EXAMINATION MECHANISM

D

4.6

METVET

JOINT HIGHER VET

COURSE IN THE METAL SECTOR

WP4 – Creation of Curriculum and Syllabus

Examination / Evaluation Mechanism for the acquired technicians' competencies (D. 4.6)

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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 Cedefop's European skills and jobs survey (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.**

Therefore, an Examination / Evaluation Mechanism that includes a **theoretical part** (Questions' Bank of graded difficulty based on training contents D4.3), as well as a **practical one** (scenarios of work simulation under similar working conditions, using material, equipment, drawings, P.P.E. etc.), is of high importance. The mechanism, also mentioned in the Qualification standard (d4.7) provides the means to assess and verify that candidates possess knowledges, skills and abilities acquired by work experience or non-formal learning outcomes.

This volume objective is to present METVET's Deliverable D4.6 "Examination / Evaluation Mechanism for the acquired technicians' competencies".

The Project Partners

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Examination / Evaluation Mechanism

PURPOSE & SCOPE

1 PURPOSE AND SCOPE

Examination mechanisms are designed to assess candidates' qualifications based on, and consistent with, the profession, by any reliable and objective mean as written, oral and/or practical exams, observation etc. The examination requirements must ensure the comparability of results of each single examination, both in content and difficulty, including the validity of fail/ pass decisions.

METVET's examination mechanism aims to evaluate if the candidate is aware of and able to apply in specific cases, the knowledge, skills and competencies required for his profession as an "Aluminium & Metal Constructions Technician". The examination mechanism consists of **theoretical and practical examination**, so as to identify individuals that achieve the predetermined level of competency and to confirm whether a candidate has exhibited a proficiency level at or above the minimum competency level.

1.1 About Theoritcal and Practical examination

The **theoretical** examination consists of a 50 multiple-choice questions quiz of graded difficulty per Learning Module, selected randomly from an Examination **Questions Bank**. The **pass mark** for the quiz is **60%** and 30 correct answers.

The **practical** part includes 5 defined practice **scenarios**, with specific implementation stages and assessment criteria under job working conditions, using material, equipment, drawings, Personal Protective Equipment (P.P.E.) etc. Candidates have to complete one of them. The output of the work is graded by the examiner. The **pass mark** is **60** out of 100 points.

The result of a candidate is considered positive if he has completed **successfully both theoretical and practical examination.**

For more information concerning the mechanism's use, please refer to Chapter 4 of D4.7 Qualification Standard for Aluminium & Metal Constructions.

Examination / Evaluation Mechanism

QUESTIONS BANK

2 QUESTIONS BANK

* Correct answers are depicted in □

2.1 Learning Module 1 Evaluation Questions

Low Difficulty Questions

1. From what raw material is the aluminium produced?
   a. from Granite Rocks
   b. from limestone rocks
   c. from Bauxite
   d. from iron

2. Why do we have so many alloys?
   a. because according to the use of each profile the specifications of each alloy change. For example, architectural uses 6060, while for industrial purposes such as ladders, scaffolding, strollers we use different alloys of higher strength
   b. because according to the use of each profile the specifications of each alloy change. For example, architectures use 6101 while for industrial purposes such as ladders, scaffolding, strollers we use different lower strength alloys
   c. because according to the use of each profile the specifications of each alloy change. But because the alloys are the same, we use the 6060
   d. we have so much because there are so many uses of aluminium

3. What is Extrusion?
   a. the process to produce sheets
   b. the process of processing the sheets
   c. the process of making ingot
   d. the process of producing profiles

4. Can we use profiles and components from different architectural systems?
   a. yes,we can
   b. no we can not
   c. it depends on the system
   d. we can use a small category

5. How do we distinguish the mechanism to be placed on a profile?
   a. we do not understand it from the profile
   b. from the groove in the leaves
   c. from the shape of the frame
   d. from the thickness

6. What is the difference in sliding mode between a simple sliding and a lift-sliding?
   a. the lift-sliding has a larger profile
   b. how the mechanism works
   c. it's the same
   d. the lift-sliding can lift a lot of weight

7. Why do entrance doors need strong hinges?
   a. because it works more than the other frames
   b. to be safety
   c. to be beautiful
   d. to be able to lift a lot of weight

8. How many dye categories for aluminium are there?
   a. 6
   b. 2
   c. 3
   d. 7

9. Which paint category has the widest variety of colours?
   a. all categories have the same colours
   b. anodizing
   c. powder coating
   d. sublimations

10. Why is quality window glazing essential in a frame?
   a. because it's nice
   b. because the law requires it
   c. because it's better the Uw
   d. because no air enters

11. Are glazes produced in all thickness?

a. yes

b. no

c. only at 4,6,8,10 mm

d. in many thickness

12. What type of glass panels are used in the patios/skylight?

a. annealed glass

b. tempered glass

c. heat strengthen glass

d. laminated glass

13. On what factor depends the thickness of the glass to be used in a window?

a. on the height of the fenestration

b. on the width

c. it does not matter

d. on the dimension

14. Where is the corrugated galvanized iron used?

a. for overlapping side of metal buildings

b. for overlapping roof of metal buildings

c. for overlapping side & roof of metal buildings

d. not for this use

15. What causes the stability and rigidity of sheet metal?

a. the corrugated shape

b. the thickness of the sheet

c. the kind of material made

d. the way of placement

16. What is the advantage of composite panels?

a. the insulation

b. the dimensions

c. the safety

d. the fire protection

17. Where is the bond used?

a. for overlapping side of buildings

b. for overlapping roof of buildings

c. for overlapping side & roof of buildings

d. not for this use

18. What is the difference between sliding and minimal in installation?

a. it's the same

b. minimal has only 2 sashes

c. the slides are positioned only in the middle of the wall

d. the frame of the minimals placed inside the wall

19. How many roller shutters do we have relative to the installing position?

a. 5

b. 7

c. 2

d. 3

20. What is the basic difference of a curtain wall from a fenestration?

a. they are not different

b. the curtain wall is placed outside the building

c. it's a matter of aesthetics

d. it's a matter of colour

21. What are the 2 major categories of curtain wall based on the way they are assembled and installed?

a. stick & wall window

b. unitized & spider

c. stick & unitized

d. rainscreen & wall window

22. What quality of glazing pane do we use on the glass railings?

a. all types

b. heat strengthen glass

c. coloured

d. laminated glass - tempered glass

23. When are stainless steel profiles used?

a. on mountain constructions

b. near rivers

c. near the sea

d. in town

24. What is the purpose of the pre-frame?

a. easily fit the frame

b. to give moor value to construction

c. be stronger

d. it is mandatory by law

Medium Difficulty Questions

1. What are the differences between euro groove e groove 16?

a they make no difference

b. the European is a more powerful mechanism

c. the shape and dimension of the channel being placed varies

d. the mechanism 16 is the cheapest one

2. What is a trapezoidal profile?

a. a corrugated profile

b. a large metal structural members

c. a square profile

d. a round profile

3. What is energy glazing?

a. decorative glass

b. glass reinforced with one or more thin layers of metallic oxides

c. glass reinforced with one or more thin layers of carbon

d. glass reinforced with one or more thin layers of zinc

4. What is tempered glass?

a. the glass that in production process heated reaching temperatures of up to 1000° C

b. the glass that in production process heated reaching temperatures of up to 200° C

c. the glass that in production process heated reaching temperatures of up to 600° C

e. there is no such thing

5. What is laminated glass?

   a. the glass that has two or more pieces

   b. the glass that has PVB (polyvinyl butyral) resin glue film between two or more pieces

   f. there is no such thing

   c. own glass with PVB (polyvinyl butyral) resin glue film

6. Why is laminated glass resistant to loads?

   a. because it is used in small dimensions

   b. because it's thick

   c. you cannot lift many loads

   d. because there are a lot of glazed together with a membrane

7. In a double-glazed window on which side it is better to have the energy coating?

   a. on the outside of the house

   b. on the inside of the house

   c. between the gap

   d. ιt doesn't matter which side it will be on

8. How much difference in performance has a double glazing from a single one?

   a. the same

   b. 10%

   c. 80%

   d. 50%

9. Where is the Woodee used?

   a. for overlapping side of buildings

   b. for overlapping roof of buildings

   c. for overlapping side & roof of buildings

   d. for overlapping side & floor of buildings

10. What is the main difference between sliding shutters and sliding systems?

    a. there is no difference

    b. the shutters have slats for filling

    c. the shutters use thermal – break profiles

    d. shutters are using only for windows

11. What is the basic difference between Stick and Unitized?

a. there is no difference

b. stick installed piece by piece while unitized is prefabricated

c. stick can withstand more loads

d. unitized is nicer than stick

12. What is the basic difference between standard and structural?

a. there is no difference

b. standard holds the glass with a pressure plate & structural with glue

e. structural ones are for larger constructions than standard

f. structural is nicer than standard

13. How do we place the Unitized curtain wall on the building?

a. with a crane

b. with scaffolding

c. with crane and scaffolding

d. we don't need any of the above

14. Can we place Stick curtain walls in a skyscraper?

a. yes we can

b. no we can't

c. we can up to 200 floors

d. we can up to 100 floors

15. What is the basic difference between a window wall and a curtain wall?

a. curtain wall is installed out of the building, while window wall between slabs

