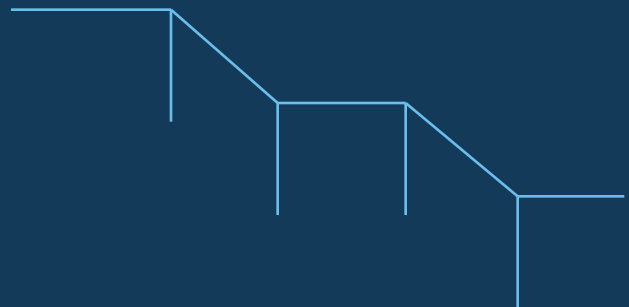




FRP PRODUCT & ENGINEERING MANUAL

Grating | Load & Deflection | Connections | Access Systems

QY product routes, design checks and selected public manufacturer benchmarks for international FRP quotation packages. Every benchmark remains source-attributed and requires exact-series verification before final design.



QY METAL TECH | WUXI QIYUE GRATING CO., LTD.

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qymetaltech.com | sales@qymetaltech.com | WhatsApp: +86 151 5225 6390



1.0 GENERAL

1.1 Purpose

This manual helps engineers, buyers and fabricators prepare FRP walkway, platform, railing, ladder, structural-profile and stair selections. It combines QY's published product routes with selected public manufacturer benchmarks. Source product, geometry, load case, units and safety factor must remain attached to every benchmark value.

1.2 Systems in scope

- Molded and pultruded FRP grating, covered-top panels, trench covers and fabricated cut panels.
- FRP guardrail, handrail, ladder, cage, platform, stair and pultruded structural-profile interfaces.
- Clips, fasteners, edge treatments, kick plates, supports, panel marks, packing and release documents.

1.3 Responsibility split

Party	Minimum responsibility
Buyer / engineer	Define governing code, loads, geometry, environment, design life, approvals and acceptance criteria.
QY	Review product family, submitted drawings, fabrication scope, quantities, finish, packing, benchmark match and requested evidence before quotation.
Installer	Verify site dimensions, supports, handling, fastening, access, sequencing and installation quality.

1.4 Guide map

- 2 FRP grating selection and support | pages 3-4
- 3 Guardrail and handrail | pages 5-6
- 4 Ladders and access | page 7
- 5 Structural profiles and connections | pages 8-10
- 6 Stair systems | pages 11-13
- Concept details QY-FRP-D01 to D10 | pages 14-23
- Public benchmark data appendix | pages 24-31
- Evidence, links and RFQ route | page 32

Public manufacturer values are retained as attributed screening benchmarks. They become a QY product value only after exact-series equivalence and release evidence are documented.



2.0 FRP GRATING AS WALKWAYS, PLATFORMS & COVERS

2.1 Minimum inputs before reading any load table

Input	Project value to provide	Evidence to match
Product identity	Molded/pultruded, series, depth, mesh/bar spacing, covered/open	Exact QY table or released submittal
Support	Clear span, bearing direction, bearing width, single/multiple span	Layout and support detail
Load case	Uniform, concentrated, line/wheel; footprint and position	Engineer-approved load criteria
Serviceability	Deflection limit, vibration/comfort, removable-panel requirement	Project criterion and table units
Environment	Chemicals, temperature, UV, wet/oily exposure, fire/smoke requirement	Resin/finish request plus report scope
Geometry	Panel sizes, cutouts, joints, edge condition, quantity	Panel schedule and marked drawing

2.2 Load-table matching sequence

- Match the exact product series and revision; molded and pultruded values are not interchangeable.
- Use clear support span, not overall panel length. Mark bearing direction for directional products.
- Match load type, footprint, units, support condition and deflection criterion before reading a value.
- Record the selected row/column and source revision in the RFQ or submittal.
- Require project approval when the table does not cover the requested configuration.

NO TRANSFER OF VALUES

Do not convert a public manufacturer benchmark into a QY rating. Keep its source attached and require exact-series equivalence or a verified QY/supplier report before release.



2.3 APPLICATION AND FABRICATION NOTES

Decision	Molded FRP grating	Pultruded FRP grating
Load path	Often bidirectional for square mesh; verify exact series	Directional bearing bars; mark span direction
Panel planning	Match available panel size, mesh and cut plan	Match panel width, bar spacing, cross-rod layout and cut plan
Joints	Support edges or coordinate approved panel-joint clips	Support panel ends and coordinate side-joint detail
Cutouts	Show opening, remaining ligaments and edge treatment	Show interrupted bearing bars and added support/banding
Fastening	Select hold-down type and quantity from released detail	Select hold-down type at support from released detail
Covered top	Confirm cover thickness, flatness, rocking control and fixings	Confirm cover/bearing-bar system and fastening

2.4 Drawing notes required for quotation

- Support centerlines, clear span, bearing direction, panel joints, removable panels and edge bearing.
- Cutouts around pipes, columns, equipment and handrail posts, including required clearances.
- Clip/fastener material, substrate, drilling restrictions, corrosion isolation and installation access.
- Surface, resin, color, cover, grit, exposed cut sealing, identification marks and packing group.

CUTOUT AND CANTILEVER GATE

Do not apply a generic one-third cutout rule, cantilever distance or clip count. QY must match the exact product, support and released detail; the project engineer approves the load path.



3.0 FRP GUARDRAIL AND HANDRAIL SYSTEMS

3.1 System definition

- Post, top rail, intermediate rail(s), handrail where required, kick/toe plate, splices, corners, gates and removable sections.
- Profile size, wall thickness, resin, color, UV coating, fire/smoke evidence and finish must be tied to a QY series or approved drawing.
- Walking-surface reference, finished rail height, clearances, openings and stair/landing transitions come from the governing project code.

3.2 Design criteria to state - do not assume

Criterion	RFQ / drawing requirement
Governing authority	Current project-selected OSHA, IBC, local code, owner standard or other named requirement
Rail loading	Concentrated and/or uniform load, direction, load combinations and allowable deflection
Post spacing	Calculated spacing by exact profile, base condition, rail continuity and load
Attachment	Top/side mount, substrate, bolt group, edge distance, backing plate and anchor responsibility
Environment	Chemical exposure, temperature, UV, washdown, electrical and fire/smoke requirements
Evidence	Calculation/submittal, profile data, resin/finish confirmation and applicable test reports

COMPLIANCE BOUNDARY

A standard-looking rail is not automatically code compliant. Compliance applies only to the released configuration, attachment, loading and governing code.



3.3 LAYOUT, CORNERS, SPLICES AND SUPPORTS

3.3.1 Layout controls

- Dimension post centerlines, corner conditions, end returns, gates, removable sections, stair transitions and expansion/separation joints.
- Place posts to suit the verified structural support. Do not attach to unsupported grating or an unverified thin FRP flange.
- Coordinate rail splice locations with post spacing, shipping length, site access and erection sequence.
- Show kick/toe plate continuity, inside/outside corner treatment and gaps at drains or equipment only where approved.

3.3.2 Attachment drawing checklist

Field	Required information
Substrate	FRP/steel/concrete type, thickness/profile, edge condition and responsible designer
Post base	Base/side mount geometry, spacer/backing plate, bolt and washer details
Anchors	Type, size, embedment, edge distance, corrosion environment and installer scope
Bolts	Material, diameter, quantity, hole size, washers, locking and torque/procedure
Load path	Post reaction, supporting member, local reinforcement and torsional restraint
Site work	Field drilling/cutting limits, sealing, inspection and as-built verification

RELEASE GATE

No post spacing, corner offset or anchor detail is approved by this guide. Use a product-specific calculation and approved interface drawing.



