conference of Regions.

The Regional Qualifications Directory maintains an open character: it is periodically updated in relation to the evolution of the regional labor market and to the maintenance processes of the national reference framework of regional qualifications referred to in the Agreement of 22 January 2015 and of the National Directory as per the decree legislative n. 13/2013.

The Repertory of regional qualifications is made up of the set of different sector repertoires, distinguished by taking as a reference for the subdivision the classification of the economic-professional sectors referred to the Inter-ministerial Decree of 30/06/2015, and by the repertoire of professional profiles, which declines the regional professional profiles starting from the competences described in the various sector repertoires.

The Repertoire of professional profiles describes the Professional profiles recognized at regional level. Every single professional profile is declined through a title and a unique code, a description, references to the national statistical codes and of the Typical Situation Sheets (SST) (also belonging to Directories of different sectors). With respect to each professional profile, the regional professional qualifiers (QPR) represent the training standard, while the Typical Situation Sheets (SST)\* represent the professional standard of reference.

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\* Typical Situation Sheets (SST): Classification scheme of the executive complexity of a competence (QPR), through a set of working situations of increasing difficulty, identified on the basis of the

In each region, regional authorities are the bodies in charge of facilitating the monitoring and updating of professional profiles. For instance, in the Veneto Region the official process concerning the recognition, monitor and update of regional repertoire has been updated in March 2017 (see DGR n° 310/2017). More in details, the official updating procedure foreseen by the Veneto Region authority body refers to two main scenarios, namely:

1. **Integration** of new professional profiles that currently don't exist in the repertoire.
2. **Changes** in the existing professional profiles already inside the repertoire.

The actors that can request to start the procedures are the following ones:

- Companies
- Accredited bodies
- Trade associations
- Social partners and employer's bodies
- Chamber of commerce
- Bilateral agency
- Other public or private bodies.

The key phases of the whole procedure are:

### **Phase 1: Presentation of the official request**

The documents to be produced and presented to the Regional Authority are:

1. The **official request module**, detailing the reasons of the request.
2. **Support letters** are to be provided by some of the above-mentioned bodies. In particular there should be the official support from accredited bodies and other bodies representing the Professional Economic Sector of reference of the professional profile concerned.

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elements characterizing the operating conditions (reference context, products / services realized, planned activities, required tools, applied techniques, materials used, etc.)

3. **In-depth analyses and surveys** concerning the professional profile concerned that highlight the adherence to the employment need of the territory; these documents are to be provided along with the support letters.
4. **CVs** of at least two experts of the economic sector of reference and at least one from a training expert with at least five-year professional experience.
5. The **document describing the integration/change proposal** for the professional profile.

### **Phase 2: Preliminary revision of all documents**

Following the presentation of these documents, a commission is created by the Human Capital and Culture Area Office of the Veneto Region Authority, which manages and supervises the process. Specific rules are detailed depending on the type of submitted request (see the two possible scenarios for updating the repertoire). The entitled commission analyses the documents, expresses a first evaluation concerning the content and method and, should there be any need, asks the applicant for integrations (15 days to provide the integration requested are foreseen).

#### **2.4.4 Summary**

The main characteristics of the methodology followed to develop a Professional Profile, during its initial phase, for each country are briefly described in the following Table.

Table 2: Sum Up of the methodology characteristics during the development Phase, by country.

	Greece	Germany	Italy
<b>Is there a national body coordinating the professional profile's development procedure</b>	Yes, the National Organization for the Certification of Qualifications & Vocational Guidance (EOPPEP)	Yes, Federal Institute for Vocational Education Training (Bundesinstitut für Berufsbildung- BiBB)	Yes, National Directory of Education, Training Titles and Professional Qualifications
<b>How is the process being kicked-off</b>	Search on the needs and goals for a new profile	Search on the needs and goals for a new profile	Search on the needs and goals for a new profile
<b>Do employees' unions take part in the development procedure</b>	Yes, Greek General Confederation of Labour (GSEE- Geniki Synomospondia Ergaton Ellados	Yes, Handwerkskammer (HK- Chamber of Crafts), and, depending on the subject, other chambers	
<b>Which are the members of the professional profile's creation "team"</b>	The Hellenic Confederation of Professionals, Craftsmen and Merchants (GSEVEE), the Hellenic Confederation of Commerce and Entrepreneurship (ESEE), the Hellenic Federation of Enterprises (SEV) and the Greek Tourism Confederation (SETE)	"Joint Committee" will be created, consisting of 8 members from entrepreneurial side, 8 members from unions, 8 members of the federal states ("Länder") and 5 members of the federal government	
<b>Which research methodology/-ies procedure is used to investigate the need for the professional profile's development procedure and to gather all relevant information</b>	In-depth interviews, the "Delfi" technique and bibliographic research are being combined	Continuous quality development of VET nationwide and in each of the federal states. Research done by the federal institute for vocational education and training BiBB. Conferences. Needs detected by the partners of the joint committee	



## 2.5 Evaluation Phase

### 2.5.1 Greece

Upon the completion of the professional profile, tertiary organizations jointly submit it to EOPPEP for certification. EOPPEP in its turn requests the deputation of representatives from the tertiary organizations, forming in this way the Advisory Committee, which will assess and certify the submitted Professional Profile. Once the evaluation phase is completed, the Advisory Committee approves the final document and sends it then to the Managing Board of EOPPEP, where it is eventually approved. Finally, in most cases, the initiative for the updating of the Professional Profile belongs as well to the relevant professional union.

### 2.5.2 Germany

The vocational education and training in Germany is done in the “Dual System”\*.

#### The frame of Dual VET:

Coordinating body is the “Main Board at BiBB (federal institute for vocational education and training)”.

This is a Committee in which employers, workers, federal and local government are each represented by 8 delegates and 8 deputy delegates (4 “benches”). The representatives are assigned for up to 4 years. They work on honorary basis (non-paid). Parliament and subcommittees hold meetings on regular basis. Decisions are taken consensus.

**Task** of this main board is to advice government on VET, to issue recommendations for practice (for instance, regarding the coherent implementation of the German Vocational Training Act) and to issue statements on VET regulations (for instance on in-company training standards) and on VET policies by the government. This board decides matters concerning BIBB (for instance budget, research).

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\* The engine of Dual VET – cooperation of stakeholders – from business, government – and society VET in Germany, GOVET – Zentralstelle für internationale Berufsbildungsk Kooperation Im Bundesinstitut für Berufsbildung Robert Schuman-Platz 3, 53175 Bonn, [govet@govet.international](mailto:govet@govet.international)

**Impact** of this board's activities is to articulate joint VET stakeholder position. It is the central national political coordination mechanism of Dual VET in Germany ("parliament of VET"). In consequence it is the mechanism, where employers, workers and government jointly steer the VET system.

### **Development and modernization of Dual VET standards**

For development and modernization there are "multi-stakeholder expert groups".

These are groups of experts with experience in vocational theory and practice. They are established on demand if there is a necessity to modernize occupational profiles. A BIBB representative leads the group, acts as moderator and manager of standard development process and provides technical input. Employer and worker side delegate their own experts. Representatives of federal government and federal states contribute to group.

**Task** of this expert groups is to develop or to up-date in-company VET standard in a given occupation and they advise stakeholders on implementation of in-company VET standard and coordinate in-company VET standard with VET standard for vocational school (frame curricula).

**Impact** of this groups' activities, part of a mechanism by which standards meeting the requirements of world of work, derives by jointly developed standards recognized by those who implement them (companies, trainers and trainees).

### **Monitoring the implementation and the run of Dual VET**

In each of the 16 federal states, there are federal state boards for VET.

These boards are established at each federal state government (16 boards nationwide). In general, they consist of 18 members: each side (employer, worker and local government) assigns 6 representatives. These representatives are assigned for up to 4 years and they work in an honorary capacity (non-paid). Decisions are taken by majority.

**Task** of these boards is to advise local governments on VET and to work towards continuous quality development of VET in the federal state.

**Impact** of these boards' activities is to articulate coordinated VET position of stakeholders, particularly on the development and implementation of vocational education in regional schools. They are part of mechanism by which VET stakeholders jointly shape local VET policies and the coordination of VET in the company with VET in vocational schools.

#### **VET boards at competent bodies:**

They are established at competent bodies (chambers, ministries, etc.) and consist of 18 members: employer, employee and vocational school sides assign 6 representatives each. These representatives are assigned for up to 4 years and they work in an honorary capacity. Decisions are taken by majority.

**Task** of these VET boards is to promulgate local regulations for implementation of Dual VET and to work towards continuous quality development of VET. They also ensure implementation of recommendations by federal state boards and they have to be consulted in all important VET matters.

**Impact** of these boards' activities is to articulate coordinated VET position, particularly on regulation of in-company VET (accreditation of training companies, assessment of trainees). They are part of a mechanism, by which stakeholders jointly monitor and develop quality of Dual VET for specific sectors (crafts, manufacture, trade etc.) in their region.

### **2.5.3 Italy**

The Commission meets with the Human Capital and Culture Area Office – Labor Directorate and they approve or reject the request. After maximum 45 working days, the phase 3 is closed.

Depending on the characteristics of each regional professional profile, their actual usability in the local area and the available training time, the expected results at the end of the training courses may include a partial, complete or extended development of the typical situations described in the individual SST.

- Complete: results are achieved in the training path that is perfectly in line with the demands of the world of work with respect to the reference competence. They constitute the distinctive element of the profession.
- Partial: in the training path only certain situations of SST are developed, which the world of work requires, but which do not imply complete mastery of the whole competence.
- Extended: results that are reached in the training course exceed the demands of the world of work with respect to the reference competence. Normally this type of development of SST refers to the professional diploma courses.

## **2.6 Common Methodology**

The analysis presented above was used to identify and differences and the commonalities in the methodology used to create the Professional Profiles and to support the development of a common methodology for the creation of the Professional Profile within the METVET Project. Detailed comparisons were made in the respective paragraphs above. Here after we will depict the main characteristics for each phase from which the common methodology will be deduced.

	Regional Process	Initiative to create the Profile	Actions taken
Italy	Yes		Kick off
Greece	No	Union	Kick off
Germany	No	Union + government	Kick off
METVET	No	Consortium	Kick off

*Figure 4: Commonalities and Differences in the Initial Phase*

In Figure 4 the identification of the commonalities and the difference are highlighted. Within the METVET Project the Project consortium according the Project Program was initiated the process and towards the creation of a joint Profile.

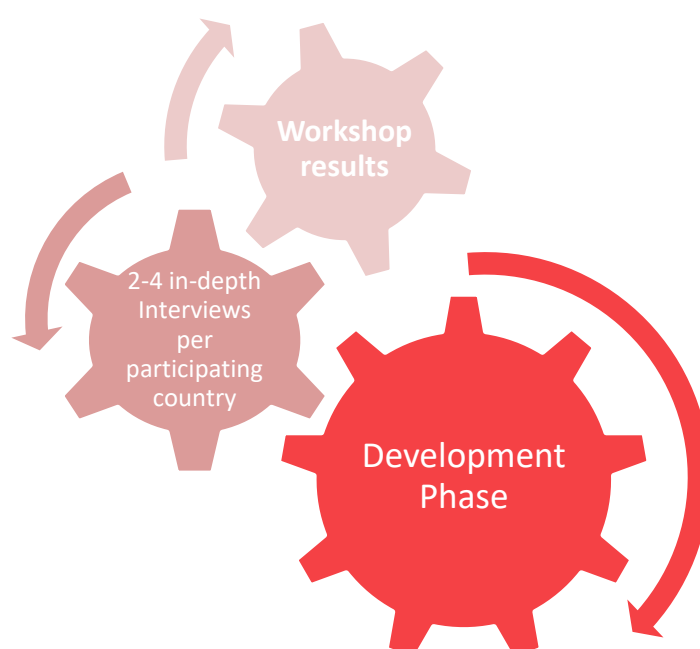
With regard to the Development phase the commonalities during the creation of the Professional Profile are highlighted below.

	Coordinating National Body	Unions take part	In depth Interviews
Italy	Yes	Yes	Yes
Greece	Yes	Yes	Yes
Germany	Yes	Yes	Yes
METVET	Yes	Yes	Yes

*Figure 5: Commonalities and Differences in the Development Phase*

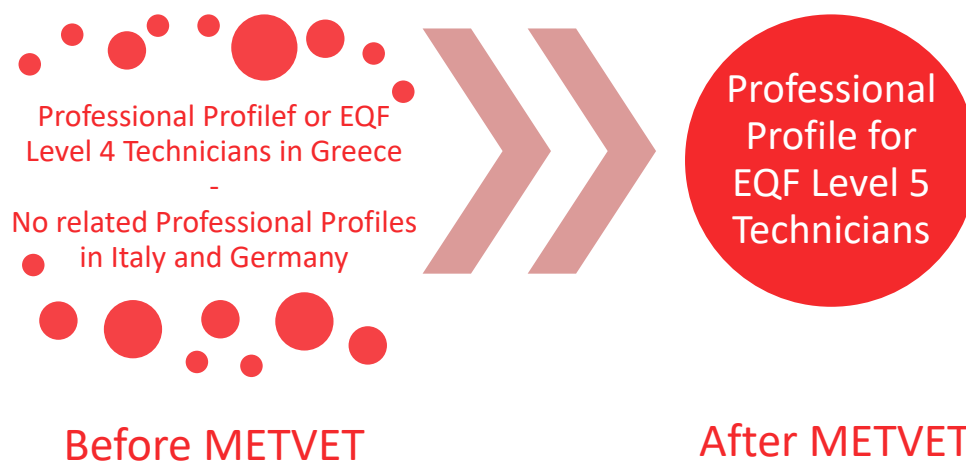
In all three cases, in Italy, in Greece and in Germany there is a coordinating national body. For each step of upgrade, or of update the previous version of the Profile is the base on which the developments are being built up. In-depth interviews are commonly used to gather all advancements, as well as conferences and workshops.

Within METVET, both in-depth interviews were conducted, as well as the results of the second Workshop were exploited in order to identify the advancements and the new market demands. This scheme is graphically depicted in Figure 6. Details of the qualitative research based on the in-depth interviews are provided in the next chapter, with an extensive presentation of the questionnaire and the results as well as a thorough discussion on the outcomes per question. The key outcomes from the Second Thematic Workshop are given below, in an appendix of this chapter.



*Figure 6 Structure of the methodology followed for the development of the Professional Profile*

It shall be noted here, that in none of the countries a previous developed Professional Profile had been developed. In Greece there is the Professional Profile for the Aluminum and Metal Construction Technician at an EQF Level 4, whereas in Germany and in Italy there was no pertinent Professional Profile.



*Figure 7 Creation of a joint Professional Profile within the METVET Project.*

The list of the Professional Profiles that were existed before the METVET Project and on which the joint Professional Profile was based on is given below.

Table 3: List of Professional Profiles on which the METVET (joint) one was based on

Country	Title	EQF Level
Italy	Metal carpenter or/and a welder	3 & 4
	CNC machine tool operator	3
Germany	Metalworker – specialized in structural engineering	4
	Roller shutter and sunshade mechatronics technician	4
Greece	Aluminium and Metal Construction Technician	4

#### Appendix: Key-outcomes from the Second Workshop

The details and some key outcomes from the METVET Second Thematic Workshop are presented below.

Workshop Details	
<b>Title</b>	Creation of Aluminium & Metal Constructions Technicians' Professional Profile
<b>Date</b>	Thursday 03/10/19
<b>Place</b>	IME GSEVEE's premises, 46, Aristotelous Str., Athens, Greece
Workshop agenda	
<b>16.00 – 16.30</b>	Arrival & Registration of Participants
<b>16.30 – 16.45</b>	Welcome, Introduction on the Purpose of the Thematic Workshop
<b>16.45 – 17.05</b>	Project's Main Aims & Results
<b>17.05 - 17.30</b>	Skills identification for aluminium and metal construction technicians: Presentation of research results
<b>17.30 – 17.45</b>	Coffee Break
<b>17.45 - 18.10</b>	Creation of a common occupational profile for aluminium and metal construction technicians
<b>18.10 – 18.30</b>	Short interventions on behalf of international partners
<b>18.30 – 19.00</b>	Discussion – Conclusions
<b>19.00 -20.00</b>	Light Lunch

From the whole Workshop, it became quite clear that a training is really needed for AMCTs on many skills that have arisen nowadays mainly due to the needs of a constantly changing market, with an emphasis on green skills and also on some digital skills, especially those that have to do with the operation of some IT driven tools and machines. That way, AMC technicians will be able to get trained and move from Level 4, based on the European Qualifications Framework, to Level 5 where a sense of autonomy while working and the skill of problem management are foremost and above all needed.



- The majority of AMC technicians acquire all the skills needed for their everyday work, such as handling the measuring equipment correctly or calculating dimensions from construction drawings and handling technical manuals for the manufacture of aluminium systems and profile specifications. Nevertheless, in the same time, there is also a lack of important skills, such as green skills.
- Even though this finding is different from country to country, emphasis is nowadays given in green skills, such as the cultivation of recycling culture or the capability of choosing the most energy efficient combination of materials. AMCs technicians need to become accustomed to these skills, whether they are going to use it in practice or not.
- Therefore, in all skill categories, practical, green and transversal –including digital skills and skills related to technical innovation- skills, an important need for training was pointed out by the majority of the participants. Therefore, the main issue to be examined during the evolution of the Project is how to build a joint vet course on the aluminium & metal domain to help technicians move from level 4 to level 5 of European Qualifications Framework (EQF).

The main outcome was that the suggested Profile from the METVET Project fulfills the current needs and the envisaged future needs both in terms of practical skills, as well as in terms of green and transversal skills. The gap of a Professional Profile for Aluminium and Metal Construction Technician at EQF Level is adequately filled with the suggested Profile, by upgrading to the corresponding Profiles for lower EQF levels and encompassing knowledges, skills and competences from related Profiles. The green skills presented cover all envisaged aspects of tasks in order to support the EU in meeting the energy-related targets



Professional [Qualification]

**PROFILE**

Qualitative Researches

### 3 WP3 | CONDUCTION OF QUALITATIVE RESEARCHES

In METVET Project Deliverable D3.2 “Quantitative Research”, the process and results from a qualitative research are presented. The Research was based on in-depth interviews with stakeholders in Greece, Germany and Italy.

The profiles of the experts interviewed during the qualitative research are given below.

Table 4: Sum Up of the methodology characteristics during the initial Phase, by country

Country	Number of interviews	VET Providers	Small & Medium sized construction companies	Large sized construction companies	System designers
Italy	3	60%	40%	-	-
Germany	4	50%	40%	10%	-
Greece	7	20%	60%	-	20%

#### 3.1 A few words to the participants

Short introductory information was read before each interview from the person who conducted the interview. This information was the following:

*The Consortium of the European Project METVET- Joint Higher VET Course in Metal Sector is going to create a higher VET course for craftsmen and workers in the field of Aluminium and Metal Construction. In the context of creating the course, a professional profile for workers of this field needs to be created initially.*

*The project's aim is, on one hand, to deal with the lack of highly qualified workforce in this field and, on the other hand, to increase this professional group's future employability. It is indeed of high importance that workers do their work with high sense of responsibility and reliability.*

*This professional profile will upgrade medium experienced workers in this field to a high-level degree regarding the European Qualification Framework (EQF) from level 4 to level 5. Level 5 means that craftsmen and workers of this field will be able to plan, work and decide with increased autonomy and self-responsibility concerning the materials they use and the way of construction.*

*This questionnaire will help build a professional profile updated and directly focused on the needs of the labour market.*

**CONFIDENTIALITY CLAUSE:** *The answers that you are going to give us, are confidential and they will be used only for the purposes of the METVET Erasmus+ project.*

*The METVET Project*

### **3.2 Questionnaire in-depth interviews/ focus group**

<b>[PART 1- GENERAL]</b>
1. Which skills and competences do you think are necessary for the exercise of the profession of the Aluminium & Metal Constructions technician (AMC technician)?
2. Which of the skills and competences you mentioned above do you think are the most important ones for being an AMC technician?
3. Do you think that the current labour force of this specialty possesses to a satisfactory degree the skills and competences you have mentioned above? If not, which skill(s) and competences it does not possess and why?
4. To which extent do you think that there is a changing in the necessary skills of the AMC technician during the last few years?
5. Do you think an updating in the training content offered to the AMC technicians through the respective trajectories is necessary?
<b>[PART 2- SPECIFIC]</b>
6. Please, list all green skills and competences you think that are required for being an AMC technician.
7. Please, list all digital skills and competences (e.g. IT skills and competences, skills related to innovation) you think that are required for being an AMC technician.

**[PART 3- SPECIFIC]**

8. Now we are going to read you a list of skills/ in front of you there is a list of skills (NOTE: DEPENDING ON HOW IT WILL BE CONDUCTED). For each one of them we would like to ask how important you consider them for an AMC technician, if there is a lack of sufficient knowledge on the specific skill and, finally, if the implementation of an educative process is necessary for the cultivation of the skill mentioned.

PRACTICAL SKILLS					
		SKILL IMPORTANCE	LACK OF SUFFICIENT KNOWLEDGE	EDUCATION/ TRAINING NECESSITY	NOTES
		(High-Medium-Low)			
1	Choose the right combinations of materials (profiles, glass, etc.)				
2	Recognize and apply the requirements of the system designer's technical manuals when assembling frames, in order to achieve maximum energy outcomes				
3	Handle the measuring equipment correctly				
4	Calculate dimensions from construction drawings, sketches				
5	Handle technical manuals for the manufacture of aluminum systems & profile specifications				
6	Carry out welding processes practicing different technical solutions				
7	Dismantle and assemble components and sub-assemblies; check, monitor and remedy errors and malfunctions; carry out routine repairs to control systems and components and document results				
8	Install and uninstall metal constructions and use various jointing techniques				
9	Select testing devices and methods and apply the company's quality assurance system				
10	Cutting and welding of steel constructions for reinforcement points				

GREEN SKILLS					
		SKILL IMPORTANCE	LACK OF SUFFICIENT KNOWLEDGE	EDUCATION/ TRAINING NECESSITY	NOTES
		(High-Medium-Low)			
1	Understand and choose the most appropriate techno-economic & energy-efficient solution				
2	Understand the requirements for energy saving in buildings through aluminum constructions				
3	Manage the recyclable materials correctly				
4	Calculate thermal properties (e.g. U-value) for various construction products by using appropriate software tools				
5	Assembly products in energy-efficient ways according to the assembly designer's requirements				
6	Identify critical check-points, pertinent to construction quality which can affect thermal energy losses				
7	Understand & calculate the energy performance of products (energy labeling)				
8	Understand the environmental performance of products (environmental product declaration)				
9	Implement waste reduction culture				
10	Implement holistic view on processes				
11	Understand and implement Near Zero Energy Building (nZEB) techniques				

TRANSVERSAL SKILLS (incl.IT)					
		SKILL IMPORTANCE	LACK OF SUFFICIENT KNOWLEDGE	EDUCATION/ TRAINING NECESSITY	NOTES
		(High-Medium-Low)			
1	Implement good working practices (working field, equipment, etc.)				
2	Implement good working practices (suitable vehicle, appropriate means of support, customer loyalty etc.)				
3	Explain the operating and maintenance instructions for the products, the rules of the warranty and its obligations as a manufacturer				
4	Handle software for calculating thermal properties				
5	Handle software to calculate constructions cost				
6	Implement health and safety rules at work				
7	Explain the information contained in the Declaration of Performance and CE products Marking				
8	Organize the file of each completed project				
9	Carry out work assignments autonomously and work as part of a team according due consideration to the relevant regulations and safety provisions and on the basis of technical documentation and work orders				
10	Plan coordinate and agree work with line managers, with colleagues and with other work divisions using technical terminology				
11	Document work and initiate quality assurances measures and measures for health and safety at work and environmental protection				
12	Set up workplaces at building sites				
13	Use IT systems, including in digitalized processes				
14	Apply regulations relating to data protection and information security				
15	Being able to organize the steel workings for reinforcement points				
16	Read, understand and apply CAD-produced and presented descriptions and work orders				
17	Understand and use 3D-Equipment for production of tools, parts etc				
18	Organize collaboration with external partners (specifications, times, costs, etc.)				
19	Sharing knowledge				
20	Continuous improvement mindset				
21	Planning of time				
22	Implement logistics and warehouse good practices				

### 3.3 The results of the research

In this section we present the results from the research. For each question the results are presented with the following structure: first the cumulative overview of the replies is presented in graphs, then we provide the comments we received in each case, that cannot be categorized. Finally, a short discussion is provided along with the conclusions drawn.

