HEDEF Platform

PRODUCTION PROCESSES

The ten-step production flow followed in steel platform grating manufacture, from quotation to dispatch, with its control points and quality records.

STRENGTH STARTS AT THE GROUND

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HDF-PP-026001

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SCOPE
Twisted square bar · Half press-locked
Fully press-locked systems

PREPARED BY
Hedef Platform Izgara Metal San. ve Tic. Ltd. Şti.

SECTION 01

PURPOSE AND SCOPE

This document defines the steps by which steel platform grating and stair treads are manufactured at HEDEF Platform Izgara facilities, from quotation to dispatch. The input, output, control point and record of each step are stated individually.

It was written for two groups of readers. For clients and project teams it shows which checks the product passes through; for our production and quality units it shows in what order and against which criteria the work is carried out.

PRODUCT GROUPS COVERED

Twisted square bar, half press-locked and fully press-locked systems; the grating, notched grating, stair tread and notched stair tread types of these systems. Black (uncoated) and hot-dip galvanized delivery options are within scope.

OUT OF SCOPE

Installation and site work, load-bearing steel structure fabrication, paint and powder coating applications are out of scope.

TERMS

Bearing bar	The vertical bar that carries the load, running perpendicular to the span. The main element that determines the load capacity of the grating.
Cross bar	The transverse element connecting the bearing bars. A twisted square bar in the twisted square bar system, a flat bar in press-locked systems.
Mesh size	The clear spacing between bearing and cross bar axes (e.g. 30 × 100 mm).
Slot	The opening cut into the bearing bar to seat the cross bar. Cut in the same operation as cutting to length (**P5**); its position sets the mesh size, its depth sets the seating level of the cross bar.
Black product	A finished product that has not been galvanized.
Mitre cut	An angled cut made to fit the grating to angled or out-of-square edges.
Press-locking	Seating the cross bar in the slot cut into the bearing bar and locking it in a press.
Gas metal arc welding	Arc welding with a wire electrode under shielding gas (MAG / EN ISO 4063 – 135).

SECTION 02

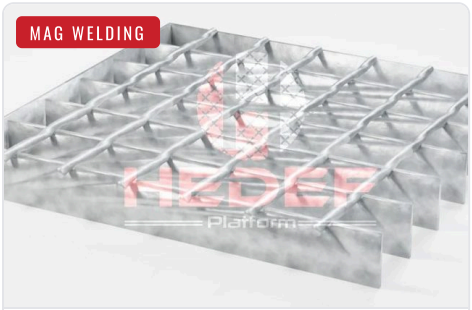
CONTENTS

Document owner: Production and Quality Department. This document defines the production flow as at its issue date; the current version is published by HEDEF Platform Izgara.

SECTION 03

OUR PRODUCTION SYSTEMS

We manufacture three systems. The difference between them is **which cross bar** joins the bearing bars and **by which method**. This choice directly determines the load behaviour, open area ratio and cost of the grating; which system is used is settled at the quotation stage, based on the specification and the load calculation.



TWISTED SQUARE BAR

CROSS BAR: TWISTED SQUARE BAR

A twisted square-section bar is seated in the slot cut into the bearing bar; the top of the bar sits **flush** with the top of the bearing bar and every intersection is joined by gas metal arc welding. The top surface stays flat. This is the system we use most: high open area ratio, light and economical.

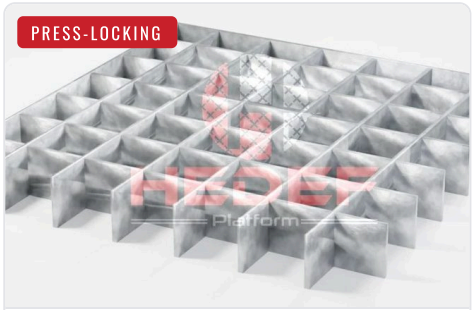
Joining	MAG welding
Cross bar	Twisted square bar
Top surface	Bar flush with bearing bar
Typical use	Platform, walkway

HALF PRESS-LOCKED

CROSS BAR: FLAT BAR

The cross bar seats to **half depth** in the slot cut into the bearing bar and is locked in a press; its top sits flush with the bearing bar and the lower half of the bearing bar remains continuous. As no welding is used, no heat-induced distortion occurs.

Joining	Press-locking
Cross bar	Flat bar
Top surface	Flush with bearing bar
Seating depth	Half — lower half solid



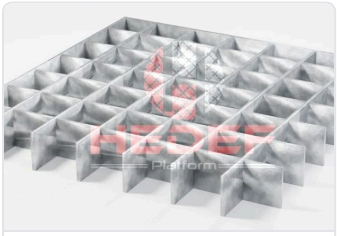
FULLY PRESS-LOCKED

CROSS BAR: FLAT BAR

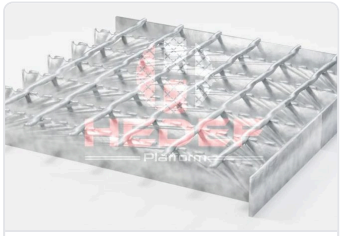
Matching notches are cut into both the bearing bar and the cross bar; the bars engage at **full depth**. Top and bottom surfaces are level. Its lattice action makes it the most rigid system, preferred for heavy loads and long spans.