4.0 FRP LADDER, CAGE AND ACCESS SYSTEMS

4.1 RFQ inputs

Category	Buyer / engineer to define
Geometry	Climb height, clear width, rung spacing, rail projection, landing and approach clearance
Support	Base support, wall-bracket spacing, substrate, bracket reactions and top restraint
Protection	Cage, fall-arrest system, rest platform, gate and transition requirement
Loading	Current governing code, user/equipment load, simultaneous users and deflection/comfort criterion
Environment	Resin, color, UV, chemicals, washdown, electrical and fire/smoke requirements
Interfaces	Floor/wall anchors, roof/landing opening, guardrail transition and field access

4.2 Design and submittal checks

- Confirm current authority requirements; do not reuse legacy cage-height or rest-platform rules without project review.
- Identify which bracket carries vertical load and which brackets provide lateral restraint.
- Require rail/rung profile data, splice detail, bracket/anchor detail, load basis and finish/resin confirmation.
- Coordinate transport length, field splice, lifting, drilling/sealing and inspection.

SAFETY NOTE

Ladder geometry and fall protection are life-safety items. Final design and installation require approval by the responsible engineer and authority.



5.0 PULTRUDED FRP STRUCTURAL MEMBERS

5.1 Profile and property package

Profile family	Drawing inputs	Released evidence
Angle / plate	Legs, thickness, holes, bearing and edge distances	Exact section dimensions and mechanical-property source
Channel	Depth/flange/web, span, bracing, connection and load	Section properties, resin/system and design values
I / wide flange	Span, compression-flange restraint, reactions and joints	Section properties and lateral-support basis
Square/round tube	Outside size, wall, holes, local crushing and connection	Profile data and connection-specific checks
Rod / threaded rod	Diameter, thread, load direction, environment and safety factor	Product-specific tensile/shear data and test basis

5.2 Member selection workflow

- Use actual QY section properties and material design values; do not substitute steel properties or competitor profile data.
- Check strength, shear, bearing, deflection, stability, lateral support, local connection effects and environmental reduction.
- Include dead load, live load, equipment, wind/seismic/thermal and erection loads as required by the project.
- State safety factors, load combinations and allowable deflection from the responsible engineer.

NO GENERIC ALLOWABLES

This guide intentionally contains no bending, shear, bearing or stock-length values. Use only product-specific QY data and the approved calculation basis.



5.3 LATERAL SUPPORT, SPLICES AND SERVICEABILITY

5.3.1 Checks that commonly control FRP members

- Compression-flange lateral support and lateral-torsional stability of beams.
- Column slenderness, end restraint, load eccentricity and local base/top connection effects.
- Web/flange bearing, bolt-hole net section, block/shear-out, pull-through and local crushing.
- Deflection, vibration, thermal movement, creep/environmental reduction and joint slip where applicable.
- Field holes, cut edges, sealing, drilling access and minimum distances from profile edges.
- Shipping segments, erection splices, temporary bracing and lifting points.

5.3.2 Calculation data sheet

Input	Value / source to record
Profile / revision	Exact designation, dimensions, section properties and QY data revision
Material system	Resin/reinforcement system, directionality, temperature/environment and reduction basis
Span / restraint	Clear span, unbraced length, support condition and lateral restraint spacing
Loads / combinations	Units, distribution, reactions, combinations and safety factors
Limits	Strength, deflection, vibration, movement and governing code/owner criteria
Connection	Bolt/plate/clip geometry, edge distances, hole sizes, washers and substrate

QY can support quotation and drawing coordination. The responsible engineer retains design approval unless a separate written engineering scope states otherwise.



5.4 CONNECTION VERIFICATION MATRIX

Limit state / check	Required inputs	Acceptance evidence
Bearing at hole	FRP thickness, bolt diameter, load direction, edge distance	Product-specific allowable/test basis plus calculation
Bolt shear / tension	Bolt material/grade, diameter, threads, shear planes, combination	Fastener standard and calculation
Net section / tear-out	Hole pattern, pitch, edge distance, profile geometry, load angle	Connection calculation and approved drawing
Washer / pull-through	Washer or plate size, thickness, clamp force, local FRP support	Detail and local bearing/pull-through check
Block shear / local bending	Clip/plate geometry, eccentricity, prying and member support	Calculation and released connection detail
Environment / isolation	Chemical exposure, moisture, temperature, metals and coating	Material compatibility and corrosion-isolation note
Installation	Hole size, drilling, sealing, torque/locking, access and inspection	Method statement and inspection record

5.5 Minimum connection drawing content

- Plan, elevation and section with load direction and component responsibilities.
- Profile and plate designations, hole sizes, bolts/washers/nuts, edge distances, pitch and finish.
- Substrate and anchors, backing plates/spacers, field-work notes and inspection hold points.

PROHIBITED SHORTCUT

Do not copy the bearing or bolt tables from another FRP manufacturer. Values are product-, direction-, thickness- and safety-factor-specific.



6.0 STAIR COMPONENTS, TREADS AND LOAD INPUTS

6.1 System components

- FRP tread or grating panel, nosing, side angles/plates, channel/profile stringers, landings, posts, rails and connections.
- Molded or pultruded tread series, depth, mesh/bearing direction, surface, visual-contrast requirement, resin and color.
- Tread width/depth, clear span, support angle, bolt-hole pattern, quantity and marked stair drawing.

6.2 Tread load-table record

Field	Project-specific value
Tread product / revision	Exact QY series, depth, construction and released table revision
Clear span / support	Stringer clear spacing, support angle/bearing and fastening
Load	Point/uniform load, footprint, position, units and combination
Deflection limit	Project/code criterion and measured/calculated value
Nosing / surface	Profile, grit/contrast, slip requirement and test/acceptance basis
Evidence	Table row/column, submittal drawing, test report or calculation reference

NO GENERIC TREAD TABLE

Point-load and deflection values from a competitor's tread cannot be relabeled as QY data. Use the exact QY tread configuration and source revision.



6.3 GEOMETRY, STRINGERS, LANDINGS AND BRACING

01

Define code & use

Governing authority, stair type, occupancy/use, environment and approval route.

02

Set geometry

Rise/run, slope, width, landings, headroom, nosing and guard/handrail transitions.

03

Define loads

Tread, stringer, landing, rail, equipment and environmental loads with combinations.

04

Select exact profiles

QY profile/tread data, span, deflection, stability, bracing and connection checks.

05

Coordinate interfaces

Top/bottom support, intermediate columns, platform framing, anchors and field access.

06

Release evidence

Approved calculation, drawing, bill of materials, inspection points and packing marks.

STRINGER TABLE BOUNDARY

Do not reuse another manufacturer's C8/C10 or stair-span chart. Stringer selection depends on the exact QY profile properties, bracing, loads, geometry and connections.