b. they are unitized for high buildings

c. there is no difference

d. window wall is only for small windows

16. What is the basic difference between stick and spider?

a. at stick the glazing is supported by aluminium profiles, while at spider is fastened to a metal frame with screws

b. there is no difference

c. at stick the glazing is only tempered & laminated, while at spider no

d. at stick the glazing is only single

17. For what purpose is a pergola used?

a. as a greenhouse

b. as a storage space

c. as a bedroom

d. as an auxiliary recreation area

18. Can we place glass railings on side-mounted?

a. no

b. yes

c. it depends on the type of building

d. it depends on the dimensions

19. In what part of a house are canopes used?

a. in the swimming pool

b. at the main entrance

c. at the balcony

d. in the parking lot

20. What typologies can we make with metal frames?

a. sliding

b. casement

c. curtain wall

d. all typologies

21. How are the aluminium's profiles for fenestrations produced?

a. with a bending machine

b. with a roller machine

c. with mannesmann

d. through extrusion

22. Where are metal Frames needed the most?

a. in fire safety systems

b. in casements systems

c. in sliding systems

d. in simple frames

23. What glasses are used on bullet doors?

a. tempered glass

b. heat strengthen glass

c. laminated glass

d. special category

24. When do aluminium curtain walls re combined with metal?

a. when we want a cheaper construction

b. to be more beautiful

c. when we have large dimensions in construction

d. we should always use for security

25. Where else can aluminium be combined with metal?

a. it is mandatory by law

b. for reinforcement inside aluminium profiles for curtain walls

c. for cheaper construction

d. for an elegant build

High Difficulty Questions

1. How much are the alloys there?

a. 1XXX, 2XXX, 3XXX, 4XXX, 5XXX, 6XXX, 7XXX & 8XXX Series

b. 6XXX Series

c. 6XXX, 7XXX & 8XXX Series

d. 1XXX, 2XXX & 3XXX Series

2. What alloys do you use to produce fenestration's profiles?

a. all 6XXX series alloys

b. specifically, 6060, 6063, 6005 & 6082

c. specifically, 6060, 6063,6061, 6005 & 6082

d. specifically, 6060, 6063,6061, 6101 & 6082

3. How many different shapes of primary aluminium are there?

a. there are three shapes, sheets, billets and ingots

b. there are four shapes, sheets, billets, profiles and ingots

c. there are two shapes, billets and ingots

d. there are various shapes, slabs, billets, industrial, architectural profiles and ingots

4. What is the difference between iron and steel?

   a. steel is an alloy of iron and carbon

   b. there is no difference

   c. iron is heavier that steel

   d. the variety is in colour

5. What is the stainless steel?

   a. a steel alloy with 2% carbon

   b. a steel alloy, >11% and maximum of 1.2% carbon

   c. iron with 10% carbon

   d. steel alloy, >11% carbon

6. What is galvanization?

   a. the process of applying a protective zinc coating to steel or iron

   b. the process of applying a protective zinc coating to steel

   c. the process to anodize the steel

   d. the process to paint the steel

7. What is the roll forming?

   a. the process to produce sheets

   b. the process to produce ingots

   c. the process to produce billet

   d. the process to produce profiles

8. What is the bottoming process?

   a. when the punch presses the material against the inner surfaces of the bottom die

   b. when the punch presses the material against the inner surfaces until the middle stroke

   c. when the punch presses the material against the inner surfaces for 3mm

   d. when the punch presses the material

9. What does the heat strengthen glass?

   a. during production when the cooling process is fast

   b. the cooling process does not matter

   c. the cooling process is slower

   d. there is no such process

10. What types of railings are there?

a. glazing/ tubular / cast

b. sheeted railing

c. sheet railing

d. Pvc railing

11. Why do we place fire doors in buildings?

a. it blocks the smoke during the fire

b. they have good aesthetics

c. they have a good price

d. they are easier to install

2.2 Learning Module 2 Evaluation Questions

Low Difficulty Questions

1. What are consumables?

a. products that consumers use repeatedly for the function of the machineries

b. machines' motor

c. electricity

d. rent

2. What is maintenance?

a. the reparation after damage

b. to consume less electricity

c. the process of preserving a good condition in function

d. the good function of a machine

3. Are there any differences between hand and handheld tools?

a. no

b. hand tools function with electricity, while handheld without

c. handheld tools are only for drilling while hand for screwing

d. hand tools function without electricity while handheld with

4. Why electrical tools must be grounded?

a. to keep the engine from crashing

b. to work well

c. to provide protection against electricity

d. to consume less electricity

5. What is a CNC machine?
   a. a computer
   b. a machine in which pre-programmed computer software dictates the movement of factory tools
   c. a group of machines
   d. all big machines

6. What are the advantages of fenestration software use?
   a. it calculates the expenses
   b. it organizes the personnel
   c. It calculates the profile/accessories and makes cutting optimization
   d. it calculates production time

7. Why does the production area between aluminium & steel should be separated?
   a. for better cleanliness
   b. for protecting aluminium
   c. for the noise
   d. it is provided by law

8. What is the main difference between steel & aluminium in connection?
   a. aluminium has accessories for all kind of connections
   b. there are not differences
   c. the labour needed
   d. the layout

9. Who is responsible for accidents at work?
   a. dangerous situations at work area
   b. dangerous situations at work area and employees' dangerous actions
   c. employees' dangerous actions
   d. incomplete laws

10. Who is responsible for most accidents?
    a. staff
    b. machines
    c. space
    d. electricity

11. What are the greatest hazards posed by hand tools?
    a. electricity
    b. falling
    c. hand breaking
    d. musculoskeletal injuries

12. What are the greatest hazards posed by electric tools?
    a. falling
    b. hand breaking
    c. musculoskeletal injuries
    d. electric shock

13. How do we distinguish gas cylinders content?
    a. from the size
    b. from the valve
    c. from the price
    d. from the colour

14. What does the straps to attach loads to trucks depend on?
    a. camion
    b. fenestration
    c. dimensions
    d. weight

15. Which straps carry the most weight?
    a. lateral ones
    b. front ones
    c. back ones
    d. top ones

16. How does the strength of the strap to be used is calculated?
    a. * % weight
    b. 2*weight
    c. = dimension
    d. 2 * hight

17. How does the strength of front straps is calculated?
    a. 10% * weight
    b. 20% * weight
    c. 50% * weight
    d. 80% * weight

18. What is the angle's joint difference the between aluminium and metal?
    a. there is no difference
    b. aluminium is joined with accessory, metal is welded or screwed
    c. different kinds of screws
    d. different kinds of glue

19. What is the meaning of red colour in safety signs?
    a. mandatory
    b. no problem
    c. pay attention
    d. danger

20. How are prohibition signals shaped?
    a. square
    b. triangular
    c. circular
    d. polygonal

21. How do we lift a load manually?
    a. we keep it close to the shoulders
    b. we keep it close to the waist
    c. we keep it close to the legs
    d. we keep it close to the head

22. At what angle should we load frames in the A-frame?
    a. 100
    b. 200
    c. 700
    d. 900

Medium Difficulty Questions

1. What is Equipment?
    a. a tool
    b. a machine
    c. tools and machines
    d. a set of tools that are used to achieve a specific objective

2. What is a tool?
    a. a device or implement, used to carry out a particular function
    b. a car
    c. a camion
    d. a compressed air networks

3. What is the benefit of a CNC machine?
   a. it can perform the entire treatment cycle on its own
   b. it consumes energy
   c. the speed of production
   d. the quality of treatment

4. Where should tools be stored?
   a. on a machine
   b. on a workbench
   c. in the tool cabinets
   d. at the warehouse

5. How many categories of maintenance are there?
   a. preventive maintenance
   b. scheduled & corrective maintenance
   c. corrective e & preventive maintenance
   d. predictive, corrective, scheduled & preventive maintenance

6. Which is the best kind of maintenance?
   a. preventive maintenance
   b. scheduled maintenance
   c. corrective maintenance
   d. predictive maintenance

7. What is dead time in production?
   a. the time that production stops
   b. the time that does not add value on the product
   c. the time of maintenance
   d. the time that electricity isn't consumed