Joining	Press-locking
Cross bar	Flat bar
Top surface	Flush with bearing bar
Seating depth	Full — bottom flush too

TYPES EACH SYSTEM IS MADE IN FOUR TYPES



GRATING
Standard panel



NOTCHED GRATING
Notched at the edge

STAIR TREAD
Nosing + fixing lug

NOTCHED STAIR TREAD
Suits the stair detail

MATERIAL	COATING	DIMENSIONS	REFERENCE
S235JR Structural steel · EN 10025-2 Supplied with certificate	**Hot-dip galvanizing** EN ISO 1461 or black (uncoated)	**Project-specific** Mesh size, bar section and panel size per order	**DIN 24537** For access ways EN ISO 14122-3

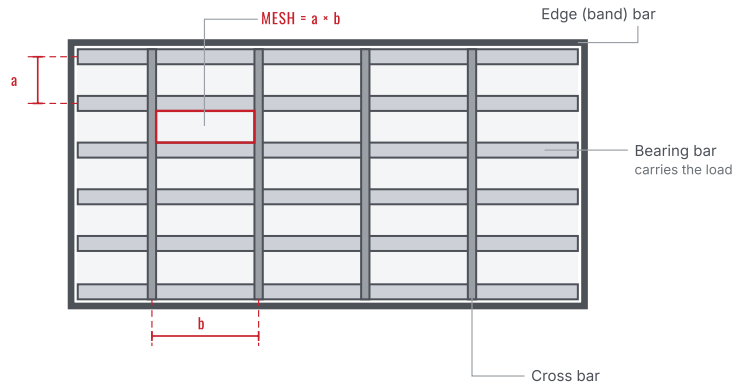
The system is selected at the quotation stage. Load class, span, mesh size and coating requirement are read from the specification; the suitable system and bar section are proposed on that basis. The process starts at **P1 — Quotation**.

SECTION 04

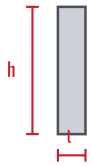
GRATING ANATOMY

What the terms used in the following sections mean. Where each element sits in a panel, where dimensions are taken from, and how the joint differs between the three systems — read this page as a reference before the production steps.

4.1 PANEL ELEMENTS AND DIMENSION DEFINITIONS — TOP VIEW



BAR SECTION



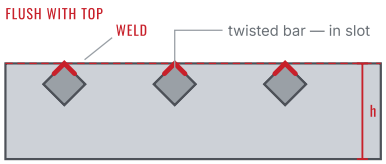
h — bar height
sets the load capacity

t — bar thickness
written h × t (e.g. 30 × 2)

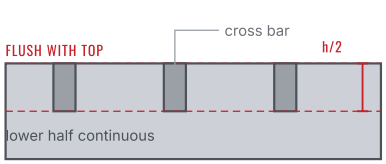
DIMENSION RULE

Mesh size is taken **axis to axis** and written as **a × b**: **a** is the bearing bar pitch, **b** the cross bar pitch. Example: **30 × 100 mm**.

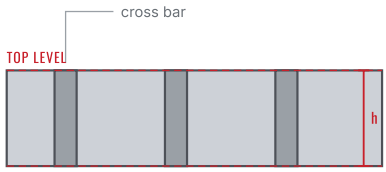
4.2 JOINT DETAIL — SECTION ALONG THE BEARING BAR



Bar seats in the slot, flush on top; welded from above.



Seats to half depth in the slot, locked in a press.



Engages at full depth; both faces level.

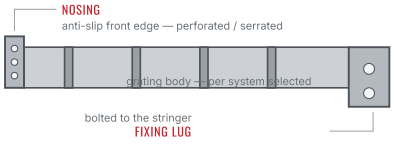
Twisted square bar — twisted bar in the slot, flush on top + MAG weld

Half press-locked — flat bar, half depth, no welding

Fully press-locked — flat bar, full depth, no welding

In all three systems the top surface is flat. The cross bar — twisted square bar or flat bar — seats in the slot and its top sits flush with the bearing bar; nothing projects above the walking surface. The systems differ in cross bar type, seating depth and joining method. The drawings are schematic and not to scale; binding dimensions are on the approved shop drawing (**P2**–**P3**).

4.3 STAIR TREAD — THE ELEMENTS THAT DIFFER FROM GRATING



EXTRA WORK ON THE STAIR TREAD

A stair tread is made by adding a **nosing** and a **fixing lug** to the grating body. Both elements are welded to the body; the lug holes are verified against a template at the **P8** inspection.

The lug hole axis directly affects installation; a deviation cannot be corrected on site.

SECTION 05

TEN-STEP PRODUCTION FLOW

Every order passes through the ten steps below in sequence. The line marked with a red dot is the check at that step where **the next step does not start without approval**. The only branch in the flow is **P9**: the product either goes to galvanizing or is prepared for dispatch black. Step details are on the following pages.

A · PROJECT

01 QUOTATION
Project and technical specification are reviewed; system, bar section and mesh size are set and the quotation is prepared.

- Is the specification complete?

02 SHOP DRAWING
Order confirmation is received; production and shop drawings, panel layouts and item numbers are prepared.

- Order confirmation received?

03 CUSTOMER APPROVAL
Drawings are submitted to the customer. If a revision comes back, the drawing is updated and resubmitted.

