VALTOR Self-Drilling Screw Selection Guide

Material, head style, drill point, sealing washer and application selection

Buyer reference only. Drilling capacity is not determined by screw diameter alone. Confirm total steel thickness, substrate hardness, drill-point design, screw material, installation speed and the manufacturer's validated drilling range.

1. Material Selection

Material / Construction	Drilling Direction	Corrosion Direction	Typical Use	Main Advantage	Main Limitation	Buyer Check	VALTOR Selection Note
410 stainless steel	Martensitic stainless can be hardened, making it a common direction for direct self-drilling performance in steel sheet	Better corrosion resistance than ordinary carbon steel, but lower than 304/316 austenitic stainless	General industrial self-drilling screws, sheet-metal fastening, hex washer head drilling screws	Combines stainless appearance/corrosion resistance with hardenability for the drill point	Not the same corrosion level as 304/316; suitability depends on environment and coating/passivation condition	Confirm substrate material, total drilling thickness and corrosion environment	VALTOR's primary stainless direction for conventional one-piece self-drilling screws.
304 / A2 stainless body with hardened drill point	For drilling steel, austenitic stainless products commonly use a hardened steel drill-point or bi-metal construction	Higher general corrosion resistance than 410	Exterior/cladding/roofing or corrosion-sensitive applications where self-drilling into steel is still required	Corrosion-resistant stainless upper body plus hard drill point	Exact construction must be confirmed; an all-austenitic 304 screw is not automatically suitable for drilling structural steel	Ask whether the product is bi-metal / hardened-point and request the validated drilling capacity	Use where 304/A2 corrosion resistance is required together with self-drilling capability.
316 / A4 stainless body with hardened drill point	Same selection logic as 304/A2: drilling capability normally requires a hardened drill-point design	Higher chloride/corrosion resistance than 304 in many environments	Coastal, roofing/cladding and higher-corrosion applications	Higher corrosion-resistance stainless upper body combined with a functional drill point	Higher cost; drilling construction and actual 316/A4 material must be verified	Confirm exact 316/316L or A4 requirement, drill-point material and drilling range	Use where corrosion demand justifies A4/316 rather than 410 or A2/304.
Carbon steel, heat-treated + protective coating	High drilling performance when point geometry and heat treatment are matched to the substrate	Corrosion resistance depends mainly on the coating system	Indoor/general construction, machinery, coated steel fastening	Cost-effective and high drilling hardness	Base material is not inherently corrosion-resistant; coating damage/cut edges matter	Specify coating system, corrosion requirement and hydrogen-embrittlement controls where relevant	Useful where drilling performance and cost dominate over stainless material requirements.

2. Head Style & Drive Selection

Head Style	Typical Drive	Best-Fit Application	Clamping / Bearing Area	Sealing Washer Compatibility	Common ISO Reference	Main Watch-Out	Buyer Selection Cue
Hex washer head	External hex	Metal sheet, roofing/cladding, steel-to-steel or sheet-to-structure fastening	High and practical bearing area; easy installation with socket/nut setter	Excellent fit for bonded sealing washers or PVC-type washers when product design requires	ISO 15480:2019	Avoid overtightening sealing washers; use controlled depth	Preferred when installation speed, clamping area and washer compatibility are important.
Pan head	Phillips / cross recess; other drives may be manufacturer-specific	Sheet metal, brackets, light industrial assemblies	Moderate bearing area with low-profile rounded head	Usually used without large roofing-style sealing washers	ISO 15481:1999	Drive recess must match installation tool to avoid cam-out	Choose when a lower-profile head is desired without countersinking.
Countersunk head	Phillips / cross recess; other drives may be manufacturer-specific	Flush-finish joints where the receiving material can accept countersinking	Bearing is developed through the countersunk seat	Not normally the first choice for external roofing weather seals	ISO 15482:1999	Countersunk seat geometry and sheet thickness must support the head	Choose only when a flush surface is required and the joint geometry supports it.
Raised countersunk head	Phillips / cross recess	Decorative / semi-flush applications	Countersunk seating with a raised crown	Generally not a primary roofing-seal head form	ISO 15483:1999	Less common; confirm customer drawing and drive requirement	Use when the specified standard or appearance requires this head form.

3. Washer & Sealing Selection

Washer / Seal	Construction	Typical Use	Primary Function	Installation Rule	Main Risk	Buyer Check	VALTOR Note
No sealing washer	Head bears directly on the connected part	Indoor/general industrial fastening, non-weather-sealed joints	Mechanical clamping only	Tighten to achieve secure seating without stripping the formed thread	No weather seal; thin sheet can deform under excessive bearing pressure	Is weather-tightness required?	Use when sealing is not part of the joint requirement.
PVC washer	White / translucent PVC sealing or insulating washer under the head	Light sealing / insulating applications and specific OEM requirements	Provides a compliant interface and can provide sealing/insulating function depending on design	Control compression; washer must remain seated and not be excessively crushed	PVC is not automatically equivalent to EPDM for long-term exterior roofing exposure	Confirm temperature, UV/weather exposure and sealing requirement	VALTOR can supply PVC washer configurations for hex washer head self-drilling screws.
Stainless bonded washer + EPDM	Metal backing washer with bonded EPDM sealing layer	Roofing, cladding and exterior weather-sealed fastening	Distributes clamping load and provides an elastomeric weather seal	Use depth control: under-tightening can leak; overtightening can damage or extrude the seal	Tilted installation or excessive compression can compromise sealing	Confirm washer diameter, metal backing material, EPDM requirement and roof-sheet geometry	Preferred VALTOR roofing-screw sealing direction for weather-exposed applications.