6.4 STAIR RFQ AND RELEASE CHECKLIST

Group	Information to provide / confirm	Status / reference
Geometry	Stair width, total rise/run, tread rise/depth, slope, landing and headroom	
Treads	Series, depth, mesh/bar direction, span, nosing, surface, color and quantity	
Stringers	Profile, support points, bracing, splices, end reactions and finish	
Loads	Tread/stringer/landing/rail loads, combinations, footprint and deflection limits	
Rails	Guard/handrail geometry, post spacing, transitions, toe plate and attachments	
Connections	Angles/plates/bolts/anchors, holes, edge distances, substrate and installer scope	
Environment	Resin, chemical/temperature/UV, washdown, fire/smoke and electrical criteria	
Documents	Calculation, layout, details, BOM, product data, test evidence and inspection plan	
Logistics	Shipping sections, field splices, marks, packing, destination and lifting/access	

RELEASE DECISION

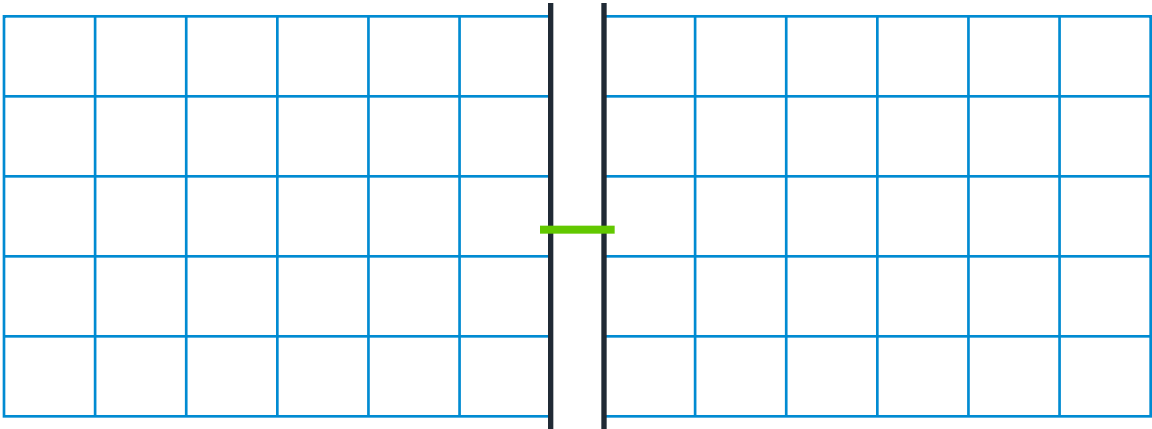
Quotation basis complete [] | Engineering inputs complete [] | Drawing approved [] | Product data matched [] | Inspection evidence agreed []



QY-FRP-D01 MOLDED GRATING PANEL JOINT & HOLD-DOWN CONCEPT

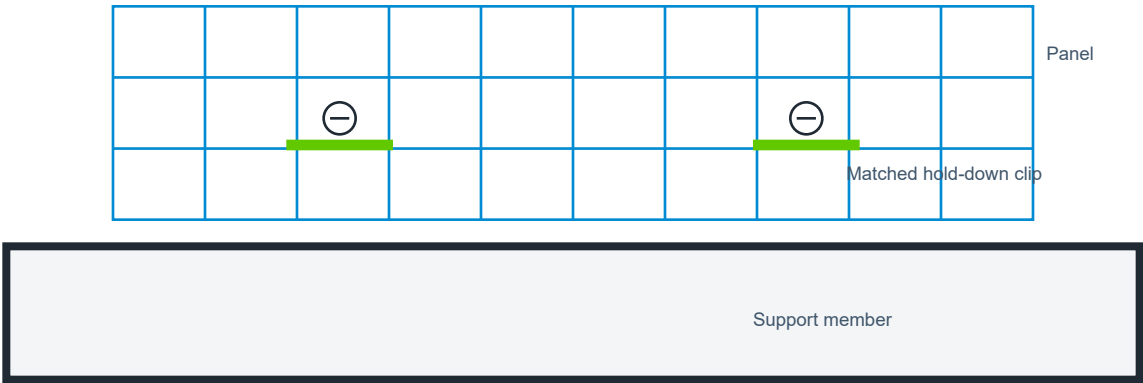
CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Adjacent panel joint



Joint clip only when matched to exact panel
Support or approved joint detail

B. Hold-down at support



RFQ FIELDS

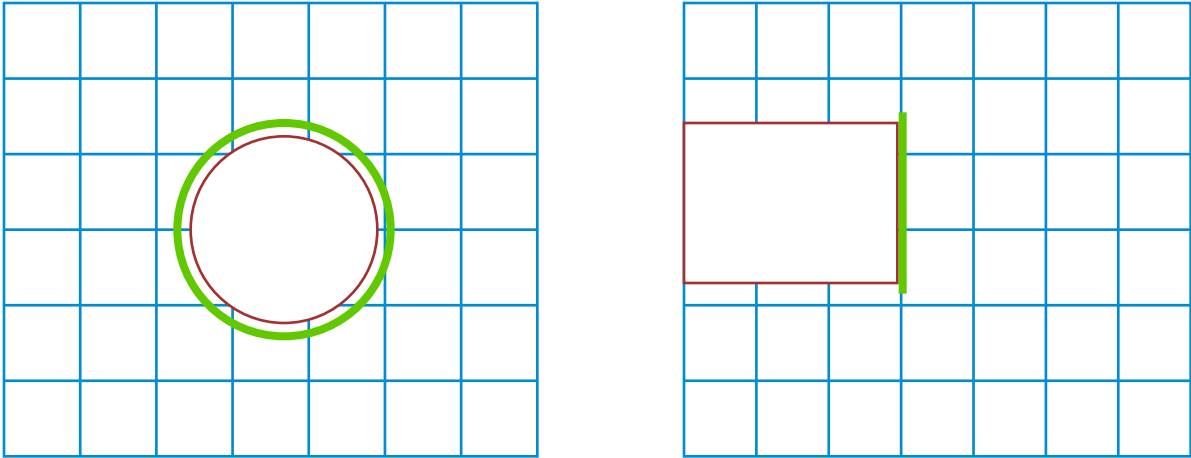
Panel series/depth/mesh | support material and width | clip type/material | bolt/hole | quantity and spacing | field drilling/sealing.



QY-FRP-D02 EDGE TREATMENT, CUTOUT & KICK-PLATE CONCEPTS

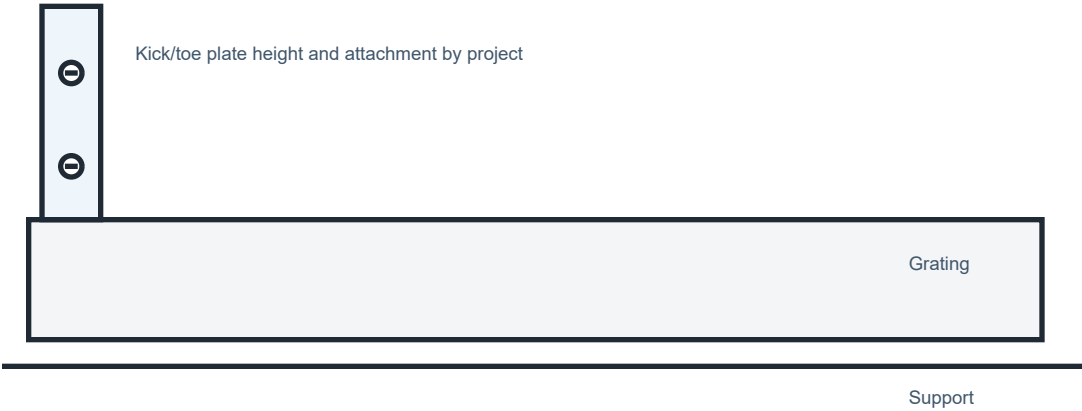
CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Straight and radius cutouts



Cutout + project-defined support / edge treatment

B. Kick/toe plate at opening



RFQ FIELDS

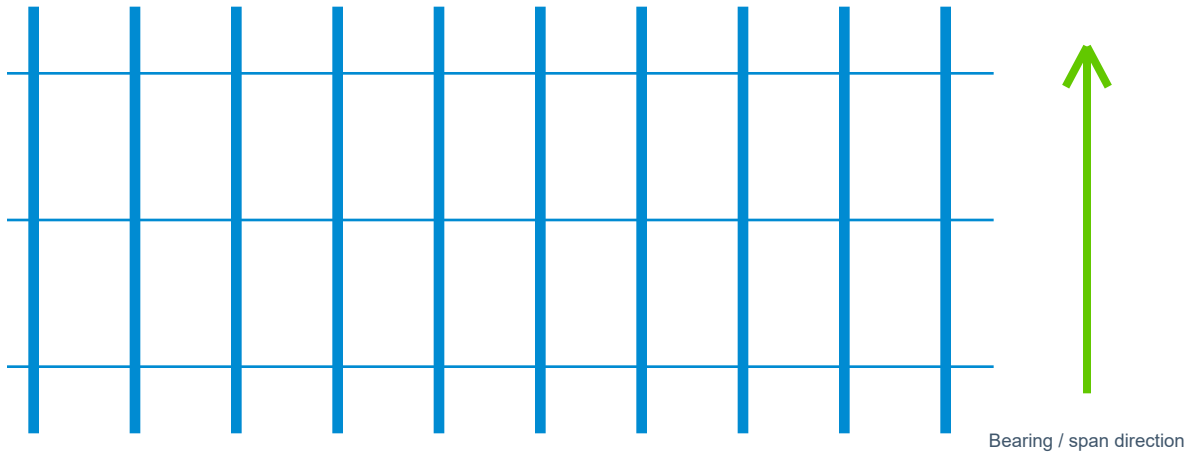
Opening shape/size | remaining panel ligaments | additional support | edge finish | kick-plate height/material | fasteners | site sealing.