- No approval, no production

04 RAW MATERIAL
The bars and rods within the approved project are supplied together with their certificates.

- Mill certificate

B · PREPARATION

05 BAR CUTTING + SLOTTING
Bearing bars are cut to length on servo-driven lines; the cross bar slots are cut in the same operation.

- First article: length + slot

06 CROSS BAR PREPARATION
Cross bar material is cut to length and made ready for production.

- Length and quantity check

C · PRODUCTION

07 GRATING MANUFACTURE
The panel is made by one of two methods, **depending on the product type**. The method is defined on the shop drawing together with the system.

- Method follows the product type

METHOD — BY PRODUCT TYPE

PRESS-LOCKING
Half and fully press-locked systems. The cross bar seats in the slot and is locked in a press; there is no welding.

MAG WELDING
Twisted square bar system. The twisted bar seats in the slot, sits flush with the bearing bar and every intersection is welded from above.

D · QUALITY · SURFACE

08 BLACK PRODUCT INSPECTION
Dimensional checks, mitre cuts and surface cleaning are carried out. A nonconforming panel does not pass to the next step.

- Dimensions · squareness · surface

09 SURFACE DECISION
Depending on the order, the product is sent to hot-dip galvanizing or prepared for dispatch uncoated (black).

- Order: galvanized or black?

SURFACE — PER ORDER

GALVANIZED
Sent for hot-dip coating (EN ISO 1461). On return, the **P10** final inspection is carried out.

BLACK
No coating is applied; the product goes straight to **P10** packing.

E · DELIVERY

10 FINAL INSPECTION · PACKING · DISPATCH
The final quality control is carried out after galvanizing; products are packed, labelled and delivered to the customer ready for dispatch.

- Coating check · package · delivery note

Return paths. If a revision comes at **P3**, the flow returns to **P2**. If a nonconformity is found at **P8** or **P10**, the panel is sent back to the relevant production step; if it cannot be corrected it is scrapped and a replacement is made.

01 PROCESS — QUOTATION

Preparing the quotation from the customer project and/or technical specification

PHASE A

The process starts with the customer's project or technical specification. Product type, mesh size, bar section, panel sizes, load class and coating requirement are read from the document. If the specification has gaps, the customer is asked before the quotation is written — an ambiguity that surfaces later is costly at the drawing and production stage.

WORK CARRIED OUT

1. Project and specification are reviewed; missing or conflicting information is queried in writing.
2. Product type and system (twisted square bar / half press-locked / fully press-locked) are set.
3. Bar section and mesh size are selected from the load and span data.
4. The coating requirement (galvanized / black) is confirmed.
5. Quantities are taken off; unit and total price and the delivery time are calculated.
6. The quotation is sent to the customer with its validity period and technical assumptions.

READ FROM THE SPECIFICATION

Product type + system grating / tread · locked / twisted	**Mesh size** a × b (axis to axis)
Bar section h × t · per load and span	**Panel size** layout and item count
Load class pedestrian / vehicle / special	**Coating** galvanized / black

↓

Missing data → customer is queried, quotation held

INPUT	OUTPUT	RECORD
Customer project, technical specification, enquiry	Quotation (quantities + price + lead time)	Quotation form, correspondence

02 PROCESS — PREPARATION OF PRODUCTION AND SHOP DRAWINGS

After the order confirmation is received

PHASE A

Drawing does not start before the order is confirmed. Once confirmation is received, the assumptions in the quotation are translated into manufacturing terms: panel layouts, item numbers, cutting lengths, mitre angles and, for stair treads, lug hole axes are entered on the drawing. This drawing is the single reference for every step that follows.

WORK CARRIED OUT

1. The order confirmation and quotation acceptance are filed.
2. The layout plan is produced; panels are divided and given item numbers.
3. Bearing and cross bar cutting lengths are calculated for each item.
4. Mitred (angled) edges and their angles are defined.
5. For stair treads, the nosing and the lug hole axis are dimensioned.
6. The material list (bar / rod quantities) is produced from the drawing → input to **P4**.

PANEL LAYOUT — EXAMPLE

Each item is dimensioned separately: cutting length, bar direction, mitre angle and any hole axis.

INPUT	OUTPUT	RECORD
Order confirmation, accepted quotation	Shop drawing + material list	Drawing (with rev. no), order file

A dimension not on the drawing is not assumed in production. The approved drawing is the basis for the **P5** cutting lengths, the **P7** production method, the **P8** dimensional and mitre checks and the **P10** packing list.

NEXT → P3

The shop drawings are submitted for **customer approval**. No raw material is ordered and no cutting line is opened before approval returns — **P3** is the first hold point in this flow.

03 PROCESS — SUBMISSION OF PROJECT AND SHOP DRAWINGS FOR CUSTOMER APPROVAL

The first hold point in the flow — no approval, no production

PHASE A

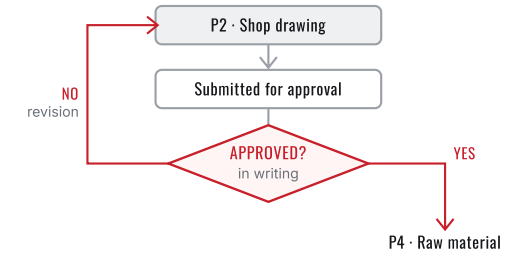
The drawings are submitted to the customer and written approval is awaited. This step is a deliberate stop: no raw material is ordered and no cutting line is opened until approval returns. The aim is to fix dimensions and details in a shared document before material is cut — a cut bar cannot be undone.

