



VISUAL WELD INSPECTION

FIELD CHECKLIST & WELD DEFECT GUIDE

South Africa | Workshop-ready | Print-friendly

PRE-WELD

Fit-up, material, joint prep, WPS

IN-PROCESS

Pass cleaning, process, controls

FINAL VT

Profile, dimensions, visible imperfections

DISPOSITION

Accept, hold, repair, reinspect, refer

FIELD READY

IDENTIFY - MEASURE

COMPARE - RECORD

Evergreen field tool. Verify the latest project specification, WPS, ITP and acceptance criteria before controlled use.

How to Use This Field Pack

PURPOSE

Use this pack to structure visual weld inspection records, welder self-checks and workshop quality-control conversations. It does not replace project specifications, approved procedures, certified NDT personnel or the governing code / standard.

Inspection sequence

1

IDENTIFY

Confirm weld, drawing, WPS, welder ID, material and acceptance basis.

2

OBSERVE

Inspect before, during and after welding using suitable access, lighting and tools.

3

MEASURE

Record dimensions or visible imperfection extent - do not rely on appearance alone.

4

COMPARE

Compare the recorded condition with the actual governing requirement.

5

DISPOSE

Accept, hold, repair, reinspect or refer for additional NDT / review.

6

TRACE

Sign, date, record repairs and preserve inspection evidence.

Status legend

OK

Condition checked / satisfactory against stated requirement

NCR

Nonconformance or measured condition outside stated requirement

N/A

Not applicable to this weld / stage

HOLD

Stop / refer / await disposition before proceeding

CRITICAL LIMITATION

This pack deliberately does not reproduce proprietary acceptance tables or dimensional limits from ISO, ASME, AWS, client or project standards. Record the applicable criterion and measured result, then make disposition under the authorised quality system.

Weld Inspection Identification Record

PROJECT / CLIENT

JOB / WORK ORDER

SITE / WORKSHOP

COMPONENT / ITEM

DRAWING NO. / REV

WELD / JOINT ID

WPS / REV

ITP / HOLD POINT

WELDER ID

PROCESS

MATERIAL / GRADE

THICKNESS / DIA

JOINT TYPE

POSITION

ACCEPTANCE STANDARD

QUALITY LEVEL / CLASS

INSPECTION DATE

INSPECTOR / CHECKER

APPLICABLE DOCUMENTS / SPECIAL REQUIREMENTS

CONTROL POINT

Do not start disposition until the applicable drawing, WPS and acceptance requirement are known. A weld gauge cannot compensate for missing acceptance criteria.

Pre-Weld Visual Inspection Checklist

Complete before arc initiation. Use HOLD where the condition must be corrected or formally accepted before welding continues.

CHECK ITEM	OK	NCR	N/A	HOLD	REF / NOTE
Material grade / identification matches drawing or material specification	☐	☐	☐	☐	_____
Material thickness / diameter verified	☐	☐	☐	☐	_____
Joint type and weld location verified against drawing	☐	☐	☐	☐	_____
Applicable WPS available and correct revision identified	☐	☐	☐	☐	_____
Bevel angle / groove preparation checked	☐	☐	☐	☐	_____
Root face / land checked where applicable	☐	☐	☐	☐	_____
Root gap / opening checked	☐	☐	☐	☐	_____
Fit-up and alignment / hi-lo checked	☐	☐	☐	☐	_____
Joint surfaces clean - oil, moisture, scale, paint and contamination controlled	☐	☐	☐	☐	_____
Tack welds sound, correctly located and suitable for incorporation / removal	☐	☐	☐	☐	_____
Backing material / backing strip arrangement correct where applicable	☐	☐	☐	☐	_____
Purge arrangement / dams / gas setup correct where applicable	☐	☐	☐	☐	_____
Welding access and inspection access adequate	☐	☐	☐	☐	_____
Welder identification and applicable qualification / authorisation verified where required	☐	☐	☐	☐	_____
Consumables available, identified and in suitable condition	☐	☐	☐	☐	_____
Preheat requirement identified and method available where applicable	☐	☐	☐	☐	_____
Restraint / fixture / sequence considerations reviewed for distortion control	☐	☐	☐	☐	_____

Pre-weld comments / NCR reference:

During-Weld Visual Inspection Checklist

Use this page for in-process controls that fall within the authorised inspection / supervision scope.