In Figure 8 the replies from Q1. “Choose the right combinations of materials (profiles, glass, etc.)” are provided.



*Figure 8: Results from Q1 Choose the right combinations of materials (profiles, glass, etc.)*

Comments received on Q1:

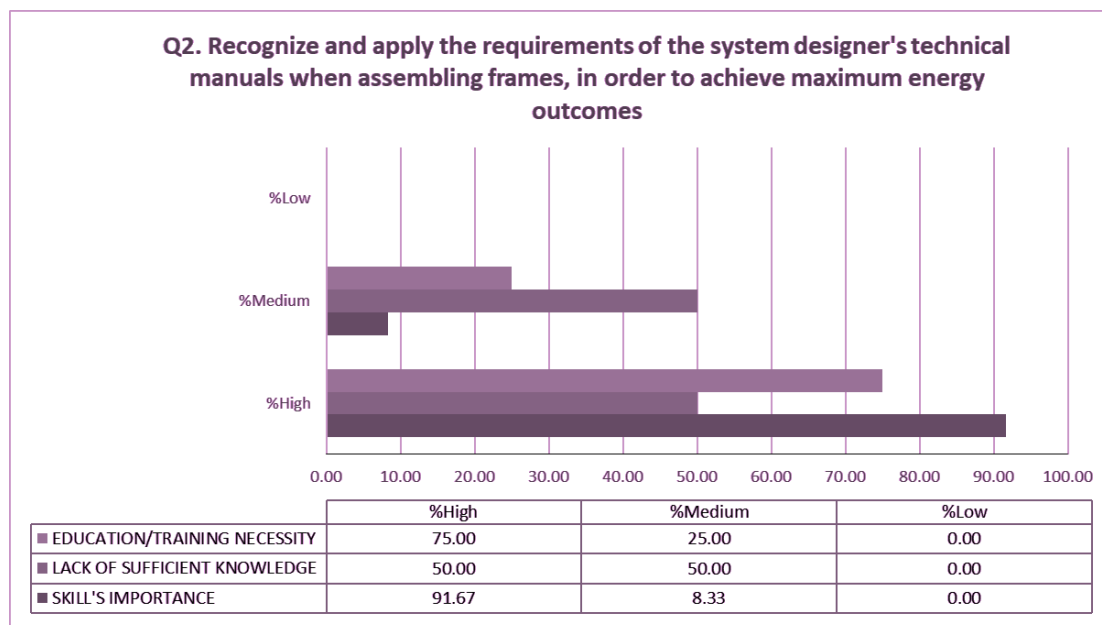
- Typically, technicians acquire this knowledge with experience
- Typically, technicians have not the authority to take such decisions



The replies on Q1 indicate that there is low lack of knowledge in this skill. Indeed, for conventional constructions the combination of materials is usually provided from the system designer, with no large space for differentiation. It is admitted, however, that this is important as reflected in the replies in the importance of this skill. The education needed has received low ranking. It is therefore concluded that:

- This skill is important
- There is no large need for education regarding conventional constructions
- There is a large need for special constructions, in which the Aluminium and Metal Construction Technician shall select independently the right combination of materials

In Figure 9 the replies in Q2 “Recognize and apply the requirements of the system designer's technical manuals when assembling frames, in order to achieve maximum energy outcomes” are depicted.

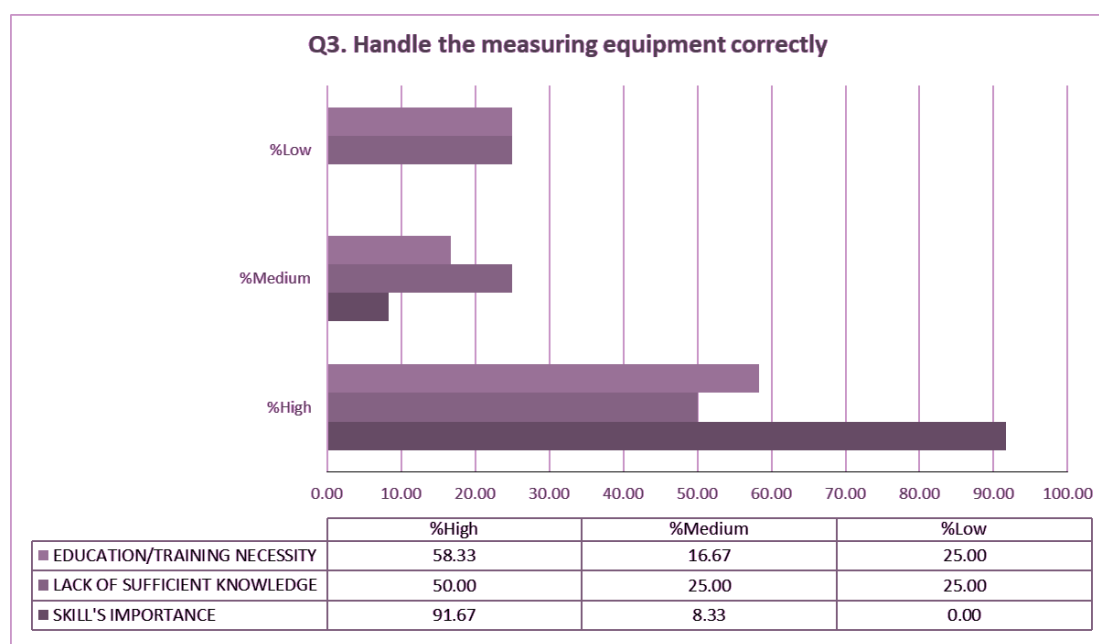


*Figure 9: Results from Q2 Recognize and apply the requirements of the system designer's technical manuals when assembling frames, in order to achieve maximum energy outcomes*

The system designer's technical manuals are of prime importance (>90%) in order to attain maximum energy outcomes. The Aluminium and Metal Construction Technician shall be capable to recognize and apply the pertinent requirements not only for the adequate structural integrity but also for achieving the targeted energy performance. Examples of good practices, such as to avoid thermal bridges, apply the suitable sealing medium etc. may support meeting such energy related targets. It is therefore concluded that:

- This skill is very important
- There is a large need for education

In Figure 10 the answers of Q3. "Handle the measuring equipment correctly" are illustrated.



*Figure 10: Results from Q3 Handle the measuring equipment correctly*

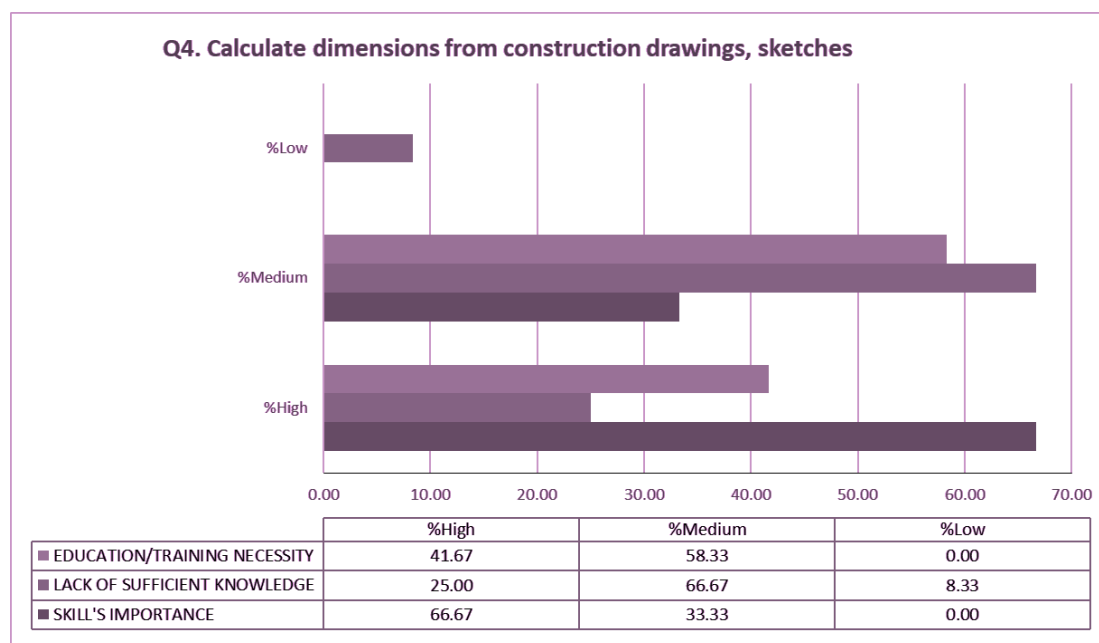
Comments received on Q3:

- Even though people think they know, actually they don't know
- High expectation to expect from technicians to be fully autonomous

For a Technician at a Level 5 EQF handling the measuring equipment correctly is expected to be very important in order to support its autonomous working. This is corroborated from the results gathered during this research, indicating the skill importance is high. The stakeholders identified that there is high lack of knowledge and therefore training is needed. At this level of qualification, the Aluminium and Metal Construction Technician shall attain a solid knowledge on handling the measuring equipment correctly, since this may affect not only the operation of the final product in terms of functionality and energy-related efficiency but also the cost during the production phase. It is therefore concluded that:

- This skill is very important
- There is an actual lack of knowledge, and therefore training is needed.

The results related to the skill pertaining the calculation of dimensions from construction drawings etc. as expressed in Q4 “Calculate dimensions from construction drawings, sketches” are provided in Figure 11.



*Figure 11: Results from Q4 Calculate dimensions from construction drawings, sketches*

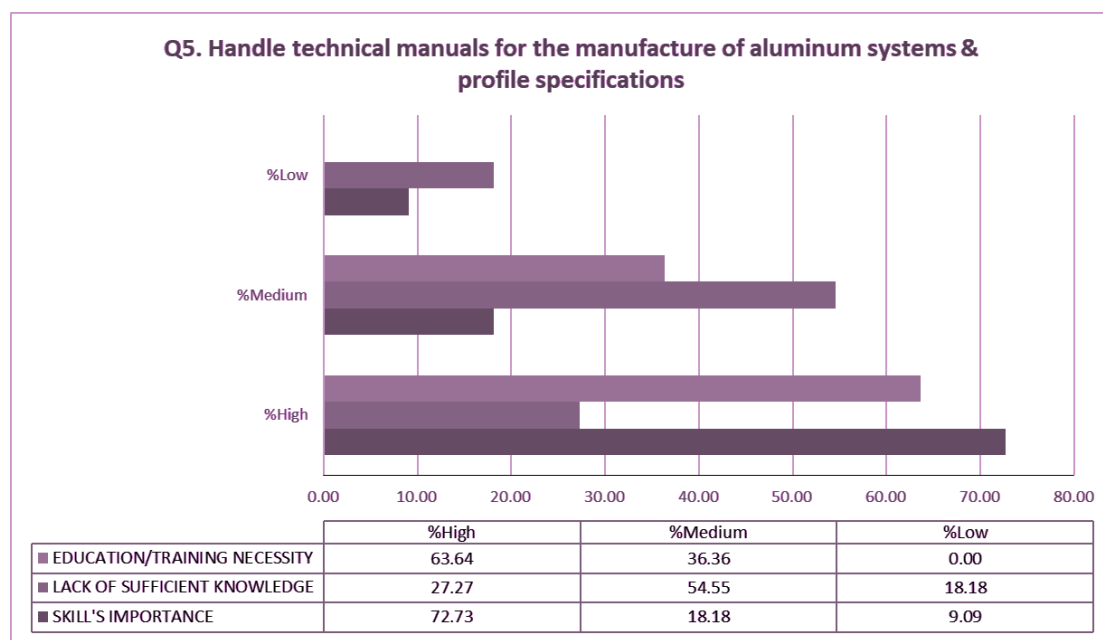
The uncategorized comment received is the following:

- Typically, a technician does not work on drawings. This happens after many years of experience.

In many cases during collaboration with the chief engineer, the Aluminium and Metal Construction Technician shall be capable to read technical drawings and extract the dimensions. Even though in the everyday working experience the dimensions are measured in situ, it is far from rare for the technician to work on structures not yet build and therefore to be capable to extract dimensions from drawing. This skill has been evaluated as highly important from the ca. 65% of the stakeholders in this study, while the low important answer received 0%. Based on the answers:

- The skill is important
- There is lack of knowledge at this point and a need for training on such tasks.

The skill to handle technical manuals was discussed with the experts in Q5 “Handle technical manuals for the manufacture of aluminum systems & profile specifications” and the results are demonstrated in Figure 12.



*Figure 12: Results from Q5 Handle technical manuals for the manufacture of aluminum systems & profile specifications.*

The comments received were the following:

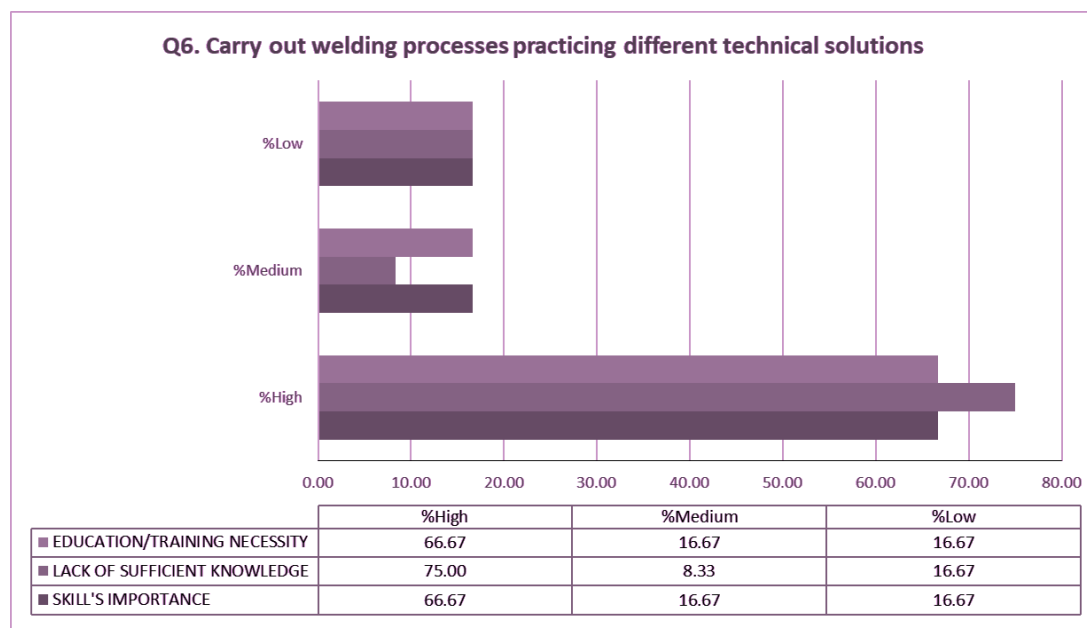
- What is needed is to make him/her refer to the technical manuals and not disrespect them.
- Technical manuals are general, and technicians shall treat them as start-points and not as the “Bible” (Comment received from system manufacturer).
- It is not in the task of the ACM technician to do this – the technical office is in charge.

None of the experts answered that there is no need for education for this skill. Indeed, the technical manuals for the case of Aluminium constructions provide complete and concise guidelines both for the production as well as for the installation of the final product. For these cases the technician shall follow these guidelines and at a level of 5 EQF, the technician shall make sure that the lower EQF level technician follow these guidelines as well. Of course, for large companies it is the engineering department that is responsible for such tasks. Still, technicians with Level 5 EQF may not only work in this department but also shall be capable to collaborate with the Engineering Department, and therefore shall be familiar with these manuals. This is not however the case for the Steel construction products, where much more flexibility is typically left for the technicians. Nevertheless, even for the Aluminium constructions there are cases where special constructions are needed and hence the technical manual of the system cannot be applied. This is where the autonomy of the technician shall apply, considering the basic principles of the technical manual, but suggesting and applying prototype solutions in order to meet the technical requirements. It is therefore concluded that:

- This skill is important.
- There is a medium lack of knowledge
- There is need for training, to read and understand the manuals, to apply them when applicable, but also to extract the underlying/salient features in cases where special constructions are needed, that are not covered in the technical manuals.

The following questions refer on skills with more technicality character, always related to the tasks of the Aluminium and Metal Constructions Technician.

In Figure 13, the results on the skill to carry out welding processes are given, as expressed in Q6 “Carry out welding processes practicing different technical solutions”.



*Figure 13: Results from Q6 Carry out welding processes practicing different technical solutions.*

The comments received are the following:

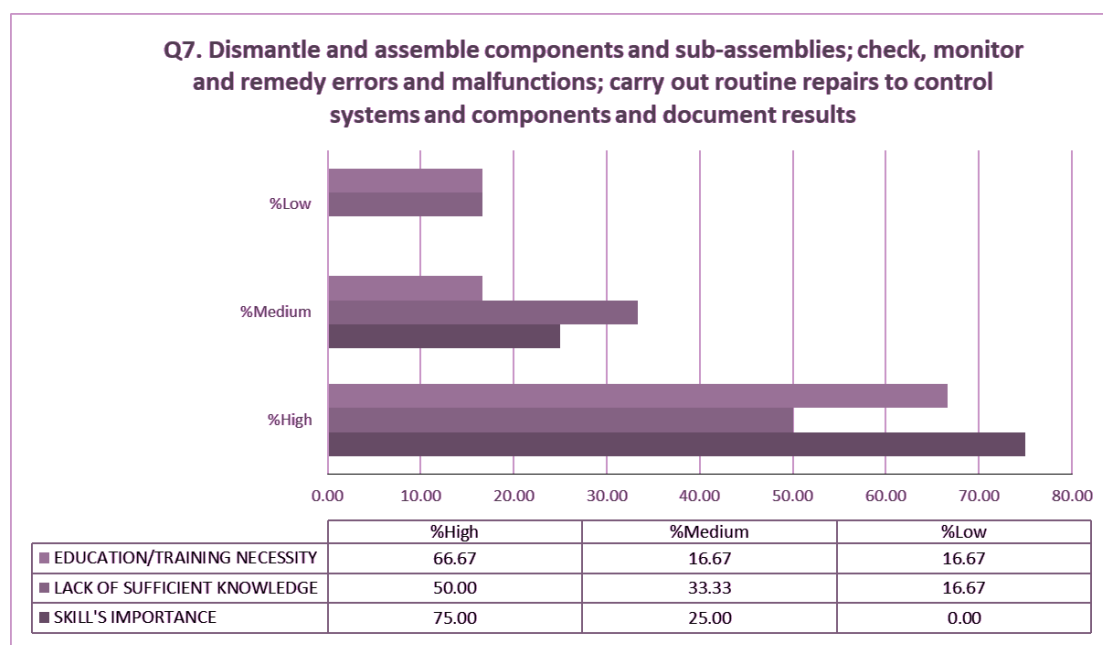
- Depending from the actual field of operations.
- This skill is not specific for/required to the ACM technician, but is owned by the welder in Italy.

Welding structural components which take loads, is not typically the task of an Aluminum and Metal Construction Technician. In Italy, in Greece and in Germany there is a special occupation responsible for welding, with special Profile and certification processes.

Notwithstanding this the Aluminum and Metal Construction Technician shall be capable to perform welding processes for secondary constructions which supplement their final products. In this context the conclusions drawn from this are:

- The skill is important.
- There is a lack of knowledge.
- Training is needed.

The following question, Q7 “Dismantle and assemble components and sub-assemblies; check, monitor and remedy errors and malfunctions; carry out routine repairs to control systems and components and document results”, relates to one of the core tasks for an Aluminium and Metal Constrictions Technician.

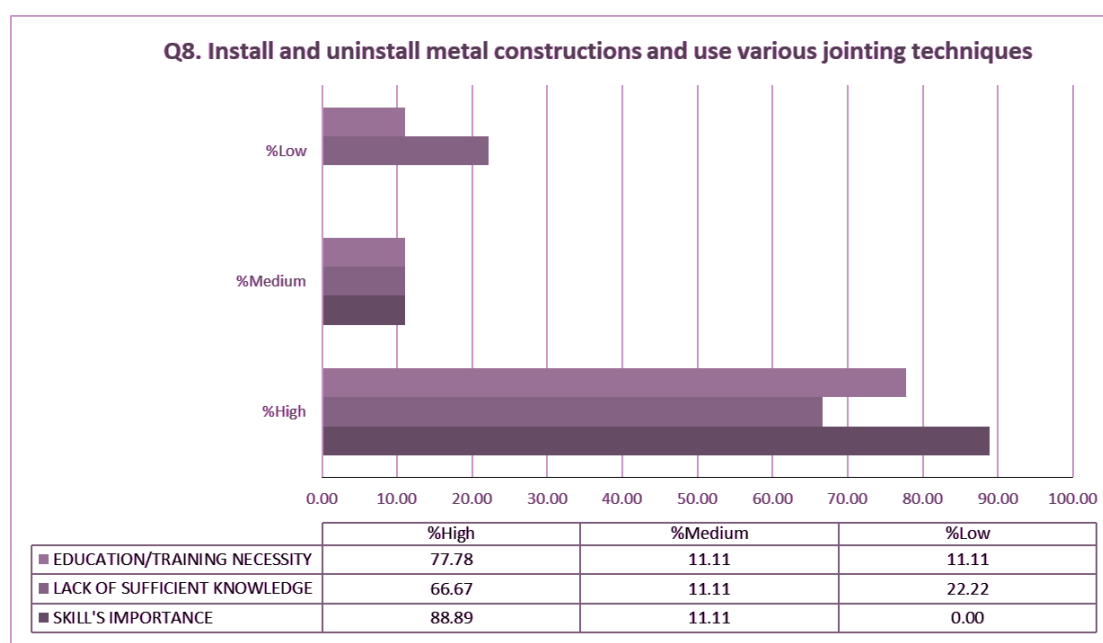


*Figure 14: Results from Q7 Dismantle and assemble components and sub-assemblies; check, monitor and remedy errors and malfunctions; carry out routine repairs to control systems and components and document results*

For the case of Aluminium constructions in particular, such processes are in everyday list of activities. This is reflected in the answers from this study, in which the skill importance received no Low replies. Even though this task is also part of lower EQF Level technician, still it is important for the Level 5 EQF, with higher autonomy characteristics and decision-making freedom. This skill is also related to the final energy performance of the products, and from this regard it relates also to green skills. It is therefore concluded that:

- The skill is very important.
- There is a lack of knowledge.
- Training is needed.

As a follow up of the previous question, the results received in Q8 “Install and uninstall metal constructions and use various jointing techniques” were overwhelming.