WORK CARRIED OUT

1. Drawings are sent to the customer with a revision number and date.
2. The customer's response is awaited; questions are answered in writing.
3. If a revision comes, the drawing is updated, its number raised and it is resubmitted.
4. The approved drawing is entered in the order file and released to production as the **only valid** reference.
5. If a change is requested after approval, the effect on time and cost is reported in writing.

No approval, no production. Verbal agreement does not release production; written approval on file is required. The approval date is the start of the delivery period.

APPROVAL LOOP



INPUT	OUTPUT	RECORD
Shop drawing (with rev. no)	Approved drawing — the only reference for production	Written approval, revision history

04 PROCESS — RAW MATERIAL SUPPLY

Supplying the raw material required within the approved project

PHASE A

Material is ordered against the list produced from the approved drawing. Bearing and cross bars and the twisted square bar are defined with their sections and grade. Every batch received is accepted together with its certificate; material without a certificate does not enter production.

WORK CARRIED OUT

1. The material list from the drawing (section, grade, quantity) is turned into an order.
2. Incoming material is checked against the delivery note and certificate.
3. Section and thickness are verified by measurement on a sample basis.
4. The surface is examined for deep corrosion, dents or bow.
5. Accepted material is stored with its batch data; it leaves for production on a work order.

ACCEPTANCE CRITERIA

Grade	S235JR (EN 10025-2) — with certificate
Section	h × t / bar size as stated on the drawing
Document	Mill certificate + delivery note
Surface	No deep corrosion, dents or bow

INPUT	OUTPUT	RECORD
Approved drawing, material list	Accepted raw material, batch identified	Certificate, delivery note, incoming inspection

PHASE A → PHASE B

Approved drawing and certified material are ready. The production phase starts with **P5**, cutting the bearing bars to length. From this point on, the only source of dimensions is the approved drawing.

05 PROCESS — CUTTING BEARING BARS TO LENGTH AND SLOTTING

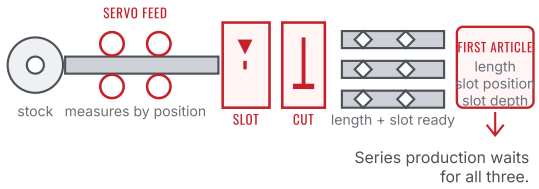
On servo-driven lines, to the required dimensions — cross bar slots are cut on the same line

PHASE B

Bearing bars are cut on **servo-driven lines** to the item lengths on the approved drawing. The servo drive ties the length setting to position control rather than to a mechanical stop: even when the same item is cut thousands of times, dimensional deviation does not accumulate.

In the **same operation** as the cut to length, the **slots** that will seat the cross bar **are also cut** — for the twisted square bar of the twisted system as well as for the cross bar of the press-locked systems. Slot position sets the mesh size (**b**) and slot depth sets the level at which the cross bar seats; the mesh size is therefore fixed **at this step**, not on the assembly line.

SERVO-DRIVEN LINE — CUT + SLOT



WORK CARRIED OUT

1. Item lengths and slot positions from the work order and approved drawing are entered into the line.
2. The bar is straightened before cutting and fed into the line.
3. Cutting to length and slotting are done on the same line.
4. A **first article** is cut; length, slot position and slot depth are verified. Series production does not start without approval.
5. Series cutting runs; intermediate dimensional checks are repeated at set intervals.
6. Cut bars are labelled with their item number and grouped; offcuts are separated.

Slot depth defines the system. In twisted square bar and fully press-locked gratings the cross bar is flush with the top; in half press-locked it stays at half depth. A depth error is prevented here, not at **P7**.

INPUT	OUTPUT	RECORD
Certified bar, approved drawing, work order	Bearing bar cut to item length with cross bar slots	First article approval (length + slot), interim check record

06 PROCESS — PREPARATION OF CROSS BAR MATERIAL

Cutting to length and completing the preparation for production

PHASE B

The cross bar depends on the system: a **twisted square bar** in the twisted product, a **flat bar** in press-locked systems. Both are cut to length for the panel width and prepared to seat in the slots cut at **P5**. Material is counted by item and delivered to the side of the production line, so that **P7** runs without waiting.

CROSS BAR AND SLOT BY SYSTEM

SYSTEM	CROSS BAR	SEATING	JOINING
Twisted square bar	Twisted square bar	**Flush with top**	MAG welding
Half press-locked	Flat bar	Half depth	Press-locking
Fully press-locked	Flat bar	Full depth	Press-locking

WORK CARRIED OUT

1. The cross bar type for the system is selected (twisted square bar / flat bar).
2. Material is cut to length for the panel width.
3. The section is compared with the slot geometry cut at **P5** — the bar must seat fully in the slot.
4. For fully press-locked gratings, matching notches are cut into the cross bar.
5. Length and quantity are verified by counting per item; material is delivered to the line with its item label.

INPUT	OUTPUT	RECORD
Twisted square bar / flat bar, approved drawing	Cross bar cut to length and counted	Length and quantity check record

PHASE B → PHASE C — Bearing and cross bar elements are ready by item. At **P7** the panel is joined by **press-locking** or **MAG welding**, depending on the product type.