CHECK ITEM	OK	NCR	N/A	HOLD	REF / NOTE
Actual welding process matches approved WPS / route	☐	☐	☐	☐	_____
Correct consumable classification / wire / electrode identified	☐	☐	☐	☐	_____
Consumables dry, clean and handled / stored as required	☐	☐	☐	☐	_____
Shielding gas type / condition / protection adequate where applicable	☐	☐	☐	☐	_____
Polarity / equipment setup consistent with procedure requirements	☐	☐	☐	☐	_____
Preheat achieved where specified	☐	☐	☐	☐	_____
Interpass temperature controlled where specified	☐	☐	☐	☐	_____
Pass sequence / bead placement consistent with procedure and access	☐	☐	☐	☐	_____
Slag / oxide / contamination removed before subsequent passes	☐	☐	☐	☐	_____
Stop-start areas cleaned and visually sound before continuation	☐	☐	☐	☐	_____
Visible surface porosity / cracks removed before burial by next pass	☐	☐	☐	☐	_____
Root pass appearance checked where accessible	☐	☐	☐	☐	_____
Root penetration / profile controlled where directly visible	☐	☐	☐	☐	_____
Inter-run profile does not create obvious slag-trap or fusion risk	☐	☐	☐	☐	_____
Temporary attachments / arc strikes controlled	☐	☐	☐	☐	_____
Environmental conditions do not compromise shielding / process where relevant	☐	☐	☐	☐	_____
Deviation, repair or unexpected condition recorded before it is covered	☐	☐	☐	☐	_____

During-weld observations / parameter or repair references:

Final Visual Inspection Checklist

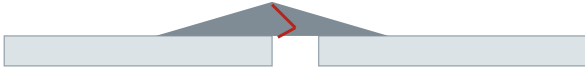
Complete after the weld is sufficiently clean, accessible and suitable for final visual examination.

CHECK ITEM	OK	NCR	N/A	HOLD	REF / NOTE
Weld complete in correct location and required length / extent	☐	☐	☐	☐	_____
Surface sufficiently clean for examination	☐	☐	☐	☐	_____
Cracks absent on accessible surfaces	☐	☐	☐	☐	_____
Surface porosity assessed and recorded	☐	☐	☐	☐	_____
Undercut measured / recorded where present	☐	☐	☐	☐	_____
Overlap / cold-lap condition absent or evaluated	☐	☐	☐	☐	_____
Weld reinforcement / face profile checked	☐	☐	☐	☐	_____
Underfill / concavity checked	☐	☐	☐	☐	_____
Fillet-weld leg / throat / profile checked as applicable	☐	☐	☐	☐	_____
Root profile inspected where accessible	☐	☐	☐	☐	_____
Misalignment / hi-lo measured where applicable	☐	☐	☐	☐	_____
Distortion / dimensional condition checked	☐	☐	☐	☐	_____
Crater / stop-start areas acceptable to stated requirement	☐	☐	☐	☐	_____
Arc strikes / unintended fusion outside weld addressed	☐	☐	☐	☐	_____
Grinding / excavation / base-metal damage checked	☐	☐	☐	☐	_____
Repairs identified, traceable and re-examined	☐	☐	☐	☐	_____
Additional NDT requirements identified / completed / referred	☐	☐	☐	☐	_____
Inspection record, photos and NCR / repair references complete	☐	☐	☐	☐	_____

Final VT comments / photos / NCR reference:

Weld Defect Field Guide 1 of 3

CRACKS



VISIBLE CLUE

Fine linear / branching indication, crater split or toe / root line

POSSIBLE CONTRIBUTORS

Hydrogen, restraint, rapid cooling, poor crater termination, material / procedure issues

WHAT TO CHECK

Record location and extent; do not simply grind over. Follow repair / escalation procedure.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

SURFACE POROSITY



VISIBLE CLUE

Rounded pinholes / cavities; isolated, clustered or scattered

POSSIBLE CONTRIBUTORS

Moisture, contamination, shielding loss, wind, consumable condition

WHAT TO CHECK

Record number, size, distribution and location; internal extent may exceed what is visible.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

UNDERCUT



VISIBLE CLUE

Groove along the weld toe or root

POSSIBLE CONTRIBUTORS

High current, fast travel, angle / manipulation / bead-placement issues

WHAT TO CHECK

Measure depth, length, continuity and location against the stated requirement.

