

MKTech Industry Sdn Bhd

TECHNICAL APPLICATION GUIDE

MKTECH INDUSTRY SDN BHD / ILLUSTRATIVE INDUSTRY IMAGE

SHIPBUILDING HULL SURFACE PREPARATION

Weld and edge preparation. Coating handover. Repeatable inspection.

For shipyard supervisors, coating inspectors, production engineers and abrasive buyers.

MKTECH-TA-SB / REV 02 / NOVEMBER 2026

01 / PURPOSE AND NAVIGATION

Define the release before selecting the abrasive

A shipyard is preparing a newly fabricated carbon-steel hull block for coating. The trial compares two methods for removing spatter and conditioning selected edges after weld inspection. Both must protect weld geometry and leave the block ready for the specified coating preparation.

Treat local metal finishing and coating preparation as two separate releases. The inspector needs to see the weld and edge condition before the specified surface preparation, then verify the prepared surface just before coating.

Use the guide in three passes

Protect the approved weld profile
Identify the hull zone, steel and weld details. Mark the work boundary and the profiles to retain.

Condition the specified edges
Separate weld release, local metal finishing and coating preparation. Record a handover at each stage.

Verify the coating handover
Measure accepted weld length, abrasive use and labour time. Release the change through QA and coating inspection.

Find the right section

WORKFLOW	PAGE	VALIDATION AND FIELD RECORDS	PAGE
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Scope and authority
Use the shipyard work instruction, applicable class or owner requirements, welding and inspection plans, and coating system specification. Qualified personnel decide any weld repair or material-removal limit.

The example scenario and cover photograph are illustrative. Use the job's approved requirements and record the actual site evidence.

02 / PROCESS AND HANDOVER GATES

Control every release between operations

Give the next operation a measurable condition, a named inspection and the status of any held work. Link each gate to the same part or zone ID.

01 **Release weld** | 02 **Mark work** | 03 **Finish locally** | 04 **Prepare steel** | 05 **Release coat**

STAGE	CONTROL THE OPERATION	RELEASE EVIDENCE
Map and release	Identify block, seam, edge detail and coating zone. Confirm weld inspection status and the exact preparation grade.	Marked-up map, released weld record and agreed edge criteria.
Clean and protect	Remove contamination by the approved process. Identify features, openings, edges and weld geometry to protect.	Clean work area, clear boundaries and authorised hot-work controls.
Remove local defects	Remove spatter and prepare specified weld or edge features within the approved limits. Refer suspected weld discontinuities.	Accepted local contour and edge condition, with holds recorded by location.
Prepare for coating	Complete the blast-cleaning or other preparation called up by the coating specification. Inspect newly exposed imperfections.	Specified visual cleanliness and profile, with any new defect referred.
Handover	Check dust, soluble salts and environmental readings where specified. Identify any delay or contamination since preparation.	Dated inspection results, locations and coating inspector release.

Make the handover traceable

Use one record per defined zone. Enter the inspected length, preparation grade, method and acceptance evidence. Keep any held location visible on the zone map until the inspector releases it.

Illustrative handover entry

Zone H-07, seam S-12. Welding inspection released. Spatter and specified edges checked against the signed zone map. The coating crew receives the separate preparation grade and inspection plan. Held locations remain marked.

03 / STARTING CONDITION

Identify the hull zone before grinding

A cargo hull can have different requirements by zone, coating system and detail. Record the actual zone and its steel and coating status on the work card.

AS-FOUND CONDITION	DECISION BEFORE WORK	CONTROL TO RECORD
Weld awaiting release	Confirm weld inspection status and the responsible inspector.	Hold abrasive work on the seam until the documented release.
Released weld with spatter	Distinguish spatter on the surrounding plate from a weld feature that affects geometry.	Mark the authorised cleanup boundary and record the retained profile requirement.
Exposed plate edge	Find the specified edge treatment and how the inspector will verify it.	Check access to both faces and protect adjacent holes and interfaces.
Shop primer or earlier coating	Identify the coating and whether it can remain under the specified system.	Record the approved cleaning or removal route and any compatibility limits.
Oil, salt or moisture exposure	Review storage, handling and exposure since fabrication or blasting.	Use the specified cleaning and contamination checks before coating release.
Suspected defect or section loss	Capture location and appearance with a scale and refer to QA.	Hold the affected detail for approved disposition and reinspection.