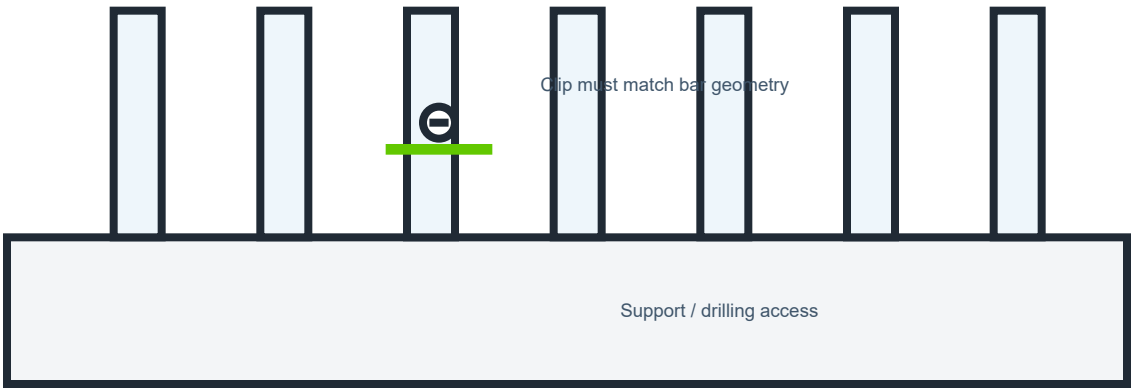
QY-FRP-D03 PULTRUDED GRATING HOLD-DOWN & BEARING DIRECTION

CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Directional panel



B. Hold-down at bearing support



RFQ FIELDS

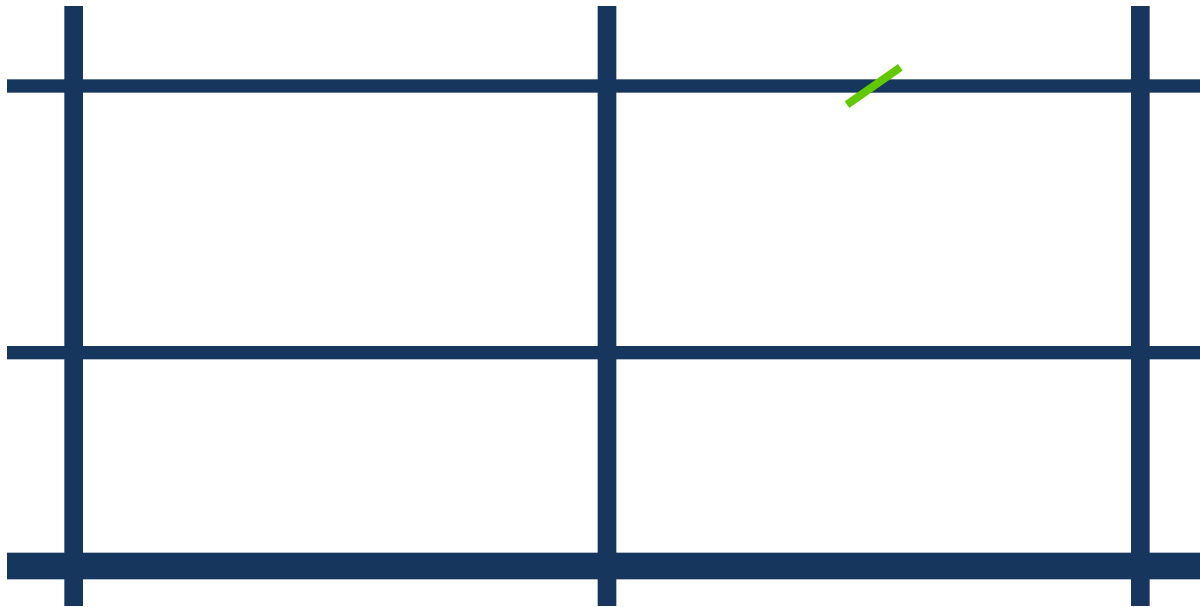
Exact pultruded series | panel depth and bar spacing | bearing direction | clear span | support width | clip/bolt | joint layout.



QY-FRP-D04 GUARDRAIL SPLICE, CORNER & TOE-PLATE CONCEPTS

CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Rail/post arrangement



Rail splice coordinated with post/support and shipping length

B. Toe-plate continuation



Straight splice / corner plate concept

RFQ FIELDS

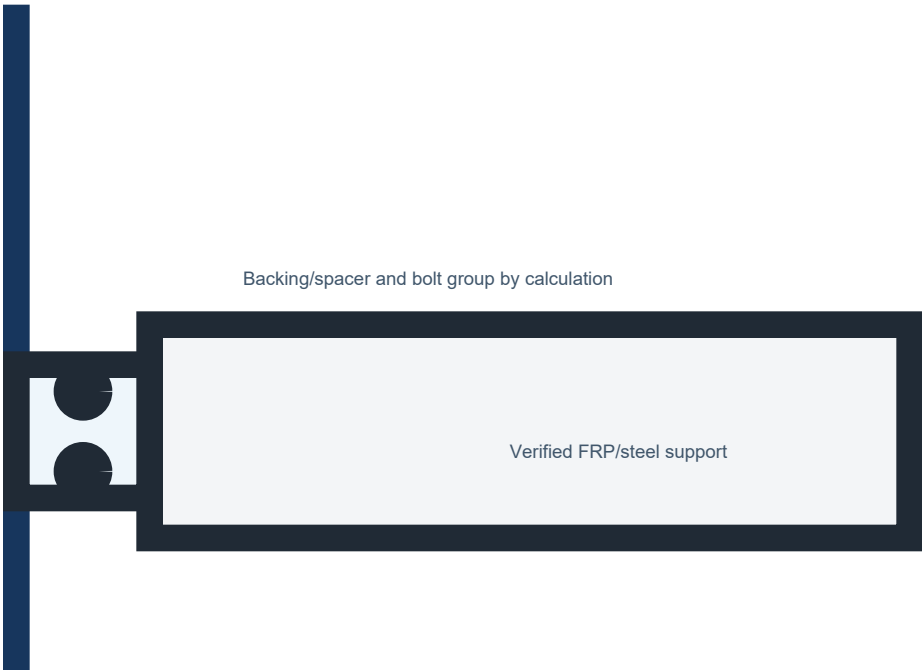
Rail/profile series | post spacing and loads | splice location | corner/gate/removable section | toe-plate continuity | rivet/bolt/bond method.



