



المهارة الذكية
Smart Skill

SHEAR STUD CONNECTORS

**Headed Shear Stud Connectors
(Type B) & Ceramic Ferrules**

ISO 13918



SHEAR STUD CONNECTORS

Company Overview

Smart Skill Contracting Est. manufactures and supplies cold-formed headed shear stud connectors (Type B) for composite steel-concrete construction in accordance with ISO 13918, with material properties compatible with ASTM A1044/A1044M. Site welding is performed by the drawn-arc stud welding process with ceramic ferrules, qualified to ISO 14555 or AWS D1.1 as required by the project specification. Design shear capacity is to be verified by the structural designer in accordance with Eurocode 4 (EN 1994-1-1) or the project's governing design code.

Product Description

Type B shear connectors are headed studs with a cheese-head (round flat head with chamfer), a cylindrical shank, and a pre-fluxed weld end containing a measured charge of aluminium deoxidising flux. The stud is welded to the supporting steel flange through the deck/slab interface by the drawn-arc stud welding process, transferring longitudinal shear between the concrete slab and the steel beam in composite construction.

Applicable Standards

Subject	Standard
Stud manufacture, dimensions, tolerances	ISO 13918:2017 - Type SD (RD) / Type B
Arc stud welding process & qualification	ISO 14555:2017
Stud base material qualification	ASTM A1044/A1044M-21
Welding procedure & qualification (alternative)	AWS D1.1/D1.1M Structural Welding Code - Steel
Composite structural design	Eurocode 4 (EN 1994-1-1), BS 5400-5
Additional regional references	AS/NZS 1554.2, JIS B 1198



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3. Dimensions and Tolerances (mm)

Nominal Dia. (D1)	Shank Length (L1)	Head Dia. (D5)	Head Height (h3)	Min. Tensile Strength
10	27 - 155	18	7	450 N/mm ²
13	27 - 155	22	8	450 N/mm ²
16	50 - 155	32	8	450 N/mm ²
19	75 - 255	32	10	450 N/mm ²
22	100 - 255	35	10	450 N/mm ²
25	100 - 255	41	12	450 N/mm ²

Note: L2 (finished length after welding) = L1 – burn-off loss. Typical burn-off allowance: 2–7 mm depending on diameter, per ISO 13918.

4. Material & Mechanical Properties

Property	Mild Steel (SWRCH18A / ML15Al)	Stainless Steel (304HC / 316Cu)
Tensile strength, min.	450 N/mm ²	500–780 N/mm ²
Yield strength (Rp0.2), min.	350 N/mm ²	350 N/mm ²
Elongation (A5), min.	15%	20%
Wire surface treatment	Phosphate plating	Film coating

5. Flux & Ceramic Ferrule

- Aluminium deoxidising flux, fixed depth max. 1.6 mm, automatically dosed for consistent arc stabilisation.
- Ceramic ferrule manufactured to ISO 13918 Type UF, single-use, available in sizes UF10–UF25 / WTD13–WTD25.
- Function: shields the weld pool, stabilises and concentrates the arc, moulds the weld collar, and protects the operator from spatter.



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6. Welding Process Parameters

Parameter	Value
Welding process	Drawn-arc stud welding with ceramic ferrule
Weld time	> 200 ms
Welding positions	PA (flat) 10–25 mm PC (horizontal) 10–16 mm PE (overhead) 10–19 mm
Welding current range	800 A – 3000 A
Weld pool protection	Ceramic ferrule (CF)
Minimum base metal thickness	$0.25 \times \text{stud diameter (d)}$

7. Quality Assurance & Certification

- Stud base material qualification - third-party verified (TÜV SÜD-type assessment).
- ISO 9001:2015 Quality Management System - third-party certified.
- Factory Production Control (FPC) - independently audited and certified.
- 100% dimensional and visual inspection; batch tensile and bend testing per ISO 13918 Annex / ASTM A1044.

8. Finish, Packing & Marking

- Surface finish: phosphate-plated or film-coated bright finish, anti-rust, high-precision forming.
- Each stud head is marked with manufacturer logo and diameter code for full traceability.
- Packed in moisture-resistant cartons; quantity per carton varies by diameter (refer to packing list).

9. Reference Images & Product Layout

The following images illustrate the general appearance, components, and welded application of headed shear stud connectors (Type B) and ceramic ferrules for general reference purposes.