Record the starting condition before the first pass

Record hull block, seam or edge ID, orientation and access class. A convenient flat seam and a restricted seam are separate trial strata when access affects grinding time or inspection.

04 / ABRASIVE AND MACHINE SELECTION

Choose the complete working system

Identify the operation and required endpoint first. Confirm the abrasive, tool, guard, mounting and work control together before evaluating productivity.

OPERATION	FORMAT TO EVALUATE	CHECK BEFORE TRIAL
Raised material	Bonded grinding disc approved for carbon steel and the identified tool.	Confirm removal limit, access, guard, mounting and allowable disc size.
Local edge blending	Flap disc suited to the steel and specified edge condition.	Check the resulting edge shape against the drawing or coating specification.
Restricted feature	Small-format abrasive on an approved machine where access warrants it.	Confirm clearance, rated speed and inspection access. Refer an inaccessible feature.
Coating preparation	Specified blasting or approved alternative for the coating system.	Verify the required cleanliness and profile using the named inspection methods.

Record these variables

Record the workpiece, abrasive construction and grade, product ID and dimensions, rated speed, tool model and setting, mounting and required guard or backing. Confirm the manufacturer's compatibility instructions for the exact setup.

Record workholding, access, extraction, required PPE and any permit or fire control. Agree the inspection method and abrasive change criterion before starting.

Use the operation to choose the tool

Open-area stock removal and local edge blending need different contact control. Use the maker's declared wheel application and supported setup. If a detail cannot be reached without losing visibility or contacting the surrounding plate, change the approved access or tool before proceeding.

Follow the current machine and abrasive instructions for the exact setup. FEPA product-specific safety guidance is listed on page 15.

05 / STANDARD WORK

Write the local finishing work instruction

The work card should tell an operator exactly where the process begins and what evidence releases it to coating preparation.

01 **Mark the work and the protected features**
Transfer the seam and edge IDs from the zone map. Confirm welding release, allowed removal, the edge target and any geometry, opening or face to protect.

02 **Establish clean and safe access**
Remove contamination by the approved route. Confirm access, spark and fire controls, extraction and the permits required by the shipyard. Make the inspection face visible.

03 **Trial the tool on a representative detail**
Confirm wheel, machine, guard and permitted operation. Use a comparable seam orientation and edge section. Confirm the first piece before working across the zone.

04 **Finish in controlled sections**
Work the marked area and check the edge condition and retained weld contour at agreed intervals. Refer cavities, cracks, undercut concerns or unexpected parent-metal removal.

05 **Inspect and hand over local work**
Record local acceptance by seam and edge. Send the coating crew the released area and outstanding holds. Complete the separate coating preparation specified for that zone.

06 **Recheck before coating starts**
Apply the named visual cleanliness, profile, dust, salts and environmental checks where specified. Reassess the area after wetting, delay or contamination.

