



TRENCH COVER & HEAVY-DUTY SYSTEMS

Trench covers - heavy-duty grating - frames - edge bands - locking and load solutions

04

ENGINEERING GUIDE

2026

ONE VERIFIED LOAD PATH FROM WHEEL OR FOOT TO STRUCTURE



A trench cover is an assembly - not a loose panel

Performance depends on the full path from cover surface to structure.

01 SURFACE

Opening, slip and access

02 PANEL

Bearing bars, bands and joints

03 FRAME

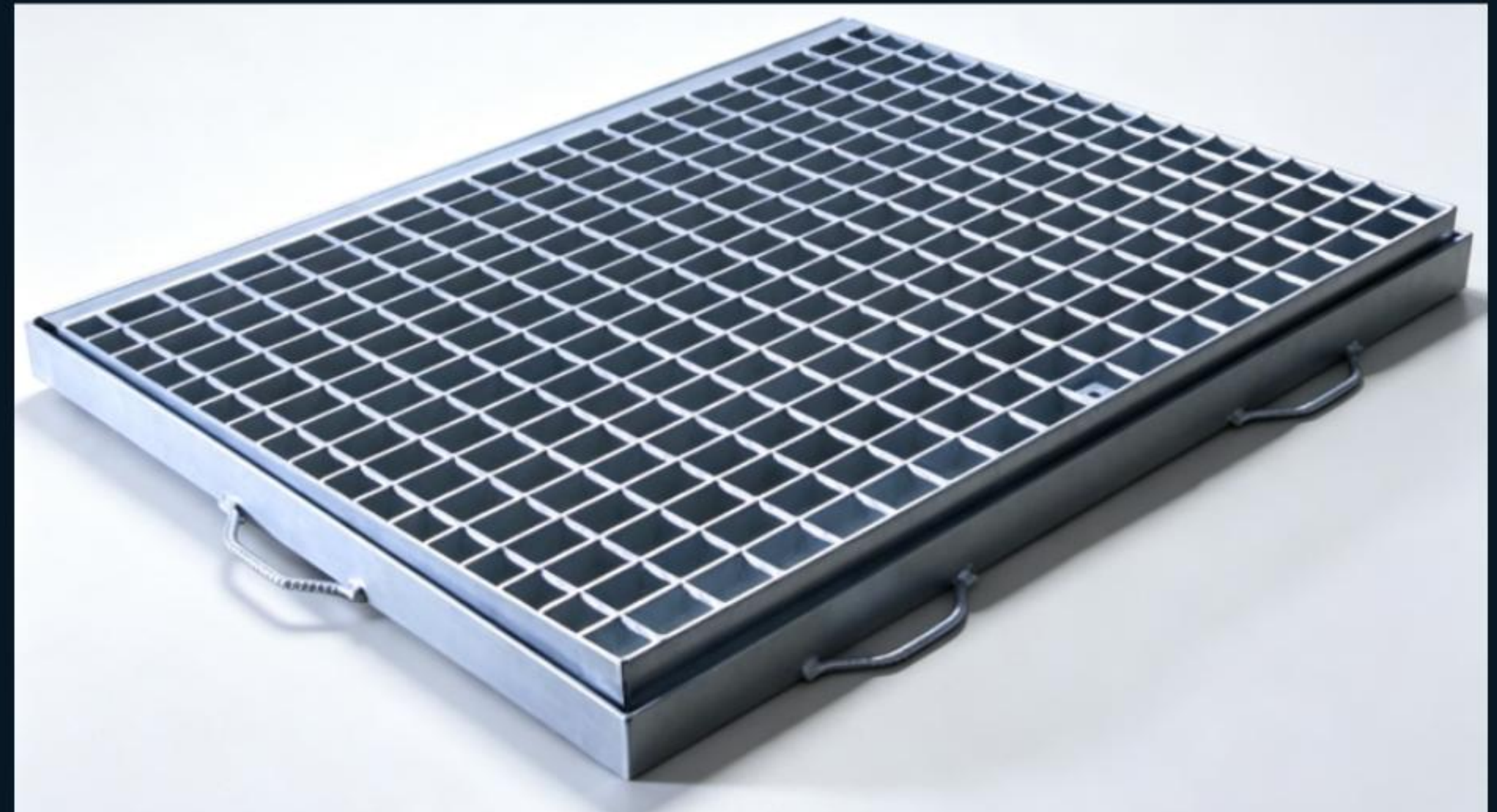
Seat width, stiffness and continuity

04 ANCHORS

Concrete or steel interface

05 RESTRAINT

Locking, uplift and removal



A certified panel cannot compensate for an undefined frame or support condition.