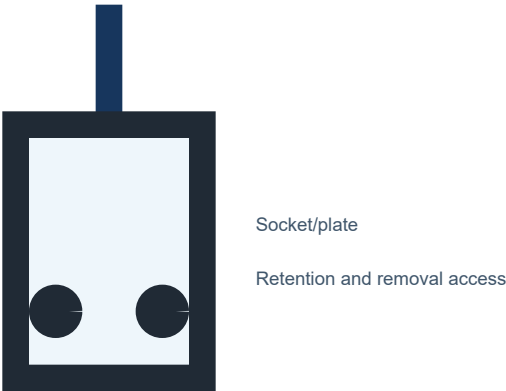
QY-FRP-D05 GUARDRAIL POST ATTACHMENT & REMOVABLE SECTION

CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Side-mounted post to verified structure



B. Removable post/socket concept



RFQ FIELDS

Post reactions | substrate/profile | mount type | bolt/anchor group | backing plate/spacer | field access | removable retention | inspection.

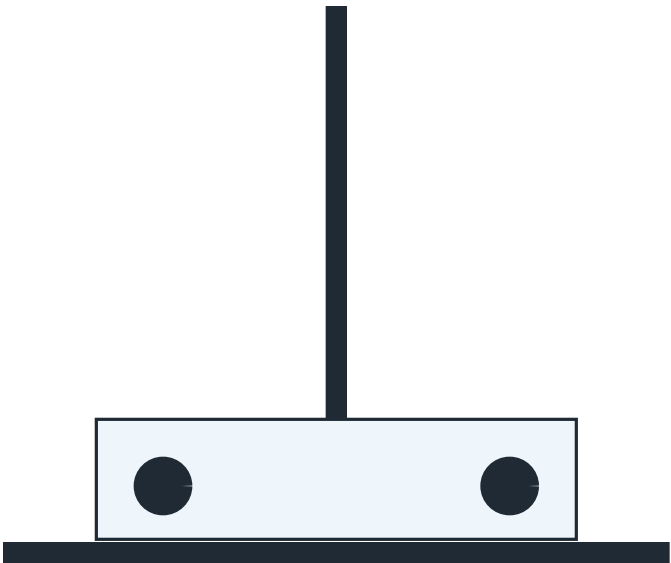


QY-FRP-D06 POST BASE & LADDER BASE SUPPORT

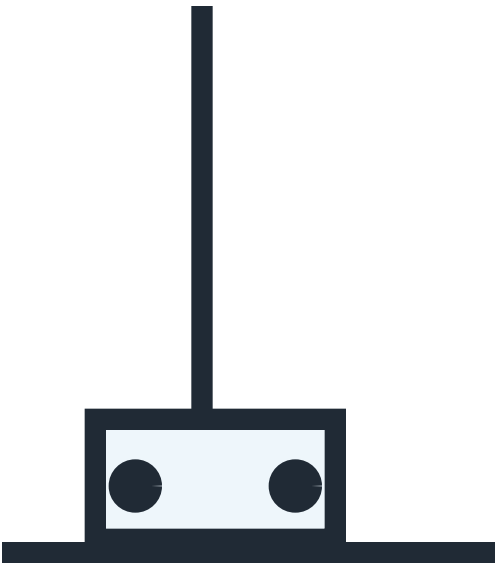
CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Guardrail post base

B. Ladder floor mount



Base plate + anchors + substrate by calculation



Base support carries stated vertical/lateral reactions

ANCHOR / BASE DATA

- Substrate type, thickness/strength and responsible anchor designer.
- Base plate/profile, bolt/anchor type, edge distance, embedment and corrosion environment.
- Vertical, horizontal and moment reactions plus grout/isolation and installation inspection.

RFQ FIELDS

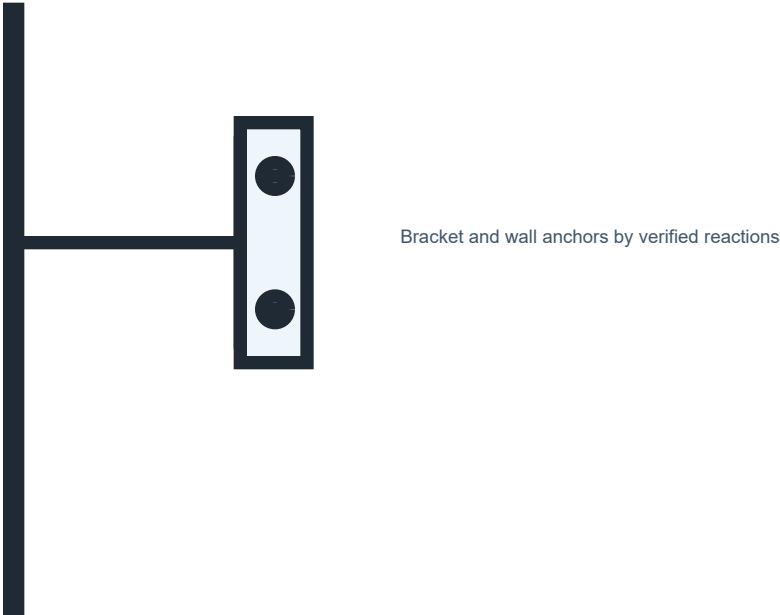
Post/rail or ladder series | reactions | base geometry | anchors by whom | substrate | environment | installation access | inspection.



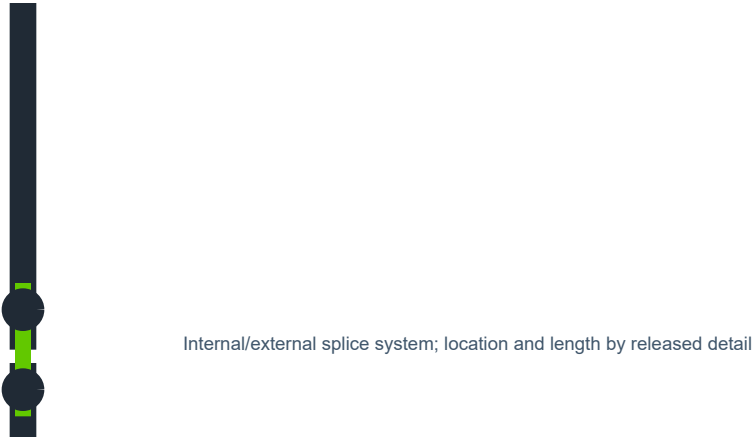
QY-FRP-D07 LADDER WALL SUPPORT & FIELD SPLICE

CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Wall support bracket



B. Rail splice concept



RFQ FIELDS

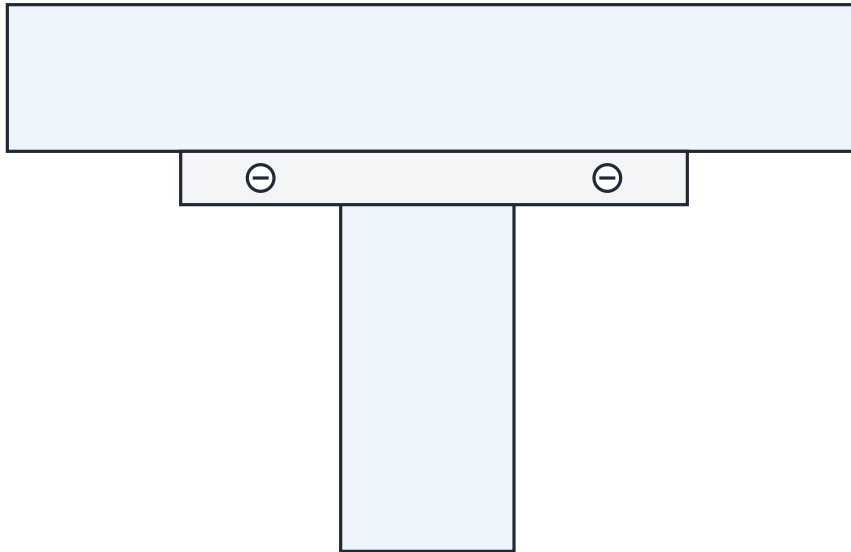
Climb height | bracket spacing by calculation | wall/substrate | base support | splice locations | rail/rung series | fasteners/bond | sealing.