*Figure 15: Results from Q8 Install and uninstall metal constructions and use various jointing techniques*

Comments received for Q8:

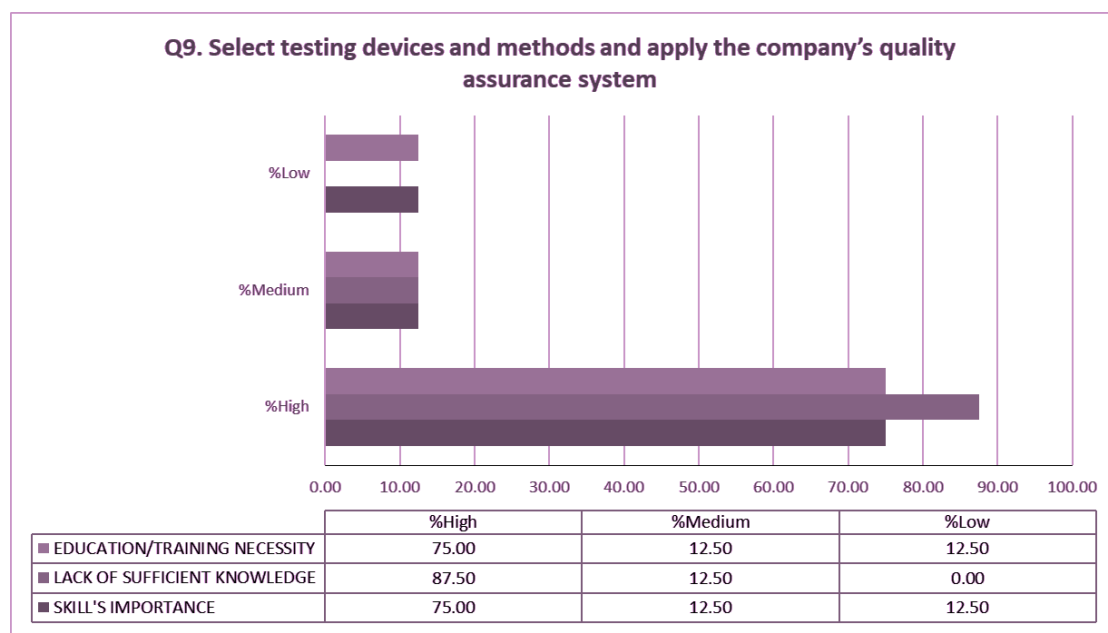
- Most important on steel metal workings



This skill, which is far more important for steel constructions, is a prerequisite also for Aluminium products, related to the production of new as well as the refurbishment of old products. The joining techniques might include welding, which was discussed earlier, as well as riveting, screwing etc. It is therefore concluded that:

- The skill is very important.
- There is a lack of knowledge.
- Training is needed.

The replies were respective also for the next question Q9 “Select testing devices and methods and apply the company’s quality assurance system”.



*Figure 16: Results from Q9 Select testing devices and methods and apply the company’s quality assurance system*

The comments received are the following:

- This is more appropriate for engineers – Needs solid knowledge of statics
- Now is done based on experience
- It is not in the task of the ACM technician to do this – the technical office is in charge.

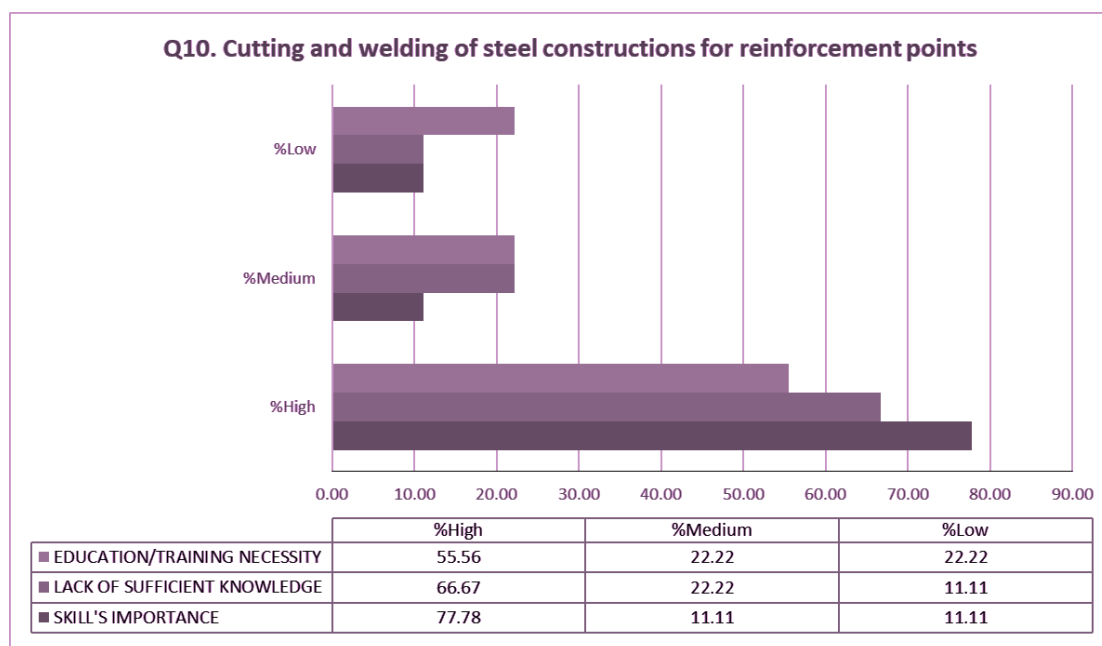
While for large companies there typically the Quality Control Department responsible for the quality assurance, this is performed from experienced and high EQF Level Technician in small and medium enterprises. This skill may affect the final performance of the products and entails holistic overview of the production process. It also necessitates knowledge of the quality provisions from the technical manual, knowledge of good manufacturing practices, measuring techniques and inspection capabilities. Indeed, it is a skill requiring multidisciplinary knowledges and this skill is one of the skills and competencies that can distinguish an experienced technician, a master craftsman from a low-experienced technician. In the context of an EQF Level 5 technician:

- The skill is very important.
- There is a lack of knowledge.
- Training is needed.

Continuing with technical skills, the results from Q10 “Cutting and welding of steel constructions for reinforcement points” are illustrated in Figure 17. This skill is particularly focusing on steel constructions. As discussed above steel constructions differ from the Aluminium constructions in a number of characteristics and requirements. Reinforcement points in this question do not correspond to structural constructions that need to take force loads. Such cases are not typically included in the subject of an Aluminium and Metal Construction Technician. Still, there are cases in which points shall be reinforced in order to support Aluminium and Metal constructions and shall be compatible to the building restrictions. In such cases the correct cutting and adequate welding quality may interfere with the actual Aluminium and Metal construction.

In the context:

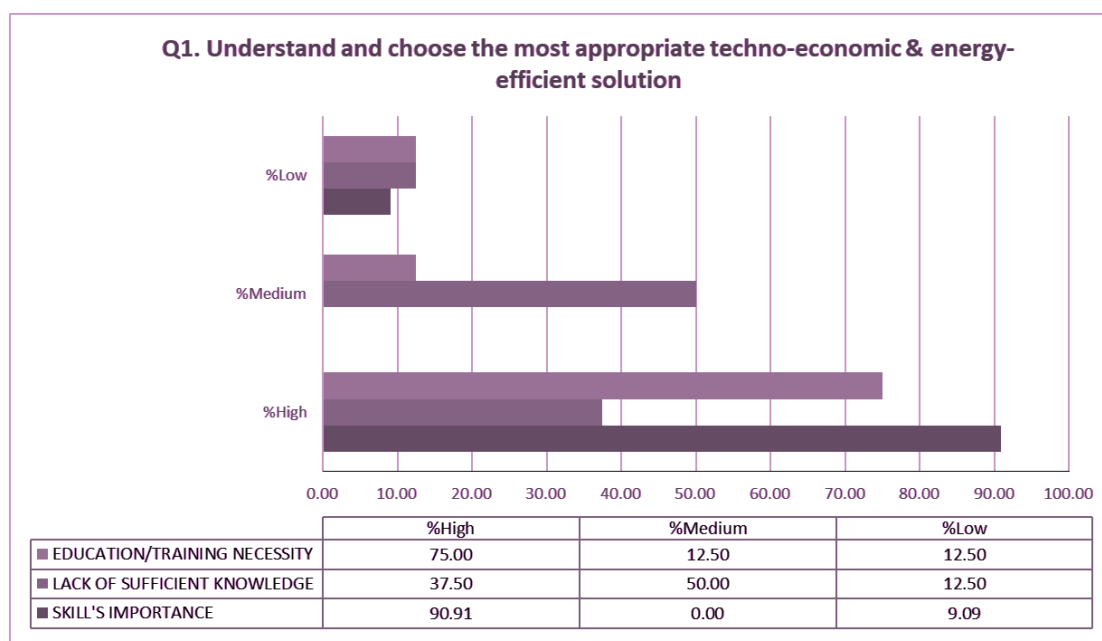
- The skill is very important.
- There is a lack of knowledge.
- Training is needed.



*Figure 17: Cutting and welding of steel constructions for reinforcement points*

The graph Figure 18 presents the replies received in Q1 “Understand and choose the most appropriate techno-economic & energy-efficient solution”. For an Aluminium and Metal Construction Technician, this skill of prime importance as indicated in Figure 18 (Skill’s importance >90%). For the case of Aluminium constructions and for small enterprises the experienced Technician with EQF Level will have to decide the solution that will offer to the client. At one hand he/she has the particularities of the building as he/she inspected or foreseen based on a drawing. On the other hand, he/she has the solutions from the system catalogue. If there is no guideline from an Engineer, he/she will need to make the correct decision or provide suggestions to the chief engineer.

For this decision various parameters shall be considered, from budget constraints, to safety, applicability and of course energy related. To this end this skill is also related to the green skills to which METVET Project is also after. Even though such decision shall involve engineering design, a high EQF Level Technician shall be capable to provide initial suggestions, constraints or limitations. For the case of large companies and for steel constructions the scenario differs.



*Figure 18: Results from Q1 Understand and choose the most appropriate techno-economic & energy-efficient solution*

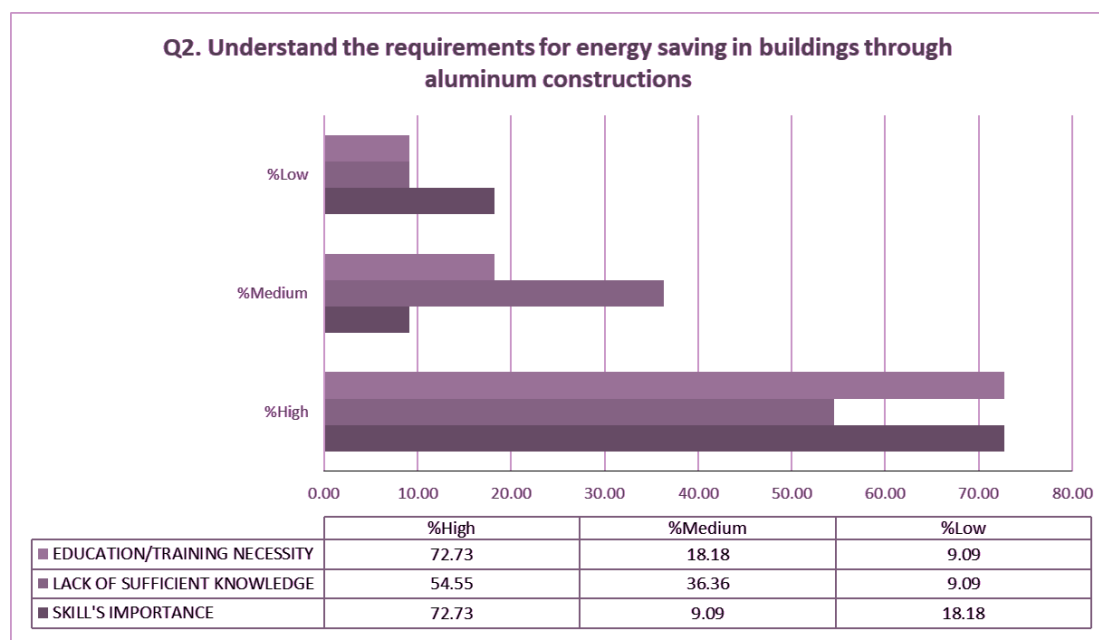
The latter are also reflected in the comments received for this question:

- This needs full techno-economic analysis. Typically, this is too much for a technician.
- Management Issue not Technician.
- It is not in the task of the ACM technician to do this – the technical office is in charge.

In this context and based on the answers received, it is concluded that:

- The skill is very important.
- There is a small lack of knowledge.
- Training is needed.

The previous is also related to the following question, Q2 “Understand the requirements for energy saving in buildings through aluminum constructions”, the results of which are depicted in Figure 19.



*Figure 19: Results from Q2 Understand the requirements for energy saving in buildings through aluminum constructions*

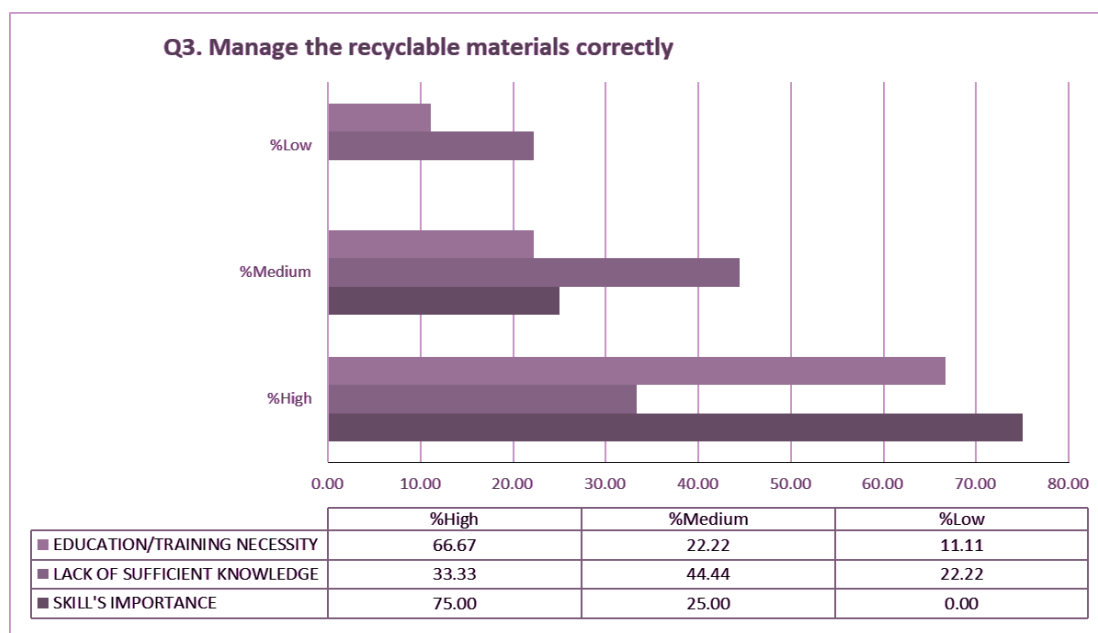
Comments received:

- Management Issue not Technician.
- It is not in the task of the ACM technician to do this – the technical office is in charge.

Again, in the context of the discussion presented for the previous question:

- The skill is very important.
- There is a lack of knowledge.
- Training is needed.

In the following questions, skills with more “green” character are discussed. The start is with the question Q3 “Manage the recyclable materials correctly”, the results of which are illustrated in Figure 20.



*Figure 20: Results from Q3 Manage the recyclable materials correctly*

The comments received are the following:

- Need for a more generic education and sensitivity
- Cost drives this skill
- It is not in the task of the ACM technician to do this – the technical office is in charge.

In the companies of this sector, namely in the companies of the Aluminium and Metal Constructions, a large amount of recyclable materials is being produced. The source of these materials may be during the production phase, from waste materials during cutting, from burring, during the installation phase from in situ cuttings, and during uninstallation of old constructions. Even though the vast majority of materials are metals (Aluminium and steel), still other types of materials occur such as plastics, e.g. from containers, protecting coverings etc., as well as paper and glass. The correct separation and management of such materials may not only reduce the environmental impact of the company and the sector in general, but also to provide some incomes, with regard to the metals in particular. It is therefore concluded for this skill that:

- Is rather important
- Requires training

A skill directly related to the energy performance of the products produced from an Aluminium and Metal Constructions Technician is the one in question Q4 “Calculate thermal properties (e.g. U-value) for various construction products by using appropriate software tools”, the results of which are depicted in Figure 21.

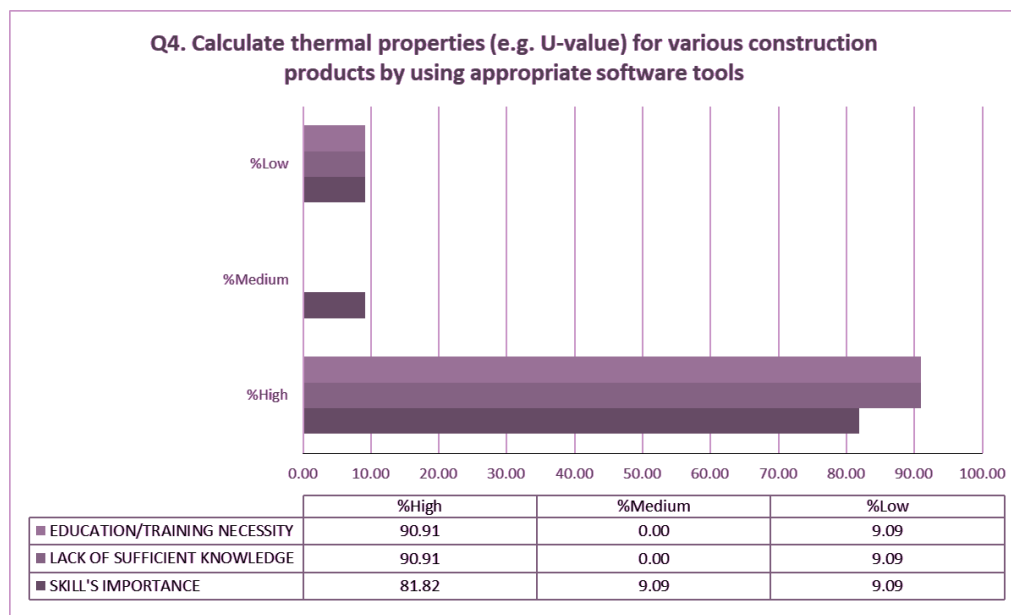
For the case of Aluminium constructions, this calculation is being routinely provided either from software in the market, or from applications provided by the System designer. The U Value itself is a critical parameter, indicating the thermal losses from this product per surface area and per temperature difference. It is the design rule for the building sector, and certain limits exist with values depending on geographical regions. It is therefore of prime importance to provide the correct U Value to the engineer, or to design and construct the product aiming at specific U Value. In any case the Technician shall be capable to calculate U Values for various constructions by using appropriate software tools.

The importance and the lack of sufficient knowledge are reflected in the graph of Figure 21, and therefore the need for training is high.

For the case of steel constructions, the U Value calculation might be more difficult since no standard profiles might be used, or no standard joints shall be applied. It shall be noted however that steel construction products are not usually being used for thermal insulation. For the cases that steel constructions shall exhibit thermal insulation properties, more complicated calculations shall be performed that are of course out of the objective of this occupational profile.

The comments received in Q4 are the following:

- This is more for the engineer and not for the technician
- More of a Management Issue.
- It is not in the task of the ACM technician to do this – the technical office is in charge.



*Figure 21: Results from Q4 Calculate thermal properties (e.g. U value) for various construction products by using appropriate software tools*

Again, the issue of the responsibility for such tasks, namely if the Technician is responsible for these calculations or if the Engineering department is responsible, depends on the scale of the company. In smaller companies Technicians are routinely performing such calculations. In larger ones though, this is a task of the engineering department. Based on the above discussion and the results in Figure 21 it is concluded:

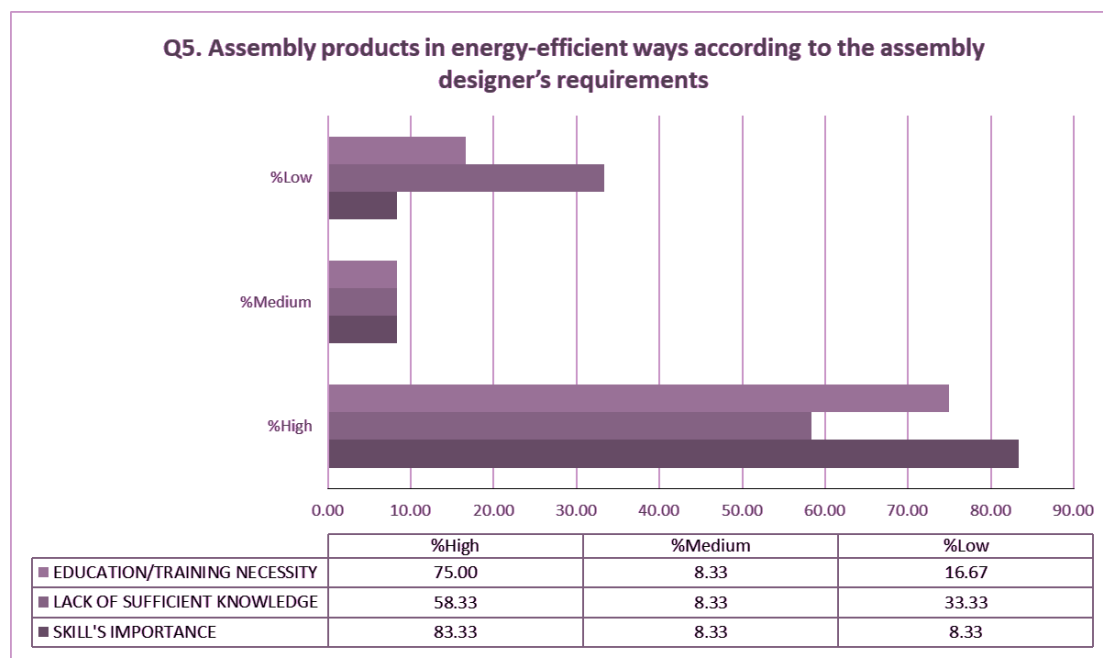
- This skill is very important
- There is currently a high lack of knowledge
- Therefore, training is highly needed.

In order to reach the U Value calculated from a software application, the Aluminium and Metal Construction Technician shall meet the requirements set from the system designer. If not, then the calculated U Value will never be actual U Value. This skill is the objective of Q5 “Assembly products in energy-efficient ways according to the assembly designer’s requirements”. The responses on this question are given in Figure 22.



The skill importance, as well as the current lack of experience is scoring high, 83% and 59% respectively. It is therefore expected that training is needed.

The key point in this skill is to follow the guidelines from the system designer, since with these the energy performance of the product will be according to the calculated one. Even small details may result in fatal deterioration of the energy performance, as well as structural integrity and longevity. The Aluminium and Metal Construction Technician shall be trained to follow the guidelines from the system designer, when applicable, and report any deviations.