07 PROCESS

MANUFACTURE OF PLATFORM GRATINGS

By press-locking or gas metal arc welding, depending on the product type

PHASE C

The joining method for a panel **follows the product type** and is defined on the approved shop drawing together with the system; it is not decided on the line. This page covers the press-locked system, the next page the gas metal arc welding method.

PRESS-LOCKING — Half press-locked · Fully press-locked — the cross bar seats in the slot and is locked in a press — THIS PAGE

MAG WELDING — Twisted square bar — the twisted bar sits in the slot, flush on top and welded — PAGE 10

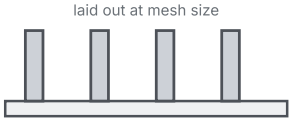
7.1 PRESS-LOCKING — STAGES

STAGE 1

SLOTTED BAR

Bearing bars cut to length with their **slots cut at P5** arrive at the line. The mesh size is already set by the slot position.

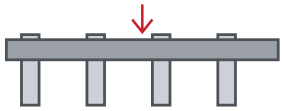
STAGE 2



LAYOUT

Bearing bars are laid out on the jig, parallel, at the mesh size on the drawing.

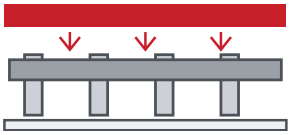
STAGE 3



INSERTION

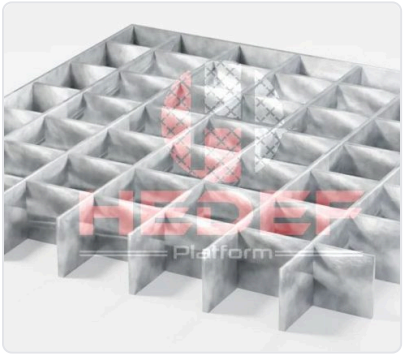
The cross bar is inserted into the slots. It goes to half depth in half press-locked and full depth in fully press-locked gratings — the slot sets the depth.

STAGE 4



PRESS

The press acts on all intersections at once; the metal locks by cold deformation. **There is no welding.**



Fully press-locked panel — the cross bars cross the bearing bar at full depth.

MONITORED ON THE LINE

1. Mesh size is verified against the jig on the first panel.
2. Is the seating depth correct for the system — in half press-locked, the lower half must stay continuous.
3. Press pressure is set to the bar section; low pressure gives a loose lock.
4. Panel corner squareness and flatness are checked.
5. The finished panel is labelled with its item number and passed to **P8**.

Joint without welding. Press-locking involves no heat input, so no thermal distortion occurs; panel flatness depends on the layout and the press setting.

INPUT
Cut bearing and cross bars, approved drawing

OUTPUT
Joined black panel (press-locked system)

RECORD
First panel approval, press setting record

P7 CONTINUES → PAGE 10

Everything so far is the **press-locked** system (half and fully press-locked). Twisted square bar products are made by **MAG welding**; that method is covered on the following page.

PRESS-LOCKING
Half press-locked · Fully press-locked — the cross bar seats in the slot and is locked in a press
PAGE 09

MAG WELDING
Twisted square bar — the twisted bar sits in the slot, flush on top and welded
THIS PAGE

7.2 GAS METAL ARC WELDING — METHOD

In the twisted square bar system the cross bar is a twisted square-section bar. The bar does not sit on top of the bearing bar; it enters the slot cut at **P5** and its top sits **flush** with the bearing bar — the walking surface stays flat and the bar does not project above it.

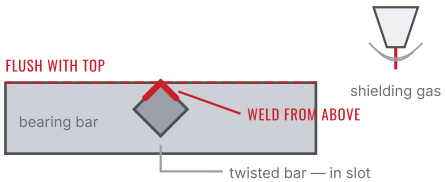
The joint is made by **gas metal arc welding from above** at every point where the bar crosses a bearing bar: under shielding gas, an arc formed with a wire electrode melts and fuses the two parts. The shielding gas keeps the molten pool away from the oxygen in the air — this is what makes the weld continuous and free of porosity.

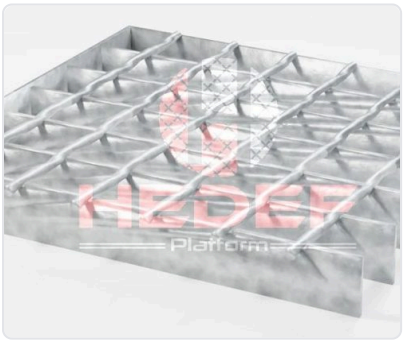
WORK CARRIED OUT

1. Bearing bars with their slots cut at **P5** are laid out on the jig.
2. Twisted square bars are seated in the slots; the flush top is verified.
3. Weld parameters (current, wire speed, gas flow) are set to the section.
4. Every intersection is welded **from above**; welds on the first panel are inspected visually.
5. Heat input is distributed evenly — concentration in one area causes distortion.
6. Burr and spatter are cleaned after welding; **the weld must not stand above the top surface**.
7. The panel is labelled with its item number and passed to **P8**.

In gas metal arc welding the shielding gas separates the molten pool from the air. Arc light and spatter make a mask, gloves and welding apron mandatory.