Six decisions from operating zone to RFQ

- 01 ZONE**
Pedestrian, maintenance, public or vehicle
- 02 OPENING**
Clear span, support seat and bearing direction
- 03 LOAD**
Uniform, wheel, impact, braking and uplift
- 04 PANEL**
Grating, solid, custom geometry and module size
- 05 INTERFACE**
Frame, edge band, anchors, joints and locks
- 06 DELIVERY**
Drawings, inspection, marking and documents

Start with the operating conditions - then select the assembly

A product name or traffic class alone is not enough for final sizing.

01 TRAFFIC

Who or what crosses?
Foot traffic, pallet jack, forklift, truck

02 LOAD

What reaches one panel?
Wheel load, footprint, impact and braking

03 GEOMETRY

What is the real clear span?
Opening, support seat, panel joint and direction

04 ENVIRONMENT

What attacks the assembly?
Outdoor wet, chemical, coastal or hot process

05 ACCESS

How often is it opened?
Occasional lift-out, frequent hinge or secured access

06 STANDARD

What governs acceptance?
Project specification, owner criteria and jurisdiction

Five coordinated components create one load path

01 COVER
Grating or plate geometry

02 EDGE BAND
Ends, joints and lifting

03 FRAME
Seat, stiffness and drainage

04 ANCHOR
Concrete or steel support

05 LOCK
Restraint, security and access



The traffic zone sets the starting configuration

Use the most severe credible operating case, including abnormal maintenance access.

ZONE	DUTY	STARTING SYSTEM	GOVERNING CHECK
CABLE / UTILITY	Pedestrian maintenance	Standard removable grating	Access + handling
PROCESS DRAINAGE	Wet industrial zone	Open grating + frame	Drainage + corrosion
PUBLIC EDGE	Pedestrian / mobility	Restricted opening + lock	Opening + security
FORKLIFT AISLE	Repeated wheel traffic	Heavy welded grating	Wheel footprint + joints
ROAD / FIRE ROUTE	Truck or emergency vehicle	Calculated cover-and-frame	Wheel load + impact

The final configuration is released only after load, span, support and assembly details are confirmed.