*Figure 22: Results from Q5 Assembly products in energy-efficient ways according to the assembly designer's requirements*

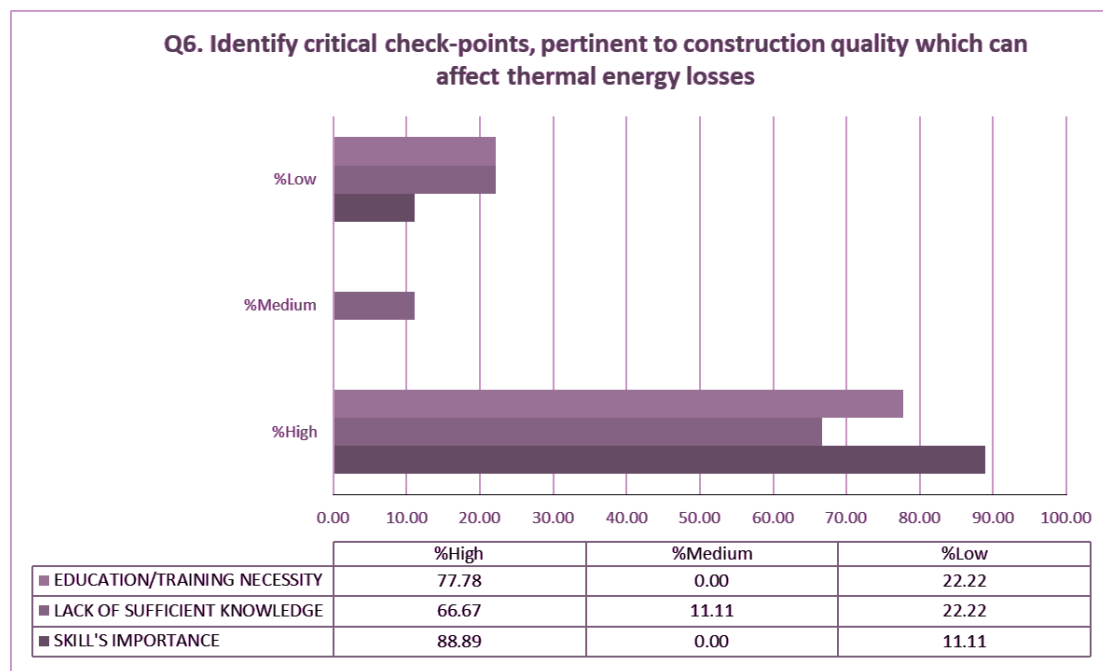
The comments received for this question are the given hereafter:

- It is needed to prove the students that this is of prime importance
- Must always follow design requirements

Based on the above discussion and the results in Figure 22 it is concluded:

- This skill is very important
- There is currently a high lack of knowledge
- Therefore, training is highly needed.

The correct assembly products in energy-efficient ways according to the assembly designer's requirements shall in turn be controlled, since any deviation might have a significant effect on the final performance. This process is discussed in the following question Q6 "Identify critical check-points, pertinent to construction quality which can affect thermal energy losses". The results from this question are provided in Figure 23.



*Figure 23: Results from Q6 Identify critical checkpoints, pertinent to construction quality which can affect thermal energy losses*

The comment received on this is the following:

- Management Issue not Technician. It is not in the task of the ACM technician to do this – the technical office is in charge.

Based on the answers, and according to the discussion presented above it is undeniably an important skill (score for High Importance=89%). The study also identified that there is a significant lack of knowledge and therefore training is needed. High training needed reached 78%. The issue of who is responsible to identify critical checkpoints, depend again on the scale of the company; a discussion presented above. In any case, the Aluminium and Metal Construction Technician with EQF Level 5 shall be capable to identify these critical check points that affect thermal energy losses, in order to avoid respective mistakes during the production phase and during the installation phase.

Based on the above discussion and the results in Figure 23 it is concluded:

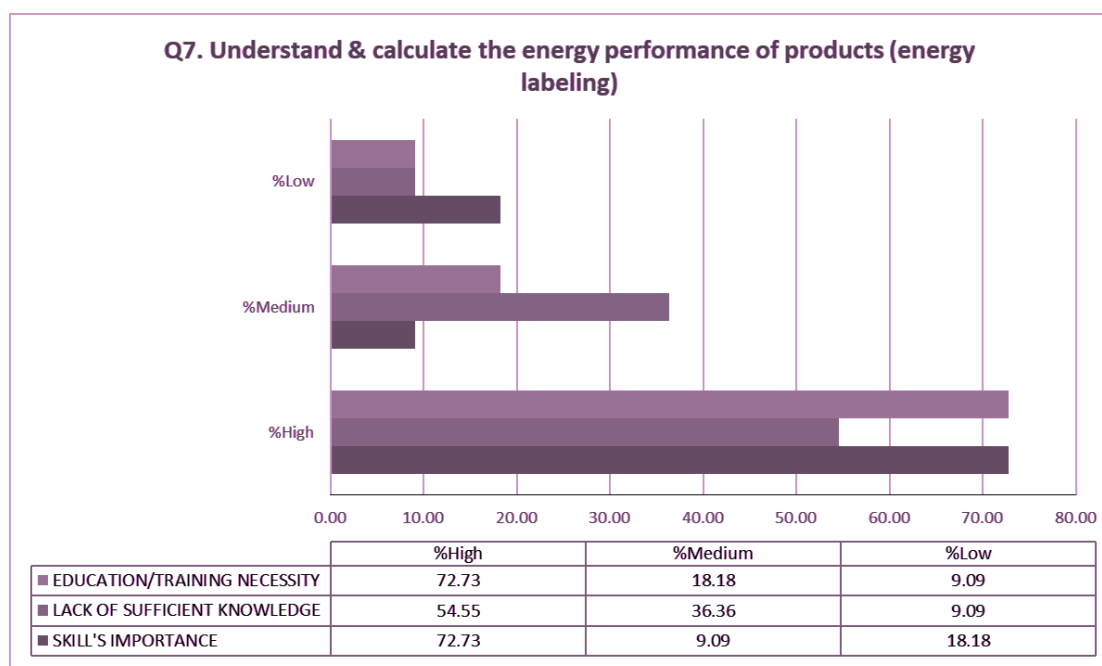
- This skill is very important
- There is currently a significant lack of knowledge
- Therefore, training is highly needed.

The U Value, however, is not the only technical parameter of an Aluminium and Metal Construction that affects the energy performance and the comfort offer to the building. The energy labeling of construction materials reflects off a pool of these parameters, and may include parameters such as air permeability, solar gain, energy storage etc.

In question Q7 “Understand & calculate the energy performance of products (energy labeling)” the responses indicated a significant importance, with a score reaching 70%, and medium lack of knowledge, with a score slightly higher than 50%. Again, training needed reaches a score higher than 70%.

Energy labeling is an important issue alone for the building products, with application also in the products from companies in the sector of Aluminum and Metal Constructions.

Even though this energy labeling as well as the environmental performance (environmental product declaration) , which is discussed in the following question, (Q8) is typically a task of the administration, as pointed out also in some of the comments received, still the EQF Level 5 Technician shall understand the energy performance and be capable to calculate those parameters that can be extracted from the respective software applications.



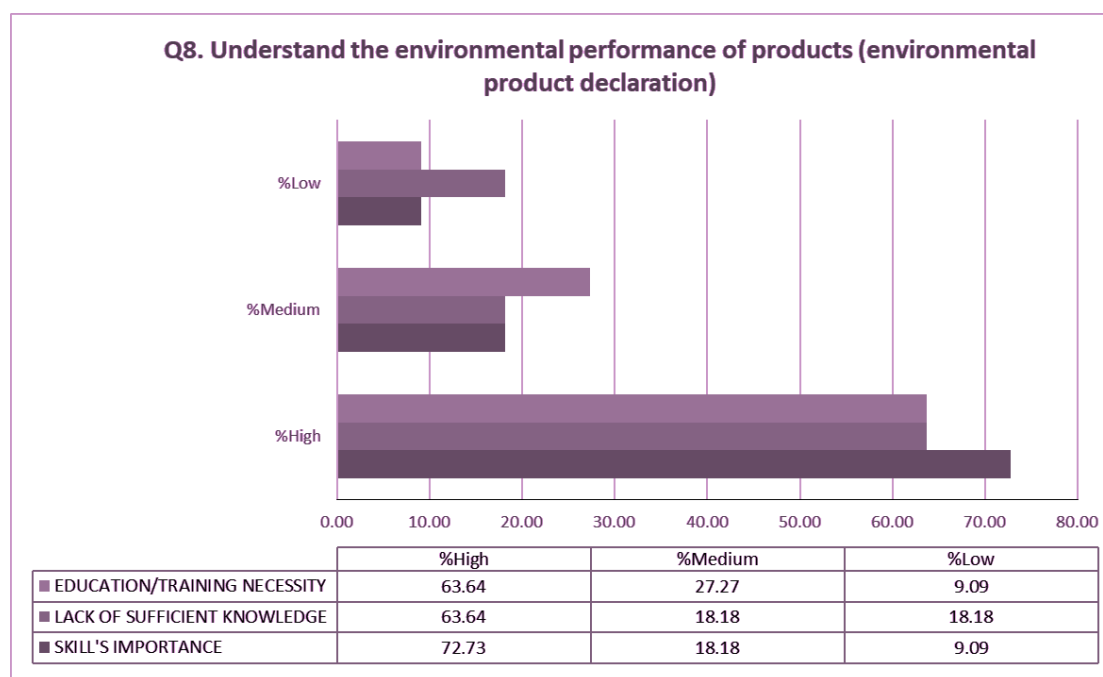
*Figure 24: Results from Q7. Understand & calculate the energy performance of products (energy labeling)*

Comments received for the Q7 are the following:

- Management Issue not Technician.
- In Italy, the most known energy label is APE
- It is not in the task of the ACM technician to do this – the technical office is in charge.
- Understand the environmental performance of products (environmental product declaration)

In any case the engagement of the Technician in the concept of energy labeling and environmental product declaration is expected to result in more efficient working practices, more attention to critical points and more detailed quality control of his/her work.

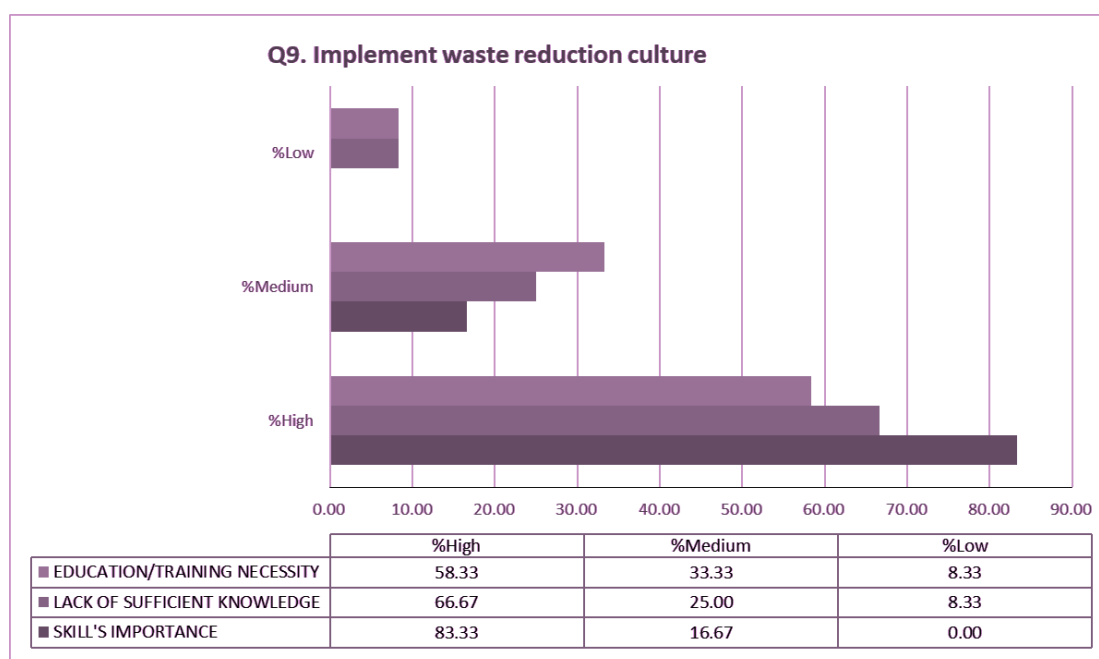
In Figure 25 the responses from Q8 “Understand the environmental performance of products (environmental product declaration)” are summarized. The results are comparable to the previous question. Both skills are identified as important with training needed for the Aluminium and Metal Construction Technician.



*Figure 25: Results from Q8 Understand the environmental performance of products (environmental product declaration)*

In Figure 26 the replies from the question Q9 “Implement waste reduction culture” are provided. This typical green skill is strongly related to the Q3 “Manage the recyclable materials correctly”, the results of which are illustrated in Figure 17 (above).

The High Importance of this skill has gained a score as much as 83%, from the experts. This result, in combination with the lack of knowledge that received score ca. 67%, signposts that there is plenty of room for improvement. To attain this improvement training will be needed.



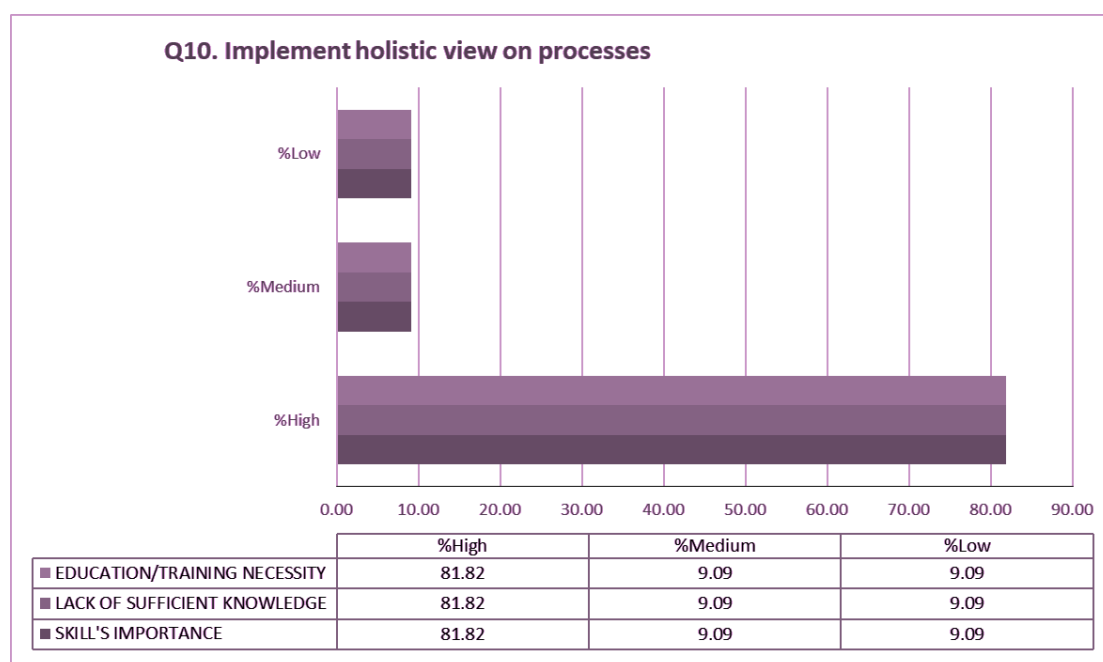
*Figure 26: Results from Q9 Implement waste reduction culture*

The issue of implementation of holistic view on the process is depicted in Figure 27. An unambiguous consensus is being recorded for this case. The skill importance was identified as high from more than the 80%. The same holds also for the lack of sufficient knowledge and the need for training.

An Aluminium and Metal Construction Technician at EQF Level 5, shall have a holistic view on the processes. This entails deep knowledge in a series of technical subjects in the field of materials, and processes related to the Aluminium and Metal Constructions, and throughout the lifecycle of the product; from the production phase to the installation and up to the end-of-life of the product. The complexity of this skill is strongly related to the scale of the company in which the Technician is working, and may have a significant effect on the overall productivity of the company, the performance of the products and the overall environmental impact of the building in which the product will be installed.

A holistic view on the processes includes a wide range of experience and competences, from the technical/practical skills domain up to the green skills and the transversal skills.

It is not questionable, therefore, the high scores in all three categories (importance, lack of knowledge and need for training) for this question, as those are illustrated seen in Figure 27. Of interesting discussion might be the route to gain such training. Based on the answers from this study this will need to follow both theoretical teaching as well as practical apprenticeship. Of valuable contribution would be visits in large companies, in which the technicians can have a view of large scales and where the technicians can focus on particular process, as well as in smaller companies in which the role of the individual technician is more enhanced with regard to the fact that they intervene in all processes.

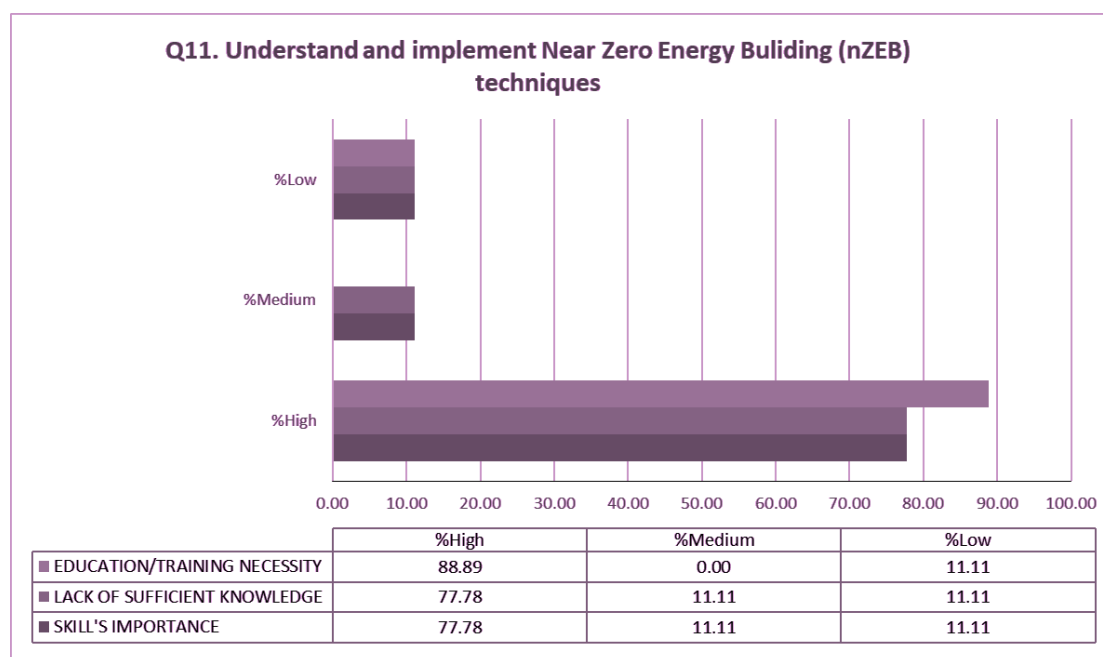


*Figure 27: Results from Q10 Implement holistic view on processes*

This skill is therefore:

- Very important
- There is currently a significant lack of knowledge
- Training is highly needed.

In the next question Q11 “Understand and implement Near Zero Energy Building (nZEB) techniques”, a rather important issue was discussed with the experts. Their replies are summarized in Figure 28.



*Figure 28: Results from Q11 Understand and implement Near Zero Energy Building (nZEB) techniques*

The term “Nearly zero-energy buildings (NZEBs)” (*DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 May 2010 on the energy performance of buildings*, 2010) correspond to buildings that exhibit very high energy performance ("Nearly zero-energy buildings," 2020). The nearly zero or very low amount of energy required should be covered to a very significant extent from renewable sources, including sources produced on-site or nearby (D'Agostino & Mazzarella, 2019; "NZEB," 2018). Even though the cut off dates after which all new buildings, with the public buildings being first, is moving from 2018 to 2021 etc. (*COMMISSION RECOMMENDATION (EU) 2016/1318 Guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings*, 2016), the NZEBs are to become a reality.



One of the most critical parameter that affects the energy performance of the buildings is the products from the Aluminium and Metal Construction Sector. It is actually one of the objectives of the METVET Project to prepare the respective technicians to support meeting the targets set from such Directives.

Again, this skill entails a wide range of other practical, green and transversal skills. Since the Aluminium and Metal Construction Technician will be the one who applies pertinent products to meet the targets set for NZEBs, it is expected that understanding and implementing NZEB techniques, is of high importance and of course training is needed. The overall design of the NZEB, falls of course out of the scope and the tasks of an Aluminium and Metal Construction Technician, but still he/she shall be capable to understand and implement related techniques, taking into account that materials and solutions provided from the system designers, are continuously improving and require continuous training.

This skill is therefore:

- Very important
- There is currently a significant lack of knowledge
- Training is highly needed.

The replies for the following question Q1 “Implement good working practices (working field, equipment, etc.)” and Q2 “Implement good working practices (suitable vehicle, appropriate means of support, customer loyalty etc.)” are presented in Figure 29 and in Figure 30, respectively.

The term good working practices, as well as the good manufacturing ones refer to a system for ensuring that manufacturers produce goods consistently and in a controlled way. Initially the term was being used for the food and pharmaceutical industry, but now the concept of good manufacturing practices, or referred herein as good working practices, is being applied also to other sectors.

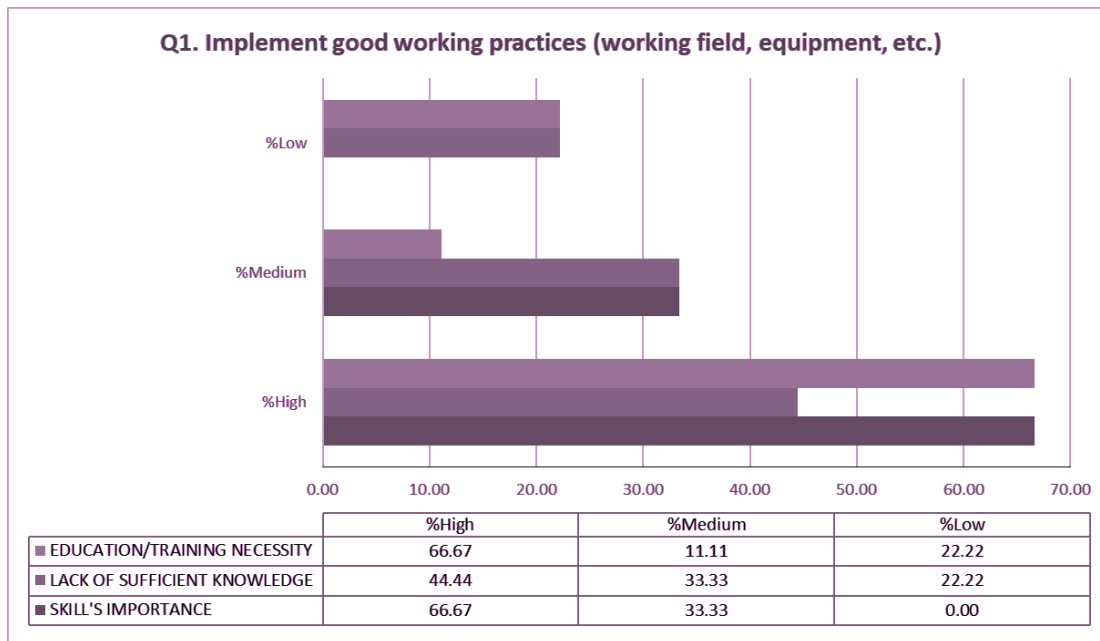


Figure 29: Results from Q1 Implement good working practices (working field, equipment, etc.)