4. Application Selection Guide

Application	Recommended Product Direction	Material Direction	Washer Direction	Critical Selection Variable	Installation Note	Avoid This Shortcut	RFQ Detail
Thin sheet-to-sheet metal connection	Hex washer head or pan head self-drilling screw	410 stainless or coated carbon steel; 304/316 hardened-point designs where corrosion requires	Usually none unless sealing/insulation is required	Combined thickness of the sheets and available thread engagement	Keep screw perpendicular and use the specified installation speed	Selecting by nominal diameter without checking drill capacity	Sheet materials + individual thicknesses + total stack + screw material + finish
Metal sheet to steel purlin / structural steel	Hex washer head self-drilling screw with drill point matched to steel thickness	410, coated steel, or bi-metal 304/316 construction depending corrosion demand	Optional sealing washer for exterior sheet applications	Total drilling thickness and steel strength/hardness	Use correct rpm, tool alignment and depth control	Assuming every screw of the same diameter can drill the same steel thickness	Substrate grade + total steel thickness + sheet stack + required drill capacity
Roofing / exterior cladding	Roofing self-drilling screw, normally hex head	Corrosion-resistant body appropriate to exposure; A2/A4 hardened-point products for higher corrosion demand	Stainless bonded EPDM washer	Weather seal + sheet/purlin drilling requirement	Tighten until seal is correctly compressed; do not deform the washer backing	Using a structural self-drilling screw without specifying the sealing system	Roof sheet material + purlin material/thickness + exposure + washer diameter/material
Corrosion-sensitive exterior assembly	Stainless or bi-metal self-drilling screw selected by both corrosion and drilling demand	304/A2 or 316/A4 body with hardened drill point where direct steel drilling is required	EPDM or project-specific washer if weather exposed	Compatibility between corrosion requirement and drill-point construction	Protect exposed joint from dissimilar-metal/galvanic issues where relevant	Calling any silver-colored screw 'stainless'	Exact alloy + drill-point construction + coating of point + certificate requirement

Interior machinery / industrial enclosure	Pan head or hex washer head self-drilling screw	410 stainless or coated carbon steel	Usually none	Sheet thickness, head clearance and service environment	Use correct drive and avoid stripping formed threads	Over-specifying roofing seals when not required	Sheet thickness + head/drive + material + corrosion requirement

5. Drilling Capacity — The Most Important RFQ Check

Check Item	Why It Matters	What Buyer Should Provide	What Supplier Should Confirm	Do Not Assume	Reference Direction
Total drilling thickness	The drill point must penetrate the complete steel stack before the tapping thread can form correctly	Thickness of each steel component and total stack	Validated drilling range for the exact screw design	A larger diameter automatically means a higher drilling range	ISO 10666 functional drilling-screw requirements + manufacturer test data
Substrate strength / hardness	Harder steel can reduce drilling capability and increase point wear/failure	Steel grade / tensile strength if known	Approved substrate range or project-specific validation	A screw tested in mild sheet will perform identically in high-strength steel	Manufacturer drilling-capacity test / approval data
Drill-point length	The point must clear the stack before full thread engagement starts	Joint stack-up and any air gaps	Point geometry / pilot length suitable for the application	Any 'TEK number' alone fully defines performance across brands	Use actual product geometry and validated performance
Installation rpm	Excessive or insufficient speed can overheat, wear or stall the drill point	Available screw gun / installation method	Recommended rpm range for the exact product	Impact gun settings are interchangeable with depth-controlled screw guns	Manufacturer installation instructions

6. Standards & Technical References

Reference	Status / Scope	Used For	Source URL
ISO 10666:1999	Current; confirmed 2024 — drilling screws with tapping screw thread, mechanical and functional properties	Functional requirements / drilling-screw performance framework	https://www.iso.org/standard/18756.html
ISO 15480:2019	Current; confirmed 2024 — hexagon washer head drilling screws, ST2.9 to ST6.3	Hex washer head drilling screw product reference	https://www.iso.org/standard/73633.html
ISO 15481:1999	Current; confirmed 2024 — cross recessed pan head drilling screws	Pan head product reference	https://www.iso.org/standard/27841.html
ISO 15482:1999	Current; confirmed 2024 — cross recessed countersunk head drilling screws	Countersunk product reference	https://www.iso.org/standard/27842.html
ISO 15483:1999	Current; confirmed 2024 — cross recessed raised countersunk head drilling screws	Raised countersunk product reference	https://www.iso.org/standard/27843.html
EJOT self-drilling screw guide	Manufacturer technical guidance on bi-metal construction	Austenitic stainless upper body + hardenable drill-point concept	https://www.ejot.com/construction/self-drilling-screws-guide/production-of-self-drilling-screws
EJOT assembly guide	Manufacturer installation guidance	Correct compression of sealing washers / EPDM seal	https://www.ejot.com/construction/self-drilling-screws-guide/avoid-assembly-errors-with-self-drilling-screws

Recommended RFQ format: APPLICATION + CONNECTED MATERIALS + EACH MATERIAL THICKNESS + TOTAL DRILLING THICKNESS + SCREW DIAMETER/LENGTH + HEAD/DRIVE + SCREW MATERIAL/CONSTRUCTION + WASHER/SEAL + CORROSION REQUIREMENT + CERTIFICATE/APPROVAL.