8. What is unit or Job type of production?
   a. the layout of machines / people for high production
   b. the layout of machines / people for good quality of products
   c. the layout of machines / people for cheaper product
   d. the layout of machines / people for most different kind of products

9. .What is lot type of Production?
   a. the layout of machines / people for cheaper product
   b. the layout of machines / people for big lot of products
   c. the layout of machines / people for high quality
   d. the layout of machines / people for cheaper product

10. What is the advantage of unit or Job type of production (beehive)?
    a. large quantities may be produced
    b. good quality
    c. flexibility of changes in production
    d. cheaper products

11. In which case the unit type of production is suitable?
    a. for non-standard products
    b. for different qualities
    c. for different quantities
    d. for different typologies

12. Why production data sheet is important?
    a. in order to know the costs
    b. it is mandatory by law
    c. for the balance sheet
    d. for the assets of the company

13. What are the safety categories of labelling / marking?
    a. permanent marking
    b. occasional marking.
    c. permanent marking & occasional marking
    d. total marking

14. Why spacing around machines is important?
    a. for cleanliness
    b. for the staff's circulation
    c. for avoiding accidents
    d. for space saving

15. What is the shape of prohibition signals?
    a. circle
    b. triangle
    c. square
    d. polygon

16. What is the shape of obligation signals?
    a. circle
    b. triangle
    c. polygon
    d. square

17. Which of the following storing position of acetylene bottles is dangerous?

a. lateral position
b. upright position
c. on trolley
d. in warehouse

18. In which of the following gases should a mask be used?

a. oxygen
b. carbon dioxide
c. argon
d. acetylene

19. What is the meaning of blue colour in safety signs?

a. mandatory
b. no problem
c. pay attention
d. danger

20. How rescue or relief signals are shaped?

a. square
b. circular or polygonal
c. rectangular or square
d. triangular

21. Which metal should not be used in acetylene bottles?

a. steel
b. stainless steel
c. tin
d. copper

22. With which gas oil is dangerous?

a. acetylene
b. propane
c. oxygen
d. argon

23. What are the permissible weights per gender?

a. man 15 - woman 10
b. man 12 - woman 10
c. man 10 - woman 7
d. man 8 - woman 5

High Difficulty Questions

1. What is code G?
   a. the production number of machines
   b. the colour of a machine
   c. any word in a CNC program that begins with the letter G
   d. the type of a machine

2. What does code G do?
   a. starts a function
   b. stops a function
   c. tells the machine tool what type of action to perform
   d. calculates opening hour

3. How many categories of gases are there?
   a. 1
   b. 2
   c. 3
   d. 4

4. What is Process layout?
   a. when all machines performing similar type of operations are grouped at one location
   b. when all machines performing similar type of operations are in different location
   c. when all machines are in line
   d. when the machines are positioned opposite to each other

5. What is the different between direct and Indirect Costs?
   a. direct costs can be directly attributed to the production, indirect costs are overheaded
   b. direct costs are overheaded, indirect costs can be directly attributed to the production
   c. they are the same
   d. direct costs are the product's cost, indirect costs are the labour cost

6. What are cost drivers?
   a. costs of transport
   b. camions' costs
   c. a factor that distributes the cost of variable costs
   d. cost of production shift

7. What is historical cost?
   a. the history of the economic data
   b. the labour cost
   c. the cost based on prior years data
   d. the cost of raw materials

8. What are the main differences between historical & estimated cost?
   a. historical cost is high
   b. estimated cost is all about taxes
   c. time that data is collected
   d. data is different

9. What affects the quantity produced?
   a. quality
   b. product cost
   c. overtime labour
   d. production time

2.3 Learning Module 3 Evaluation Questions

Low Difficulty Questions

1. Why do technicians need communication skills?
   a. for understanding customer/project needs
   b. to earn more money
   c. it is mandatory by law
   d. to understand plans

2. What is non-verbal communication?
   a. written communication
   b. verbal communication
   c. non-verbal communication
   d. visual communication

3. Why architectural plans are important to craftsmen?
   a. to know the house surface
   b. to see the space
   c. to recover the frame's measures for offer
   d. to know the name of architect

4. Why metric scale is important?
   a. for the costs
   b. for the typology
   c. for the real dimensions
   d. for the quantity

5. Can we understand the typology of fenestrations in an architectural plan?
   a. yes
   b. no
   c. it depends on the typology
   d. it depends on the architect

6. What is law 305/2011 about?
   a. the European Union legal requirement in the field of Construction
   b. the USA legal requirement in the field of Construction
   c. the European Union legal requirement in the field of transportation
   d. the European Union legal requirement in the field of medicine

7. What is the certification of resistance to wind load about?
   a. the strength of the glazing to wind
   b. the durability of the mechanism
   c. the durability of the accessories
   d. the strength of the frame to wind

8. On which parameter does the method of measuring wind resistance depend on?
   a. colour
   b. dimensions
   c. deflection
   d. accessories

9. What does NPD as assessment mean?
   a. very hight performance
   b. it is the name of a law
   c. medium performance
   d. no Performance Determined

10. What are the 2 options that make water tightness test?
   a. fenestrations shielded & not shielded
   b. fenestrations hight & small
   c. fenestration of 2 different colours
   d. fenestration of different typologies

11. What does shielded fenestration mean?

a. in a bathroom

b. in a matrimonial room

c. under the balcony

d. in the ground

12. What does frame air permeability test measure?

a. the total surface area

b. the frame area

c. the total surface area and their joints

d. the joints

13. What is CE marking about?

a. quality

b. identity

c. colour scheme

d. measurement unit

14. What should the manufacturer issue according to Regulation 305/2011?

a. declaration of conformity

b. declaration of performance

c. declaration of product

d. all of the above

15. How should the CE marking be displayed?

a. as the customer wishes

b. as the manufacturer wishes

c. it is defined by law

d. it depends on the product

16. Why is CE needed?

a. to know the price

b. to know the fabricator

c. for the legal circulation of products in the markets

d. for quality

17. How many years should a manufacturer maintain a record (hard-copy or digital) according to the technical documentation?