WELD POINT — DETAIL





Twisted square bar panel — the twisted bar sits in the bearing bar slot, flush on top, with every intersection welded.

7.3 MONITORED DURING WELDING

ITEM	WHAT IS CHECKED
Top level	Is the bar fully seated in the slot and flush with the bearing bar; a bar left high projects above the walking surface.
Weld continuity	Is there a weld at every intersection; a missed point lowers panel rigidity.
Porosity	Low gas flow or a dirty surface leaves pores in the weld.
Heat input	Excess current distorts and thins the bar; it is distributed evenly.
Spatter / burr	If not cleaned, it impairs coating adhesion in galvanizing.

INPUT
Cut bearing bar, twisted square bar, approved drawing

OUTPUT
Joined black panel (twisted square bar)

RECORD
Weld parameter record, first panel inspection

PHASE C → PHASE D

Whichever of the two methods was used, the panel is now a **black product**. At **P8** the dimensional checks, mitre cuts and surface cleaning are carried out.

08 PROCESS

QUALITY CONTROL OF BLACK PRODUCTS

Dimensional checks, mitre cuts and surface cleaning

PHASE D

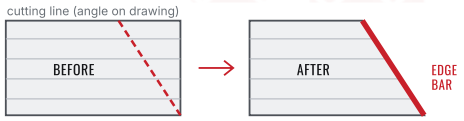
The panel has left production but is not yet coated — in this state it is called a **black product**. P8 is the last technical check before the product goes to galvanizing or is prepared for dispatch, and it sits here deliberately: **correcting a part after galvanizing means damaging the coating.** A nonconforming panel does not pass to the next step.

8.1 DIMENSIONAL AND GEOMETRY CHECKS

CHECK	WHAT IS CHECKED	REFERENCE
Panel size	Are width and length at the item dimension	Approved drawing
Mesh size	Is a × b axis to axis correct	Approved drawing
Squareness	Are the corners square, the diagonals equal	Diagonal measurement
Flatness	Does the panel sit flat on a level floor, is there twist	Visual + straightedge
Joint	Weld continuity where welded; lock tightness where press-locked	**P7** output
Stair tread	Lug hole axis and nosing position	Template

8.2 MITRE CUTTING

A platform edge is not always square. On panels meeting a wall, a pipe or an angled structure, the edge is cut to the angle on the drawing — this is called a **mitre cut**. After cutting, the exposed bearing bar ends are closed with an **edge bar**; otherwise the panel comes apart and sharp ends are left.



8.3 SURFACE CLEANING

Surface cleanliness is not only about appearance: in galvanizing, **zinc does not bond to a dirty surface**. Weld spatter, burr, oil and loose rust are removed at P8 — they leave gaps and weak points in the coating.

1. Weld spatter and burr are removed.
2. Sharp edges and ends are dressed.
3. Oil, grease and marking residue are removed.
4. Loose rust and dirt are removed mechanically.

> **If a nonconformity is found:** the panel is sent back to the relevant production step. If it cannot be corrected it is scrapped and a replacement is made — **no doubtful panel goes to galvanizing**.

INPUT
Black panel from P7, approved drawing

OUTPUT
Black product: dimensions verified, mitres cut, surface clean

RECORD
Dimensional check form, nonconformity record

NEXT → P9

The panel is technically complete. At **P9** the path splits according to the order: the product is sent to **hot-dip galvanizing** or prepared for dispatch **black**.

09 PROCESS

SURFACE DECISION AND HOT-DIP GALVANIZING

Sending to galvanizing or preparing for uncoated dispatch, depending on the order

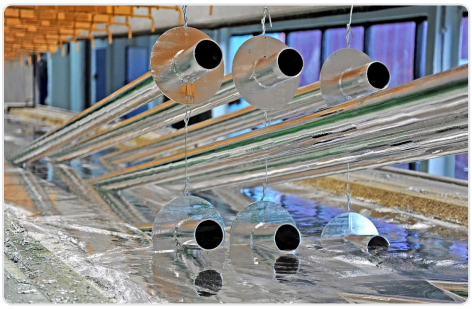
PHASE D

This is the **only branch point** in the flow. If the order is galvanized, the panel is sent to the coating line; if it is black, it goes straight to **P10** packing. The decision is not made in production — it is read from the specification at **P1** and fixed in the order.

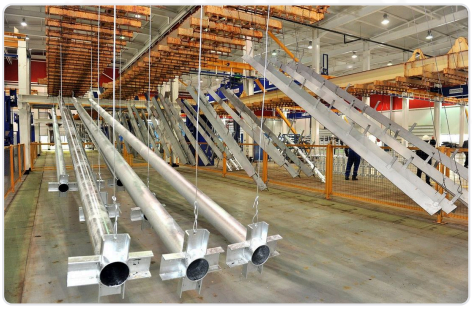
Why galvanizing? Zinc protects steel two ways: it forms a physical barrier and, even if scratched, it sacrifices itself through **cathodic protection** to stop the steel from rusting.