01

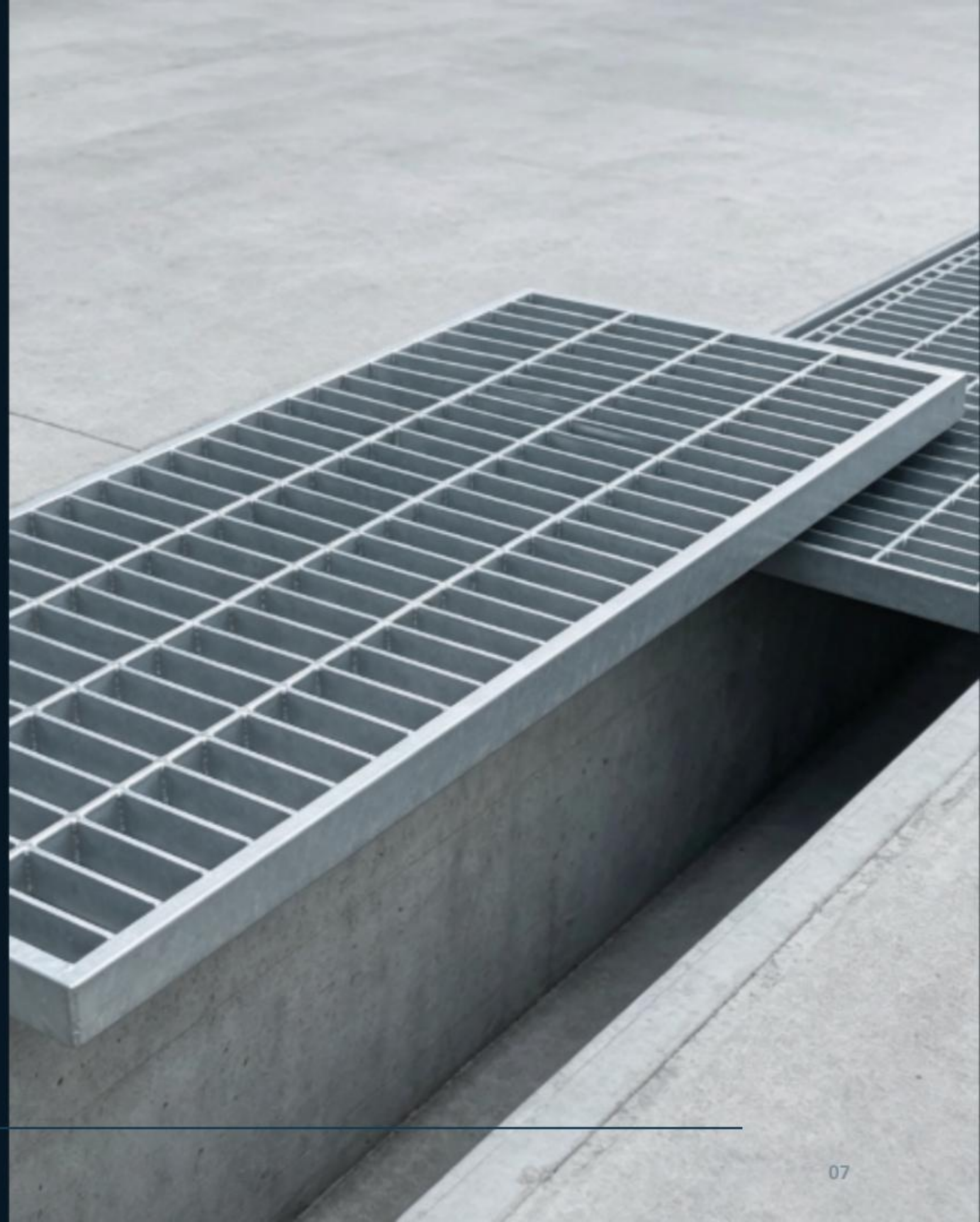
COVER TYPES

Choose the cover around drainage, access and removal - not appearance alone.

ASSEMBLY LED

LOAD VERIFIED

DRAWING BASED



Standard covers suit defined pedestrian and maintenance loads



PARAMETER	PRELIMINARY RANGE
Bearing bars	Common starting range 25 x 3 to 40 x 5 mm
Pitch	30 or 40 mm typical starting point
Panel width	200-600 mm common removable modules
Frame	L63 x 63 x 6 preliminary starting point
Restraint	Bolted, lifting or anti-theft by access risk

Final bar size follows clear span, design load and approved support geometry.

Drainage and traffic must be stated together

A channel opening does not establish a structural capacity.

01 FLOW

Open area, direction and debris

02 ZONE

Pedestrian, forklift or vehicle

03 SPAN

Clear width and support layout

04 SURFACE

Plain, serrated or restricted opening

05 MATERIAL

HDG, stainless or FRP by environment



Custom covers begin with a controlled CAD profile

Irregular openings, penetrations and hinged sections require drawing-based fabrication.



GEOMETRY

Rectangular, circular, tapered or irregular

CUT-OUTS

Pipes, cables, valves and equipment interfaces

ACCESS

Lift-out, hinged, split panel or removable beam

SECURITY

Bolted, keyed, padlocked or anti-theft

MARKING

Panel sequence, area code and orientation

CAD PROFILE + LOAD CASE + SUPPORT LAYOUT

Opening and surface are operating decisions

01	OPEN GRATING	High drainage and ventilation	Process drainage, washdown
02	RESTRICTED OPENING	Smaller passage openings	Public or small-object risk zones
03	SERRATED SURFACE	Improved wet-condition traction	Oily, wet or sloped approaches
04	SOLID / PLATE	Debris or odor containment	Utility access where drainage is secondary

Confirm heel, cane, wheel, debris and slip requirements from the project specification.