a. 2

b. 3

c. 5

d. 10

18. Where should CE marking be affixed?

a. on the fenestration

b. in the contract

c. given to lower

d. on the entrance

19. How many years should product's instructions for use and maintenance be kept?

a. 5

b. 10

c. 15

d. 20

20. What is the main cause of having a showroom?

a. it is mandatory by law

b. to sell in higher prices

c. to show products to the customer

d. to make more sales

21. Why should we have fenestrations samples?

a. for the customer to understand the product

b. to see the colours

c. to see the glass

d. it is mandatory by law

22. What should be considered as a proper appearance of a seller?

a. wear expensive clothes

b. be nicely dressed and clean

c. have work clothes

d. It doesn't matter what he/she looks like

23. In what way does software help with the cost of materials?

a. to have better prices

b. to have precise results concerning items, quantity and price

c. to have the specials items

d. to find the suppliers

24. Why is it important to use a computer?

a. for wording

b. for costing and offers

c. for internet use

d. for payments

25. Why is software use important for production?

a. it provides used codes, quantities and optimization

b. it calculates the cost

c. it provides the debit balance

d. it is mandatory by law

26. What must be given with the offer?

a. a gift

b. the fenestration's dimension

c. certification

d. a folder with all details

27. How is an offer substantiated?

a. by the manufacturer's signatures on the offer

b. by the customer's signatures on the offer

c. by the manufacturer's and customer's signatures on the offer

d. by a lawyer's signatures on the offer

28. Why is fabrication manual use important?

a. for selecting the right combination of profiles and accessories

b. for calculating the profile's price

c. for choosing the available accessories

d. for calculating the assembling time

29. What should be done before cutting?

a. frame & sashes should be separated

b. uncoloured profiles should be cut

c. sashes should be cut

d. quality controlling

30. How is measure for cutting inserted?

a. Via network or miter tape

b. via network or UPS

c. By miter tape

d. Manually or all the above

31. What is the advantage of software cuts?

a. time

b. precision

c. quality

d. Optimization

32. How many kinds of machining are there?

a. punch press

b. drill bit

c. milling machine as CNC, Pantograph, router

d. punch press, milling machine, drill bit, punch press

33. How many weep holes must a frame has?

a. 2

b. 3

c. 10

d. it depends on the dimension and the typology

34. Why is drilling applied at the upper sides of the sash?

a. for ventilation

b. for humidity protection

c. for screwing the mechanism

d. for aesthetic reasons

35. What should be done before installing the screwed-in corners?

a. screwing the profile

b. put glue in the chamber

c. cleaning the chamber of the profile

d. drilling the profile

36. Why should vulcanized corner gaskets be used for?

a. the glazing pane outside

b. the central gasket

c. the glazing pane inside

d. the sash inside

37. What kind of glue should be used for connecting vulcanized corners?

a. any glue

b. silicon neutral

c. silicon aside

d. vulcanized compatible glue

38. What should be done before assembling a frame?

a. put silicon

b. put protection for corrosion on the profiles section

c. clean it with water

d. install gaskets

39. What do we place in the same way as the glass on the leaves?

a. the handles

b. the panel

c. the mechanisms

d. the hinges

40. What does CE marking confirm?

a. that the product is safe and complies with the European Legislation

b. that the product complies with the US Legislation

c. the origin of the product

d. the cost

41. Are companies obliged to have Factory Production Control (FPC) systems?

a. no

b. only big companies

c. yes, it is mandatory

d. it depends on the products

42. In what projects should FPC be applied?

a. to large projects

b. to public buildings projects

c. it is not mandatory to be applied

d. it should be applied to each undertaken project

43. What does quality control mainly include?

a. incoming and raw materials controls

b. final controls

c. intermediate controls

d. all the above

44. Are most workplace accidents preventable?

a. no

b. yes

c. it depends on the staff

d. it depends on the kind of the production

45. Is it important to monitor the progress of the production?

a. no

b. yes, as it is mandatory

c. it depends on the production

d. yes, in order to ensure that it is in-line with the original plan

46. Why is file documentation important for FPS?

a. it will be used to testify its correct application

b. to know the production

c. to know the equipment

d. just for information

47. How can risks of machinery be minimized?

a. by buying new one

b. by having a voltage of 110v

c. by having proper and regular maintenance

d. by having enough space

48. What is the key to success in any work?

a. communication

b. nice production space

c. nice offices

d. nice showcase

49. Which list of data should we monitor?

a. labour

b. machining

c. milling

d. all the above

Medium Difficulty Questions

1. What is the most important communication skill?

a. speaking

b. listening

c. learning

d. taking notes

2. How many categories of deflection are there?

a. 1

b. 2

c. 3

d. 4

3. How many classes of air permeability are there?

a. 2

b. 3

c. 4

d. 5

4. When should quality controls be carried out?
   a. during raw materials receipt
   b. in intermediate production stages
   c. before product release from the company's premises
   d. all the above

5. How does accounting help?
   a. to know clients
   b. it is very important in planning
   c. to know the suppliers
   d. to pay the staff

6. What does the final offer include?
   a. the raw materials
   b. the labour
   c. the raw materials and labour
   d. the raw materials, labour, overhead cost & profit

7. What is a win-win deal?
   a. when the result is good for everyone involved
   b. when the result is good for the client
   c. when the result is good for the technician
   d. when the price is low

8. What is crucial for a good negotiation?
   a. the economic level of client
   b. the information
   c. the kind of fenestration
   d. the place of construction

9. Why is catalogues use important?
   a. for ordering the right raw materials
   b. for seeing the price
   c. for choosing between available colours
   d. for choosing between appropriate glazing

10. Who provides information concerning the necessary tools to be used?
   a. suppliers
   b. internet
   c. technicians
   d. fabrication manuals

11. Why should the fabricator certify his products and himself?

a. it is mandatory
b. for having better prices
c. for finding clients easily
d. in order to be exempted from duties

12. Why does the frame must be smaller than the wall that to be installed?

a. to be more beautiful
b. for easy installation
c. its dimensions are altered due to temperature change
d. for estimating the cost

13. What is the problem with temperature change in metals?

a. expansion
b. contraction
c. there is no problem
d. breaking

14. How can we measure the appropriate gap between the frame & the wall?

a. ask the supplier
b. see the catalogue
c. check the guidelines of installation
d. estimate 10 mm anyway

15. Should there be a gap between the union of two large windows?

a. no
b. yes
c. it depends on the typology
d. it depends on the dimensions

16. Why production planning is crucial?

a. it facilitates the production requirements needed
b. it facilitates the staff
c. it minimizes raw materials cost
d. it is mandatory by law

17. Where should molds be used in the cutting process?

a. to uncoloured profiles
b. to large profiles
c. to small profiles
d. for having better fix in saw

18. Why should attention be paid to twin chambered sashes top and bottom weep holes?

a. because they be misaligned by at least 60 mm

b. because they have to be on the same straight

c. because no second hole is needed

d. no attention should be paid

19. What is the reason for sliding weep holes length being higher than the casement windows?

a. the sliding is bigger than casements

b. the sliding has smaller profiles

c. because of the typology

d. water barrier created by rail guides that obstructs water from being evacuated

20. In case of parallel sliding windows, where are weep holes machined?

a. on the upper external profile

b. on lateral profile

c. on the lower framing profile corresponding to the effective track length of the external moving sash

d. on the lower framing profile corresponding to the effective track length of the internal moving sash

21. Where should the central sealant in the sliding systems be put?

a. in the middle of the framing profile, upper & down

b. in the middle of the framing profile, upper

c. in the middle of the framing profile, down

d. in the middle of the framing profile, on the side

22. How many types of joining corners are there?

a 2

b. 3

c. 4

d. 5

23. On what does machining of handles depend on?

a. the kind of the profile

b. the kind of the handles

c. the typology

d. the mechanism

24. What is achieved through following a manual?

a. money

b. time

c. proper assembly

d. space in production

25. How can the maximum permitted dimensions of fenestrations be verified?

a. by experience

b. it doesn't need verification

c. by the manual's charts

d. by the supplier

26. How many steps of glazing gaskets installation are there?

a 2

b. 3

c. 4

d. 5

27. How much longer should the length of the gaskets be?

a. 1-2%

b. 3%

c. 2-5%

d. 10%

28. Where should protection for corrosion been applied?

a. all profile's section, drainages, corners, handles etc.

b. corners

c. handles

d. drainages

29. What will by happen if glazing pane isn't shimmed appropriately?

a. absolutely nothing

b. handles will be damaged

c. frame will be bended

d. sash will be bended

30. What is the main concept of casement's sashes shimming?

a. to transfer the glazing's load on the frame

b. to transfer the glazing's load on the sash

c. to transfer the glazing's load on the corners

d. to transfer the glazing's load on the hinges

31. What is the main concept of sliding sashes shimming?

a. to transfer the glazing's load on the corners

b. to transfer the glazing's load on the sash

c. to transfer the glazing's load on the rollers

d. to transfer the glazing's load on the frame

32. Is there a different kind of shimming between right & left opening casement?

a. no

b. yes

c. it is the same

d. it depends on the system

33. Is there a different kind of shimming between right & left sliding sash?

a. no

b. yes

c. it is the same

d. it depends on the system

34. What is the most important element of the factory production control system?

a. space

b. staff

c. capital

d. file documentation

35. How should non-conforming products be dealt with?

a. they should be sold cheaper

b. they should be reconstructed with the same materials

c. they should be thrown away

d. they should be recorded, while those records should be kept for a period defined in the written procedures

36. What should we always have in mind concerning measuring and control instruments?

a. they should be calibrated at regular intervals

b. they should be renewed at regular intervals

c. there should be more in stock than necessary

d. they should be maintained

37. How does a manufacturer make a product recall?

a. by publicizing the problem and by visiting building sites where non-conforming products have been installed, in order to examine and address non-conformities

b. by providing product declarations of conformity

c. by placing CE marking stickers on the product

d. by publicizing the problem to the production

38. Do peculiarities of each industry need to be taken into account?

a. no

b. it depends on the owner of the company

c. yes

d. it depends on the size of the company

39. What is the most important element in the implementation of FPS?

a. clients

b. money

c. file documentation

d. tax

40. Are the vast majority of workplace accidents preventable?

a. no

b. it depends on the production

c. it depends on the equipment

d. yes

41. Who needs to be schooled for Health and Safety?

a. no one

b. clients

c. drivers

d. every employee on site who is exposed to potentially dangerous equipment

42. What is need to be considered regarding safety, besides law regulations?

a. the capital of the investment

b. the site of the company

c. the peculiarities of each industry

d. the country

43. Why is it important to monitor the work progress?
    a. it is mandatory
    b. to collect all the needed data and check the planning
    c. to know the time of the production
    d. to know the different kind of products

44. How should the time during monitoring be managed?
    a. by spending as much time as possible
    b. by spending as much time as convenient
    c. by striking a balance between the time spent on tracking activities and the value of the effort
    d. by spending time based on own judgement

High Difficulty Questions

1. What does classification in weather tightness 5A mean?
    a. withstands pressure up to 200 Pa
    b. withstands pressure up to 300 Pa
    c. withstands pressure up to 400 Pa
    d. withstands pressure up to 500 Pa

2. Why is it difficult to sell a window?
    a. because of its many colours
    b. because of its different systems
    c. because it is expensive
    d. because we must get the “recipe” first and then sell it

3. What does local marketing help with?
    a. prices
    b. quantity of the products
    c. quality
    d. customizing marketing to different channels and audiences