9.1 HOT-DIP GALVANIZING LINE — IN SEQUENCE

01	02	03	04	05	06	07
DEGREASING	**PICKLING**	**RINSING**	**FLUXING**	**DRYING**	**ZINC BATH**	**COOLING**
Oil, grease and organic dirt are removed in an alkaline bath.	Rust and scale dissolve in an acid bath; the steel is taken down to a metallic surface.	Acid residue is washed off; carried over, it spoils the flux bath.	The surface is protected against oxidation until dipping and prepared to wet with zinc.	Moisture is removed. A wet part causes flash evaporation in hot zinc.	Dipped in molten zinc. An **alloy layer** forms between the zinc and the steel — the coating does not sit on top like paint, it bonds to the surface.	Cooled under control, taken off the jig and passed to inspection.
alkaline	acid	water	flux	preheat	≈ 450 °C	on the jig



06 — Zinc bath. The surface of parts coming out of molten zinc; the coating forms in this dip.



07 — Cooling. Parts are cooled on the jig without touching each other; a contact point leaves a mark in the coating.

Transfer. Once cool, products are taken off the line for inspection and packing (**P10**).

9.2 BEFORE DIPPING — JIGGING AND HOLES

In hot dipping the part is **fully immersed** in molten zinc at 450 °C. Two things must therefore be settled before dipping: **how the part will be hung** and **where the zinc will enter and drain**.

1. **No closed volume is left.** A cavity the zinc cannot enter is not coated, and the moisture inside it flash-evaporates and creates a hazard. This is why the nosing and lug area of a stair tread are designed with holes.
2. **The drain path must be open.** Zinc must be able to flow out as readily as it flows in; trapped zinc adds weight and leaves lumps.
3. **A hanging point is chosen.** The part hangs from a wire; the jig point leaves a small mark in the coating, so a concealed area is chosen.
4. **Panels do not touch.** Zinc fuses at a contact face and the coating is damaged when the parts are separated.

Parts are hung individually and dipped without touching each other. The open mesh of a grating helps the zinc drain.

P9 CONTINUES → PAGE 13

On products such as gratings, with **closed volumes and many intersections**, the venting and drain holes made before dipping are decisive; coating thickness and acceptance criteria are on the following page.

9.3 HOW THE COATING FORMS — SECTION

Coating does not sit on top — it alloys with the steel.
That is why it does not peel when scratched.

In the zinc bath, **zinc–iron alloy layers** form on the steel surface, with pure zinc on top. The coating does not rest on the surface like paint, it joins with the metal. It therefore behaves differently from paint under impact and wear: it does not peel easily.

Coating thickness depends on the thickness of the base metal. A thin bar takes a thin coating, a thick section a thicker one — this is not a fault but the nature of the process, and it is defined that way in the standard.

9.4 COATING THICKNESS — EN ISO 1461

BASE METAL THICKNESS	MEAN COATING (min., µm)	LOCAL MEASUREMENT (min., µm)
t > 6 mm	85	70
3 mm < t ≤ 6 mm	70	55
1.5 mm ≤ t < 3 mm	55	45
t < 1.5 mm	45	35

The values are the standard's general table for steel products and are given for reference. What is binding is the class stated in the order specification together with the measurement report issued after coating. The standard defines different values for small centrifuged parts.

9.5 ACCEPTANCE CRITERIA

Continuity	No uncoated gaps. Small repair areas are made good within the limits and by the methods the standard permits.
Surface	No sharp zinc spikes, runs or lumps; no roughness left on the walking or mounting face.
Adhesion	The coating does not peel or blister under normal handling.
Holes	Lug and fixing holes must not be blocked with zinc; they are cleared if needed.
Appearance	A difference between matt grey and bright surfaces is **not a defect**; it depends on the silicon content of the steel and does not affect protection.

The surface after galvanizing. The difference in brightness depends on the composition of the steel; it does not change protective performance.

INPUT
Black product approved at P8, coating requirement from the order

OUTPUT
Galvanized panel (or black panel — no coating applied)

RECORD
Coating measurement report, outward/return delivery note

PHASE D → PHASE E

Coating is complete (or the order is black). At **P10** the final quality control is carried out, the products are packed and delivered ready for dispatch.

10 PROCESS

FINAL QUALITY CONTROL, PACKING AND DELIVERY

Final inspection after galvanizing, packing and dispatch of the products

PHASE E

The last step does two things at once: it **approves the outgoing quality** of the product and makes sure it reaches site undamaged. Galvanized products arrive here from the coating line, black products straight from **P8**. After this point we do not see the product again — no panel is loaded without approval.

10.1 FINAL QUALITY CONTROL

CHECK	WHAT IS CHECKED	APPLIES TO
Coating	Thickness measurement; continuity, no runs or zinc spikes	Galvanized
Holes	Lug and fixing holes not blocked with zinc	Galvanized
Dimensions	Panel size and item match the drawing	All
Geometry	No distortion or twist after coating	Galvanized
Surface	No sharp edges or roughness that impedes handling	All
Quantity	Quantities per item match the order exactly	All

A nonconforming panel is not dispatched. A correctable defect is made good and the panel goes back through the same check; if it cannot be made good, the panel is remanufactured.

Galvanized products are taken off the line once cool; final inspection and packing start here.

ON SITE

If galvanized panels are stacked **wet and without ventilation**, wet storage stain (white rust) can form on the surface. This is usually superficial and does not end the protection; even so, we recommend keeping the packs in a **dry, ventilated** place and raised off the ground.