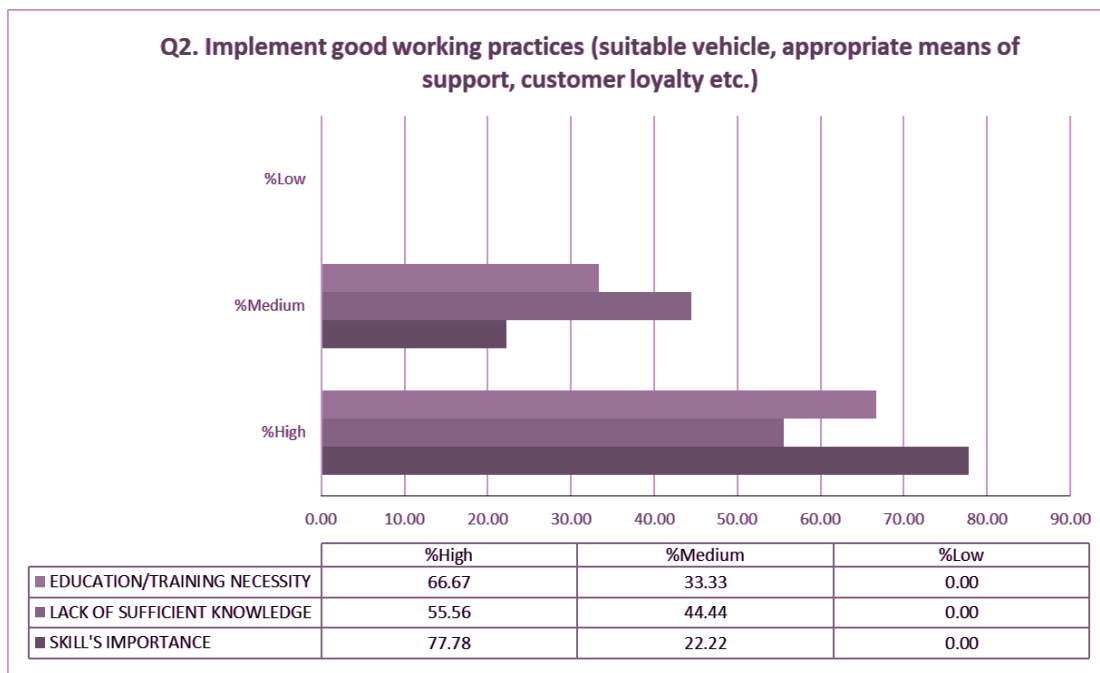
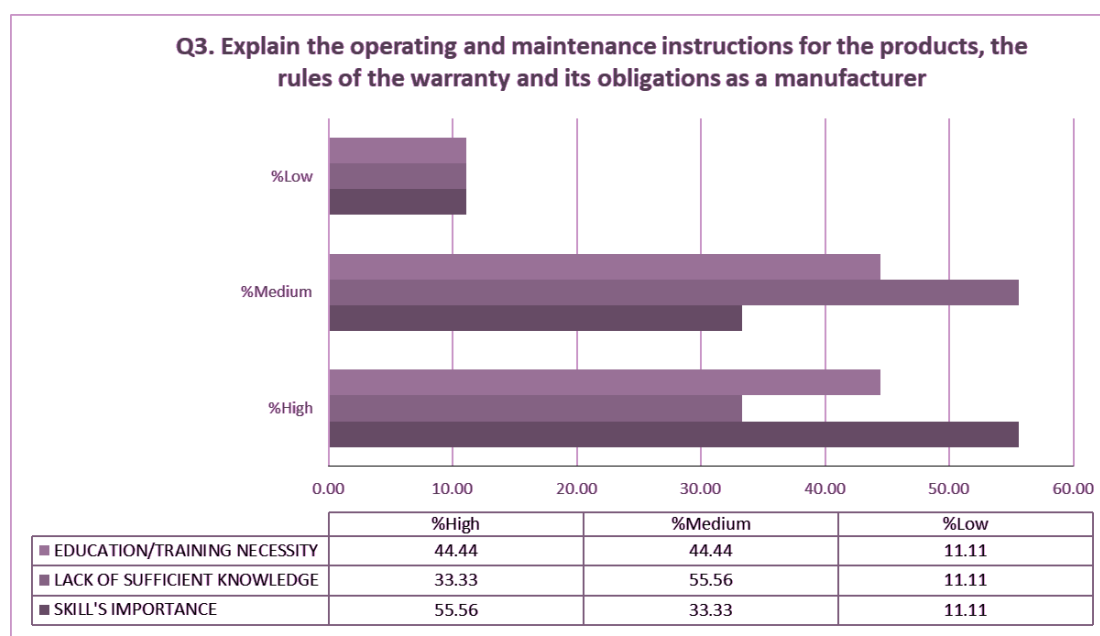


Figure 30: Results from Q2 Implement good working practices (suitable vehicle, appropriate means of support, customer loyalty etc.)

In any case, with this skill the Aluminium and Metal Constructions Technician is expected to comply to the guidelines of a quality system and implement all good practices imposed in tasks related to the working field, equipment etc. as well as in tasks related to the selection and use of the suitable vehicle, the appropriate means of support, the customer loyalty etc.

The implementation of such practices in the working environment of the Aluminium and Metal Construction Technician shall be of significant importance. As seen in Figure 29 and in Figure 30 the lack of sufficient knowledge is not high, from which it is concluded that the needed training shall target not only to present and explain the good practices, but also to sensitize the trainees for the importance to actually implement them.

In the following graph the answers received on the question Q3 “Explain the operating and maintenance instructions for the products, the rules of the warranty and its obligations as a manufacturer” are provided.

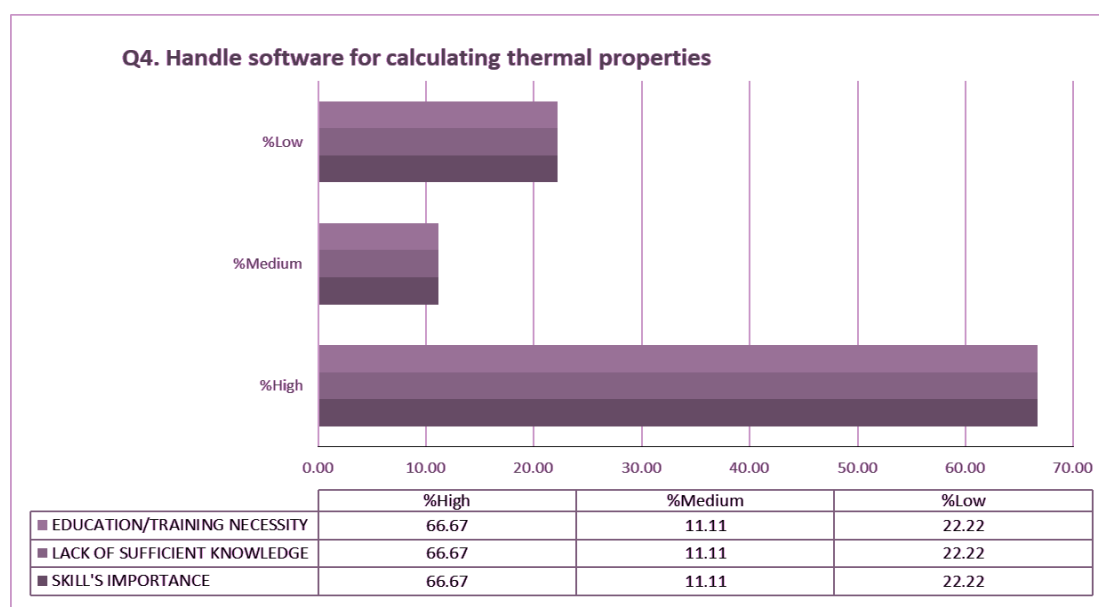


*Figure 31: Results from Q3 Explain the operating and maintenance instructions for the products, the rules of the warranty and its obligations as a manufacturer*

Based on the quality system (factory production control system) applicable in the companies in the sector of Aluminium and Metal Constructions and the relevant harmonized standards, it is a requirement of the technician after installation and testing of the construction to explain the operating and maintenance instructions, and provide the warranty conditions as well as the obligations of the manufacturer and the installation personnel. For large companies this is typically a task of the marketing, or the engineering department. For smaller companies the Aluminium and Metal Construction Technician is routinely performing this task.

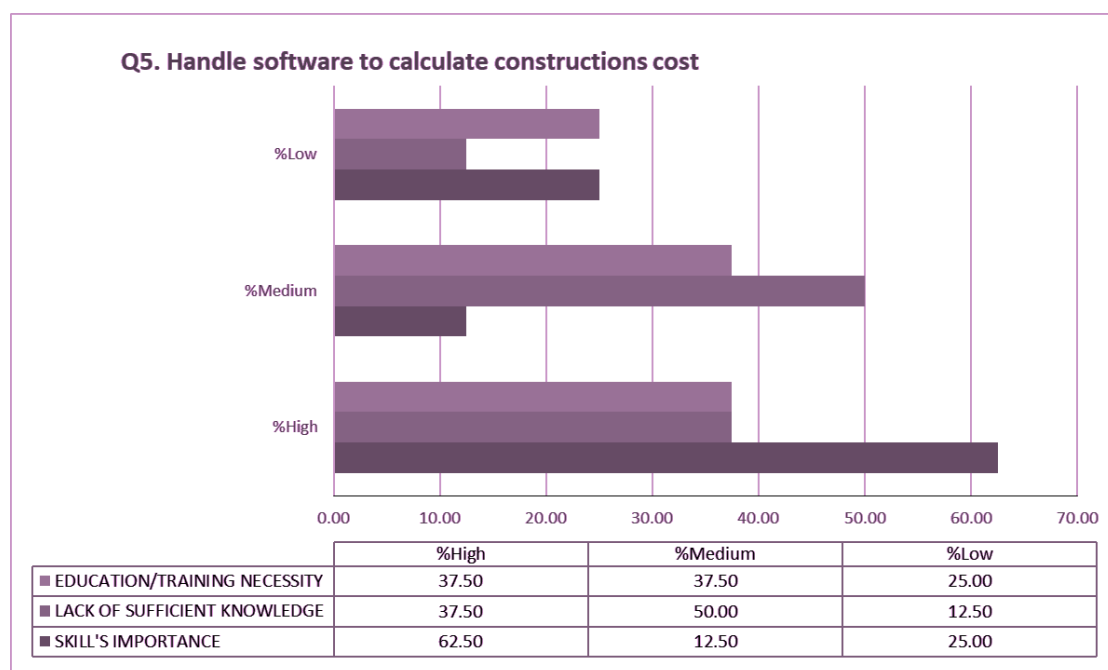
Since this is explicitly mentioned in the respective quality system, the lack of sufficient knowledge is medium. The importance of this skill has been evaluated as high from than 55% of the experts interviewed. It is thus concluded that the needed training, (medium and high scored >80%) shall also target to teach correct / effective methods to transfer the information to the customer.

The following question Q4 “Handle software for calculating thermal properties”, the results of which are presented in Figure 32, is strongly related to the question Q4 “Calculate thermal properties (e.g. U-value) for various construction products by using appropriate software tools”, the results of which are depicted in Figure 21.



*Figure 32: Results from Q4 Handle software for calculating thermal properties*

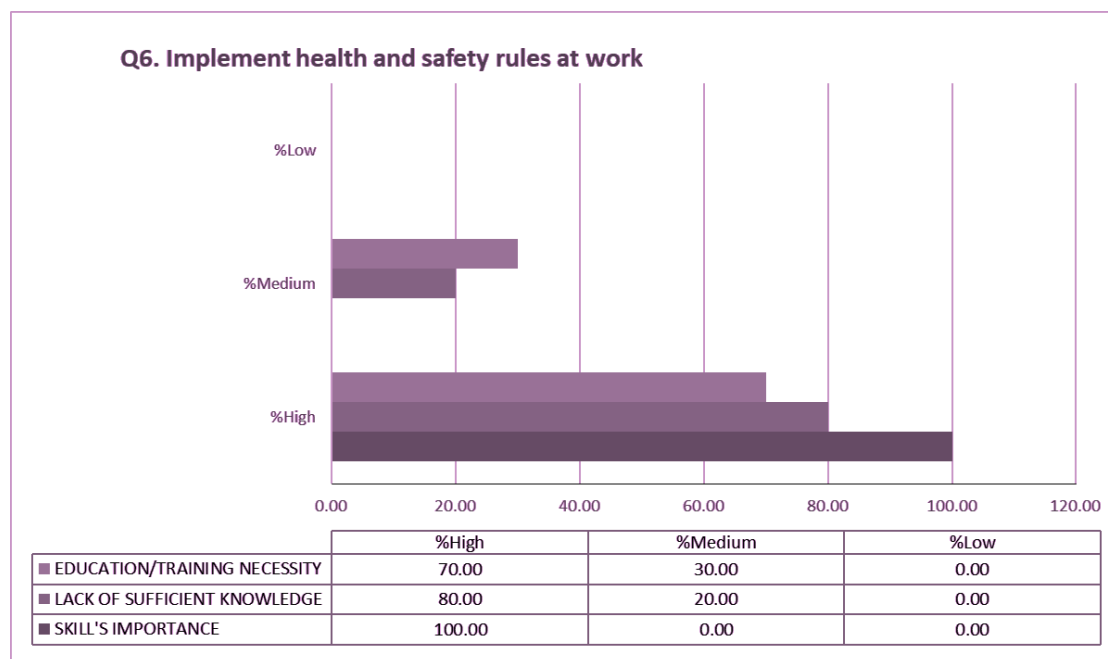
In both cases the skill importance is high, as well as the lack of current sufficient knowledge. This skill is particularly important for the case of Aluminium constructions (windows, doors, curtain walling), as discusses earlier. This calculation is typically offered in conjunction within the software package that is being used for the calculation of the construction cost. The results received on the Q5 “Handle software to calculate constructions cost” are given in Figure 33. The large variations seen in the graph in Figure 33 originate from the fact that such calculations are typically being performed from the engineering department and not from the Aluminium and Metal Constructions Technician. This falls back to the discussion presented above and the variations between small and large companies, and the discussion on the variations between the Aluminium and the Metal constructions.



*Figure 33: Results from Q5 Handle software to calculate constructions cost*

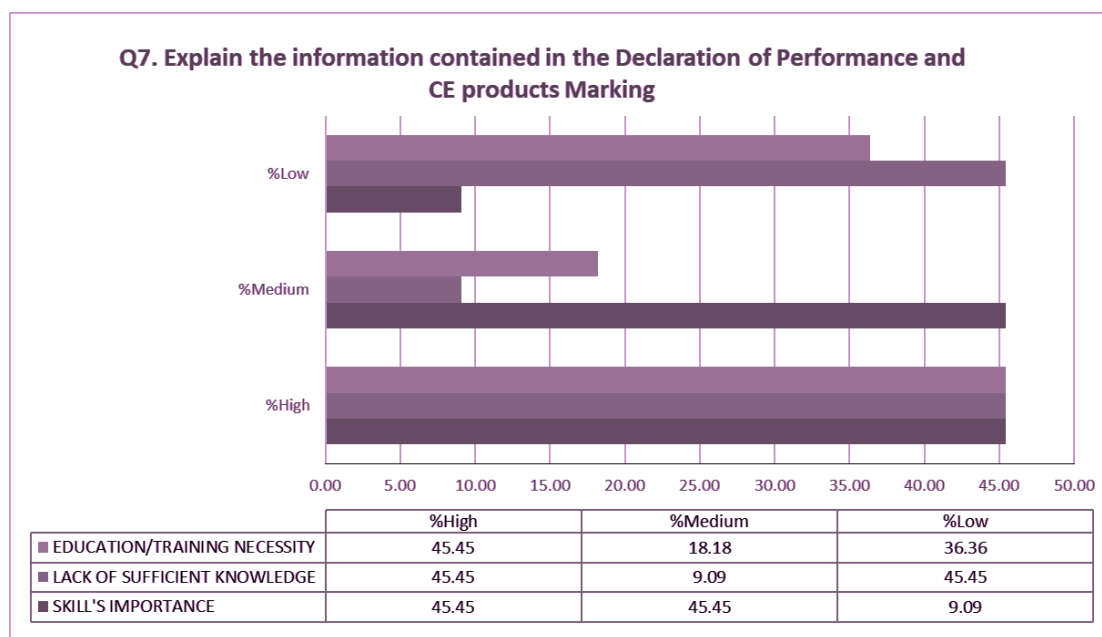
In any case the skill has been evaluated as important, while the lack of sufficient knowledge has been ranked as medium.

A consensus regarding the skill importance has been recorded for the question Q6 Implement health and safety rules at work, as might be seen in Figure 34. Implementing Health and Safety rules at work shall follow a continuous education throughout the work life of a Technician, and for all EQF levels.



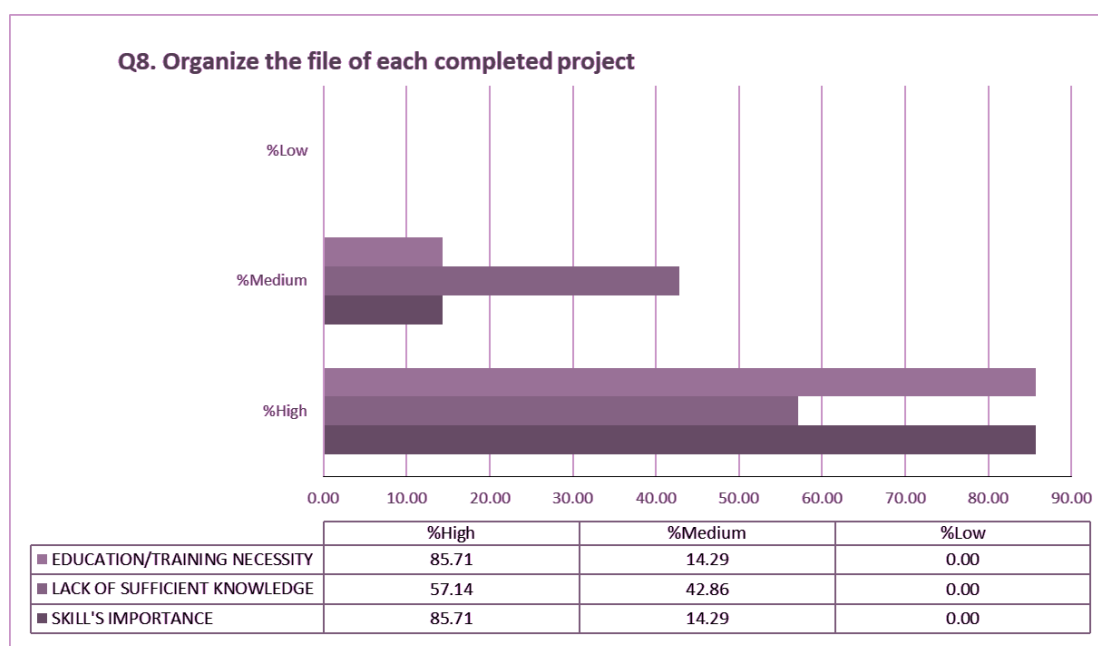
*Figure 34: Results from Q6 Implement health and safety rules at work*

In Figure 35 the results from the question Q7 “Explain the information contained in the Declaration of Performance and CE products Marking” are given. This question relates to the results presents in Figure 31, regarding the question Q3 “Explain the operating and maintenance instructions for the products, the rules of the warranty and its obligations as a manufacturer”. The importance as well as the lack of sufficient knowledge has been evaluated as high from a lower percentage than 50% of the experts. Since this is already an obligation from most quality systems it is assumed by most of the experts that typically the technicians have already this competence and no significant education is needed. This, as well as in the Q3, needs more a training in subjects such to improve the communications skills.



*Figure 35: Results from Q7 Explain the information contained in the Declaration of Performance and CE products Marking*

In order to issue the CE marking and the related documents the Aluminium and Metal Construction Technician shall file accordingly a set of documents, in order to meet the requirements for the CE marking. On top of that through such processes the product traceability improves, thus enabling the identification of non-conformities that may be found in the future. Such skills were discussed over the Q8 “Organize the file of each completed project”, the results of which are presented in Figure 36. Even though this is typical the task of the Engineering department, for larger companies, or the of the owner himself, for smaller companies, an Aluminium and Metal Construction Technician at an EQD Level 5 is expected to know the such procedures and follow them, or assisting in delivering them. Since the Technician is expected to have a holistic overview of the process (see Figure 27 for Q10) it is expected to be able also to perform or supervise paper-work. This is the reason why the “low” was not chosen as a reply from none of the experts. It is also important to notice that the owners of small companies were much more interested in this skill.

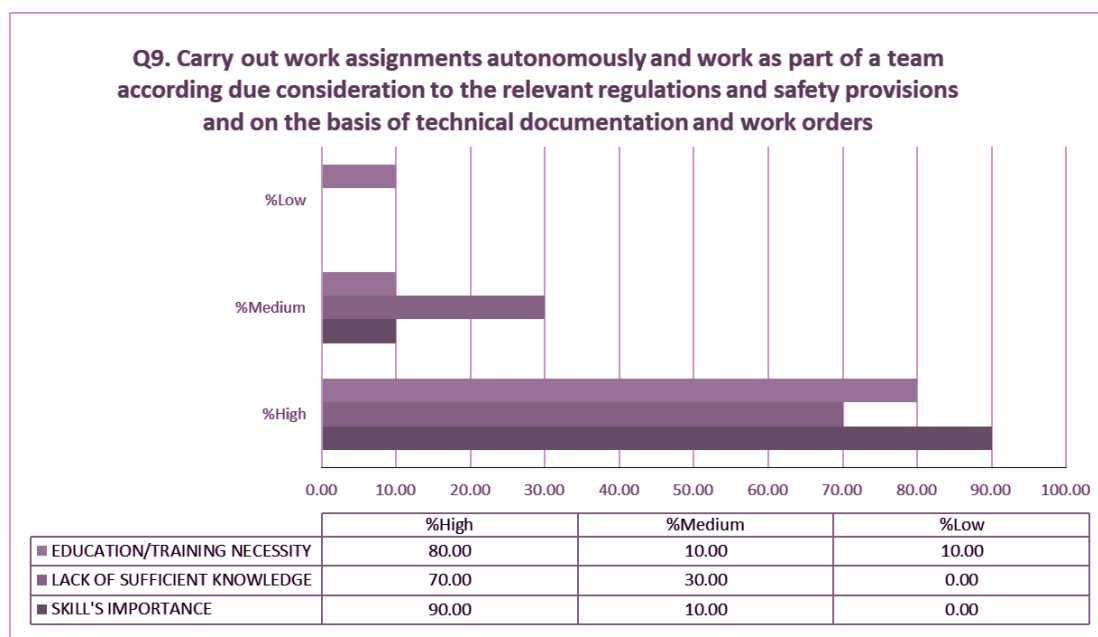


*Figure 36: Results from Q8 Organize the file of each completed project*

This skill however entails a good knowledge of the language, written and oral, in which the documents are being filed, organizational skills and related skills. As was extracted from this study, the most plausible means to train this, would be practical training, i.e. to perform characteristic examples and have the trainees follow standard steps.

This will enable to work the Aluminium and Metal Construction Technician to work with a degree of autonomy, as imposed by the EQF Level 5. The issue of working autonomously in technical tasks was discussed over the question Q9 “Carry out work assignments autonomously and work as part of a team according due consideration to the relevant regulations and safety provisions and on the basis of technical documentation and work orders”. It is expected at an EQF Level 5 to work with a degree of autonomy, but at the same time to be able to work as a part of team. This was evaluated as highly important by the 90% of the experts. High percentages were also recorded for the lack of sufficient knowledge, as well as to the need for education/training.