4. How many costings are there?
    a. Complete, partial & ABC (Activity Based Costing)
    b. Partial costing
    c. Complete costing
    d. Medium costing

5. What kind of data is needed for costing?
    a. prices
    b. quantities, labours
    c. fixed and variable cost
    d. all the above

6. What is the advantage of ABC costing?

a. it distributes the costs to each product

b. it is easier to apply

c. it takes less time

d. It is costless

7. What is the simplest method to make a price list?

a. cost + tax

b. cost + labour

c. cost + profit

d. cost + labour + tax

8. What is B2C sales?

a. sales to consumers

b. sales to staff

c. sales to public service

d. wholesale

9. What should a fabricator do after having a materials list?

a. order materials immediately

b. order materials as soon as the production starts

c. wait for the customer

d. check the warehouse for stocks

10. What determines good profiles cutting?

a. dimensions

b. colours

c. geometry & direction

d. typology

11. What is the maximum permissible sash dimension based on?

a. the kind or rollers

b. the typology

c. the weight of the glazing & on the load of wind

d. the country

12. Can we install glass with glue?

a. no

b. yes, in special typologies

c. yes

d. it depends on the client

13. Can we place adhesive panels on the sash?

a. no

b. yes

c. it depends on the low

d. yes in special typologies

14. What does quality control and management systems help with?

a. to achieve good price of the product

b. to achieve good circumstances of labour

c. to achieve quality of the product

d. to achieve lower taxes

15. What is the different between quality assurance and quality control?

a. It is the same

b. control refers to inspections, measurements and tests, while assurance ensures that the control have been completed

c. control refers to products, while assurance refers to accounting

d. control refers to production, while assurance refers to staff

16. What does PDCA stands for?

a.. Pay- Do- Check - Act

b. Plan -Do - Close - Act

c. Place -Do - Check - Act

d. Plan -Do - Check - Act

17. How many systems of assessment should the manufacturer follow for the declaration of performance of the construction products essential characteristics?

a. 3

b. 4

c. 5

d. 6

18. What does a company at least need to define regarding production?

a. the head of the commercial department

b. the head of the Factory Production Control

c. the head of the maintenance department

d. the head of the accounting department

19. What is at the top of a Quality System according to ISO 9001 pyramid?

a. production control

b. quality policy

c. personnel duties

d. measuring equipment

20. What is the first action in the series of the quality cycle?

a. check

b. do

c. plan

d. act

21. How many systems of assessment and verification of constancy of performance exists, according to Regulation 305/2011?

a. 2

b. 3

c. 4

d. 5

22. Does the information related to safety facilities also include other facilities except for the equipment?

a. yes, for the equipment

b. yes, but only for transportation

c. yes, but only for the production

d. yes, it includes welfare facilities

23. How many steps of monitoring programming are there?

a. 2

b. 3

c. 4

d. 5

24. What is the purpose of quality management systems according to the ISO 9001 standard?

a. to make companies adopt the processes of continuous improvement

b. to minimize the cost of the products

c. to have better salaries

d. to have less labour

25. What is the major purpose of project management?
    a. to be strict with subordinates
    b. to align and motivate people
    c. to be polite to the management
    d. to be polite to the clients

26. What are the main steps of programming monitoring?
    a. scope
    b. budget
    c. schedule progress
    d. schedule progress, budget, scope

27. Why should works be recorded?
    a. it is mandatory
    b. to have statistics for each task
    c. to know the time of production
    d. to know the performance of workers

2.4 Learning Module 4 Evaluation Questions

Low Difficulty Questions

1. Why accurate cost information is needed?
    a. Is mandatory by law
    b. For make the payment of staff
    c. For manage our suppliers
    d. To be the basis for pricing decision

2. What are Eurocodes?
    a. They are the Europe-wide standards for all aspects of the structural design and development of buildings.
    b. They are laws of Europe
    c. Code for introduction to European legislation
    d. Production laws

3. What is the reason we use stainless steel screws for connection to aluminium?
    a. For beauty
    b. For safety
    c. The law stipulates it
    d. Aluminium does not oxidise

4. What gases can we use to weld and cut metals?
   a. With oxygen-acetylene / propane flame
   b. With oxygen
   c. Argon
   d. Methane

5. What changes on the device for cutting or welding?
   a. The valve
   b. The handle
   c. Pressure
   d. The power hose

6. Are there different types of covered electrode coverage?
   a. No
   b. Yes, they are.
   c. Only for the steel
   d. Only for the copper

7. What does the number in the name that characterizes a bolt mean?
   a. The size
   b. The length
   c. The colour
   d. The diameter

8. What could happen when two different metal parts meet each other?
   a. Temperature
   b. Corrosion
   c. Colour change
   d. Expansion

9. Besides CE marking on metal products other than FPS and declaration of conformity, what other document is needed?
   a. Nothing
   b. Welding certification
   c. Authorized
   d. 5 years of experience certificate

Medium Difficulty Questions

1. Why a suitable is tool required for each type of profile?
   a. Because there are many different profiles in dimension and shape.
   b. To spend less time
   c. It is mandatory from the procedures
   d. It costs less in the company

2. How does recording production time help us with different tasks?
   a. To pay the staff
   b. To pay the suppliers
   c. To know the kind of products
   d. We can plan production and cost the product

3. Does the CE apply to accessories or finished products?
   a. Only for finished products
   b. Only for accessories
   c. For both
   d. For neither

4. Which of the T.I.G., M.I.G. and M.A.G., electrodes are ideal for small thickness welding?
   a. M.I.G.
   b. M.A.G.
   c. Electrodes
   d. T.I.G

5. What do the 3 numbers on an electrode package indicate?
   a. Tensile strength, temperature, and extension
   b. Diameter, impact, and extension
   c. Diameter, impact, and length
   d. Tensile strength, impact, and extension

6. Does temperature affect the construction?
   a. Yes, the colour changes
   b. Must use different profiles
   c. Yes, it creates contraction-expansion.
   d. Need to use large profiles

7. What does oxygen help in gases?
   a. Is moor easy
   b. In combustion
   c. The welding makes less time
   d. Is moor safety

8. Do heterogeneous welds have the same welding temperature?
   a. Yes
   b. Some time
   c. Depend from the kind of welding
   d. No, they have different one

9. How do we remove the coating and adhesion of foreign materials for a perfectly welded surface?
   a. With the angle grinder
   b. With the special belts (straps)
   c. With sandblasting
   d. With oxygen

10. How can we understand leakage from propane?
    a. From the smell
    b. From the colour
    c. From the noise
    d. From the valve

High Difficulty Questions

1. Why is the traditional costing technique so inaccurate?
   a. It does not count labour
   b. because there is no actual relationship between the cost pool and the cost driver
   c. It does not calculate the overhead
   d. It does not calculate the fixed costs

2. Is cost the same whether it is calculated it with a classic method or another one?
   a. Yew is the same
   b. No, it's different
   c. Depends on the product
   d. Depends on the production

3. What does the weld density depend on?
   a. Thickness of profile and diameter of electrode.
   b. The colour of the profile
   c. The moment that make the weld
   d. Temperature

4. How many categories of bolts materials are there?
   a. 5
   b. 3
   c. 2
   d. 8

5. What does the first letter in the decimal number that defines materials' categories of bolts mean?
   a. The diameter
   b. The length
   c. The size
   d. Multiplying by 10 the leakage force

6. Are all electrodes suitable for welding in vertical direction?
   a. Yes
   b. Depends on the quality of material
   c. Depends on the thickness of material
   d. No there are special electrodes

2.5 Learning Module 5 Evaluation Questions

Low Difficulty Questions

1. Who is responsible for the installation?
   a. the fabricator
   b. the client
   c. the architect
   d. the contractor

2. What are the consequences of incomplete placement?
   a. it is not aesthetically pleasing
   b. it costs less
   c. it has a problem with the threshold
   d. it cancels the certification categories and hence the quality of the frame

3. What are non shielded windows?
   a. windows with not visible sash
   b. windows not protected by a balcony or recess in the building
   c. windows with not visible frame
   d. windows with not visible handle

4. What is a blower doors test?
   a. a test for small windows
   b. a test for main doors
   c. a test for installed windows measuring the air permeability between frame and wall
   d. a test for installed windows measuring the air permeability between frame and sash

5. Why do frames need to be installed on site appropriately?
   a. in order not to hinder the movement of employees
   b. for employees and attendees safety
   c. to protect from the sun
   d. to protect from the rain

6. What is the main principle for shimming a frame?
   a. to transfer the loads in the masonry at points absorbing the load via the frame without deforming it
   b. to be horizontal to the frame
   c. to transfer the loads in the sash
   d. to place the anchors