OVERLAP



VISIBLE CLUE

Rolled lip / weld metal extending onto base metal without smooth fusion

POSSIBLE CONTRIBUTORS

Low heat, slow travel, excessive deposition, angle / technique

WHAT TO CHECK

Inspect toe transition; distinguish from smooth properly fused reinforcement.

LACK OF FUSION



VISIBLE CLUE

Unfused edge / surface-connected line; may be hidden internally

POSSIBLE CONTRIBUTORS

Low heat, contamination, poor angle, poor bead placement, slag

WHAT TO CHECK

Visible clues may require PT / MT / UT / RT or destructive confirmation.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

INCOMPLETE PENETRATION



VISIBLE CLUE

Unfused root / gap where root is accessible

POSSIBLE CONTRIBUTORS

Insufficient root gap, excessive land, low heat, access / alignment issues

WHAT TO CHECK

Inspect accessible root; do not infer full penetration from face appearance alone.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

Weld Defect Field Guide 2 of 3

EXCESS PENETRATION

**VISIBLE CLUE**

Excessive root projection / irregular root

POSSIBLE CONTRIBUTORS

Excess heat, large root gap, slow travel, thin land

WHAT TO CHECK

Measure accessible root projection and compare with applicable criterion.

BURN-THROUGH

**VISIBLE CLUE**

Hole / local collapse at root

POSSIBLE CONTRIBUTORS

Excess heat, excessive gap, insufficient root face, poor fit-up

WHAT TO CHECK

Define extent; repair must follow approved procedure and be reinspected.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

ROOT CONCAVITY

**VISIBLE CLUE**

Recessed root below adjacent parent surface

POSSIBLE CONTRIBUTORS

Heat / shrinkage, insufficient filler, technique / purge conditions

WHAT TO CHECK

Measure depth and length where accessible; distinguish from incomplete penetration.

EXCESS REINFORCEMENT

**VISIBLE CLUE**

Excessively high weld face / abrupt toe transition

POSSIBLE CONTRIBUTORS

Excess filler, slow travel, low voltage, joint volume

WHAT TO CHECK

Measure height / profile / transition against stated requirement.

UNDERFILL

**VISIBLE CLUE**

Weld face below adjacent parent material

POSSIBLE CONTRIBUTORS

Insufficient filler, fast travel, excessive grinding

WHAT TO CHECK

Measure depth, area and remaining required weld size.

INCORRECT FILLET SIZE

**VISIBLE CLUE**

Leg / throat / profile inconsistent with drawing

POSSIBLE CONTRIBUTORS

Incorrect deposition, interpretation, bead placement

WHAT TO CHECK

Measure leg length / throat / length / pitch with appropriate gauge.

Weld Defect Field Guide 3 of 3

MISALIGNMENT / HI-LO



VISIBLE CLUE

Offset, angular mismatch or pipe hi-lo

POSSIBLE CONTRIBUTORS

Poor fit-up, tacking, dimensional error, thermal movement

WHAT TO CHECK

Measure offset / angle and compare with drawing / specification.

DISTORTION



VISIBLE CLUE

Bowing, twist, angular movement, shrinkage

POSSIBLE CONTRIBUTORS

Heat input, sequence, restraint, weld size, joint design

WHAT TO CHECK

Use straightedge / square / tape / template; record dimensional deviation.