QY-FRP-D08 BEAM-COLUMN TOP & BEAM CONNECTION CONCEPTS

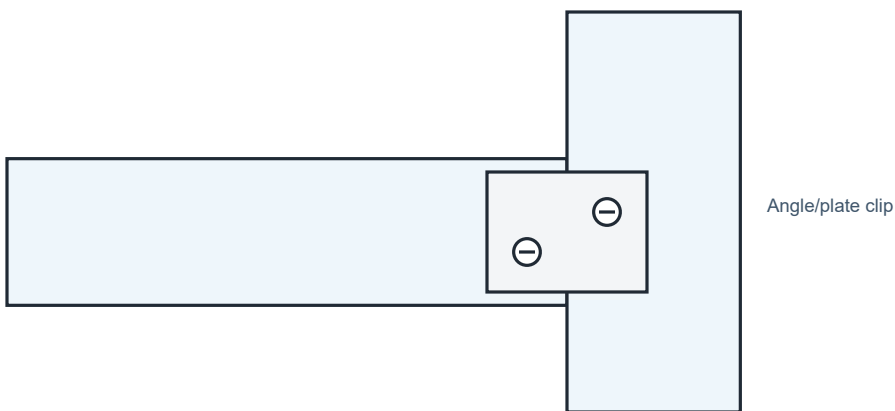
CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Beam bearing at column



Bearing plate / clip / bolt group by reactions and local checks

B. Beam-to-beam / channel connection



RFQ FIELDS

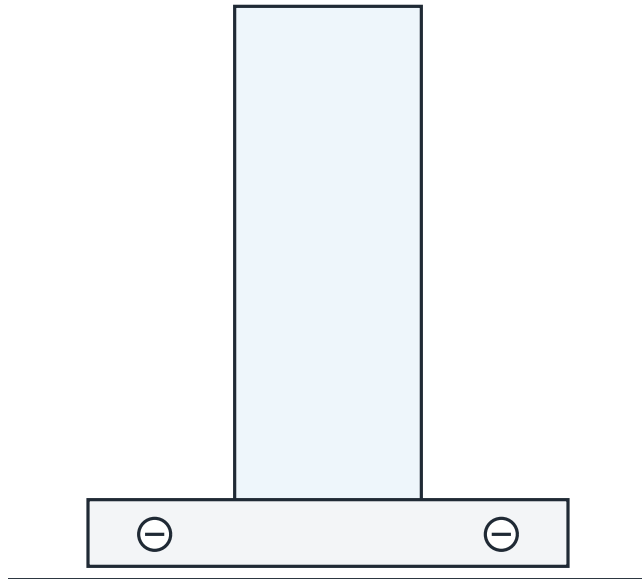
Member/profile revision | reactions | bearing length | plate/clip | hole/bolt pattern | lateral restraint | splice/erection | coating/isolation.



QY-FRP-D09 COLUMN BASE & BOTTOM STAIR STRINGER CONCEPTS

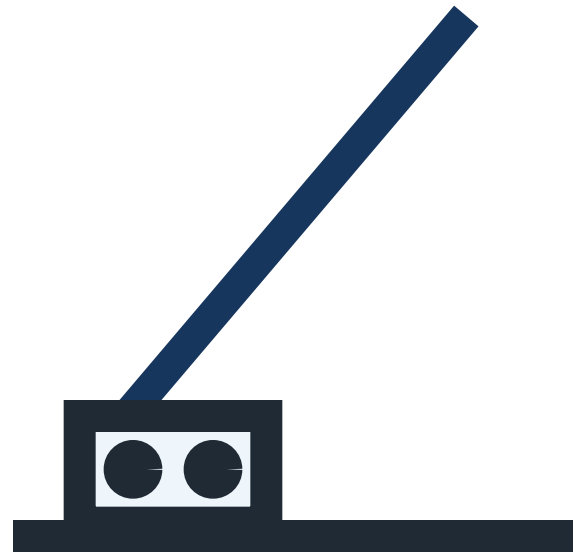
CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. FRP column base



Base plate/clip, anchors and substrate by calculation

B. Bottom stringer support



Support angle/plate and anchors by reactions

RFQ FIELDS

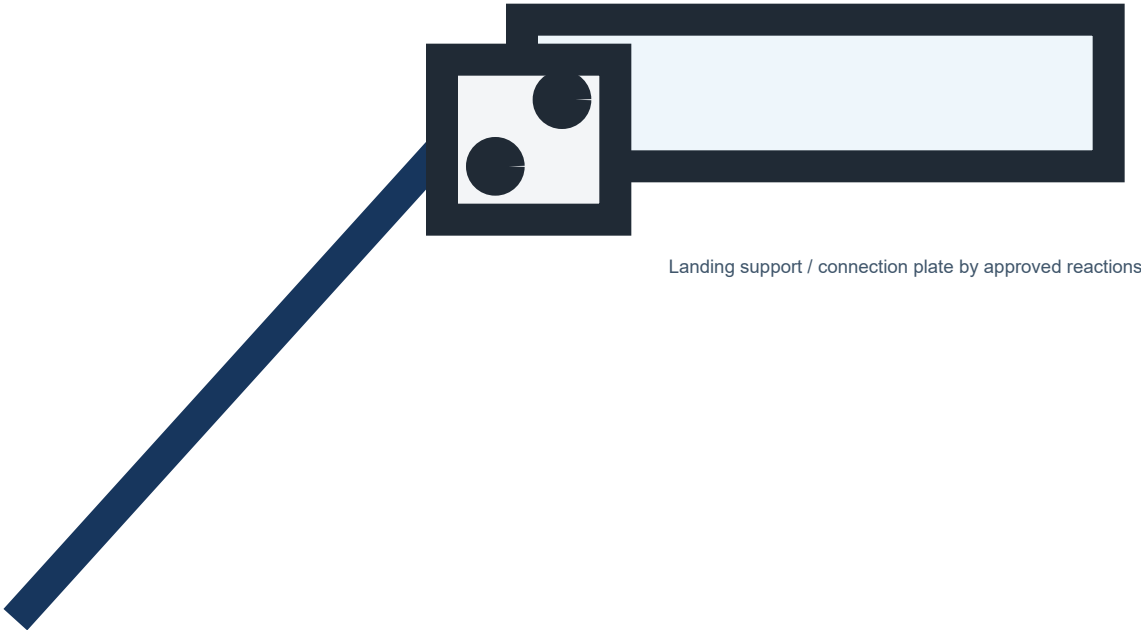
Column/stringer profile | end reactions | base/support plate | anchors and substrate | drainage/isolation | field holes | inspection.



QY-FRP-D10 TOP STAIR STRINGER INTERFACE & DRAWING SCHEDULE

CONCEPT ONLY - FINAL DIMENSIONS, MATERIALS, FASTENERS AND LOAD PATH REQUIRE APPROVED PROJECT DRAWINGS.

A. Top stringer / landing interface



B. Drawing and evidence schedule

ID	Document	Minimum content
GA	General arrangement	Geometry, levels, supports, panels, stairs, rails, ladders and marks
DET	Connection details	Profiles, plates, clips, bolts, anchors, holes, loads and responsibilities
CALC	Design calculation	Codes, loads, properties, reductions, checks, reactions and limits
PDS	Product data	Exact series, dimensions, material/resin, table/report revision
ITP	Inspection plan	Incoming material, dimensions, assembly, finish, load/test records and release
PKG	Packing plan	Marks, bundle/pallet groups, protection, lifting and destination

RELEASE GATE

Each concept detail must be replaced by an approved project detail before fabrication or installation.