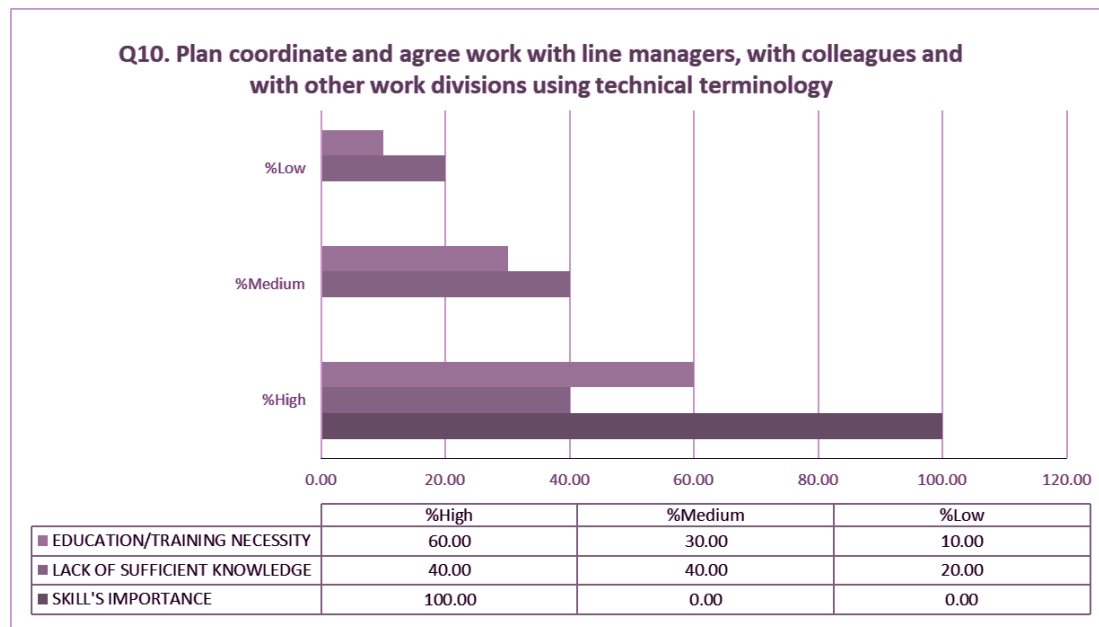


*Figure 37: Results from Q9 Carry out work assignments autonomously and work as part of a team according due consideration to the relevant regulations and safety provisions and on the basis of technical documentation and work orders*

A 100% consensus about the importance of a skill was recorded for the following question Q10 “Plan coordinate and agree work with line managers, with colleagues and with other work divisions using technical terminology”. As it might be seen in Figure 38 all the experts participated in this study agreed that it is highly important for an Aluminium and Metal Construction Technician at level 5 to be able to plan, coordinate and agree to work with line managers, and with colleagues of other division using common technical terminology.

This skill entails a set of knowledge and competences both transversal and technical/practical. The skill to work smoothly with line managers are well as with colleagues was commented by the vast majority of the experts interviewed. The main message was this is of prime importance for the smooth operation of the production unit, either large or small. The difficulty in the selection of the appropriate teaching method was underlined by most, with the case study to be the most suitable.

The usage of common terminology clearly indicates the need to use standard engineering terminology throughout the training program, and not jargon since the latter might introduce difficulties and misunderstanding/miscomprehensions.



*Figure 38: Results from Q10 Plan coordinate and agree work with line managers, with colleagues and with other work divisions using technical terminology*

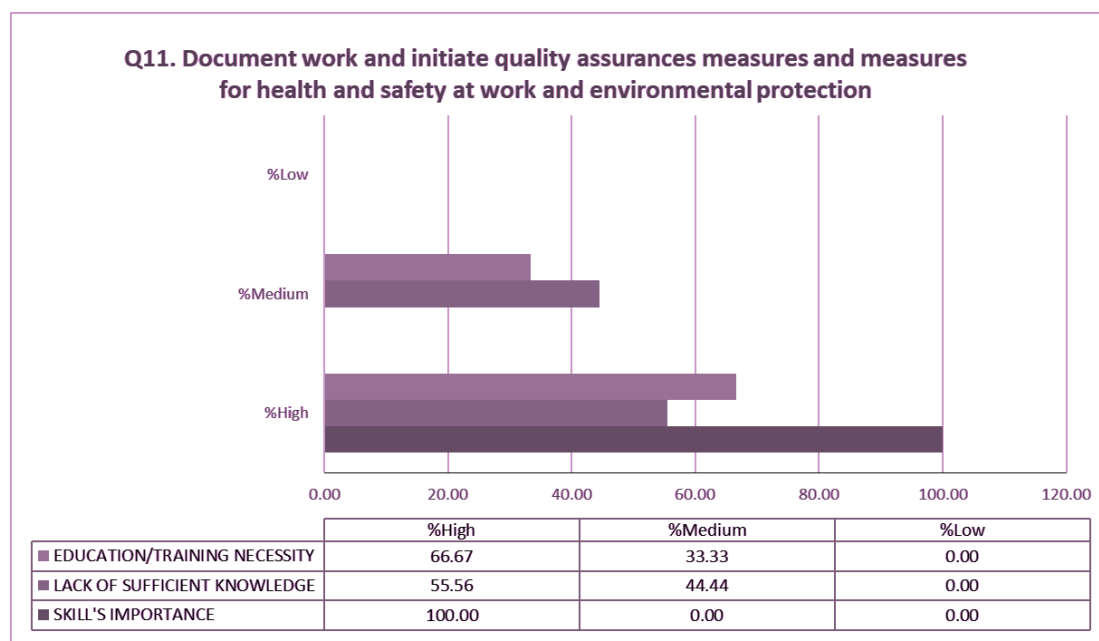
The issue of Health and Safety is again discussed in Q11 “Document work and initiate quality assurances measures and measures for health and safety at work and environmental protection”, and the results are provided in Figure 39. As in the case of Q6 “Implement health and safety rules at work” (Figure 34) this was evaluated as highly important from the total of the experts. It is noteworthy than the “low” answer received zero selections. This question differentiates from Q6 in that the Technician in this the technician shall be capable to document work and initiate quality assurances measures as well as health and safety and not only to implement the conventional health and safety rules. This is in conjunction with the advanced tasks of an EQF level 5 Technician.

It shall be noted, however, that this does not implies full autonomy in initiating such measures, since this the technicians do not have such authority. Their initiatives shall be communicated with the responsible department or engineer.

The case of measures for environmental protection is different compared to the Health and safety case. The environmental protection here, relates to the question Q9 “Implement waste reduction culture” in Figure 23, but now in a more macroscopic view that includes not only the waste reduction. Environmental protection may include various parameters from energy savings in production area, to a more eco-friendly driving behavior.

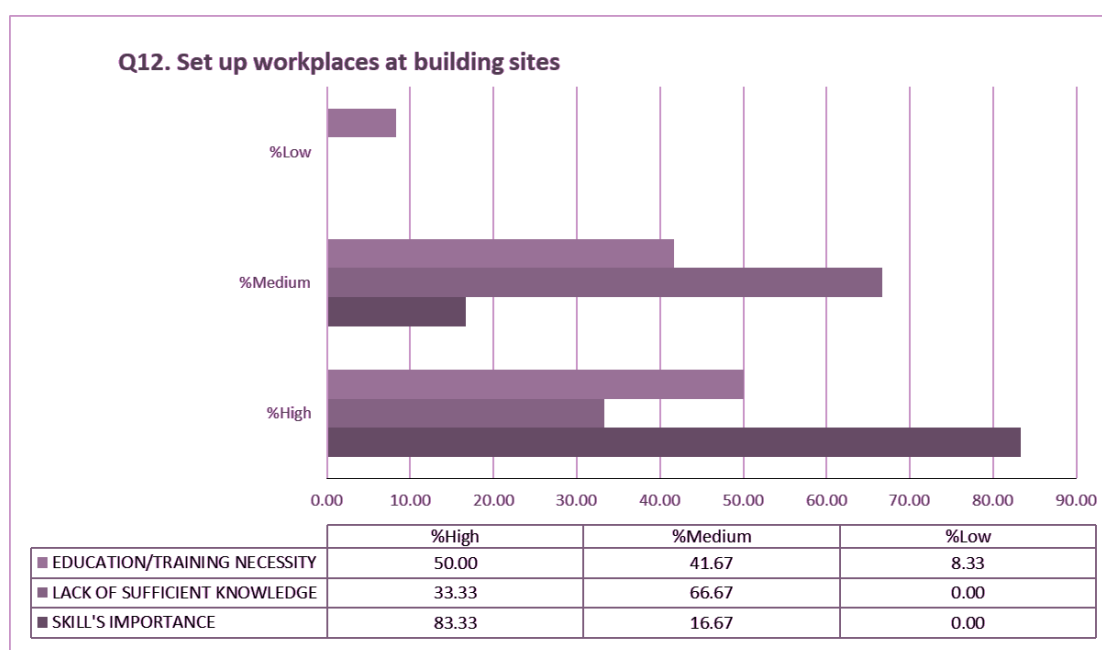
It is therefore concluded within the framework discussed above:

- The skill is highly important
- There is low a significant lack of knowledge
- Training is needed.



*Figure 39: Results from Q11 Document work and initiate quality assurances measures and measures for health and safety at work and environmental protection*

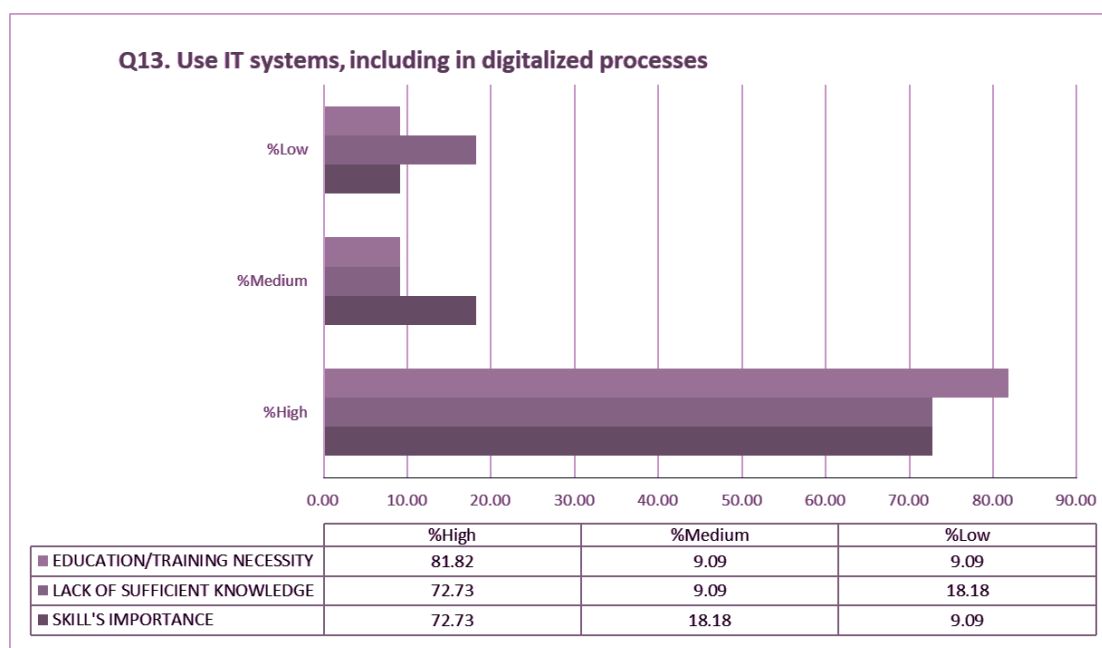
The responses to the question Q12 “Set up workplaces at building sites” are given below in Figure 40. The Aluminium and Metal Construction Technician shall set up workplaces at building sites in order to place the constructions and perform basic processes in situ. In order to perform such tasks, he/she shall be capable to predict the needs for space, to understand the surface area limits, be able to collaborate with other working teams, and to strictly follow all pertinent health and safety procedures. This skill has been evaluated as highly important from more than the 80% of the experts. The answers regarding the lack of knowledge are either medium or high, with no “low” answer recorded. Training is therefore needed in this.



*Figure 40: Results from Q12 Set up workplaces at building sites*

The need for a more generic education relating to Information Technology (IT) is discussed in question Q13 “Use IT systems, including in digitalized processes”. In this new era of digitization, it is expected to demand Technician that may use IT systems in their work. Such IT systems may include, but are not limited to, the use of smartphones and applications to help their work, the use of digital integrated measuring machines, the use of related solutions helping logistics and stock management etc.

As seen in Figure 41 the importance of such skills has been ranked highly as well as the need for education/training. Even if it has been commented that this sector is still far from full digitization, especially for the smaller companies, it is acknowledged that this will be a strong advantage to have for an Aluminium and Metal Construction Technician, in order to meet the upcoming changes in the sector (digital transformation and 4<sup>th</sup> Industrial Revolution).

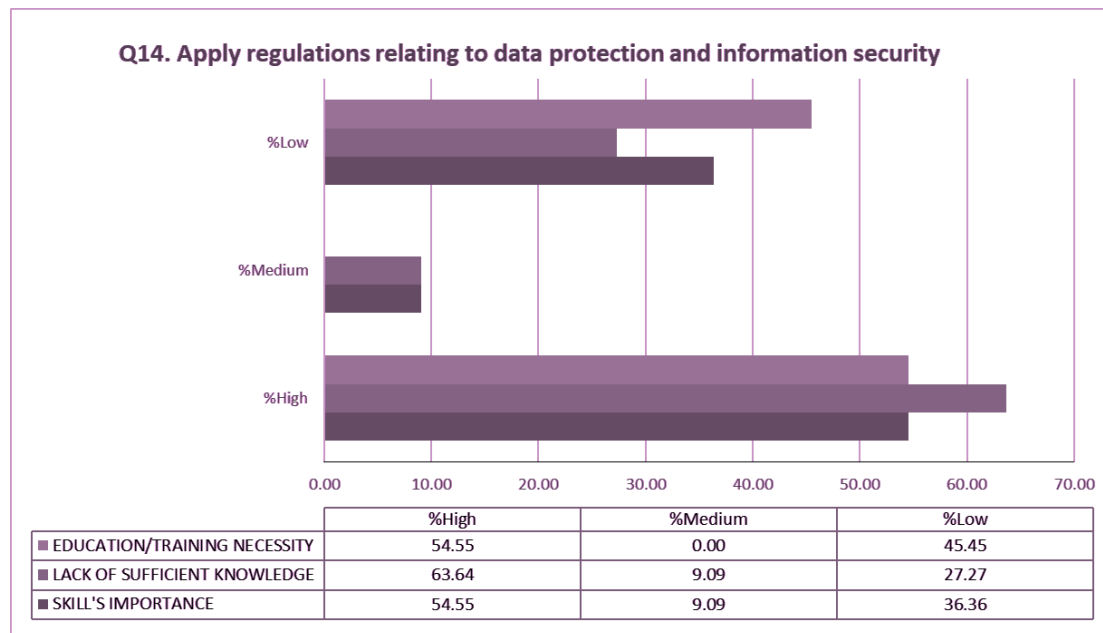


*Figure 41: Results from Q13 Use IT systems, including in digitalized processes*

A different skill compared to all previous is discussed in Q14 “Apply regulations relating to data protection and information security”. This is a transversal skill, needed not only for an Aluminium and Metal Construction Technician, but for all workers that may build or use of databases.

Even though there is significant percentage of experts that training is not required, still the majority of experts recognize that such training is needed, since the lack of knowledge is still high. Again, for larger companies this task is the responsibility of the finance department. Still, the technician may have access to critical databases related not only to the production phase, but also to the installation phase.

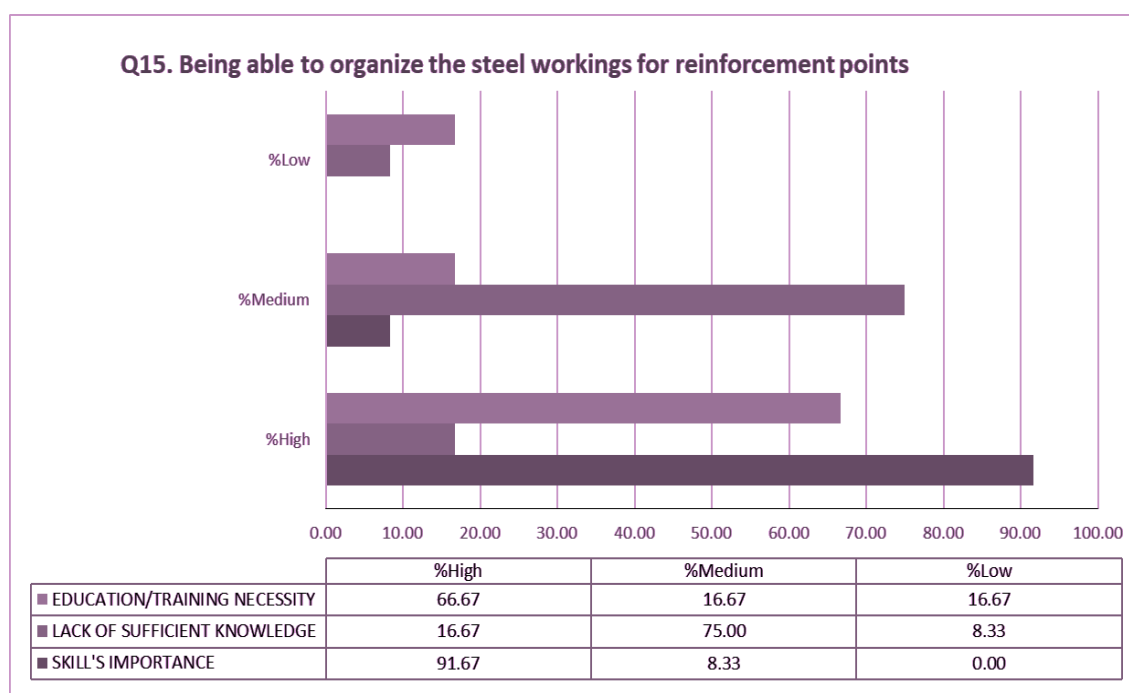
Names, addresses, emails, technical drawings of the building technical details of the constructions shall be kept following the respective laws.



*Figure 42: Results from Q14 Apply regulations relating to data protection and information security*

The results to the question Q15 “Being able to organize the steel workings for reinforcement points” are illustrated in Figure 43. This relates to the question Q10 “Cutting and welding of steel constructions for reinforcement points” (Figure 17). In this case however the task to organize steel workings is studied. In many cases the Aluminium and Metal Construction Technician shall organize related tasks, since the reinforcement of critical points that are subject to structural loads is not typically performed by him/her, but from technicians of other occupations. Nevertheless, in many cases his/her constructions require such reinforcement points.

The Aluminium and Metal Construction Technician shall use the same terminology, shall be capable to read dimensions from technical drawings and understand particularities of special constructions, in terms of tolerances etc.



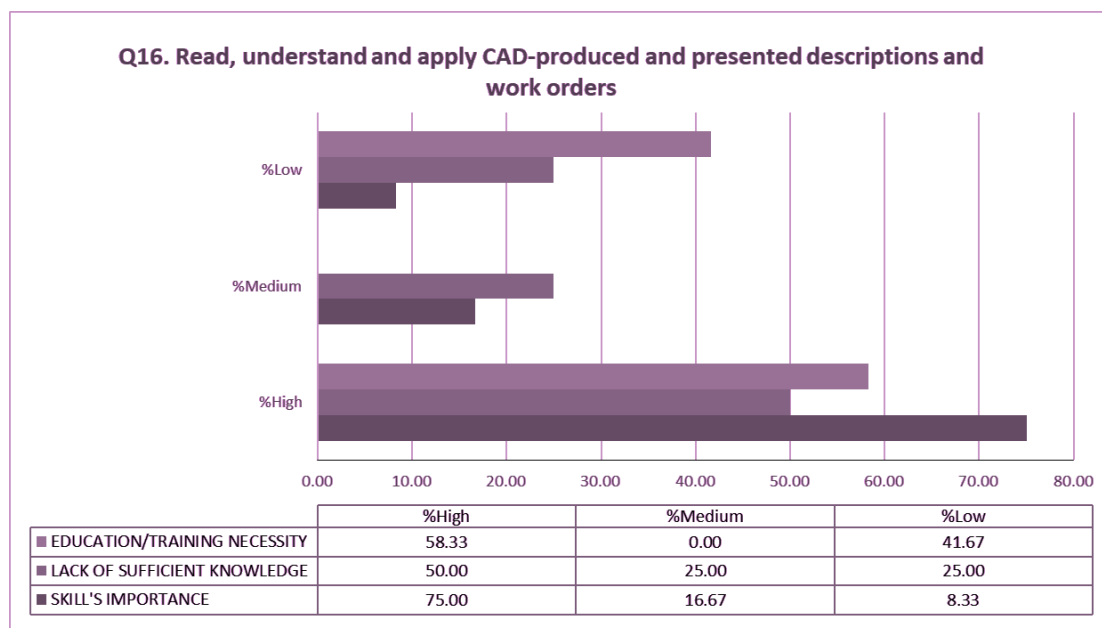
*Figure 43: Results from Q15 Being able to organize the steel workings for reinforcement points*

This skill has been evaluated as highly important from more than the 90% of the experts and the need for education has been evaluated as high from more than the 65%. It is therefore concluded that:

- The skill is highly important
- Training is needed.

With the question Q16 “Read, understand and apply CAD-produced and presented descriptions and work orders” the capability of Aluminium and Metal Construction Technician to work with CAD-produced processes is evaluated. Even in small companies the use of CAD software for cutting and assembling is far from rare. Typically, such software extracts not only the dimensions, but also integrated work orders and work plans for the Technician to follow.

The importance of this skill has been evaluated as high from the 75% of the experts and stakeholders interviewed. Even though the programming of such software is typically done either from the Engineering department or from the IT department, still the output reports eventually come into the Technician fingers.



*Figure 44: Results from Q16 Read, understand and apply CAD-produced and presented descriptions and work orders*

It is therefore concluded that:

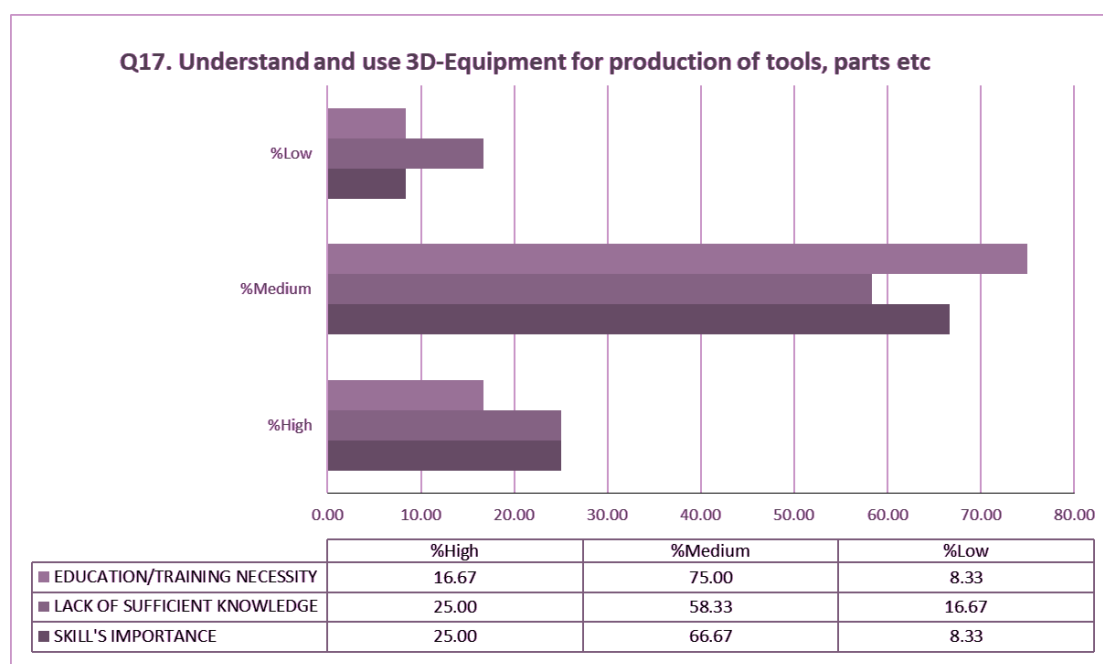
- The skill is highly important
- Training is needed.