7. Why is it necessary to have a lot of pads in doors threshold?
   a. for levelling the frame
   b. for the best operation
   c. for floor finishing
   d. because there are a lot of loads when there is traffic

8. On how many sides can a frame be attached to a wall?
   a. 2, 3, 4
   b. 3
   c. 4
   d. 2, 4

9. Why should sealing and insulation materials have elasticity?
   a. to absorb their weight
   b. to absorb the expansion - contraction of masonry
   c. for earthquakes protection
   d. for easier fastening

10. What is the property of foam?
   a. to watertight
   b. to fasten the frame
   c. to work as base for the plaster
   d. to insulate the window

11. Why should we explain the operation & maintenance of a window to the customer?
   a. to get paid
   b. to get more money
   c. for advertising reasons
   d. to avoid problems with mishandling

12. Why should we explain the technical characteristics of a frames to the customer?
   a. to avoid problems with mishandling
   b. to handle the mechanisms appropriately
   c. to understand the limits of the frames technical possibilities
   d. to earn more money

Medium Difficulty Questions

1. What does affect the different position of the window on a wall?
   a. thermal insulation and waterproofing
   b. more installation times
   c. the cost of consumable
   d. aesthetics

2. What is the basic principle of frame shimming in the sliding?
   a. shimming the guide, where the sashes rollers are when it is closed
   b. shimming the guide on the edges
   c. shimming every 200 cm
   d. shimming every 500 cm

3. At which points of the frame do we screw for wall installation?
   a. as it suits us
   b. in the corners on both sides
   c. in the traverses on both sides
   d. in the places where there are columns, traverses and in the corners

4. What should be the minimum distance between the mounting brackets?
   a. there is a table for each type of fenestration.
   b. every 200 cm
   c. every 400 cm
   d. every 400 cm

5. How many categories of plugs are there?
   a. 4
   b. 5
   c. 9
   d. 10

6. On what does the appropriate length of an anchor depend on?
   a. on the type of fenestration
   b. on the type of the fenestration's material
   c. on the type of the masonry
   d. on the type of the screw

7. How should we place the screw in perforated bricks?
   a. the screw should penetrate at least 2 holes vertically or laterally
   b. as it is easier
   c. 10 cm in depth
   d. 20 cm in depth

8. Why don't we screw on the edge of a wall?
   a. support is not stable
   b. the wall may crack due to the expansion of the plug
   c. it is prohibited by law
   d. it is not right for the frame

9. What do we achieve with perfect sealing?
   a. no temperature leaks
   b. no thermal bridges
   c. no external noise
   d. make the perimeter of the frame with the wall nice

10. On what does the depth of application of the sealing material depend on?
    a. the kind of typology
    b. the weight of the fenestration
    c. the gaps between frame and masonry
    d. the kind of masonry

11. What should we do to avoid condensation?
    a. avoid air intrusion and stay in the space between the window and the masonry
    b. have special glass the fenestration
    c. have special hardware
    d. make good fastening

12. Apart from foam, what other insulating materials can we use?
    a. silicon
    b. self-adhesive tape before installing
    c. sealing membranes (films)
    d. pvc membranes

13. How many types of sealing membranes (films) are there?
    a. sealing in air, water, and air/water
    b. sealing in air
    c. sealing in water
    d. sealing in air/water

High Difficulty Questions

1. What is the first step in uninstalling frames?
    a. unscrew the screws of frame
    b. cutting the frame in two opposite sides at 45 degrees
    c. cut the frame into small pieces
    d. cut the mounting brackets

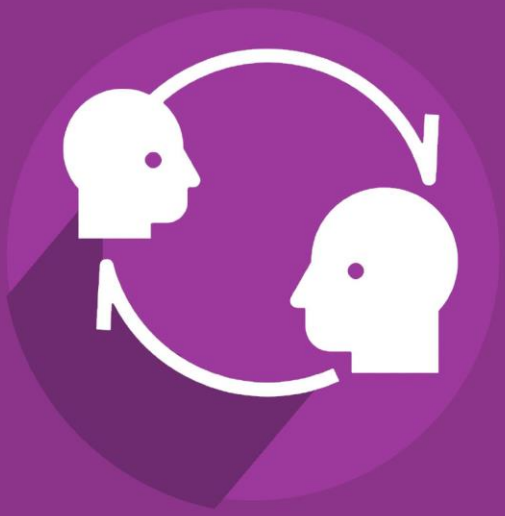
2. What is the recommended solution for fastening the threshold?
    a. To put only silicon
    b. To screw only at both ends
    c. To use brackets in order to no drilling
    d. To screw every 200 cm

3. On what does the appropriate diameter of an anchor depend on?
   a. on the type of the masonry
   b. on the typology
   c. on the dimension of the fenestration
   d. on the load

4. On what does the number of anchors to be used in an installation depend on?
   a. on the architect will
   b. it is the sum of the minimum necessary and those related to the dimensions
   c. as many as the client wants
   d. as many as per 500 cm

5. What materials are elastic?
   a. materials that no deformation remains and returns to the original form more than 40%
   b. gaskets
   c. silicon
   d. accessories

6. When do we use self-adhesive tapes?
   a. after shimming
   b. before installing a window
   c. when the installation is complete
   d. before cleaning



Examination / Evaluation Mechanism

PRACTICE SCENARIOS

3 PRACTICE SCENARIOS

3.1 Scenario 1 - Fenestration installation

Exams duration: **2 hours** (120 minutes)

Assessment criteria : 1. Correct use of Personal Protective Equipment-PPE (5 credits)

2. Effective and skilled use of equipment and materials (10 credits)
3. Ability to interpret architectural drawings/blueprints to identify the position and the fenestration typology (15 credits)
4. Ability to understand the technical manuals for installation of various structural components (20 credits)
5. Precise & correct follow of installation process steps (40 credits)
6. Quality control of the installed fenestration – Final deliver process to the customer (10 credits)

Pass Mark : ≥ 60 credits

The examinee shall carry out the following:

- Put on the PPEs
- Identify and check the required equipment to carry out the process steps
- Interpret the architectural drawing and identify the position and the fenestration typology
- Understand the correct positioning with regard to the structural unit, and to precisely use the materials, the accessories and the consumables as they are described in the installation technical manuals
- Carry out precisely and correct the installation process steps
- Carry out the quality control of the installed fenestration, to demonstrates the final product, to hand over the pertaining certifications, guarantee papers, and to explain the good maintenance and cleaning practices.

1. **Correct use of Personal Protective Equipment-PPE (5 credits in total)**
    a. Protective eyeglasses (1 credit)
    b. Protective gloves (1 credit)
    c. Protective helmet (0,5 credit)
    d. Straps (0,5 credit)
    e. Protective work suit (1 credit)
    f. Protective shoes/steel-toe boots (1 credits)

    Instructions for the examiner: In case the examinee does not have one of the above PPEs, then the respective credits shall be subtracted from the total credits.
    The examinee shall be checked before starting the upcoming steps. In case he/she lack one or more the Lab manager shall provide him/her with the ones missing.

2. **Tools (10 credits in total)**
    a. Level
    b. Laser level
    c. Tool belt
    d. Battery screwdriver
    e. Battery driller
    f. Hammer/screwdriver/allen keys

    Instructions for the examiner: The examinee shall collect all of the above-mentioned tools from the Lab shelf in order to carry out the installation process given below in point 5. In case he/she misses some tools, 1.5 credits shall be subtracted for each tool.

3. **Ability to interpret architectural drawings/blueprints to identify the position and the fenestration typology (15 credits in total)**

    An architectural drawing including five (5) fenestrations is given to the examinee. He/she shall write down a list of these fenestrations, describing the typology and the dimensions for each one given in the drawing. He/she shall also select the precise position of the fenestration on the wall, in order to minimize the thermal bridging (15 credits).

    Instructions for the examiner: If the examinee does't recognize the correct typology, dimensions of the fenestration, or position to avoid thermal bridging, then three (3) credits per fenestration shall be subtracted. If he/she recognizes the typology and the dimensions, with wrong position selection in the wall, 1.5 credits shall be subtracted.

4. **Ability to understand the technical manuals for installation of various structural components (20 credits in total)**

A double walling system with insulation in between, a thermal insulation fenestration and a technical manual are handed to the examinee. He/she shall select the correct position for installation on the structural unit, along with the necessary materials (sealants etc) in order to achieve the best thermal insulation performance. As a given to the examinee, is the information that the inner wall face will be painted, while the outer wall face will be exposed to the sun illumination. (20 credits)

Instructions for the examiner: In case the examinee selects a position in which the thermal insulation is not optimized or in case he/she uses unsuitable materials then 10 credits shall be subtracted.