7.0 DATA HIERARCHY, SOURCES & RELEASE STATUS

7.1 Four data classes used in this manual

Class	Meaning	Permitted use
A - QY published route	Geometry or option publicly stated by QY, without an assigned performance value.	Catalog starting point and RFQ preparation.
B - public benchmark	Value published by a named FRP manufacturer for its own identified series.	Screening comparison only; keep source, geometry, units and limits.
C - equivalent-series release	QY or supplying factory confirms that the quoted series matches the benchmark construction and controls.	Preliminary project submittal with signed equivalence record.
D - verified QY series	QY/supplier test report or approved calculation identifies the exact series and revision.	Released product value, subject to project code and approval.

7.2 Required benchmark match

- Match molded or pultruded construction, nominal depth, mesh/bar geometry, load direction and open/covered top.
- Match load type, clear span, bearing condition, units, deflection criterion, safety factor and ambient/service conditions.
- Record manufacturer, document title, page/table, publication revision, access date and any conversion formula.
- Use the lower governing value when two public sources are shown; do not average values or interpolate across different series.

PRIMARY SOURCE LINKS

- QY molded FRP product route - qymetaltech.com
- QY panel size and span RFQ route - qymetaltech.com
- ASTM D790 flexural test method - astm.org
- ACMA/FGMC grating manual status and scope - acmanet.org

CONTROLLED USE

Pages 25-31 contain selected public benchmarks, not QY test certificates. A quotation may reference them only after the exact product offered is identified and the benchmark match is recorded.

Customer edition source control: external benchmark records A/B are retained internally; public technical references shown here are ASTM D790 and the ACMA/FGMC Grating Manual framework.



7.1 COMMON MOLDED GRATING GEOMETRY

QY publicly presents 25, 30, 38 and 50 mm as selection starting points and 38 x 38 mm as a common mesh. The comparison below shows why nominally similar products still require exact-series matching.

Source	Nominal style	Open	Weight	Section properties per ft width	Published panel note
QY route	25/30/38/50 mm; common 38 x 38 mm mesh	Confirm	Confirm	Not publicly assigned	Finished size, span and cutting list by RFQ
Benchmark A	1 in; 1.5 x 1.5 in	70%	2.50 psf	A 1.71 in2; I 0.14 in4; S 0.29 in3	3 x 10, 4 x 8, 4 x 12 ft
Benchmark B	1 in; 1.5 x 1.5 in	69%	2.50 psf	A 1.79 in2; I 0.15 in4; S 0.30 in3	3 x 10, 4 x 8, 4 x 12 ft
Benchmark A	1.5 in; 1.5 x 1.5 in	70%	3.80 psf	A 2.85 in2; I 0.51 in4; S 0.65 in3	3 x 10, 4 x 8, 4 x 12, 5 x 10 ft
Benchmark B	1.5 in; 1.5 x 1.5 in	68%	3.94 psf	A 2.73 in2; I 0.49 in4; S 0.65 in3	3 x 10, 3 x 12, 4 x 12 ft
Benchmark A	2 in; 2 x 2 in	72%	4.00 psf	A 2.88 in2; I 0.96 in4; S 0.94 in3	4 x 12 ft
Benchmark B	2 in; 2 x 2 in	71%	4.51 psf	A 3.12 in2; I 1.03 in4; S 1.03 in3	4 x 12, 5 x 12 ft

Metric conversion and interpretation

- 1 psf = 4.8824 kg/m2. Nominal 1, 1.5 and 2 in depths correspond to about 25.4, 38.1 and 50.8 mm.
- Open area, weight and section properties differ even when depth and mesh labels look equivalent.
- Panel availability is manufacturer-specific and does not establish QY stock or final cut size.

Customer edition: values are labeled external Benchmark A/B. Full source documents and page references are retained in QY's internal evidence register.



7.2 NOMINAL 25 MM MOLDED GRATING

Selected uniform-load screening values for nominal 1 in deep, 1.5 x 1.5 in square-mesh molded grating. Deflection is shown at 50 psf (2.39 kPa). Maximum recommended load is the source manufacturer's value.

Clear span	Benchmark A defl.	Benchmark A max.	Benchmark B defl.	Benchmark B max.
457 mm / 18 in	0.51 mm	30.16 kPa	0.43 mm	59.61 kPa
610 mm / 24 in	1.52 mm	16.76 kPa	1.27 mm	31.98 kPa
762 mm / 30 in	3.56 mm	10.53 kPa	3.02 mm	20.44 kPa
914 mm / 36 in	7.87 mm	7.18 kPa	6.10 mm	11.49 kPa
1067 mm / 42 in	12.45 mm	5.27 kPa	10.95 mm	9.82 kPa

Source controls

- Benchmark A states a 5:1 factor of safety on ultimate capacity.
- Benchmark B states a 4:1 factor of safety and limits the published table to static ambient conditions.
- At 610 mm span the public maximum recommended values differ by about 91%; this difference is not removed by matching nominal depth and mesh.
- Check serviceability against the project limit as well as strength. No value above is a QY certificate.

NO INTERPOLATION ACROSS BENCHMARKS

Use a complete row from one matched product series. Do not combine Benchmark A deflection with Benchmark B capacity or convert the higher result into a QY rating.

External benchmark records A/B are retained internally. Conversions: 1 in = 25.4 mm; 1 psf = 0.0478803 kPa.



7.3 NOMINAL 38 MM MOLDED GRATING

Selected uniform-load screening values for nominal 1.5 in deep, 1.5 x 1.5 in square-mesh molded grating. Deflection is shown at 50 psf (2.39 kPa); source maximum recommended loads use different safety factors.

Clear span	Benchmark A defl.	Benchmark A max.	Benchmark B defl.	Benchmark B max.
457 mm / 18 in	<0.25 mm	67.99 kPa	0.13 mm	86.81 kPa
610 mm / 24 in	0.51 mm	38.30 kPa	0.36 mm	48.89 kPa
762 mm / 30 in	1.27 mm	24.42 kPa	0.84 mm	31.27 kPa
914 mm / 36 in	2.54 mm	16.76 kPa	1.70 mm	21.69 kPa
1067 mm / 42 in	4.32 mm	12.45 kPa	3.12 mm	15.94 kPa
1219 mm / 48 in	7.11 mm	9.58 kPa	5.31 mm	12.21 kPa

Screening sequence

- Confirm exact clear span, not overall panel length.
- Compare project uniform load with the lower matched-source maximum, then check the required deflection limit.
- Add impact, dynamic, creep, temperature, chemical, cutout and covered-top effects required by the source and project.
- A 38 mm label alone does not select a safe panel.

PUBLIC BENCHMARK ONLY

The table is useful for RFQ screening and checking whether a proposed span is plausible. Final QY release requires the exact supplied series and its traceable performance basis.

Customer edition: full source identity, document revision and page references are retained in QY's internal evidence register.



7.4 NOMINAL 51 MM MOLDED GRATING

Selected uniform-load screening values for nominal 2 in deep, 2 x 2 in square-mesh molded grating. Deflection is shown at 50 psf (2.39 kPa). These values are not interchangeable with a 50 mm product until geometry is verified.