In Figure 45 the results received from the question Q17 “Understand and use 3D-Equipment for production of tools, parts etc.” are demonstrated. Even though 3d printing is already being evaluated for structural parts and components, from concrete, metal or plastic, still no work has been published towards 3d printed doors, windows and related constructions. For 3d metal constructions the cost and time is still high enough to impede actual applications.

For the interests of an Aluminium and Metal Construction Technician 3d printing is limited to small plastic parts that are routinely used in conventional structures. For example, 3d printing may be used to produce small secondary joining parts, or coverings etc.

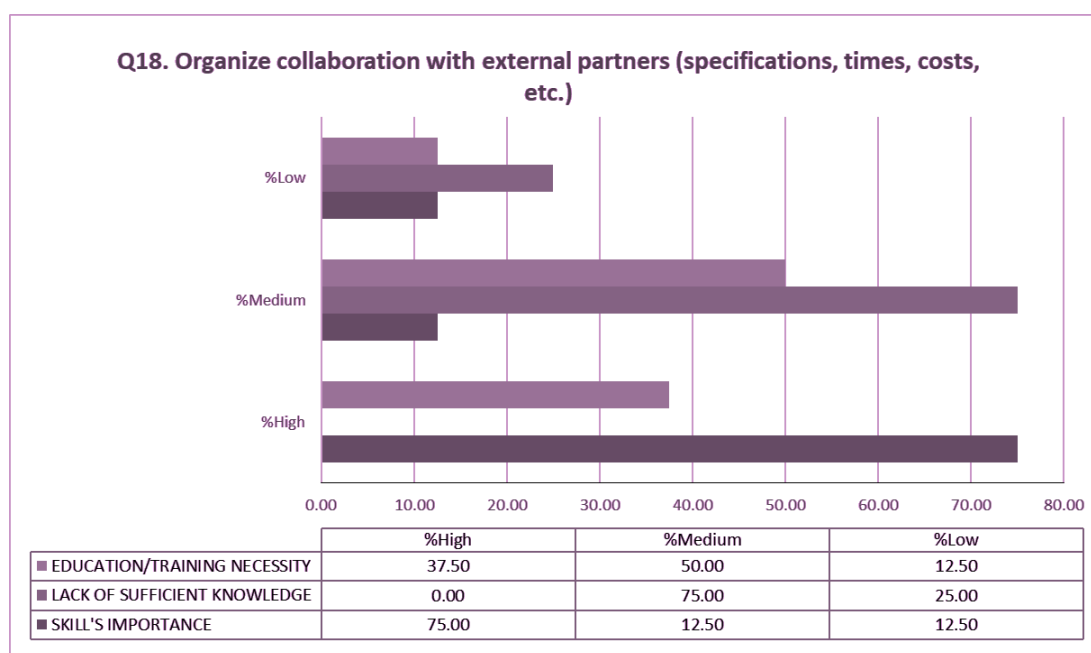


As evident from the results in Figure 45 this is still far from application in this sector, and thus the skill importance has been evaluated as high from only the 25% of the experts. Following this evaluation, the need for education/training is also low or medium. It is expected that until the cost and the production time for 3d printing parts falls significantly, then 3d printing will not be a priority for this sector, except from the cases where no standard parts in special construction will be needed, or in rapid prototyping.



*Figure 45: Results from Q17 Understand and use 3D-Equipment for production of tools, parts etc*

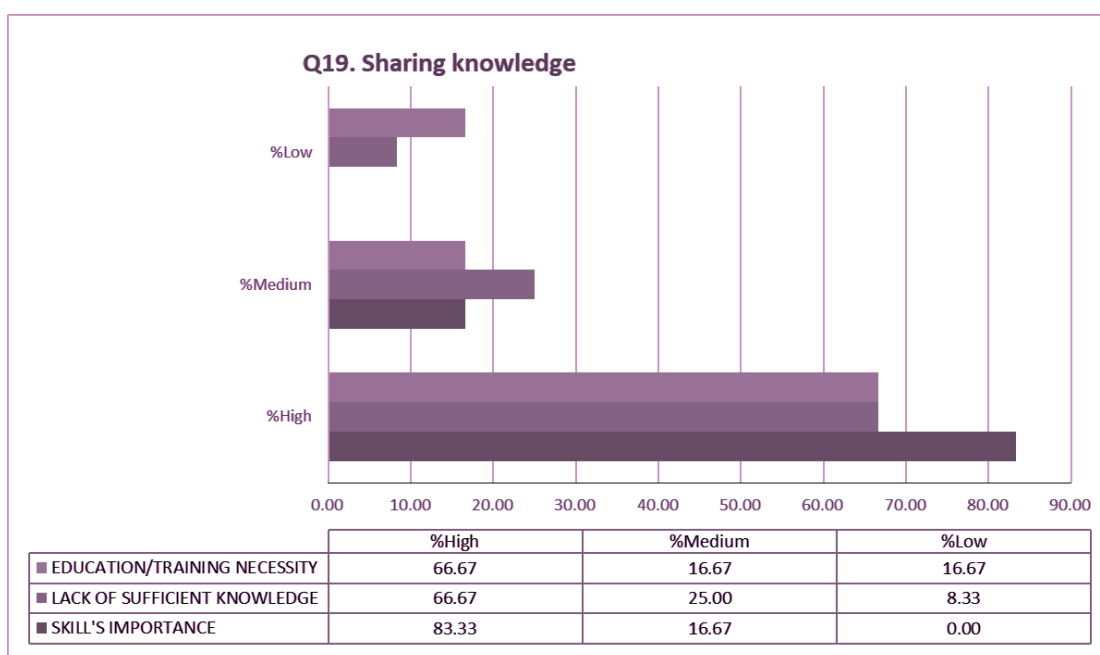
Following the previous discussion for cost and time, the results received on the question Q18 “Organize collaboration with external partners (specifications, times, costs, etc.)” are given in Figure 46. The importance of this skill has been evaluated as high from the 75% of the experts. It is noteworthy that none ranked the lack of sufficient knowledge as high. The Aluminium and Metal Constructions Technician at an EQF Level 5 shall be capable to collaborate with external partners and organize either directly or through the responsible department.



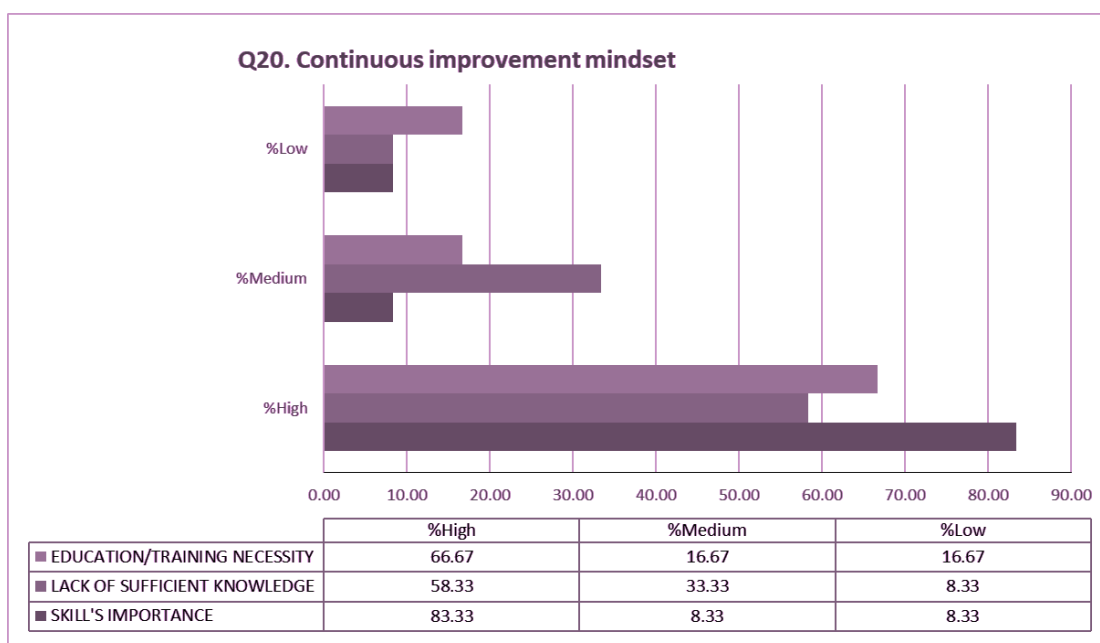
*Figure 46: Results from Q18 Organize collaboration with external partners (specifications, times, costs, etc.)*

This skill relates strongly to the question Q10 “Implement holistic view on processes” in Figure 27. The Technician at EQF Level 5 is expected to execute the duties of a master craftsman and therefore he/she will be very frequently in the position to collaborate with external partners.

In this process he/she shall also share knowledge, an issue discussed over question Q19 “Sharing knowledge”, the results of which are in Figure 47. Not only with external partners but also within the company sharing knowledge is expected to be valuable. Based on the qualitative study such skills as also the following regarding question Q20 “Continuous improvement mindset” (Figure 48), are difficult to be taught. A sharing knowledge environment shall be cultivated throughout the training process. In any case for both questions the skill importance was evaluated as high by more than 80%.

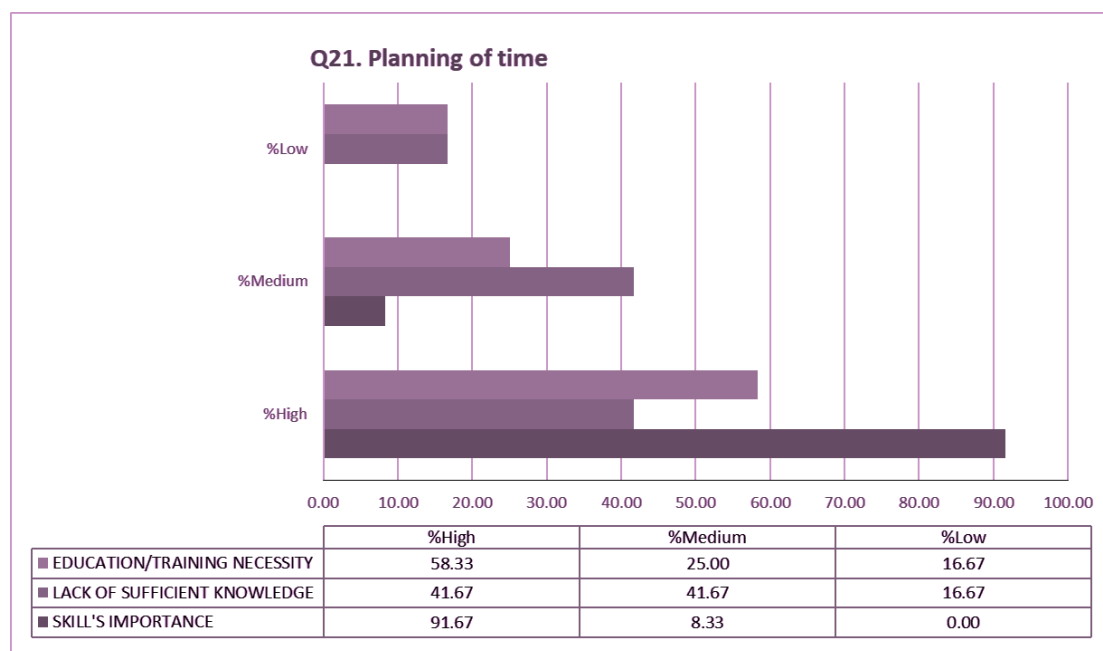


*Figure 47: Results from Q19 Sharing knowledge*



*Figure 48: Results from Q20 Continuous improvement mindset*

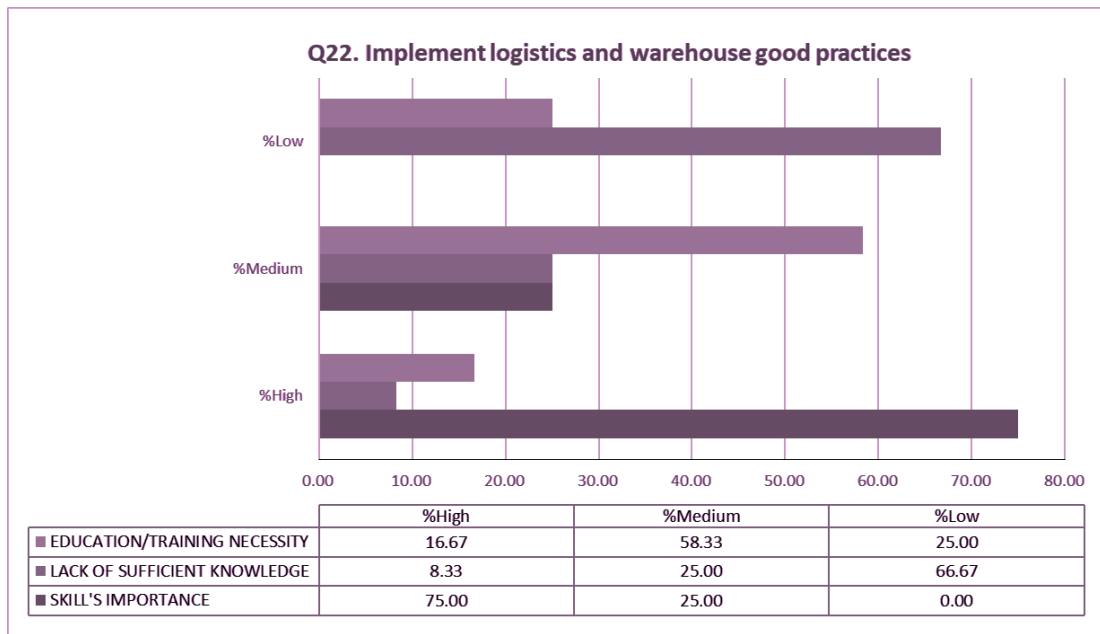
Planning of time as might been seen in Figure 49 has been evaluated as highly important in the respective question Q21 “Planning of time”. Most of the experts commented that this planning is typically being done from the administration and the Engineering/Planning department. This is the reason that the need for education was comparably low.



*Figure 49: Results from Q21 Planning of time*

The logistics and warehouse management were discussed in the question Q22 “Implement logistics and warehouse practices”. The results are provided in Figure 50. Even though the importance of the skill is high, the need for education is medium.

Based also on the comments received on this question one of the targets for the respective course shall be among others, the importance of implementing good warehouse practices with regard to the cost and availability of the parts stored.



*Figure 50: Results from Q22 Implement logistics and warehouse good practices*



Professional [Qualification]

**PROFILE**

Aluminium & Metal Construction Technician

## **4 WP3 | PROFESSIONAL PROFILE FOR ALUMINUM & METAL CONSTRUCTION TECHNICIAN**

### **4.1 Introduction**

The aim of METVET Deliverable D3.3 is to provide a Professional or Qualification Profile for Aluminium & Metal Constructions Technicians. In this Profile, the conventional skills are included and upgraded targeting to EQF level 5, while new, namely green, skills have been added.

To this end, a holistic approach has been followed in order to take into consideration all the concrete characteristics implemented within a national level. In addition, of outmost importance is the qualification profile to be adjusted in real market needs and consequent educative prerequisites. Under this precondition, this Qualification Profile has been based both on the research findings of METVET/WP2 “Definition of Joint skills demands-Need Analysis” actions and METVET/WP2 Deliverables, from which the current skills have been identified, as well as on interviews that were implemented with stakeholders from the participating countries, in order to identify the new skills and setup a joint skill list.

The results from these studies have been presented in the pertaining Deliverables of METVET/WP2, namely D2.1 List of existing skills and D2.3 List of joint skills. The outcomes from those Deliverables stated the basis on which this Qualification profile has been compiled. In order to guarantee a smooth upgrade from lower EQF levels, and ensure the compatibility with existing qualification profiles this deliverable has adopted key points from (1) the outcomes of the Erasmus+ Project INNO-APPRE-NET (2014-1-EL01-KA202-001564) (2) the current Professional Profile for Aluminium and Metal Construction Technician of Greece (up to EQF level 4), (3) the Professional Profile of Metalworker – specialized in structural engineering from Germany (up to level 4) and on (4) the Professional Profile of roller shutter and sunshade mechatronics technician from Germany.

It shall be noted at this point that based on the analysis performed in METVET Deliverable 3.1 “Methodologies for the creation of professional profiles” there no Profile for Aluminium and Metal Construction Technicians at EQF Level 5, a gap that METVET Project aims to fill.

## 4.2 Occupational analysis

The specific occupation deals with the processing of metal architectural profile in order to manufacture and place/install in buildings windows and doors and other custom-made constructions from metal alloy for the energy performance, the exterior protection (burglar resistance) and appearance as well as the interior arrangement of a building. The scope of the specific occupation also includes the manufacture and placing of custom-made metal constructions, mainly out of ferrous metal, intended for architectural purposes in buildings.

This technician also maintains, fixes and replaces the Aluminium and Iron constructions according to energy saving, safety (Burglar resistance), protection, appearance and functionality needs of the building.

On top of that the Aluminium and Metal Construction Technician execute supplementary mechanical works, constructs supplementary parts etc.

The occupation of the Aluminum and Metal Construction Technician strongly depends on the development of the Building Sector and has evolved historically from the traditional metal constructor occupation and the traditional wood carpenter occupation. With the advancement of the Aluminium building constructions supported by the enabling of delivering a wide range of colors from the powder coatings technology, have attracted the focus from the architectural engineers to apply such constructions in modern building. This provided the background for the development of the respective demand for the system designers to provide pertinent technical solutions for the architectures and the need for technician capable to construct such products and install them in the building.

With the more recent energy-saving regulations that are strongly related to products such as windows and doors, there is nowadays an increased demand for Aluminium and Metal Construction Technician, that are trained properly and are capable to support the meeting of the targets related to energy saving.



It is therefore clear that the evolution and the development of the occupation is strongly connected to the requirements and the needs of the Building Sector and on the provisions of novel materials with advanced properties.

The occupation of the Aluminium and Metal Construction Technician can be described from a combination of ISCO08 codes (Ganzeboom, 2010):

- 7125 Craft and Related Workers: Building Frame and Related Trades Workers (excluding Electricians): Building Frame and Related Trades Workers: Glaziers
- 7212 Craft and Related Workers: Metal Machinery and Related Workers: Welders and Flame Cutters
- 7214 Craft and Related Workers: Metal Machinery and Related Workers: Sheet and Structural Metal Workers, Moulders and Welders, and Related Workers: Structural Metal Prepares and Erectors
- 7223 Craft and Related Workers: Metal Machinery and Related Workers: Blacksmiths, Toolmakers and Related Trades Workers: Blacksmiths Welders and Flame Cutters

The occupation of the Aluminium and Metal Construction Technician can be described from a combination of NACE codes (Eurostat, 2008):

- 25.11 Manufacture of metal structures and parts of structures
- 25.12 Manufacture of doors and windows of metal
- 25.62 Machining
- 25.99 Manufacture of other fabricated metal products n.e.c

In the Table below the main legislation and standards related to the occupation of the Aluminium and Metal Construction Technician is provided.

Table 5: legislation and standards related to the occupation of the Aluminium and Metal Construction Technician.

Code	Title
EC 305/2011	Harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC
EC 31/2010	Energy performance of buildings
EC 125/2009	Framework for the setting of ecodesign requirements for energy-related products
EC 1369/2017	Framework for energy labeling and repealing Directive 2010/30/EU
EN 14351-1	Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics
EN 13659	Shutters and external venetian blinds - performance requirements including safety
EN 13561	External blinds and awnings. Performance requirements including safety
EN 13830	Curtain walling - Product standard
EN 1090-1	Requirements for conformity assessment for structural components (CE-Marking)
EN 1090-2	Technical requirements for the execution of steel structures
EN 1090-3	Technical requirements for the execution of aluminium structures

The occupation of “Aluminium and metal construction technician” is characterized by high satisfactory rates of development, because Aluminium and metal alloys are materials increasingly used in building constructions, especially for architectural needs and applications. In Greece, the specific occupation has become one of the most important trades in building construction and energy saving industry. Its importance is highly expected to grow in the immediate future, by 28% in 2050 compared to 2017<sup>3</sup>.

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<sup>3</sup> European Aluminum, Vision 2050, <https://www.european-aluminium.eu/resource-hub/vision-2050/>

In the following Table the Key Occupational Functions (KOF), the Occupational Activities (OA) and the Occupational Tasks (OT) are briefly depicted.

Table 6: Key Occupational Functions (KOFs), and Occupational Activities for the Aluminum and Metal Construction Technician.

<b>KOF 1: PREPARATION OF ALUMINUM CONSTRUCTION</b>	
<b>OA 1.1:</b>	<b>Understand the project demands and recommend the best technical solution</b>
OT 1.1.1:	Autonomously assess the project on-site
OT 1.1.2:	Communicate and share information with the building engineer, e.g. the architecture engineer
OT 1.1.3:	Recommend the optimal solution in terms of materials and their materials combinations, based on the project specifications and design
OT 1.1.4:	Calculate the cost and the time schedule needed to complete the project
OT 1.1.5:	Understand the demands and the specifications for Near to Zero Energy Buildings (nZEB)
OT 1.1.6:	Plan, coordinate and agree work with line managers, with colleagues and with other work divisions using technical terminology
<b>OA 1.2:</b>	<b>Take project measurements (products' dimensions) on site</b>
OT 1.2.1:	Measure the dimensions of the openings of the project
OT 1.2.2:	Extract the dimensions from blueprints, drawings, sketches etc
OT 1.2.3:	Draw and provide sketches, and blueprints based on the building's blueprint

<b>OA 1.3:</b>	<b>Select the appropriate materials and to prepare the construction</b>
OT 1.3.1:	Select the best combination of materials and construction type according to building specifications, taking into consideration energy saving and efficiency
OT 1.3.2:	Communicate and inform the engineers and/or the clients on the various construction types and the selected one
OT 1.3.3:	Comply with National and European Legislation, e.g. Construction Products Regulation 305/2011/EU, CE-marking, Buildings Energy Performance Regulations
OT 1.3.4:	Plan and organize autonomously the works that need to be done within the timetable and the cost constraints
<b>OA 1.4:</b>	<b>Field preparation for installation</b>
OT 1.4.1:	Select the appropriate materials and materials combinations based on the technical specifications and guidelines
OT 1.4.2:	Communicate and collaborate with other workers group on the field
OT 1.4.3:	Construct all necessary supporting elements for the constructions
OT 1.4.4:	Install all necessary supporting elements taking into account minimization of thermal losses and avoidance of thermal bridges

## KOF 2: ALUMINUM CONSTRUCTION

### OA 2.1: Select and procure materials

- OT 2.1.1: Select the material combinations in order to achieve the desired U-values, as per the project specifications
- OT 2.1.2: Communicate with colleagues and suppliers, e.g. paint shops, special geometries etc
- OT 2.1.3: Write, implement and check work orders
- OT 2.1.4: Make quality control of the raw materials, hardware and supplementary materials, considering the technical datasheets, and the quality system
- OT 2.1.5: Make logistics on the incoming materials, e.g. to fill in the appropriate forms/documents, to safely store them etc
- OT 2.1.6: Document work and initiate quality assurances measures and measures for health and safety at work and environmental protection

### OA 2.2: Extract the dimensions of the construction

- OT 2.2.1: Measure correctly and extract dimensions
- OT 2.2.2: Understand the peculiarities of each project
- OT 2.2.3: Calculate the exact dimensions for profiles cutting

### OA 2.3: Cut the profiles- from basics to advanced tasks

- OT 2.3.1: Tune the cutting parameters
- OT 2.3.2: Select the suitable positioning of the profiles on the saw
- OT 2.3.3: Cut with precision and with safety
- OT 2.3.4: Perform and document quality controls
- OT 2.3.5: Categorize the cut profiles and label them appropriately
- OT 2.3.6: Implement service on equipment where needed
- OT 2.3.5: Handle recyclable materials

**OA 2.4: Process the profiles**

OT 2.4.1: Position the materials, e.g. the profiles, correctly on the joining machines

OT 2.4.2: Machine or drill the appropriate holes for water drainage, ventilation etc

OT 2.4.3: Imprint the profiles correctly. To machine and trim the profiles correctly

OT 2.4.4: Install the locks, the handles etc

OT 2.4.5: Construct (assemble or fabricate) in energy-efficient way according to technical manual directions.

