



# ASTM Specification B898 – 2020 Revision Summary

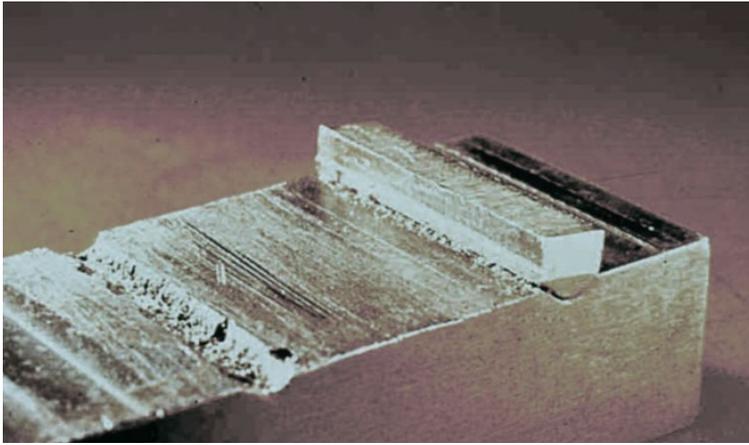
ASTM Specification B898 is the global specification for Reactive Metal Clad Plate products comprised of titanium, zirconium, tantalum and niobium. Upon the 20<sup>th</sup> anniversary of the original B898 publication, the ASTM B10 Task Group for Clad updated the specification to address user and producer quality concerns related to global industry changes. The resulting revision, B898–20, invokes upgrades in testing and inspection criteria intended to assure continuance of historical high product reliability. These efforts were undertaken at the request of user and 3<sup>rd</sup> party inspectors based upon observations that periodic supply of inferior products resulted from improper product testing methods. The changes in B898–20 focus on assuring proper shear testing and upgrading of procedures, controls and acceptance/rejection criteria for ultrasonic inspection. The objective was to clarify verbiage related to procedure and technique and to close “loopholes” being used by parties with limited quality control and limited understanding of typical specification terminology. The ASTM team was comprised of experienced representatives from global clad equipment users, fabricators and manufacturers.

## Shear Strength Testing

B898–99 Original: Frequency of shear strength testing, test specimen location and test method were at the option of the manufacturer. Product shear testing was not mandatory unless Supplementary Requirement S1 was invoked.

B898–20 Revision: Changes were made to reflect best practice of established manufacturers and users.

1. Shear strength testing of every plate is mandatory. (*Paragraph 7.6.1*)
2. Specimen location, specimen design and testing procedure are explicitly defined. (*Paragraph 7.6.2 and Figure 1*)
3. The specification explicitly defines when a retest is permitted and limits retests to a single set of two. (*Paragraph 7.6.3*)
4. The results of every shear strength test, compliant or not, is to be reported on the MTR. (*Paragraph 7.6.4*)



Shear testing in  
Liebenschaid,  
Germany  
facility.

## Ultrasonic Inspection

B898–99 Original:

1. All rules regarding choice of inspection equipment, procedure, technique, operator qualification, defect recording and characterization were invoked by reference to ASTM–A578. Subsequently, A578 was revised in 2007 and references for use with clad were removed. The absence of a direct reference to “clad” in later revisions of A578 created an opportunity for the producer to deviate from best practice.
2. Three ultrasonic testing quality levels were invoked with the lowest quality level being the default unless otherwise specified by the purchaser.

B898–20 Revision: Changes were made to reflect best practice of established manufacturers and users.

1. All rules for inspection equipment, procedure, technique and operator qualification were redefined by reference to ASTM specifications specifically written for ultrasonic inspection of metal plates. (*Paragraph 11.1 to 11.4*)
2. Search criteria for locating recordable indications and the technique for precise size characterization of these indications were explicitly incorporated. (*Paragraph 11.1.5*)
3. Ultrasonic Testing Quality Level B, 98% minimum sound bond was specified as the default Quality Level. (*Paragraph 11.2*)

The criteria of B898–20 reduces opportunities for the producer to cut corners and manipulate testing requirements in an effort to lower cost and sacrifice product quality. The upgrade provides increased assurance for users that their clad product is produced to the best practices of industry experts. To assure compliance the purchaser is strongly encouraged to specify the latest revision, B898–20, in procurement documents.

Automated Ultrasonic Testing of  
Clad Plates | Watch How it Works



*Automated ultrasonic testing (UT) scanning of up to 100% of clad plate surface area in Mt. Braddock, PA facility.*

### **The Importance of 100% Ultrasonic Testing for End Users**

Chemical processors & refineries have a long history of relying on the corrosion-resistance strength of reactive metals like tantalum, zirconium and titanium on explosion welded clad vessels, reactors or heat exchangers. Reactive metal cladding can lead to lifetime equipment savings to design flexibility, project continuity and safety in chemical processes, refining and metal extraction.

It is the utmost importance for clad vendors to provide reliable material for fabrication. In order to do so, various specifications and requirements must be provided; including ASME, ASTM, DIN, ISO and Euronorm.

With aggressive processing environments, end users must require stringent Non-Destructive Examination. Only characterization of the bond zone for 100% of the clad plate surface area by automatic ultrasonic testing can provide all guarantees of compliance with customer requirements.

When asking for minimum clad thickness inspection and advanced characterization of the bond zone for 100% of the clad plate surface area, owner-operators can be sure the clad has met rigorous requirements for chemical composition and mechanical properties, and the clad complies with stringent NDE requirements. This guarantees the highest level of reliability for clad fabrication.

### **Knowledge is the First Step to Creating Value**

We believe in sharing our metallurgical expertise and invite you to attend an interactive, free 45-minute webinar: **ASTM Specification B898 — Importance of 100% Automated Ultrasonic Testing**. [Fill out this form](#) – and a NobelClad expert will contact you to schedule your webinar.