10.2 PACKING AND LABELLING

PACKING

1. Panels are stacked by item, same size together.
2. Stacks are strapped with steel band; protection is placed under the band.
3. Packs are made up for safe lifting by crane and forklift.
4. Stair treads are stacked so that the nosing is protected.

LABEL AND DOCUMENTS

1. Each pack is labelled with order no, item no, size and quantity.
2. The packing list is compared with the items on the drawing.
3. A delivery note is issued; the coating measurement report is attached on request.
4. Pack count and labels are counted once more before loading.

INPUT
Galvanized or black panel, order and item list

OUTPUT
Inspected, packed product ready for dispatch

RECORD
Final inspection form, packing list, delivery note

FLOW COMPLETE

The product is delivered to the customer as shown on the approved drawing, with its records kept. Any nonconformity reported after delivery is assessed through the order file; if needed, the process step is revisited to find the cause.

ANNEX 1

CONTROL POINTS SUMMARY

Every check in the document in one table. At steps marked **Hold point**, the next step does not start without approval — these are the deliberate brakes in the flow. The table can also be used as a checklist by the production and quality units.

STEP	PHASE	PROCESS	WHAT IS CHECKED	ACCEPTANCE CRITERION / REFERENCE	RECORD	STATUS
P1	A	**Quotation**	Is the specification complete	Product type, mesh size, section, load and coating defined	Quotation form, correspondence	Information
P2	A	**Shop drawing**	Order confirmation and drawing completeness	Item, cutting length, mitre and hole axis defined	Drawing (rev. no)	Information
P3	A	**Customer approval**	Has written approval been received	No production without approval; on revision the drawing is updated	Written approval, revision history	Hold point
P4	A	**Raw material**	Material grade and section	S235JR with certificate; section per drawing; surface acceptable	Certificate, delivery note, incoming inspection	Hold point
P5	B	**Bar cutting and slotting**	First article: length, slot position, slot depth	Item length and mesh size exactly per drawing; slot depth correct for the system	First article approval, interim check record	Hold point
P6	B	**Cross bar preparation**	Length and quantity	Matches the panel width; quantity per item complete	Length/quantity check record	Check
P7	C	**Grating manufacture** press-locking	Mesh size, seating depth, press pressure	Correct for the half/fully press-locked system; lock tight; panel flat	First panel approval, press setting record	Check
P7	C	**Grating manufacture** MAG welding	Top level (flush), weld continuity, porosity, heat input	Bar in slot, flush with the bearing bar; weld at every intersection; no porosity; no distortion	Weld parameter record, first panel inspection	Check
P8	D	**Black product inspection**	Size, mesh size, squareness, flatness, surface	Approved drawing; diagonals equal; surface clean (ready for galvanizing)	Dimensional check form, nonconformity record	Hold point
P9	D	**Galvanizing**	Coating thickness and continuity	EN ISO 1461 / order specification; holes clear	Coating measurement report	Hold point
P10	E	**Final inspection and dispatch**	Coating, dimensions, geometry, quantity, packing	Exact match with the order and item list; packs labelled	Final inspection form, packing list, delivery note	Hold point

IF A NONCONFORMITY IS FOUND

The panel is sent back to the production step where the defect originated and, once corrected, goes through the same check again. A panel that cannot be corrected is **scrapped** and replaced. A dimensional error found after galvanizing is not corrected on site — it damages the coating.

RETENTION OF RECORDS

The records in this table are kept together in the **order file**. A question raised after delivery can therefore be traced back to the material a given panel was made from, the drawing it was made to and the checks it passed.

The table is a summary of the document. If a conflict is found, the explanation on the relevant process page and the order specification prevail.

ANNEX 2

STANDARDS AND DOCUMENT DATA

A2.1 REFERENCE STANDARDS

STANDARD	SUBJECT	RELATES TO
EN ISO 1461	Hot-dip galvanized coatings — requirements and test methods	P9 · P10
EN 10025-2	Non-alloy structural steels — technical delivery conditions (S235JR)	P4
EN ISO 4063	Welding process numbers — gas metal arc (MAG) welding: 135	P7
DIN 24537	Steel gratings — general product reference	P1 · P2
EN ISO 14122-3	Permanent means of access to machinery — stairs and guard-rails	P1 · P2

The order specification is what binds. The above are the references this document cites; if a project calls for a different standard or a stricter criterion, it is stated in the specification and recorded at the quotation stage (**P1**).

A2.2 IMAGE SOURCES AND LICENCES

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A2.3 DOCUMENT DATA

Document title	Production Processes
Document no	HDF-PP-026001
Issue date	17 July 2026
Number of pages	16
Prepared by	Production and Quality Department
Scope	Twisted square bar, half and fully press-locked systems; grating, notched grating, stair tread and notched stair tread
Validity	The current version is issued by HEDEF

Effect. This document defines the production flow as at its issue date. Should the production line, a method or a control criterion change, the current version is issued by HEDEF Platform Izgara.

HEDEF PLATFORM IZGARA
STRENGTH STARTS AT THE GROUND

Hedef Platform Izgara Metal Sanayi ve Ticaret Limited Şirketi
Fatih Mah. 3111. Cad. No: 2 A 3 · Kahramankazan / ANKARA
0545 767 14 24
hedef@hedefplatformizgara.com · www.hedefplatformizgara.com
Tax Office / No: Kahramankazan / 4611204558