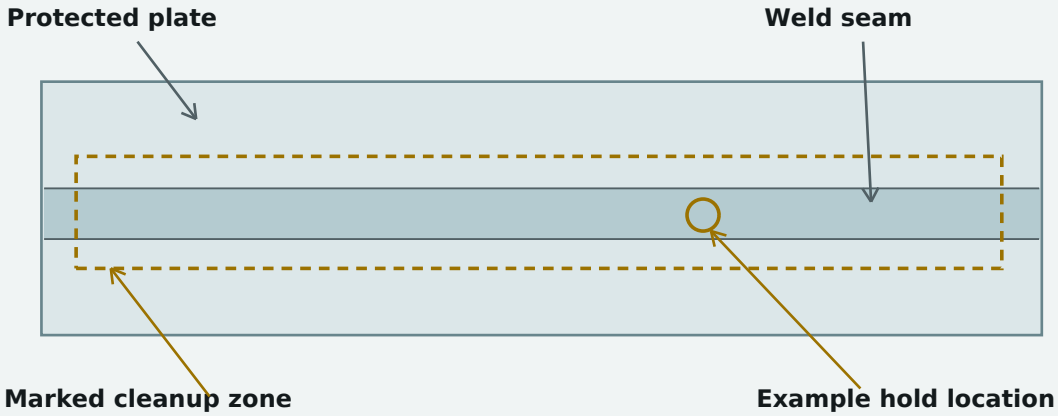
Record the release before proceeding
Use one record per defined zone. Enter the inspected length, preparation grade, method and acceptance evidence. Keep any held location visible on the zone map until the inspector releases it.

06 / APPLICATION DETAIL

Mark the seam and its inspection limits

This plan view shows a selected seam area before local metal finishing. The inspector marks the permitted cleanup area on the work card and identifies the features whose geometry must be retained.

INSPECTION SCHEMATIC



FEATURE OR CHECK	WHAT TO CONTROL
Protected areas	Treat the surrounding plate and the weld profile as defined by the drawing and weld inspection plan. The sketch shows a boundary concept without defining removal depth.
When to hold	Mark a suspected discontinuity at the actual seam position, photograph it and refer it for welding or QA disposition.
What to measure	Tie the accepted length and edge check to the seam or edge ID. Record coating grade and profile evidence in a separate inspection entry.

Use the drawing as an inspection aid

Put the actual dimensions, limits and methods from the approved work instruction on the job card. Mark the feature, inspection location and disposition on the workpiece record.

07 / INSPECTION AND ACCEPTANCE

Release local work and coating preparation separately

Assign an inspector and a record to each hold point. A surface can pass weld and edge checks and still require further coating preparation.

CONTROL POINT	VERIFICATION METHOD	EVIDENCE TO RETAIN
Weld status	Check the weld record and the condition of the released seam.	Retain the weld release, drawing revision and any open repair or hold.
Weld and edge geometry	Check the approved profile and edge condition by the named visual or dimensional method.	Record seam and edge IDs and the actual pass, hold or rework outcome.
Visual cleanliness	Assess the prepared surface using the coating specification's named grade and method.	Record grade, zone, lighting and time of inspection.
Surface profile	Use the agreed method and range appropriate to the specified preparation.	Record instrument or method, locations and results with units.
Contamination and climate	Carry out named dust and salt checks and record ambient, surface and dew-point conditions as required.	Retain test method and values, reinspection trigger and coating release time.

At the hold point

Record actual readings and units where the inspection plan calls for measurements. Record the applicable limit or reference, method, date and reviewer. Retain the rejected or held items in the register until the responsible team records their disposition.

Apply the named requirement

When the specification invokes separate standards for weld and edge preparation, visual cleanliness and profile, record each separately. The named test method and project limit belong on the inspection card.

08 / INTERFACE AND RELEASE CONTROLS

Hand the prepared steel over to coating

Local abrasive work prepares details. The coating specification controls the full surface preparation route, allowable window and release checks for each coating zone.

CONTROL POINT	WHAT TO VERIFY	WHAT TO TRANSFER
Cleaning and masking	Confirm approved contaminant removal and protection of openings, contact faces and adjacent work.	Record the cleaning step and protected features before metal finishing or blasting.
Preparation grade and method	Match the method to the project coating system and zone. Complete specified blast cleaning where called up.	Identify the actual method and named grade, with any approved exception.
Profile and inspection coverage	Use the specified profile method where applicable. Sample both representative and critical areas as instructed.	Record result, units, instrument and exact location.
Dust, salts and atmosphere	Follow the inspection plan and product data for required checks. Review values after delay or exposure.	File the readings before coating release.
Stripe coat or next operation	Follow the coating sequence and inspection plan for edges, welds and restricted details.	Transfer the signed zone map and outstanding holds to the receiving team.

