

# Enhanced Primers For Welding Operations

NSRP SPC Panel Meeting  
September 2024



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# Background

- Welding and coating application in shipyards are performed by different groups with long intervals in between work evolutions. Often, welding is performed long after coating operations have been completed and touch-ups are later required.
- The coating application teams must be made aware of future weld sites and mask off these areas for future work. This leaves bare steel exposed to the elements to corrode and potentially result in material loss prior to weld operations.
- This project seeks to investigate the current field of weldable primers and their use within shipyard operations. This will involve understanding the current constraints present in shipbuilding, developing testing criteria for weld through primers, and shipyard demonstrations to develop real time cost and schedule benefits.

# Anticipated Benefits

- This testing will generate data comparing weldable primers efficiency to be welded through as well as the performance of the resulting welds.
- This data will be used to help reduce costs by providing shipyards with the best primers available for weld-through application. The results will provide a more efficient option than leaving metal uncoated to be welded in the future or requiring the removal of primer before welding.

# Scope of Work

- This project will evaluate Goals/Objectives
  - Identify weld through primer coatings suitable for shipyard operations.
  - Evaluate weld through primers for shipyard use.
  - Provide a final report with data on findings.

# Previous Work

- Though weld through primers have been explored in the past by NSRP and the US Navy, there have been advances in technologies used in other industries. In recent years the USMC CPAC program has evaluated use of weld through primer and their effectiveness.
- **USMC Study 2021**
  - Purpose
    - Evaluate various weld through primers to limit corrosion in areas that would not be accessible to coat after the welding process
  - Highlights
    - Evaluated on both steel and aluminum substrates
    - Variety of test configurations
    - Recommend 2 products:
      - Wurth's Zinc-Rich Weld-Thru Primer for steel substrates
      - Tempil's Bloxide Weldable Primer for aluminum substrates



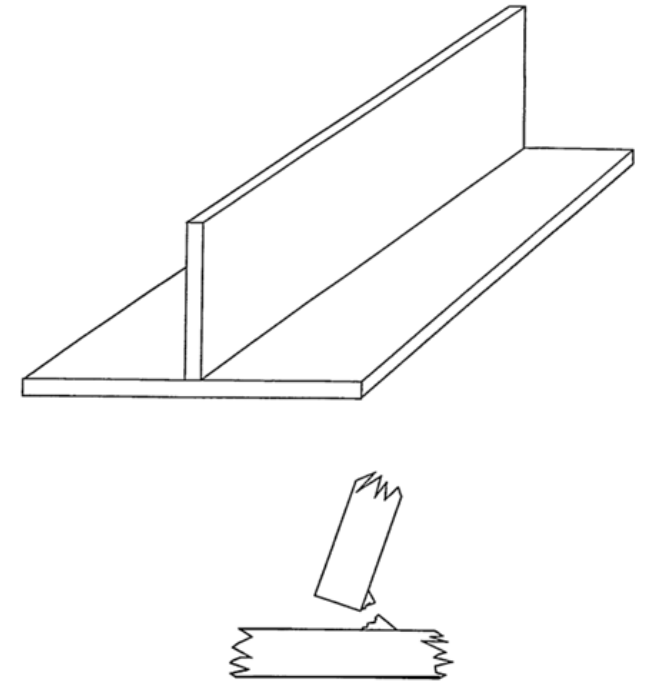
# Tasks

- Task 1 – Identify suitable weld through primers, testing requirements, and current usage.
  - Hold a Kick-off Meeting with the project team to discuss weld through primers currently being used, areas of use, and identify and constraints when using weld through primers. The project team will identify testing strategies for production and long-term use.
- Task 2 – Weld through primer evaluation and laboratory testing
  - As necessary, the project team will interact with weld through primer suppliers to identify suitable materials based on findings from Task 1. The team will work with Navy technical advisors to finalize the test plan and requirements. Laboratory testing is expected to demonstrate the effects of various weld through primers on final weld conditions.
- Task 3 – Shipyard Demonstration
  - Shipyards will implement the use of select weld through primers based on Task 2 findings on test articles provided by the NSRP shipyard. Data will be gathered related to production speed and potential cost reduction when compared to current methods.
- Task 4 – Final Report

# Task 1 (In Progress) – Test Requirements

## NSRP Project SP-3-84-I: “DEFINE AND STANDARDIZE PROCEDURES FOR CERTIFICATION OF WELD THRU PRIMERS” (1993).

- Over the course of the project, the researchers were unable to determine a satisfactory coating that would meet all the demands of a shipyard environment. Despite this issue, they were able to begin introducing some ideas on ways to standardize certifications of weld through primers. One way they found promising was through the use of “T-Shape” break test, similar to the process described above.

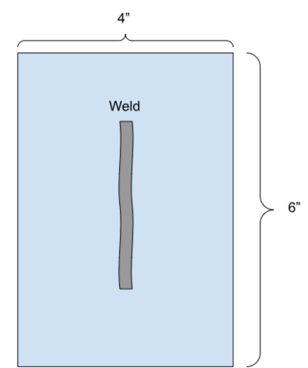


## NAVSEA Technical Publication’ Requirements for Welding and Brazing Procedure and Performance Qualification” – (2019)

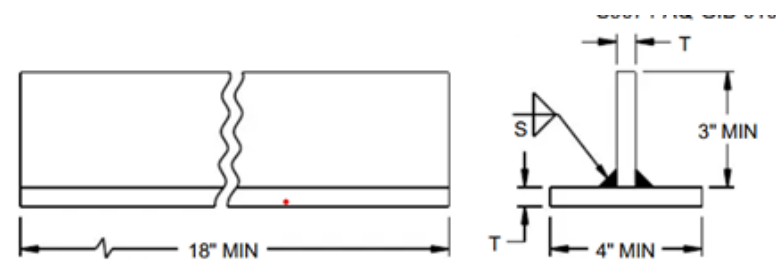
# Task 1 (In Progress) – Identify suitable weld through primers, testing requirements, and current usage.

- Held kick-off meeting with the project team and determined weld through primers to be tested, how to test them, and where they are used.
- Test plan in review, received comments back from Partner Yards
- Candidate systems under review

Coating	Outdoor Weathering Samples	Accelerated Corrosion Samples	Total
System 1	3	3	6
System 2	3	3	6
System 3	3	3	6
System 4	3	3	6
		<b>Total</b>	<b>24</b>



Coating	Weld Break Testing	Total
System 1	3	9
System 2	3	9
System 3	3	9
System 4	3	9
		<b>36</b>





## Task 2 (Future Work) – Task 2 – Weld through primer evaluation and laboratory testing

- Once test coatings are finalized, samples will be fabricated for lab testing.
  - Current talks with Partner Yard to perform all welding of test panels, Tentative Dates in October 2024
- Accelerate corrosion and weld performance testing will be performed.
- Data will be collected, analyzed, and presented to the shipyard community after testing.

## Task 3 (Future Work) – Shipyard Demonstration

- Successful weld through primers will be further tested in a shipyard demonstration.
- Data will be gathered related to production speed and potential cost reduction when compared to current methods.
- Shipyard test platform is to be determined.
- Shipyard demonstration timeline not yet decided.

# Path Forward

- Finalize Primers to be tested
- Finalize Testing Requirements
- Finalized Test Matrix
- Begin Lab Testing
- Perform Demonstration on best performing primers
- Provide Final Report

# Questions?