5. **Precise and correct follow the process steps for installation (40 credits in total)**

i. The examinee shall put in order the following installation process steps (**15 credits**):
   a. Window leveling
   b. Thermal insulation
   c. Window fixation
   d. Wind permeation insulation internally
   e. Functioning /operation check
   f. Secure placement of products on site
   g. Water permeation insulation externally
   h. Window shimming
   i. Final delivery to the customer
   j. Cleaning

   Instructions for the examiner: The examinee shall put in correct order the above-mentioned process steps (answer: f, a, h, c, b, d, g, e, j, i). In case he/she makes mistakes, 1.5 credit shall be subtracted for each mistake.

ii. The examinees shall follow the installation process steps, correctly using the suitable materials, the accessories, and the consumables. The examiner shall indicate two of the above-mentioned steps and the examinee shall identify the necessary materials and consumables, in order to apply these steps so as to attain an optimized final product **(25 credits)**.

Instructions for the examiner: In case the examinee fails in more than two (2) tasks per step then 12.5 credit shall be subtracted.

6. **Quality control of the installed fenestration – Final deliver process to the customer (10 credits in total)**

   The examinee shall check the openings between adapter frame and the sashes for correct fitting and check the good operation of the sashes. **(5 credits)**.

   The examinee shall deliver the installed fenestration to the examiners, hand over the pertaining certifications, guarantees etc. and also demonstrate the good operation procedures and the cleaning instructions. **(5 credits)**.

   Instructions for the examiner: In case the examinee fails to demonstrate the functioning/operation of the fenestration or to hand over the pertaining certifications etc., 2.5 credits shall be subtracted.

3.2 Scenario 2 - Cutting and processing of profiles

Exams duration: **2 hours** (120 minutes)

Assessment criteria :
1. Correct use of Personal Protective Equipment-PPE (5 credits)
2. Calculation of the required amount of materials & final cutting lengths (25 credits)
3. Ability to skillful use of the related equipment and materials (10 credits)
4. Profile cutting and quality control (30 credits)
5. Machining processes (30 credits)

Pass Mark : ≥ 60 credits

The examinee shall carry out the following:

- Put on the PPEs
- Make correct calculations for the required profile amount and cutting lengths, given the final product dimensions, based on the instructions given in the system technical manual
- Identify, select and check the required equipment to complete the tasks assigned
- Carry over the cuttings and check them
- Carry over all necessary machining processes in accordance with the system technical manual in order to meet the requirements for the specific final product

1. **Correct use of Personal Protective Equipment-PPE (5 credits in total)**
    a. Protective eyeglasses (1 credit)
    b. Protective gloves (1 credit)
    c. Protective work suit (1 credit)
    d. Protective shoes/steel-toe boots (1 credit)
    e. Protective earmuffs/ear plugs (1 credit)

    Instructions for the examiner: In case the examinee does not have one of the above PPEs, then the respective credits shall be subtracted from the total credits.
    The examinee shall be checked before starting the upcoming steps. In case he/she lack one or more the Lab manager shall provide him/her with the ones missing.

2. **Calculation of the required amount of materials & final cutting lengths (25 credits in total)**
    The final dimensions are given to the examinee for a particular fenestration type (e.g. double opening window with camera europea mechanism), along with a calculator and the system technical manual. The examinee shall make all necessary calculations, as described below:
        a. The examinee shall calculate the necessary amount of materials/profiles **(5 credits)**
        b. Then, the examinee shall calculate the cutting lengths. No deviations are allowed in the cutting lengths **(20 credits)**

    Instructions for the examiner: In case the examinee makes incorrect calculation on the required amount of materials then five (5) credits shall be subtracted. In cases the examinee makes incorrect calculations on the cutting lengths then he/she fails the exams, and the exams are finalized.

3. **Ability to skillful use of the related equipment & materials (10 credits in total)**
    a. Cutting-off machine
    b. Punching machine
    c. Machining machine
    d. Drilling tool and bits

    Instructions for the examiner: The examinee shall report the required equipment to enable him/her to carry over the assigned tasks for cutting and machining given below in points 4 and 5. In case he/she does not include one or more of the necessary equipment then 2.5 credits per tool/equipment shall be subtracted.

4. Profile cutting and quality control (30 credits in total)

The examinee shall check the profiles before the machining (bending, scratches, blisters etc). Only the profiles conforming the pertaining quality provisions shall proceed for further processing. **(10 credits)**

The examinee shall then set the cutting-off machine operation parameters and then she/he carries out the cuts, in accordance with the health and safety provisions **(10 credits).**

In the next stage she/he shall check the dimensions after the cutting, along with the cutting edge. The final dimensions shall be exactly as the ones calculated before **(10 credits)**.

Instructions for the examiner: In case the examinee does not recognize any non-conformity, as described above, then 5 credits shall be subtracted. The maximum deviation in the dimensions of the final cut profiles is 0.5 mm. In case this limit is crossed then the exam is finalized, and she/he fails the exams.

5. Machining processes (30 credits in total)

The examinee shall machine the profiles after cutting, by drilling the drainage openings in frame and sash profiles, in accordance with the system technical manual. The drainage openings shall be drilled in the correct position and with the correct dimension **(15 credits)**.

The examinee shall machine the profiles by perforating openings for the sash handle. These openings shall be drilled on the correct position and with the correct dimensions **(15 credits).**

The system technical manual shall be provided to the examinee before the exams.

Instructions for the examiner: In case the examinee does not drill the profile's drainage openings or the sash handle openings, on the correct position or in case these openings are not dimensional correct then 7.5 credits per case shall be subtracted.

3.3 Scenario 3 - Assembling profiles

Exams duration: **2 hours** (120 minutes)

Assessment criteria : 1. Correct use of Personal Protective Equipment-PPE (5 credits)
2. Effective and skilled use of equipment and materials (10 credits)
3. Ability to understand the technical manuals (35credits)
4. Correct follow of the process steps for assembly (40 credits)
5. Quality control – functioning (10 credits)

Pass Mark : ≥ 60 credits

The examinee shall carry out the following:

- Put on the PPEs
- Identify the necessary equipment to carry out the process steps
- Identify and correctly use the suitable materials and accessories as described in the respective technical manual
- Carry out the process steps for assembling in accordance with the respective technical manual
- Carry out quality control

1. Correct use of Personal Protective Equipment-PPE (5 credits in total)

a. Protective eye glasses (1 credit)

b. Protective gloves (1 credit)

c. Protective work suit (1 credit)

d. Protective shoes/steel-toe boots (2 credits)

Instructions for the examiner: In case the examinee does not have one of the above PPEs, then the respective credits shall be subtracted from the total credits.
The examinee shall be checked before starting the upcoming steps. In case he/she lacks one or more, the Lab manager shall provide him/her with the ones missing.

2. Effective and skilled use of equipment and materials (10 credits in total)

a. Trolley to help transfer the assembled parts (2 credits)

b. Bench for assembling the frames (2 credits)

c. Corner crimping machine (2 credits)

d. Trolley for frames transport (2 credits)

e. Assembly bench (2 credits)

Instructions for the examiner: The examinee shall report the necessary equipment in order to carry out the process steps, as analyzed below on paragraph 4 and 5. In case he/she does not report one or more necessary equipment then the respective credits shall be subtracted.

3. Ability to understand the technical manuals (35 credits in total)

Detailed dimensions of one type of window shall be provided to the examinee (e.g. double opening window with camera europea mechanism), along with the respective technical manual. The examinee shall identify the necessary equipment, materials and consumables for each process step.

Deviations greater than 10% are not allowed for the materials and accessories needed to assembly the final product.

Instructions for the examiner: In case the examinee does not predict/calculate correct the necessary materials, accessories etc for the final product, within the 10% deviations reported above, then the exams are finalized and the examinee is failed. In case the materials and accessories predictions/calculations are within the acceptance limits, but there are deviations in more than two steps then 17.5 credits shall be subtracted.

4. Correct follow of the process steps for assembly (40 credits in total)

i. The assembly steps will then be provided to the examinee, which he/she will have to identify and then put in the correct order, so as to create only the window's frame and the two sashes. **(15 credits)**.

Specifically:

a. Fitting of the suitable gaskets on the profiles
b. Installation of the mechanisms/accessories
c. Sealing the profile's joints
d. Crimping corners fitting in the profiles
e. Quality control
f. Installation of plug on the adapter frame
g. Assembly of adapter frame on the sash
h. Functioning test for the mechanism
i. Special crimping glue placement in the profile chamber
j. Profiles joint by using a corner crimping machine
k. Glazing installation
l. Final assembly of sashes with the frame

Instructions for the examiner: The examinee shall select 4 of the above mentioned steps in order to construct the window's frame and the two sashes, and then to place them in the correct order (correct: c, i, d k). In case the examinee fails to select the 4 correct steps, then he/she fails and the exams are finalized. In case he/she select the correct ones buts install them in incorrect order then 3.75 credits shall be subtracted for each incorrect step.

ii. Follow the 4 steps out of 12 (c, i, d k). The examinee shall follow in practice all assembly steps, by selecting the suitable profiles, accessories and **consumables (25 credits)**. The examinee is allowed to fail on one step maximum.