SURFACE-BREAKING SLAG



VISIBLE CLUE

Dark irregular trapped material / cavity at surface

POSSIBLE CONTRIBUTORS

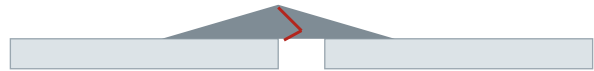
Poor cleaning, narrow access, low heat, bead placement

WHAT TO CHECK

Inspect inter-run and final surface; internal slag generally needs additional NDT.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

ARC STRIKE



VISIBLE CLUE

Local fused mark outside intended weld

POSSIBLE CONTRIBUTORS

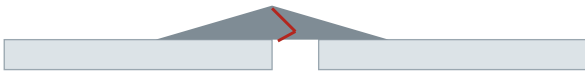
Accidental arc contact

WHAT TO CHECK

Record location; assess and repair under project procedure.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

CRATER / STOP-START



VISIBLE CLUE

Depression, cavity, crack or abrupt profile at termination

POSSIBLE CONTRIBUTORS

Abrupt stop, poor crater fill, restart contamination

WHAT TO CHECK

Inspect all starts / stops; record cavities, cracks, porosity and tie-in quality.

ESCALATE / ADDITIONAL NDT MAY BE REQUIRED

GRINDING / BASE-METAL DAMAGE



VISIBLE CLUE

Gouge, notch, reduced section or over-excavation

POSSIBLE CONTRIBUTORS

Uncontrolled defect removal / repair preparation

WHAT TO CHECK

Measure material loss / weld loss; ensure repair is traceable and re-examined.

Visual Imperfection Measurement Record

RECORD FACTS, NOT IMPRESSIONS

Use one line per observed condition. Write the exact document / clause / drawing reference in the criterion column and record the measured result separately.

NO	IMPERFECTION / CONDITION	LOCATION	MEASURED RESULT	CRITERION / REFERENCE	STATUS
1					☐ ☐ ☐ ☐
2					☐ ☐ ☐ ☐
3					☐ ☐ ☐ ☐
4					☐ ☐ ☐ ☐
5					☐ ☐ ☐ ☐
6					☐ ☐ ☐ ☐
7					☐ ☐ ☐ ☐
8					☐ ☐ ☐ ☐
9					☐ ☐ ☐ ☐
10					☐ ☐ ☐ ☐
11					☐ ☐ ☐ ☐
12					☐ ☐ ☐ ☐

Status: A = Accept | H = Hold | R = Repair | X = Refer / additional examination

Repair & Reinspection Register

TRACEABILITY PRINCIPLE

A repair should remain traceable from the original indication through repair action, repair reference, reinspection and final disposition. Do not allow grinding or rework to erase the inspection history.

REF	WELD / LOCATION	CONDITION FOUND	REPAIR / ACTION	REINSPECTION RESULT	FINAL STATUS
1					
2					
3					
4					
5					
6					
7					
8					

Repair procedure / NCR / concession references:

NDT Escalation & Referral Record

WHEN VT IS NOT ENOUGH

Visual testing evaluates accessible surface conditions and geometry. A visually acceptable weld can still contain internal imperfections. Use the project / code / ITP to determine when additional NDT is required.

Reason for referral / escalation

- ☐ Project / ITP requires additional NDT
- ☐ Surface indication needs method-specific examination
- ☐ Root / internal condition not visible
- ☐ Repair requires re-examination
- ☐ Engineering / client review required
- ☐ Other

Method requested / specified

- ☐ **VT** Visual testing / reinspection
- ☐ **PT** Penetrant testing
- ☐ **MT** Magnetic particle testing
- ☐ **UT** Ultrasonic testing
- ☐ **RT** Radiographic testing

NDT PROCEDURE / STANDARD

NDT REPORT NO.

NDT PERSONNEL / LEVEL

DATE

RESULT / FOLLOW-UP

Final Disposition & Sign-Off

DISPOSITION AUTHORITY

Final acceptance authority is defined by the project quality system, contract, code, client or employer. This form records the decision; it does not grant inspection authority.


ACCEPT

Meets the stated visual / dimensional requirement and required records are complete.


HOLD

Do not proceed until review, missing information or additional examination is resolved.


REPAIR

Repair under the approved process / procedure, then reinspect.


REINSPECT

Repeat the required examination after cleaning, repair or changed condition.