Panel modules should be safe to remove and easy to replace

01 MODULE
Split the trench into repeatable panels

02 WEIGHT
Set a handling limit before fabrication

03 LIFTING
Provide rated points or dedicated tools

04 ORIENTATION
Mark direction and sequence

05 JOINTS
Keep support beneath panel ends



Frequent access may justify hinges or removable intermediate beams.

02

HEAVY-DUTY ENGINEERING

Wheel load, contact patch and support continuity govern vehicle-zone design.

ASSEMBLY LED

LOAD VERIFIED

DRAWING BASED



Uniform load and wheel load are different design problems

UNIFORM LOAD

Distributed across the panel

INPUT	psf or kPa
CHECK	Bearing-bar bending and deflection
TYPICAL	Platforms, storage or distributed process loads

WHEEL / POINT LOAD

Concentrated through a footprint

INPUT	Wheel force + contact patch
CHECK	Local distribution, joint and frame response
TYPICAL	Forklifts, pallet jacks, trucks and outriggers

For vehicle zones, wheel load usually governs even when a uniform load is also specified.

Define the vehicle before asking for a cover rating

- 01 WHEEL LOAD**
Maximum force on one wheel
- 02 CONTACT PATCH**
Tire or wheel footprint
- 03 PATH**
Where wheels cross panel ends
- 04 DYNAMICS**
Speed, impact, braking and turning
- 05 FREQUENCY**
Occasional crossing or repeated duty
- 06 ABNORMAL**
Fire access, maintenance crane or overload case



Use load tables as a screen - not as the final assembly design

Illustrative website table: welded 19-W-2, 1/4 in bearing bars, carbon steel $F_y = 36$ ksi, simple span.

BEARING BAR	36 IN	48 IN	60 IN	72 IN
2 x 1/4 in	820	460	295	205
2-1/2 x 1/4 in	1280	720	460	320
3 x 1/4 in	1850	1040	665	460
3-1/2 x 1/4 in	2520	1415	905	630
4 x 1/4 in	3280	1850	1180	820
4 x 5/16 in	4100	2310	1480	1025

Values shown in psf. Bending-stress controlled; verify deflection, concentrated loads, joints, frame and anchors.

Heavy-duty capacity is built into the panel and its interfaces

- 01 BEARING BARS**
Depth and thickness from calculation
- 02 CROSS BARS**
Maintain spacing and load distribution
- 03 EDGE BANDS**
Stabilize ends and transfer joint loads
- 04 STIFFENERS**
Add where local wheel path requires
- 05 FRAME SEAT**
Continuous, level and sufficiently wide



A 3,000 lb wheel illustrates why span control matters

Preliminary website guide for a 4 x 4 in contact patch and 1/4 in thick bearing bars.

CLEAR SPAN	PRELIMINARY BAR	TYPICAL SERIES
36 in / 915 mm	2-1/2 x 1/4 in	19-W-2
48 in / 1220 mm	3 x 1/4 in	19-W-2
60 in / 1525 mm	3-1/2 x 1/4 in	19-W-2
72 in / 1830 mm	4 x 1/4 in	19-W-2
96 in / 2440 mm	4 x 5/16 or 5 x 3/8 in	19-W-2 + reinforced band
PROJECT RELEASE REQUIRES THE ACTUAL WHEEL LOAD, FOOTPRINT, WHEEL PATH, FRAME AND SUPPORT DETAIL		

The support layout can govern before the grating does

- | | | |
|---|--------|--|
| 1 | WHEEL | Force enters through a small footprint |
| 2 | PANEL | Bearing bars distribute toward supports |
| 3 | SEAT | Frame receives reaction along the support line |
| 4 | FRAME | Channel, angle or beam resists local deformation |
| 5 | ANCHOR | Reaction passes into concrete or steel structure |



A nominal trench width is not the clear structural span.

