



CAPABILITY STATEMENT

Welding Inspection and Technical Services

WPS, PQR and welder qualification, witnessed,
tested and endorsed to ASME Section IX and AWS D1.1

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Transparency. Competence. Reliability.

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Welding inspection, from the procedure to the endorsed record

TCR Engineering prepares and reviews welding procedure specifications, witnesses procedure and welder qualification tests to ASME Section IX, AWS D1.1 and API 1104, inspects production welds from fit-up to final visual, and endorses the records through an IIW-certified International Welding Specialist. Qualification coupons are tested at TCR's NABL accredited laboratory (NABL T0726MH18640) in Navi Mumbai. The work covers carbon and low-alloy steels, the stainless family, nickel alloys, and titanium and aluminium alloys.

Scope of services

Service	What TCR does	What you receive
WPS preparation and review	Writes the WPS for the process, material and joint, or reviews the fabricator's draft against the code: variables, filler, preheat, interpass and PWHT	A preliminary WPS ready to qualify, or a review with each finding referenced to its code clause
PQR qualification	Witnesses the procedure test coupon, records the actual parameters and routes the coupon to the laboratory	The PQR and the qualified WPS
Welder qualification	Witnesses each welder's or operator's test in the position, process and thickness the work needs	The welder performance qualification record (WPQ) with the range qualified
Testing	Visual, non-destructive, metallographic, mechanical and, where specified, corrosion testing of the coupons	Accredited test reports traceable to each coupon
Witnessing	Hold and witness points of the inspection and test plan, at TCR or at the works	A signed record for each witnessed stage
Certification and endorsement	Review and endorsement of WPS, PQR and WPQ by an IIW-certified International Welding Specialist, acting as external welding coordinator where the contract calls for one	Endorsed records for the quality file and the client's approval

Welding procedure qualification

- WPS prepared to the applicable code or standard (ASME, AWS, API) and the project's design conditions, with advice on process, technique and consumables.
- Post-weld heat treatment criteria and parameters reviewed against the base metal and the filler before the coupon is welded.
- Coupon welding and testing: visual, non-destructive and metallographic examination, PWHT, mechanical and corrosion testing.
- Procedure qualification record (PQR) and final qualified WPS documented.

Welder performance qualification

- Training, coupon welding, examination and testing of welders and welding operators to the code, with advice on the qualification variables that match production welding.
- Welder and welding operator qualification records (WPQ), each stating the range qualified.

Welding consumables testing

- Classification and brand testing of solid, flux-cored and metal-cored wires and electrodes to ASME Section II Part C and IS 814.

- Batch testing to the client's requirements, including PWHT simulation and special corrosion and mechanical tests.

Getting the qualification type right

The costliest welding errors are made on paper. Rebuilding a scored 13Cr valve seat on a WCB body, for example, is a hard-facing overlay under ASME Section IX QW-216, tested to QW-453 by penetrant, macro sections and hardness, not a groove weld with tensile and bend tests; and plain E410 filler must be tempered at 732 to 760 °C, at or above the lower critical temperature of the carbon steel body, where E410NiMo tempers at 593 to 621 °C. TCR checks what the code calls the weld, and what heat treatment the joint can take, before the first coupon is welded.

Inspecting production welds

Stage	What the welding inspector checks
Before welding	Qualified WPS in use; welder qualifications valid for process, position and range; consumables identified against certificates; joint preparation and fit-up; preheat; safety of the set-up, including arc radiation for people nearby
During welding	Current, voltage, travel and heat input within the WPS; interpass temperature; run sequence from root to cap
After welding	Visual examination against the acceptance criteria; PWHT records; the NDT the code calls for, by qualified personnel; samples to the laboratory where a test is needed

Inspectors carry the instruments the checks need: inspection mirrors, a safe lighting supply, weld gauges, rule and vernier, ammeter and voltmeter, and contact thermometers or temperature crayons.