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9.1 Shear Stud Connector & Ceramic Ferrule



Headed shear stud connector with ceramic ferrule



Ceramic ferrule (single-use, ISO 13918 Type UF)

9.2 Stud Components - Cheese Head / Flux / Shank



Cheese head, flux charge, and shank - the three key functional zones of a shear connector

9.2 Stud Components - Cheese Head / Flux / Shank



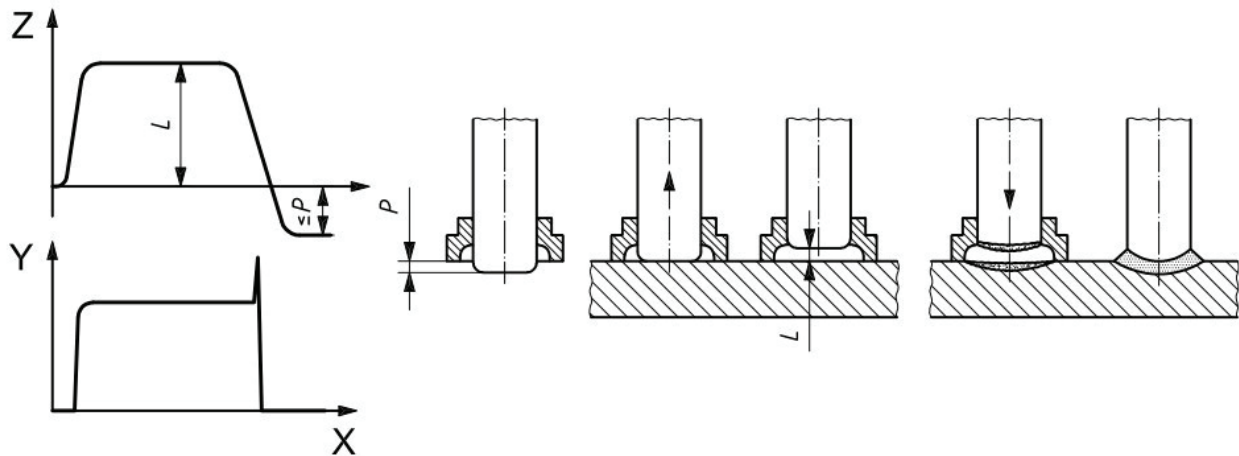
General arrangement: shear studs welded to steel beam supporting composite slab



Drawn-arc stud welding in progress
completed 360° weld collar

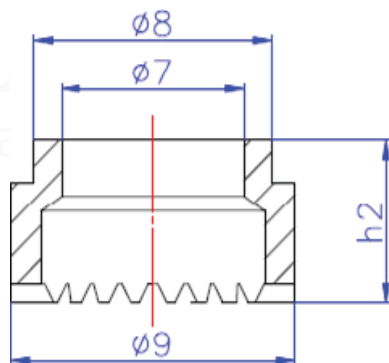
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9.4 Drawn-Arc Welding Process - Layout

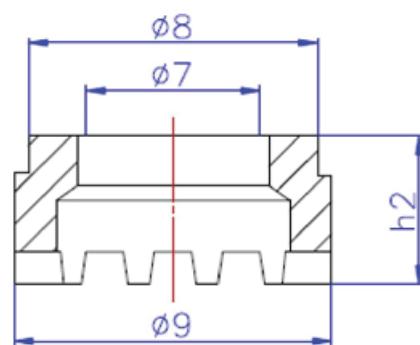


P: Protrusion L: Lift X: Weld Time Y: Weld Current Z: Stud Movement
Welding cycle: lift (L), protrusion (P), weld time (X) and weld current (Y) vs. stud movement (Z)

9.5 Ceramic Ferrule - Dimensional Layout (ISO 13918 Type UF / WTD)



Type UF ferrule - dimensional layout (Ø7, Ø8, Ø9, h2)



Type WTD ferrule - dimensional layout (Ø7, Ø8, Ø9, h2)

Note: Images are provided for general visual reference of product type, components, and welding layout.
Refer to Sections 3–6 for certified dimensional and mechanical data governing supply.

10. Manufacturer

Smart Skill Contracting Est. | C.R. No. 7016908217 Sari Street, As Salamah, Jeddah 23436, Saudi Arabia

This datasheet is issued for general product reference. Project-specific design values shall be verified against the structural design (Eurocode 4 / project specification) and confirmed by Smart Skill's technical department.



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