Panel ends and wheel-path joints need explicit detailing

END BAND	Stabilizes bearing-bar ends and supports handling
LOAD-CARRYING BAND	Transfers force where the wheel crosses a panel end
JOINT SUPPORT	Places reaction beneath both adjacent panels
GAP CONTROL	Limits rocking, noise and debris traps
WELD DETAIL	Matches bar thickness, coating and fatigue exposure



Design out the failures that appear in service

01 ROCKING PANEL

Uneven seat, tolerance stack or missing restraint

02 CRUSHED EDGE

Wheel crosses unsupported panel end

03 FRAME ROTATION

Angle or channel lacks stiffness or anchorage

04 ANCHOR DISTRESS

Insufficient edge distance or undefined substrate

05 LIFT / RATTLE

Traffic, pressure or vibration without restraint

06 EARLY CORROSION

Water trap, coating damage or incompatible material

03

FRAMES, BANDS & LOCKS

Coordinate support, restraint and access before fabrication starts.

ASSEMBLY LED

LOAD VERIFIED

DRAWING BASED



Select the frame by load path and construction interface



ANGLE FRAME

Concrete rebate / standard duty



CHANNEL FRAME

Higher stiffness / vehicle zone



BEAM SUPPORT

Wide openings / cross-member system

Confirm seat width, frame stiffness, drainage, splice and anchor pattern on the assembly drawing.

Anchors complete the reaction path into the structure

01 CAST-IN

J or L bolts, plates or embedded anchors

02 POST-INSTALLED

Mechanical or chemical anchors by substrate

03 STEEL INTERFACE

Bolted cleats, welded tabs or support brackets

04 EDGE DISTANCE

Concrete breakout and installation tolerance

05 CORROSION

Anchor grade and coating compatible with frame



Choose restraint from traffic, access frequency and security



DEVICE	USE CASE	DESIGN INTENT
HEX BOLT	Occasional access	Positive hold-down
SPRING CLIP	Frequent light access	Quick release; duty limited
HINGE + PADLOCK	Routine opening	Retention + security
RECESSED KEY	Public / anti-theft	Tamper resistance
LIFTING POINT	Heavy panel handling	Controlled removal

Restraint is part of the traffic and uplift design - not an accessory selected after fabrication.

04

INSTALLATION & DELIVERY

Control the seat, sequence and records so the calculated system reaches site intact.

ASSEMBLY LED

LOAD VERIFIED

DRAWING BASED



Install the frame first - then verify every support and restraint

SURVEY Confirm trench geometry, levels and substrate

SET FRAME Align, level, brace and maintain seat width

ANCHOR / GROUT Install to approved detail and cure requirement

PLACE PANELS Match marks, bearing direction and joint support

LOCK Fit restraints, hinges and lifting hardware

INSPECT Check rocking, clearances, finish and records



Match material and inspection to the operating environment

ENVIRONMENT	STARTING MATERIAL	INSPECTION FOCUS
DRY INDOOR	Carbon steel / paint system	Coating continuity + damage
OUTDOOR WET	Hot-dip galvanized steel	Coating thickness + drainage
COASTAL	HDG or stainless by specification	Edges, fasteners + washdown plan
CHEMICAL / HYGIENIC	304 / 316L or FRP by compatibility	Grade certificate + cleaning detail
HEAVY VEHICLE	Structural carbon steel system	Dimensions, welds, bands + fit-up

Coating selection does not replace drainage detailing, compatible fasteners or maintenance planning.

Freeze the design basis before detailed engineering starts

CLIENT / CONSULTANT INPUT

LAYOUT	Plan, trench sections, levels and supports
LOAD	Wheel / axle, footprint, traffic and impact
ENVIRONMENT	Wet, chemical, coastal and temperature
ACCESS	Removal frequency, lifting and security
STANDARD	Owner specification and governing code
SCOPE	Design, supply, installation and documents

WIBERG ENGINEERING OUTPUT

- 01 Assembly and panel layout
- 02 Preliminary / certified load basis as contracted
- 03 Frame, band, anchor and locking details
- 04 Material, finish and fabrication schedule
- 05 Inspection, marking and packing records
- 06 MTC, coating and agreed document register



BUILD THE **VERIFIED** LOAD PATH

Covers, frames, edge bands, anchors and locking - coordinated as one project-ready assembly.

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