Testing the welds

Coupons are tested at TCR Engineering's laboratory in Mahape, Navi Mumbai, accredited by NABL to ISO/IEC 17025:2017 (NABLT0726MH18640). ASME Section IX tensile, bend, macro-etch, fracture, peel and shear tests and the AWS B4.0 fillet weld break test are on the accredited scope, alongside hardness, chemical analysis, Charpy V-notch impact and radiography of the coupon.

Welder testing agency work

A fabricator that appoints a welder testing agency buys one chain: the test witnessed by a certified inspector, the coupons in the agency's custody to an ISO/IEC 17025 laboratory, radiography and mechanical tests signed by qualified personnel, and the certificates returned with the coupons. TCR runs every link, from Mahape in India and, in Saudi Arabia, through TCR Arabia, the group's joint venture in Dammam.

Link	How TCR covers it
Witness	CSWIP or AWS CWI certified welding inspectors, each named with the certificate on the record; in the Kingdom, Saudi Aramco approved inspectors engaged by TCR Arabia on contract
Coupon custody	Collection lead time, holding period after testing and return to site fixed in writing in the offer
Radiography	ASNT RT Level II technicians, RTFI-qualified film interpreters and ASNT Level III radiography personnel; TCR Arabia is Saudi Aramco approved for conventional NDT including RT (1 September 2021)
Mechanical tests	Bend, macro and nick break to ASME Section IX and API 1104 at Mahape (NABL, NABLT0726MH18640); in the Kingdom, at TCR Arabia's IAS accredited laboratory in Dammam, on Saudi Aramco's list of approved in-Kingdom laboratories for welding procedure qualification testing (22 June 2020)
Certificates	Welder performance qualification record stating the range qualified, with the test and NDT reports, and a welder identity card, issued by TCR in India and TCR Arabia in the Kingdom; any job clearance card format the owner specifies is agreed in the offer
Quality dossier	Calibration certificates for every test machine and instrument used, traceable under ISO/IEC 17025; quality plan, inspection and test plan, HSE procedures and organisation chart submitted for approval before work starts

For Saudi Aramco work the agency is TCR Arabia, which Saudi Aramco's Inspection Department approved as a Welder Testing Agency for qualifying welders working for Saudi Aramco (vendor 10040677, notified 20 July 2020). Where a contract names an owner's approval, its current status is confirmed in writing with the offer.

Who signs the welding work

Sachin Ram Bhadange, Welding Engineer, Welding Coordinator and welding educator and trainer: IIW-certified International Welding Specialist (IWS) and IIW-certified welding inspector (CWI-S).

TCR's welding inspectors are certified under at least one of CSWIP, the American Welding Society, BGAS or ASNT Level II visual testing, and are competent in ASME BPVC Section IX, API 1104 and AWS D1.1. TCR acts as an independent third party; it does not claim ISO/IEC 17020 accreditation as an inspection body.

What to send with an enquiry

- The governing code and its edition (for example ASME Section IX or AWS D1.1/D1.1M).
- Base metal specification, thickness, and pipe size and schedule where it is pipe.
- Process, filler classification, position and the pass sequence to be recorded.
- The examination and testing required, and the records to be issued.
- Whether photographs or video of the test are needed, who supplies material and consumables, and where the test is to be held.
- Coupon custody: who collects the coupons and by when, how long they are held after testing, and when they are returned.
- The certificate format, and any welder identity or job clearance card the owner's system uses.
- The quality dossier and when each part is due, and any owner approval the contract requires, with its validity.

Write to inspection@tcreng.com or sales@tcreng.com. Details of the service are on www.tcreng.com/services/inspection-manpower/welding-inspection/ and www.tcreng.com/services/materials-testing/welder-qualification/.



TCR Engineering Services Pvt. Ltd.

Materials testing, non-destructive testing, failure analysis, inspection and asset integrity, since 1973.

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