REFER

Escalate to engineering, client, authorised inspector or additional NDT.

INSPECTOR / CHECKER

Name / signature

Date / time

WELDER / SUPERVISOR ACKNOWLEDGEMENT

Name / signature

Date / time

AUTHORISED DISPOSITION / QA

Name / signature

Date / time

Welder Self-Inspection Pocket Checklist

PURPOSE

This page is for welder self-inspection and training feedback. It does not replace independent inspection, certified NDT or authorised final acceptance where those are required.

BEFORE I WELD

- ☐ Correct WPS / instruction understood
- ☐ Material and joint preparation correct
- ☐ Root gap / fit-up checked
- ☐ Joint clean and dry
- ☐ Consumables correct and in good condition
- ☐ Machine / polarity / gas setup checked
- ☐ Position and access safe / workable

WHILE I WELD

- ☐ Arc / pool stable
- ☐ Travel speed controlled
- ☐ Bead placement consistent
- ☐ Stops / starts controlled
- ☐ Slag / oxide removed between passes
- ☐ No visible cracks / porosity buried under next pass
- ☐ Heat / interpass control followed where required

BEFORE I HAND OVER

- ☐ Weld complete and cleaned
- ☐ Profile and weld size checked
- ☐ No visible crack / overlap / severe undercut
- ☐ Stops / starts checked
- ☐ Arc strikes / grinding damage checked
- ☐ Root checked where accessible
- ☐ I reported any condition I am unsure about

TRAINER / SUPERVISOR FEEDBACK

NEXT PRACTICE FOCUS:

Workshop Weld Quality Trend Tracker

USE TRENDS TO REMOVE REPEAT DEFECTS

Track repeated conditions by job, welder, process or shift. The goal is not to create a blame sheet - it is to identify whether recurring defects point to training, fit-up, consumables, procedure, equipment, supervision or workflow problems.

DATE	WELD / JOB	PROCESS	CONDITION / DEFECT	LIKELY SYSTEM AREA	ACTION OWNER	CLOSED
						☐
						☐
						☐
						☐
						☐
						☐
						☐
						☐
						☐
						☐

ROOT-CAUSE PROMPTS

Repeated porosity -> contamination / shielding / consumables. Repeated undercut -> settings / travel / technique. Repeated lack of fusion -> heat / access / prep / bead placement. Repeated distortion -> sequence / restraint / weld size / heat input. Repeated misalignment -> fit-up / tacking / fabrication dimensions.

Visual Inspection Decision Flow



Standards, References & Verification Notes

KEEP THIS PACK EVERGREEN

Before using this pack on controlled work, confirm the latest issue / status of every standard and the actual project-specific specification. The references below identify the framework used to design this generic field tool; they do not reproduce the purchased standards.

ISO 17637:2016

Visual testing of fusion-welded joints; current international standard for VT of fusion welds.

[OFFICIAL SOURCE](#)

ISO 5817:2023

Quality levels for imperfections in applicable fusion-welded joints; B, C and D, with B the highest requirement.

[OFFICIAL SOURCE](#)

ISO 6520-1:2007

Classification and description framework for geometric imperfections in fusion welding; confirmed current in 2026.

[OFFICIAL SOURCE](#)

ISO 17635:2025

General rules for selection and application of NDT methods to metallic welds and evaluation for quality control.

[OFFICIAL SOURCE](#)

SAIW Visual Testing

South African context for visual testing training / certification pathways under ISO 9712.

[OFFICIAL SOURCE](#)

PROFESSIONAL SCOPE NOTE

This pack does not qualify or certify a person as a welding inspector or NDT technician, does not replace authorised inspection personnel, and does not define acceptance criteria. Use only within the competence, authority and quality system applicable to the work.

Swift Skills Academy - Welding Quality Resources

Turn inspection feedback into better welding performance

Use this pack to identify and record recurring welding-quality problems. Then decide whether the corrective action is training, fit-up control, consumables, equipment, procedure, supervision, additional NDT or engineering review.

READ THE COMPLETE GUIDE



Visual Weld Inspection South Africa

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