Instuctions for the examiner: In case the examinee fails on more than one steps, then he/she fails and the exams are finalized. In case the examinee fails on one step, then then 12.5 credits shall be subtracted.

5. Quality control (10 credits in total)

The examinee shall check the leveling of the edges of the frames and their finishing with respect to remaining sealants. (10 credits).

Instructions for the examiner: In case the examinee does not identify problems or malfunctions, while these exist, then 5 credits shall be subtracted.

3.4 Scenario 4 - Window assembling

Exams duration: **2 hours** (120 minutes)

Assessment criteria : 1. Correct use of Personal Protective Equipment-PPE (5 credits)
2. Effective and skilled use of equipment and materials (10 credits)
3. Ability to understand the technical manuals (25credits)
4. Correct follow of the process steps for assembly (50 credits)
5. Quality control – functioning testing (10 credits)

Pass Mark : ≥ 60 credits

The examinee shall carry out the following:

- Put on the PPEs
- Identify the necessary equipment to carry out the process steps
- Identify and correctly use the suitable materials and accessories as described in the respective technical manual
- Carry out the process steps for assembling in accordance with the respective technical manual
- Carry out quality control

1. Correct use of Personal Protective Equipment-PPE (5 credits in total)

a. Protective eyeglasses (1 credit)
b. Protective gloves (1 credit)
c. Protective work suit (1 credit)
d. Protective shoes/steel-toe boots (2 credits)

Instructions for the examiner: In case the examinee does not have one of the above PPEs, then the respective credits shall be subtracted from the total credits.
The examinee shall be checked before starting the upcoming steps. In case he/she lack one or more the Lab manager shall provide him/her with the ones missing.

2. Effective and skilled use of equipment and materials (10 credits in total)

a. Trolley to help transfer the assembled parts (2 credits)

b. Bench for assembling the frames (2 credits)

c. Window assembly bench (2 credits)

d. Battery screwdriver (2 credits)

e. Caliper (2 credits)

Instructions for the examiner: The examinee shall report the necessary equipment in order to carry out the process steps, as analyzed below on paragraph 4 and 5. In case he/she does not report one or more necessary equipment, the respective credits shall be subtracted.

3. Ability to understand the technical manuals (25 credits in total)

Detailed dimensions of one type of window shall be provided to the examinee (e.g. double opening window with camera europea mechanism), along with the window's frame, the 2 sashes, the rest of the profiles (adapter frame, glazing beads) and the respective technical manual. The examinee shall identify the necessary equipment, materials and consumables for each process step.

Deviations greater than 10% are not allowed for the materials and accessories needed to assembly the final product.

Instructions for the examiner: In case the examinee does not predict/calculate correct the necessary materials, accessories etc for the final product, within the 10% deviations reported above, then the exams are finalized, and the examinee is failed. In case the materials and accessories predictions/calculations are within the acceptance limits, but there are deviations in more than two steps, 12.5 credits shall be subtracted.

4. Correct follow of the process steps for assembly (50 credits in total)

i. The assembly steps will then be provided to the examinee, which he/she will have to identify and then put in the correct order, so as to finalize the fenestration, with the window's frame and the two sashes in place, along with the adapter frame and glazing beads **(15 credits)**.

Specifically:

a. Fitting of the suitable gaskets on the profiles
b. Installation of the mechanisms/accessories
c. Quality control
d. Installation of plug on the adapter frame
e. Assembly of adapter frame on the sash
f. Operation check
g. Glazing installation
h. Final assembly of sashes with the frame

Instructions for the examiner: The examinee shall place the above-mentioned steps in the correct order (correct: a, e, d, b, f, g, h, c). In case he/she selects the correct ones buts install them in an incorrect order, 1.875 credits shall be subtracted for each incorrect step.

ii. The examinee shall follow in practice all assembly steps, by selecting the suitable profiles, accessories, and consumables **(35 credits)**. The examinee is allowed to fail in one step maximum.

Instructions for the examiner: In case the examinee fails on more than one steps, then he/she fails and the exams are finalized. In case the examinee fails on one step, 17.5 credits shall be subtracted.

5. Quality control – Operation check (10 credits in total)

i. **The examinee shall check the operational integrity of the fenestration, to check** whether it opens/closes smoothly, if the tilt and turn mechanism works properly etc. (5 credits).

ii. The examinee shall measure and check if the space between the sash and the adapter frame comply with the technical manual requirements (max deviations shall be ±1mm). (5 credits).

Instructions for the examiner: In case the examinee does not recognize non-conformities existing, as identified by the examiner, or malfunctions in the operation, or in the space between the sash and the adapter frame, 5 credits shall be subtracted.

3.5 Scenario 5 - Cutting and processing of profiles

Exams duration: **2 hours** (120 minutes)

Assessment criteria : 1. Correct use of Personal Protective Equipment-PPE (5 credits)
2. Calculation of the required amount of materials and the final cutting lengths (25 credits)
3. Ability to skillful use of the related equipment and materials (10 credits)
4. Profile cutting and quality control (30 credits)
5. Machining processes (30 credits)

Pass Mark : ≥ 60 credits

The examinee shall carry out the following:

- Put on the PPEs
- Make correct calculations for the required profile amount and cutting lengths, final product dimensions, based on the instructions given in the system technical manual
- Identify, select and check the required equipment to complete the tasks assigned
- Carry over the cuttings and check them
- Carry over all necessary machining processes in accordance with the system technical manual in order to meet the requirements for the specific final product

1. Correct use of Personal Protective Equipment-PPE (5 credits in total)

a. Protective eyeglasses (1 credit)
b. Protective gloves (1 credit)
c. Protective work suit (1 credit)
d. Protective shoes/steel-toe boots (1 credit)
e. Protective earmuffs/ear plugs (1 credit)

Instructions for the examiner: In case the examinee does not have one of the above PPEs, then the respective credits shall be subtracted from the total credits.
The examinee shall be checked before starting the upcoming steps. In case he/she lacks one or more, the Lab manager shall provide him/her with the ones missing.

2. Calculation of the required amount of materials and the final cutting lengths (25 credits in total)

The final dimensions are given to the examinee for a particular fenestration type (e.g. double lift and slide window), along with a calculator and the system technical manual. The examinee shall make all necessary calculations, as described below.

The examinee shall calculate the necessary amount of materials/profiles (5 credits)

Then, the examinee shall calculate the cutting lengths. No deviations are allowed in the cutting lengths (20 credits).

Instructions for the examiner: In case the examinee makes incorrect calculation on the required amount of materials, five (5) credits shall be subtracted. In case the examinee makes incorrect calculations on the cutting lengths, he/she fails the total examination.

3. Ability to skillful use of the related equipment and materials (10 credits in total)

a. Cutting-off machine

b. Punching machine

c. Machining machine

d. Drilling tool and bits

Instructions for the examiner: The examinee shall report the required equipment to enable him/her to carry over the assigned tasks for cutting and machining given below in points 4 and 5. In case he/she does not include one or more of the necessary equipment, 2.5 credits per tool/equipment shall be subtracted.

4. Profile cutting and quality control (30 credits in total)

i. The examinee shall check the profiles before the machining (bending, scratches, blisters etc). Only the profiles conforming the pertaining quality provisions shall proceed for further processing **(10 credits)**.

ii. The examinee shall then set the cutting-off machine operation parameters and then she/he carries out the cuts, in accordance with the health and safety provisions **(10 credits)**.

iii. In the next stage she/he shall check the dimensions after the cutting, along with the cutting edge. The final dimensions shall be exactly as the ones calculated before **(10 credits)**.

Instructions for the examiner: In case the examinee does not recognize any non-conformity, as described above, 5 credits shall be subtracted. The maximum deviation in the dimensions of the final cut profiles is 0.5 mm. In case this limit is crossed, the examination is finalized and she/he fails.

5. Machining processes (30 credits in total)

i. The examinee shall machine the profiles after cutting, by drilling the drainage openings in guiderail and sash profiles, in accordance with the system technical manual. The drainage openings shall be drilled in the correct position and with the correct dimension **(15 credits)**.

ii. The examinee shall machine the profiles by perforating openings for the sash handle. These openings shall be drilled on the correct position and with the correct dimensions **(15 credits)**.

The system technical manual shall be provided to the examinee before the exams.

Instructions for the examiner: In case the examinee does not drill the profile's drainage openings or the sash handle openings, on the correct position or in case these openings are not dimensional correct, 7.5 credits per case shall be subtracted.

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