Clear span	Benchmark A defl.	Benchmark A max.	Benchmark B defl.	Benchmark B max.
457 mm / 18 in	<0.25 mm	88.58 kPa	0.08 mm	197.12 kPa
610 mm / 24 in	0.25 mm	49.80 kPa	0.20 mm	110.89 kPa
762 mm / 30 in	0.51 mm	31.60 kPa	0.46 mm	70.96 kPa
914 mm / 36 in	1.02 mm	22.03 kPa	0.91 mm	49.27 kPa
1067 mm / 42 in	2.03 mm	16.28 kPa	1.65 mm	36.20 kPa
1219 mm / 48 in	3.56 mm	12.45 kPa	2.77 mm	27.72 kPa
1372 mm / 54 in	5.33 mm	9.58 kPa	4.34 mm	21.88 kPa
1524 mm / 60 in	9.40 mm	7.66 kPa	6.58 mm	17.76 kPa

Why the spread is material

- Benchmark A publishes 72% open area, 4.00 psf and I = 0.96 in4/ft for this geometry.
- Benchmark B publishes 71% open area, 4.51 psf and I = 1.03 in4/ft.
- The different section geometry, material system and safety-factor convention produce different capacities.

50 MM IS NOT 50.8 MM BY DEFAULT

Verify actual depth, bar shape, open area, weight and test series before using this benchmark for a QY 50 mm RFQ.

External benchmark records A/B are retained internally. Conversions are rounded for screening.



7.5 38 MM POINT & LINE LOAD SCREENING

Selected external Benchmark A values for nominal 1.5 in deep, 1.5 x 1.5 in square mesh. Point-load deflection uses 300 lb (1.33 kN). Line-load deflection uses 300 lb/ft (4.38 kN/m).

Clear span	Point defl. at 1.33 kN	Line defl. at 4.38 kN/m	Max rec. line load
457 mm / 18 in	0.51 mm	1.27 mm	15.47 kN/m
610 mm / 24 in	0.76 mm	2.54 mm	11.68 kN/m
762 mm / 30 in	1.52 mm	4.57 mm	9.34 kN/m
914 mm / 36 in	2.29 mm	8.13 mm	7.73 kN/m
1067 mm / 42 in	3.30 mm	11.94 mm	6.57 kN/m
1219 mm / 48 in	4.57 mm	Not published at this load	5.84 kN/m
1372 mm / 54 in	5.59 mm	Not published at this load	5.11 kN/m
1473 mm / 58 in	6.35 mm	Not published	Not published

Load case controls

- Point load, line load and uniform load are separate cases; do not substitute one for another.
- Confirm load footprint, position, panel orientation, support width and whether the load moves or impacts the panel.
- Blank source cells remain blank. Do not extrapolate a larger span or higher load.

PROJECT APPROVAL

Wheel loads, forklifts, vehicles, dropped loads and repeated dynamic service require a product/system-specific review; this pedestrian-style benchmark is not a vehicle rating.

External Benchmark A source record is retained internally. 1 lb = 4.44822 N; 1 lb/ft = 0.0145939 kN/m; 1 in = 25.4 mm.



7.6 SECTION PROPERTIES & CONNECTION CHECKS

Source	Nominal	Open	Weight	A / I / S per ft width	Use
Benchmark A	25 mm	70%	12.21 kg/m2	1.71 in2 / 0.14 in4 / 0.29 in3	Square 38 mm mesh benchmark
Benchmark B	25 mm	69%	12.21 kg/m2	1.79 in2 / 0.15 in4 / 0.30 in3	Square 38 mm mesh benchmark
Benchmark A	38 mm	70%	18.55 kg/m2	2.85 in2 / 0.51 in4 / 0.65 in3	Square 38 mm mesh benchmark
Benchmark B	38 mm	68%	19.24 kg/m2	2.73 in2 / 0.49 in4 / 0.65 in3	Square 38 mm mesh benchmark
Benchmark A	51 mm	72%	19.53 kg/m2	2.88 in2 / 0.96 in4 / 0.94 in3	Square 51 mm mesh benchmark
Benchmark B	51 mm	71%	22.02 kg/m2	3.12 in2 / 1.03 in4 / 1.03 in3	Square 51 mm mesh benchmark

External connection Benchmark A

- FRP plate/web bearing benchmark: $P_{allow} = t \times d \times 10,000 \text{ psi}$. The source states bearing controls with factor of safety 3.0.
- 316 stainless bolt single-shear benchmark: $V_{allow} = 0.17 \times F_u \times \text{bolt area}$, using source $F_u = 75,000 \text{ psi}$.
- Source recommended ratios: end edge distance 3d, side edge distance 2.5d and bolt pitch 5d.
- Check bolt grade, FRP thickness, hole quality, washers, pull-through, block shear, tear-out, local bending and substrate/anchor effects separately.

DO NOT TRANSFER THE ALLOWABLE

The formula and constants above describe external connection Benchmark A. QY must replace F_p , F_u and any FRP rod value with the actual supplied plate/profile and fastener basis before release.

Full source identity, document revision and page references for Benchmark A/B are retained in QY's internal evidence register.



7.7 RESIN SYSTEMS & RELEASE EVIDENCE

7.7.1 Public resin benchmark

Public family	Typical benchmark description	QY release requirement
Orthophthalic polyester	General-purpose/economical corrosion route in external benchmark literature.	Exact resin designation, supplier statement and exposure review.
Isophthalic polyester	Premium polyester route for industrial corrosion exposure.	Exact formulation, temperature/chemical limits and report revision.
Vinyl ester	Higher-corrosion-resistance route in public manufacturer literature.	Exact formulation and chemical-resistance evidence for the named exposure.
Phenolic / special	Fire/smoke or special-environment product family; not interchangeable.	Product-specific fire, smoke, mechanical and fabrication evidence.

7.7.2 Evidence matrix

Claim	Method / document	Minimum identity to record
Flexural properties	ASTM D790 or named equivalent	Series, specimen, direction, conditioning, rate and report number
Surface burning	ASTM E84 / project method	Resin, reinforcement, thickness, surface, mounting and FSI/SDI
Burning behavior	ASTM D635 when specified	Specimen thickness, conditioning and classification/result
Barcol hardness	ASTM D2583 when specified	Product, cure state, readings, acceptance rule and lot
Chemical resistance	Manufacturer/lab table plus exposure basis	Chemical, concentration, temperature, duration and cleaning cycle
Slip resistance	Project-selected wet/dry method	Surface, contaminant, direction, specimen and test laboratory

RELEASE PACKAGE

Product designation | geometry | resin/surface/color | source and revision | load table or calculation | test report IDs | drawings | inspection record | packing marks | authorized approval.

A test method is universal; a test result is tied to the tested product. External benchmark claims remain external until QY has a matching report.



QY METAL TECH | FRP PRODUCT SUPPORT

PROJECT ROUTES

Molded FRP grating

Confirm panel depth, mesh, surface, resin/color request, supports, cutouts and quantity.

Pultruded FRP grating

Confirm bearing direction, bar spacing, clear span, load case, deflection and table revision.

Fabricated panels & trench covers

Confirm opening/frame, support ledge, removable panels, marks and packing.

Guardrail, ladder, profiles & stairs

Quote only against defined geometry, loads, connections, evidence and approval scope.



MOLDED FRP
PRODUCT ROUTE



LOAD & SPAN
GUIDANCE



RESIN INPUTS



SEND RFQ

RELEASED EVIDENCE PACK - AS AGREED PER ORDER

- Approved product designation, series/revision and fabrication drawing.
- Material/resin/finish confirmation and applicable supplier certificates.
- Inspection records and product-specific load/test report when contractually required.
- Packing list, item/batch marks, traceability records and release approval.

CONTACT QY

sales@qymetaltech.com

WhatsApp: +86 151 5225 6390

Wuxi, Jiangsu, China

qymetaltech.com

ENGINEERING AND EVIDENCE BOUNDARY

This manual includes selected, attributed public manufacturer benchmarks for screening. It does not convert those values into a QY certificate, approve a structure or replace current codes, exact-series verification, sealed calculations, product-specific tests, approved drawings or competent installation. No competitor trademark, stock claim or certification is adopted.