Transfer the evidence with the work

Use one drawing or zone map to track local finishing, preparation and release. The receiving team should be able to locate any held seam, edge or repair without relying on memory.

09 / TROUBLESHOOTING

Investigate the cause before repeating the work

Record the first stage where the defect appears. Inspect the material, setup and previous operation before changing the abrasive or repeating a pass.

SYMPTOM	CHECK FIRST	CONTROL THE NEXT RUN
Spatter remains	Obstructed sightline or work ended at a different boundary.	Check with the agreed lighting and inspection view. Rework permitted areas and record them.
Unexpected cavity or weld shape	Potential discontinuity or excess removal.	Stop at the affected location, identify it and refer for welding or QA disposition.
Sharp edge or burr	The specified edge condition was missed or local access varied.	Check the edge requirement and repeat permitted local preparation before release.
Dust, salt or profile out of limits	Method, exposure or contamination differs from the release plan.	Hold coating, investigate the affected zone and repeat the specified checks after correction.
Early rust after blasting	Review time, wetting, environment and handling before coating.	Hold the affected zone. Follow the coating plan for re-preparation and repeat the specified checks.
Inconsistent time by weld	Check seam orientation, weld starting profile, access and abrasive change criterion.	Group comparable details before interpreting labour or abrasive consumption.

Keep the as-found evidence

Use a part or area ID and photograph or reading. Record the setup, stage, observed condition and who approved the next action. Compare the first corrected piece with the same acceptance reference.

10 / CONTROLLED VALIDATION

Run a trial that supports a decision

Can the candidate local finishing sequence reduce labour per released seam segment while preserving the specified weld and edge condition?

01 **Define the unit**
Use equal-length seam segments with an agreed share of comparable edge work. Keep the same weld release and surface-preparation requirements.

02 **Pair comparable work**
Record orientation, access, starting profile and operator. Alternate the routes within comparable pairs or groups where practical.

03 **Freeze the inspection**
Use the same inspector or equivalent method for geometry and edge checks. Apply the same separate coating preparation and acceptance criteria.

04 **Retain every outcome**
Record active time, abrasive changes, rework, holds and reasons. Count a segment as accepted after the agreed handover checks pass.

05 **Repeat across conditions**
Include the orientations and access restrictions in the approval scope. Record any excluded details and define a revalidation trigger.

Write the approval scope in advance

Name the approved material or part family, tool and abrasive setup, acceptance criteria and responsible reviewer. Define the sample and repeat checks around the risk and normal variation of the process.

ACCEPT
All named criteria pass and the result repeats in scope.

EXTEND
The process needs more evidence for a condition or operator group.

HOLD
A quality or operating limit failed. Investigate before release.

11 / QUALITY AND ECONOMICS

Measure cost per accepted result

Compare the same work and inspection scope. Retain time and consumables for all starts, including work that remains held or rejected.

Calculation

Included cost per accepted unit = included consumables and direct labour divided by finally accepted output. Calculate labour from active, changeover and additional rework minutes once.

Hypothetical comparison at RM 48 per labour hour

ILLUSTRATIVE TRIAL	A / CURRENT	B / CANDIDATE
Units started (seam segments)	24	24
First-pass accepted	20 / 24	22 / 24
Finally accepted after rework	23	24
Held or rejected at close	1	0
Active, changeover and rework minutes	110 + 18 + 31	100 + 13 + 18
Included direct labour	RM 127.20	RM 104.80
Consumables	RM 60.00	RM 72.00
Total included cost	RM 187.20	RM 176.80
Cost per finally accepted unit	RM 8.14	RM 7.37

Scope the example to local abrasive work and its rework. Coating application and blasting costs are outside the example because both routes use the same downstream specification.

At the example's candidate labour and accepted output, the candidate could spend up to RM 90.54 on consumables before equalling the baseline unit cost. Recalculate when time, acceptance or the cost boundary changes.