OT 2.4.6: Understand and use 3D-Equipment for production of tools, parts etc

OT 2.4.7: Handle recyclable materials and to take actions in order to reduce wastes

**OA 2.5: Assemble and finishes the construction (product)**

OT 2.5.1: Prepare and correctly install the hardware, the operable mechanisms, the gaskets etc

OT 2.5.2: Correctly install the accessories for joining, e.g. L-sections, adhesives etc

OT 2.5.3: Correctly assemble the various parts together, taking into account energy-efficiency parameters, e.g wind permeation, as per the technical manual guidelines

OT 2.5.4: Construct (assemble or fabricate) in energy-efficient way according to technical manual directions.

OT 2.5.5: Perform quality controls on-site

OT 2.5.6: Correctly install the insulating glass units

OT 2.5.7: Package the final product and mark it appropriately

OT 2.5.8: Handle recyclable materials and to take actions in order to reduce waste

<b>KOF 3: DELIVERY/INSTALLATION OF THE ALUMINUM CONSTRUCTION</b>	
<b>OA 3.1:</b>	<b>Slings, securing and transporting in safety</b>
OT 3.1.1:	Safely package the products for transport
OT 3.1.2:	Load and fasten the packages on the appropriate truck
OT 3.1.3:	Comply to the Highway Code
OT 3.1.4:	Unload the truck and unpackage the construction on the field
<b>OA 3.2:</b>	<b>Install and finish the construction</b>
OT 3.2.1:	Install and affix the construction on the right place, correctly taking into account the peculiarities of the building thermal insulation
OT 3.2.2:	Seal the construction and to achieve maximum energy efficiency
OT 3.2.3:	Check the functionalities and to regulate the mechanisms
OT 3.2.4:	Clean the field and leave the place uncluttered, and to clear up and tidy up his/her tools
<b>OA 3.3:</b>	<b>Demonstrate the functions of the construction (product)</b>
OT 3.3.1:	Demonstrate the functions of the construction (product)
OT 3.3.2:	Communicate and inform the clients and/or the engineer on the good operation practices
OT 3.3.3:	Hand the pertaining documents and provide information on maintenance and cleaning, safety in use instructions, end use instructions, product warranty and product's performance (CE-marking, DOP)
OT 3.3.4:	Keep files with the project details, the technical details of the projects and any particularities

## KOF 4: STEEL CONSTRUCTIONS

### **OA 4.1: Steel construction preparation**

- OT 4.1.1: Take measurements and extract dimensions and specifications
- OT 4.1.2: Collaborate with the principle engineer on the performance of the construction
- OT 4.1.3: Select the appropriate materials, according the project specifications
- OT 4.1.4: Calculate the cost and the time schedule needed to complete the project
- OT 4.1.5: Plan, coordinate and agree work with line managers, with colleagues and with other work divisions using technical terminology
- OT 4.1.6: Document work and initiate quality assurances measures and measures for health and safety at work and environmental protection

### **OA 4.2: Process, surface process, and weld parts of the steel construction**

- OT 4.2.1: Measure dimensions and precisely cut parts of metals
- OT 4.2.2: Machine metals, e.g. to cut, drill, join etc
- OT 4.2.3: Implement service on equipment where needed
- OT 4.2.4: Finish the construction
- OT 4.2.5: Construct in energy-efficient way according to technical manual directions, where applicable
- OT 4.2.6: Being able to organize the steel workings for reinforcement points
- OT 4.2.7: Understand and use 3D-Equipment for production of tools, parts etc
- OT 4.2.8: Handle recyclable materials and take actions in order to reduce wastes
- OT 4.2.9: Document work and initiate quality assurances measures and measures for health and safety at work and environmental protection



#### **OA 4.3: Install and finish the construction**

OT 4.3.1: Safely package the products for transport

OT 4.3.2: Load and fasten the packages on the appropriate truck

OT 4.3.3: Unload the truck and unpackage the construction on the field

OT 4.3.4: Follow the specifications regarding the fixation of the construction

OT 4.3.5: Handle recyclable materials and take measures in order to reduce wastes and effluents

### **4.3 Knowledge, skills and abilities necessary for occupational practice**

The objective of the profile in this Project is the Profile for the Aluminium and Constructions Technician at an EQF Level 5.

<b>Aluminium &amp; Metal Constructions Technician</b>	
<b>EQF</b>	Level 5

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>KOF 1: PREPARATION OF ALUMINUM CONSTRUCTION</b>			
<b>OA 1.1:</b>  <b>To understand the project demands and recommend the best technical solution</b>	Basic technical terminology, Basic construction principles, Basic Euclidean geometry and Mathematics, Basic word processing software, Techno-economics	<ul style="list-style-type: none"> <li>• Apply typology to customer needs and available space.</li> <li>• Select the best combination of materials and typology type according to building specifications, taking into consideration energy saving and efficiency.</li> <li>• Selection and implementation of the appropriate system.</li> <li>• Understand basic circular economy aspects</li> <li>• Implementation of the ideal system for collaboration with neighboring structures and landscape architecture.</li> </ul>	Ability to understand the technical specifications related to energy efficiency and the state-of-the-art aluminium systems.

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>OA 1.2:</b> Take project measurements (dimensions) on site	Technical drawing, Engineering basics	<ul style="list-style-type: none"> <li>Measuring, dimensioning and drawing skills</li> <li>Select and apply the correct measurement techniques and to provide correct draws</li> </ul>	<ul style="list-style-type: none"> <li>Select and apply the correct measurement techniques and to provide correct draws</li> <li>Ability to measure the openings correctly and sketch down the measurements</li> </ul>
<b>OA 1.3:</b> To select the appropriate materials and to prepare the construction	Materials Technology, Health and Safety, Engineering Basics Mechanical-qualitative materials behavior.	<ul style="list-style-type: none"> <li>Choose the appropriate alloys and equipment for processing according to technical specifications.</li> <li>Select the appropriate materials.</li> <li>Continuous improvement mindset.</li> <li>Apply good practices for raw materials.</li> <li>Sheet metal forming cutting and elaboration process for all categories of metal shapes.</li> <li>Understand basic circular economy aspects.</li> <li>Implement the appropriate profile for elaboration based on technical needs.</li> <li>Application of different soldering techniques.</li> </ul>	<ul style="list-style-type: none"> <li>Select the proper material combinations (profiles, glass units etc).</li> <li>To know and understand the demands from the law (CE marking, Buildings Energy Performance Regulations etc)</li> <li>Ability to communicate and produce short written reports</li> <li>Ability to calculate the U-value of a product</li> <li>Computational ability to predict the time and cost for a construction</li> <li>Risk management</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>OA 1.4:</b> <b>Field preparation for installation</b>	Health and Safety, Measurement Basics, Euclidean geometry	<ul style="list-style-type: none"> <li>• Install the construction to the appropriate points, interpreting the designs correctly.</li> <li>• Field preparation for installation.</li> <li>• Set up workplaces at building sites.</li> <li>• Carry out work assignments autonomously and work as part of a team according due consideration to the relevant regulations and safety provisions and on the basis of technical documentation and work orders.</li> <li>• Recognize and apply the requirements of technical guidelines during product installation, in order to achieve maximum energy outcomes.</li> <li>• To install and affix the construction on the right place, correctly taking into account the peculiarities of the building thermal insulation.</li> <li>• Uninstalls the construction to the appropriate way without damaging the construction and the component. Damage walls repair.</li> <li>• Apply leveling inside, outside, diagonally, up &amp; down.</li> <li>• Communicate and collaborate with other workers group on the field.</li> <li>• It applies the shimming, according to the typology of the construction to the building block.</li> </ul>	<ul style="list-style-type: none"> <li>• Handle joining techniques</li> <li>• Comply to good working practices (building, facilities, equipment etc)</li> <li>• Ability to communicate and transfer information</li> <li>• Ability to handle portable technical equipment</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>KOF 2: Aluminium construction</b>			
<b>OA 2.1:</b> <b>To select and procure materials</b>	Basic software use, Logistics introductory sections, Construction Engineering basics	<ul style="list-style-type: none"> <li>• Communicate and inform the engineers and/or the clients on the various construction types and the selected one.</li> <li>• Communicate and share information with the building engineer, e.g. the architecture engineer.</li> <li>• Organize collaboration with external partners (specifications, times, costs, etc.).</li> <li>• Implement good working practices (customer loyalty etc.).</li> <li>• Apply the relevant European and national legislation.</li> <li>• Plan and organize autonomously the works that need to be done within the timetable and the cost constraints.</li> </ul>	<ul style="list-style-type: none"> <li>• Organize collaboration schemes with the suppliers; to set specifications, to define deadlines, to predict costs etc</li> <li>• Ability to select and check materials, such as profiles and pertaining materials,</li> <li>• Ability to communicate and transfer information</li> <li>• Ability to understand risks and hazards in the construction field</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>OA 2.2:</b>  <b>To extract the dimensions of the construction</b>	Technical drawing, Euclidian geometry, Measurement basics, Basic software use	<ul style="list-style-type: none"> <li>• Reading of technical drawing.</li> <li>• Procure information.</li> <li>• Extract the dimensions of the construction.</li> <li>• Extract the dimensions from blueprints, drawings, sketches etc.</li> <li>• Measure correctly and extract dimensions.</li> <li>• Understand the peculiarities of each project.</li> <li>• Take project measurements on site.</li> <li>• Measure the dimensions of the openings of the project.</li> <li>• Draw and provide sketches, and blueprints based on the building's blueprint.</li> <li>• Understand the project demands and recommend the best technical solution.</li> <li>• Autonomously assess the project on-site.</li> </ul>	<ul style="list-style-type: none"> <li>• Select and apply good measurement practices with safety and to extract correct dimensions</li> <li>• Technical ability to understand dimensions</li> <li>• Ability to use PC and related software</li> <li>• Understand the risks and the occupational hazards</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>OA 2.3:</b> <b>To cut the profiles- from basics to advanced tasks</b>	Health and Safety, Machining Engineering, Corrosion protection principles, Technical drawing, Basic Mathematics	<ul style="list-style-type: none"> <li>• Utilize production manuals, directories, profiles for cutting dimensions and the list of accessories.</li> <li>• Handle technical manuals for the manufacture of aluminum systems.</li> <li>• Estimation of production time.</li> <li>• Recognize and apply the requirements of the system designer's technical manuals when cutting and machining profiles, in order to achieve maximum energy outcomes when assembly.</li> <li>• Apply standards and guidelines to ensure product quality and continuous improvement of work processes in the company</li> <li>• Apply all stages of production, cutting, processing, assembly of all types of frames.</li> <li>• Tune the cutting parameters.</li> <li>• Select the suitable positioning of the profiles on the saw.</li> <li>• Cut with precision and with safety.</li> <li>• Perform and document quality controls.</li> <li>• To machine or drill the appropriate holes for water drainage, ventilation etc.</li> <li>• To imprint the profiles correctly. To machine and trim the profiles correctly.</li> <li>• To handle recyclable materials.</li> <li>• Identify critical checkpoints, pertinent to construction quality which can affect thermal energy losses.</li> </ul>	<ul style="list-style-type: none"> <li>• Select and apply the correct measurement techniques and to work complying to the health and Safety directions</li> <li>• Handle technical equipment, e.g.</li> <li>• Technical ability to handle technical equipment</li> <li>• Ability to perform on-site quality control</li> <li>• Understand the risks and the occupational hazards</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks		Knowledges	Skills	Competences
To process the profiles	OA 2.4:	Health and safety, Machinic engineering, Basic mathematics, materials technology	<ul style="list-style-type: none"> <li>• Ensuring operational readiness of machines and plants.</li> <li>• Handle equipment properly (machine tools, presses, pantographs, hand tools) with health &amp; safety.</li> <li>• Read, understand and apply CAD-produced and presented descriptions and work orders.</li> <li>• Apply regulations relating to data protection and information security.</li> <li>• Plan and control work processes, check, protocol and evaluate work results.</li> <li>• Understand and use 3D-Equipment for production of tools, parts etc.</li> <li>• Use IT systems, including in digitized processes.</li> <li>• Implement good working practices (working field, equipment, etc.).</li> <li>• Handle the measuring equipment correctly.</li> </ul>	<ul style="list-style-type: none"> <li>• Handle the related equipment</li> <li>• Understand and apply the guidelines from the technical manuals provided from the system designer, towards maximum energy efficiency results</li> <li>• Technical ability to handle technical equipment</li> <li>• Ability to perform on-site quality control</li> <li>• Understand the risks and the occupational hazards</li> </ul>



Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<p><b>OA 2.5:</b></p> <p><b>To assemble and finish the construction</b></p>	<p>Basic mathematics, Materials technology, Energy science and engineering</p>	<ul style="list-style-type: none"> <li>• Comply with National and European Legislation, e.g. Construction Products Regulation 305/2011/EU, CE-marking, Buildings Energy Performance Regulations.</li> <li>• Apply all stages of production</li> <li>• Assembling of all types of fenestrations and outdoor, fencing, railing systems etc.</li> <li>• Processing procedure appropriate to the material used.</li> <li>• Install the locks, the handles etc.</li> <li>• Position the materials, e.g. the profiles, correctly on the joining machines.</li> <li>• Recognize and apply the requirements of the system designer's technical manuals when assembling frames, in order to achieve maximum energy outcomes.</li> <li>• Assembly products in energy-efficient ways according to the assembly designer's requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Apply good working practices (building, equipment etc)</li> <li>• Understand and apply the guidelines from the technical manuals provided from the system designer, towards maximum energy efficiency results</li> <li>• Technical ability to handle technical equipment</li> <li>• Ability over the integrated process and quality control on the critical points that may result in energy losses.</li> <li>• Understand the risks and the occupational hazards</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>KOF 3: Delivery/Installation of the Aluminum construction</b>			
<b>OA 3.1:</b> <b>Slinging, securing and transporting in safety</b>	Occupational Health and Safety, Basic Engineering,	<ul style="list-style-type: none"> <li>• Transportation and related safety skills</li> <li>• Apply good working practices in selecting the appropriated truck and appropriate means of securing the construction</li> </ul>	<ul style="list-style-type: none"> <li>• Technical ability to handle technical equipment</li> <li>• Understand the risks and the occupational hazards</li> </ul>
<b>OA 3.2:</b> <b>To install and finishes the construction</b>	Occupational Health and Safety, Basic Engineering, Basics mechanics, Materials technology	<ul style="list-style-type: none"> <li>• Apply the anchors to the correct construction position.</li> <li>• Select the appropriate materials and materials combinations based on the technical specifications and guidelines.</li> <li>• Apply the instructions in the anchor dimension table.</li> <li>• Install and finishes the construction.</li> <li>• Apply intermediate protective materials when joining / fastening mixed construction.</li> <li>• Apply waterproofing products.</li> <li>• Seal the construction and to achieve maximum energy efficiency.</li> <li>• Apply insulation products.</li> <li>• Install all necessary supporting elements taking into account minimization of thermal losses and avoidance of thermal bridges.</li> <li>• Application of insulation and waterproofing products in metal / aluminum construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Technical ability to handle technical equipment</li> <li>• Understand the risks and the occupational hazards</li> <li>• Apply good working practices</li> <li>• Respect the building ownership and the peculiarities of the house/filed.</li> <li>• Understand and apply the guidelines from the technical manuals provided from the system designer, towards maximum energy efficiency results</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>OA 3.3:</b>  <b>To demonstrate the functions of the construction</b>	Communication, Proofreading,	<ul style="list-style-type: none"> <li>• Informs about the use and handling of the mechanisms.</li> <li>• Demonstrate the functions of the construction (product).</li> <li>• Explain the operating and maintenance instructions for the products, the rules of the warranty and its obligations as a manufacturer.</li> <li>• Informs about maintenance and cleaning.</li> <li>• Hand pertaining documents and provide information on maintenance and cleaning, safety in use instructions, end use instructions, product warranty and product's performance (CE-marking, DOP).</li> <li>• Clean the field and leave the place uncluttered, and to clear up and tidy up his/her tools.</li> <li>• Check the functionalities and regulates the mechanisms.</li> <li>• Keep files with the project details, the technical details of the projects and any particularities.</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to communicate</li> <li>• Hand the pertaining documents and provide information on maintenance and cleaning, safety in use instructions, and use instructions, product warranty and product's performance (CE-marking, DOP)</li> <li>• Explain the constructor responsibilities/obligations</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks		Knowledges	Skills	Competences
KOF 4: Steel constructions				
OA 4.1: Steel construction preparation	Materials Technology, Basic mathematics, Basic engineering and mechanics	<ul style="list-style-type: none"><li>• Offer for individual metal construction or metal-aluminum combination.</li><li>• Handle software for calculating the weight of the profiles</li><li>• Handle software to calculate constructions cost.</li><li>• Make quality control of the raw materials, hardware and supplementary materials, considering the technical datasheets, and the quality system.</li><li>• Make logistics on the incoming materials, e.g. to fill in the appropriate forms/documents, to safely store them etc.</li><li>• Choose the ideal profile for the metal construction based on the required loads.</li><li>• Reading of technical drawing.</li><li>• Make the ideal profile choice for individual metal construction or metal-Aluminium combining.</li><li>• Understand corrosion phenomena and select appropriate methods for corrorion prevention</li><li>• Make separable and inseparable connections.</li></ul>	<ul style="list-style-type: none"><li>• Select and apply good measurement techniques and provide correct dimensions</li><li>• Work complying to the Health and Safety requirements</li><li>• Technical ability of the project specifications and the state-of-the-art</li><li>• Ability to understand relative dimensions in a space</li><li>• Plan and organize processes</li><li>• Computational ability to predict the time and cost for a construction</li><li>• Risk management</li></ul>	

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>OA 4.2:</b> <b>To process, to surface process, and to weld parts of the steel construction</b>	Materials technology, Welding-joining engineering, corrosion Protection engineering  Basic mechanics, Statics and Load stress, Dynamic load, Wind load.  Occupational health and safety	<ul style="list-style-type: none"> <li>• Recognize and apply the requirements of the system designer's technical manuals when assembling frames.</li> <li>• Dimensional the basic profiles from the technical chart for different loads and selects the appropriate mounting mode.</li> <li>• Knowledge of using technical tables for selecting the ideal profile.</li> <li>• Communicate and share information with the building engineer, e.g. the architecture engineer.</li> <li>• Comply with National and European Legislation, e.g. Construction Products Regulation 305/2011/EU, CE-marking, Buildings Energy Performance Regulations.</li> <li>• Production and assembling all types of windows and external pedestrian doorsets, railing systems etc.</li> <li>• Processing procedure appropriate to the material used.</li> <li>• Realization of workmanships on metal sheets.</li> <li>• Processing procedure appropriate to the material used.</li> <li>• Communicate and share information with the building engineer, e.g. the architecture engineer for the big constructions.</li> <li>• Applies tools and consumables for perfect aesthetic restoration of glued joints.</li> <li>• Apply welding finishing techniques.</li> </ul>	<ul style="list-style-type: none"> <li>• Technical ability to handle technical equipment</li> <li>• Understand the risks and the occupational hazards</li> <li>• Select and apply good measurement practices in safety</li> <li>• Provide correct products as per the drawings</li> <li>• Assemble and correctly welds/joins metallic parts</li> <li>• Choose the most appropriate type of welding</li> </ul>

Key occupational functions (KOF) and Occupational activities (OA) job tasks	Knowledges	Skills	Competences
<b>OA 4.3:</b> <b>To install and finishes the construction</b>	Materials technology, Occupational health and safety	<ul style="list-style-type: none"> <li>• Check the functionalities of the construction, and the proper treatment of the joints.</li> <li>• Safely package the products for transport.</li> <li>• Load on a truck and transport the construction in safety</li> <li>• Load and fasten the packages on the appropriate truck.</li> <li>• Organize the file of each completed project.</li> </ul>	<ul style="list-style-type: none"> <li>• Technical ability to handle technical equipment</li> <li>• Understand the risks and the occupational hazards</li> <li>• Apply good working practices</li> <li>• Respect the ownership and the peculiarities of the house/filed.</li> <li>• Understand and apply the directions from the technical manuals provided from the system designer, towards maximum energy efficiency results, where applicable</li> </ul>

#### 4.4 Indicative ways for accessing the necessary knowledge, skills and abilities

In the following Table indicative ways for assessing the necessary knowledge, skills and competences are provided. Based on the analysis for each occupational activity and based on the results from the qualitative research presented above the best ways were concluded. It shall be noted, however, that these shall be treated as indicative and not as obligatory.

After the end of each course with the respective outcomes, that will be presented in the following METVET WP4, and for each activity one or a combination of the following can be used and based on the ISO17024 rules.

	Written exams	Oral exams	Practical exams	Project	Case study
<b>KOF 1: PREPARATION OF ALUMINUM CONSTRUCTION</b>					
<b>OA 1.1:</b> To understand the project demands and recommend the best technical solution		+	+		+
<b>OA 1.2:</b> Take project measurements (dimensions) on site	+		+	+	
<b>OA 1.3:</b> To select the appropriate materials and prepares the construction			+	+	+
<b>OA 1.4:</b> Field preparation for installation			+	+	+

	Written exams	Oral exams	Practical exams	Project	Case study
<b>KOF 2: Aluminum construction</b>					
<b>OA 2.1:</b> To select and procure materials			+		+
<b>OA 2.2:</b> To extract the dimensions of the construction		+	+	+	
<b>OA 2.3:</b> To cut the profiles- from basics to advanced tasks			+	+	
<b>OA 2.4:</b> To process the profiles		+	+	+	
<b>OA 2.5:</b> To assemble and finishes the construction			+	+	+
<b>KOF 3: Delivery/Installation of the Aluminium construction</b>					
<b>OA 3.1:</b> To load on a truck and transport the construction in safety			+	+	
<b>OA 3.2:</b> To install and finishes the construction		+	+	+	
<b>OA 3.3:</b> To demonstrate the functions of the construction	+	+		+	



	Written exams	Oral exams	Practical exams	Project	Case study
<b>KOF 4: Steel constructions</b>					
<b>OA 4.1:</b>  Steel construction preparation	+	+	+	+	+
<b>OA 4.2:</b>  To process, to surface process, and to weld parts of the steel construction			+	+	
<b>OA 4.3:</b>  To install and finishes the construction		+	+	+	+
















Professional [Qualification]

PROFILE

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## 5 WP3 | REFERENCES

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