Use the arithmetic to compare scope and yield. The values are hypothetical and the approved quality criteria govern release.

12 / REUSABLE FIELD FORM

Preparation and release card

Print one card per job, batch or zone. Attach the drawing or map, abrasive and tool labels, readings and any authorised disposition.

Hull block, zone, seam and edge ID

Drawing, weld release and coating specification

Steel and starting condition, including coating history

Tool, wheel, setting and work permits

STAGE	METHOD OR PRODUCT	READING / EVIDENCE
Release weld		
Mark work		
Finish locally		
Prepare steel		
Release coat		

Release checks

- ☐ Welding inspection released and protected geometry marked.
- ☐ Edge condition and local metal finishing accepted.
- ☐ Named coating prep grade and specified readings recorded.
- ☐ All held locations identified on the zone map.

Hold, corrective action or referenced attachment

Inspector, date and release status

13 / REUSABLE FIELD FORM

Paired trial and acceptance record

Complete one record per matched comparison. Attach raw observations, inspections and the list of held, rejected or reworked items.

Trial ID, date, location and operator group

Matching conditions and scope of costs

Length or segment ID, orientation, access group, geometry and coating handover status

MEASURE OR OBSERVATION	A / CURRENT	B / CANDIDATE
Tool, setup and consumable IDs		
Started / first-pass / final accepted		
Held or rejected and disposition		
Active / changeover / rework minutes		
Consumable quantity and cost		
Inspection method and readings		
Total included cost / accepted output		

- ☐ Comparable work and the same acceptance criteria used.
- ☐ Failures and rework retained in the record.
- ☐ Acceptance, extension or hold decision recorded.

Approved scope, changes requiring revalidation and follow-up

Reviewer and supervisor, date and decision

14 / TECHNICAL REFERENCES

Source notes and further reading

The references describe methods, application boundaries and abrasive selection. Use the current manufacturer data and the project-specified edition and acceptance criteria.

01 **ISO 8501-3**
Preparation grades for welds, edges and steel surface imperfections. Use the edition and grade specified for the job.

02 **ISO 8502-3**
Pressure-sensitive tape method for assessing dust on prepared steel.

03 **ISO 8502-6**
Field extraction of water-soluble contaminants. Use the analysis method and limits specified in the inspection plan.

04 **Jotun coating advisory and inspection practice**
Coating specifications, surface preparation, inspection planning and documentation.

05 **MKTECH Weld Grinding**
Weld profile, geometry protection, tool selection and inspection record.

06 **FEPA abrasive safety instructions**
Product-specific guidance for bonded wheels, flap discs, fibre discs and belts.

07 **ISO 8503-5**
Replica tape measurement of blast-cleaned steel profile when the method is specified.

08 **MKTECH product families**
Abrasive ranges and technical enquiry details. Confirm the current specification before ordering.

Titles link to the reference pages. The application scenario, sketches and trial figures are illustrative.

15 / APPLICATION SUPPORT

Turn the job details into a better specification

A useful enquiry tells MKTECH what the abrasive must do, how the machine is configured and how the result will be accepted.

INPUT	WHAT TO SEND
Material and detail	Hull steel, plate condition, seam and edge photos or sketches, access and orientation.
Current method	Tool model, rated speed and mounting, abrasive ID and size, operation and typical consumption.
Acceptance	Released weld profile, edge criteria, coating preparation grade, inspection method and permitted material removal.
Trial and supply	Representative segments, approval owner, trial schedule, quantities, delivery location and traceability needs.

Prepare one representative example

Send the weld and edge detail, substrate, approved preparation requirements, tool model, current abrasive, trial quantity and inspection method.

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01 **Discuss the application**
Product selection, trial scope and supply enquiry.

02 **Browse MKTECH product families**
Review cutting, grinding, flap and finishing abrasive ranges.

03 **Read the corresponding case study**
Open the illustrated application and its latest guide.