

ADC HSS Anti-Circumvention Briefing

by



AustubeMills

SHAPING POSSIBILITIES

Tuesday, 2 June 2015

@ Arrium ARC - Docklands

Agenda



- 1 Introductions
- 2 Modification – technical matters
- 3 Purpose, end use and marketing
- 4 Legitimate trade
- 5 Impact on other Commission activities



1. Introductions

- Introductions
- Inquiry key dates
- Inquiry process



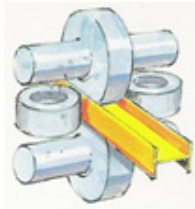
Basic manufacture & categorisation of constructional steels

— “hot” process
— “cold” process

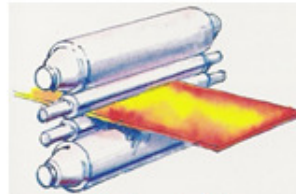


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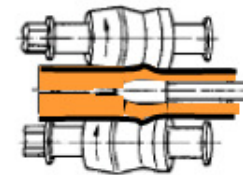
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- ← Molybdenum (Mo)
- ← Other alloying elements (Nb, V, Ti, B, etc)



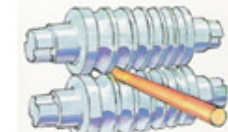
Hot-rolled structurals (UB, UC, TFB, PFC, TFC, EA, UA)



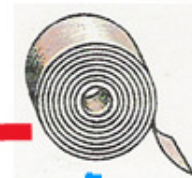
Hot-rolled flat products



Seamless tube from hot ingot



Hot-rolled Rods & Bars (steel shapes < 75 mm – e.g. Flats, Squares, Rounds, Hex, Angles, Y-bar, Rebar, mesh, strand, etc)



Rolled plate & U-O formed CHS/shapes



Hot-rolled plate (fabricated I-, box, etc sections, tank structures, etc)

Cold-formed open sections (Zed, Cee, etc)



(Longitudinal) Welded HSS (CHS, RHS, SHS, Oval)

Cold-formed HSS



Hot-finished HSS



Spiral welded pipe



Cold-formed cladding & decking



Present day Austube Mills



Presence

- 80+ years of manufacturing experience with a history dating back to the 1930's evolving from Stewarts and Lloyds, Palmer Tube Mills, Tubemakers and OneSteel Pipe & Tube.

Scale

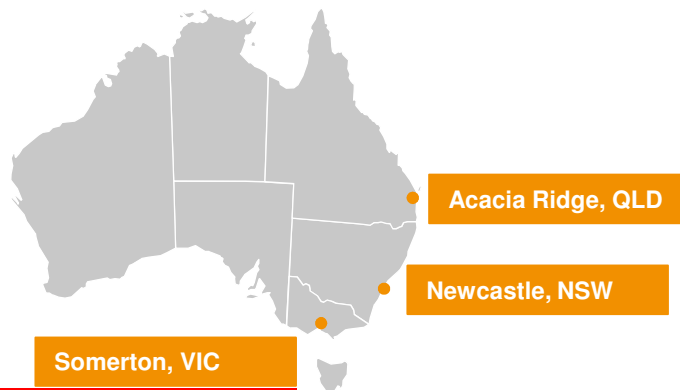
- Largest manufacturer of Hollow Structural Sections (HSS) in Australia

Brand recognition



Customers and suppliers

- Access market via Commercial
- Strong relationship with Commercial Commercial Commercial



Closing operations in Aug 2015



Newcastle facility

2. Modification – technical matters

- Cost of modification
- Additional processes required to include alloy
- Identifying alloyed goods – test certificates, other documents, testing etc
- Boron levels
- Other alloys
- How do the boron-added goods differ from the non-alloyed physically?



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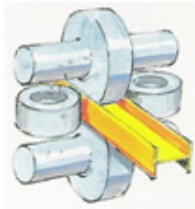
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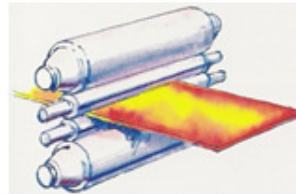


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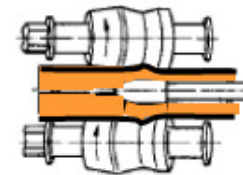
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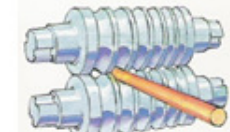
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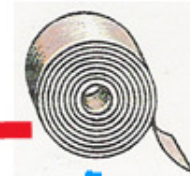
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Hot-finished HSS



Spiral welded pipe



Cold-formed cladding & decking



Modification – technical matters

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Cost of modification

General

- Boron is added during the steelmaking stage through the addition of ferro boron to the melt

Raw material cost differences (alloy and non-alloy)

- **Suppliers** advise that just the cost of boron:
 - is about USD\$ 4.22/kg for ferro boron
 - in a 270 tonne batch of steel, 4-5 x 5kg bags of boron are added to achieve the minimum amount necessary to qualify the steel as "alloy"
 - which, for boron > 0.0008% is around AUD\$ 0.45/tonne

Modification – technical matters

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Cost of modification

Cost of manufacturing process changes (impact on overheads, etc)

- **Suppliers** further advise that the process cost of adding Boron:
 - occurs when the molten steel passes through the ladle treatment station where micro additions and temperature control is undertaken
 - consequently, the additional process cost is negligible as it is added with other elements
- Hence, the overall cost of boron addition is really the cost of the boron itself, i.e. AUD\$0.45/tonne.

Modification – technical matters

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Cost of modification

Impact on finishing (paint, galvanizing, etc)

- There is no impact on finishing such as subsequent painting and galvanizing
 - However, it should be noted that the bona fide use of boron to enhance mechanical properties
 - is generally followed with a heat treatment process such as quench & tempering (Q&T)
 - can impact on the weldability of the steel – more care is required in welding and there is concern on this issue around the world
 - The [REDACTED] HSS does not undergo any Q&T process [REDACTED]
- [REDACTED]

Additional processes required to include alloy?

- None

Modification – technical matters



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Identifying alloyed goods – test certificates, other documents, testing etc

- Import documentation
- Test certificates
- Chemical analysis

Identifying alloyed goods



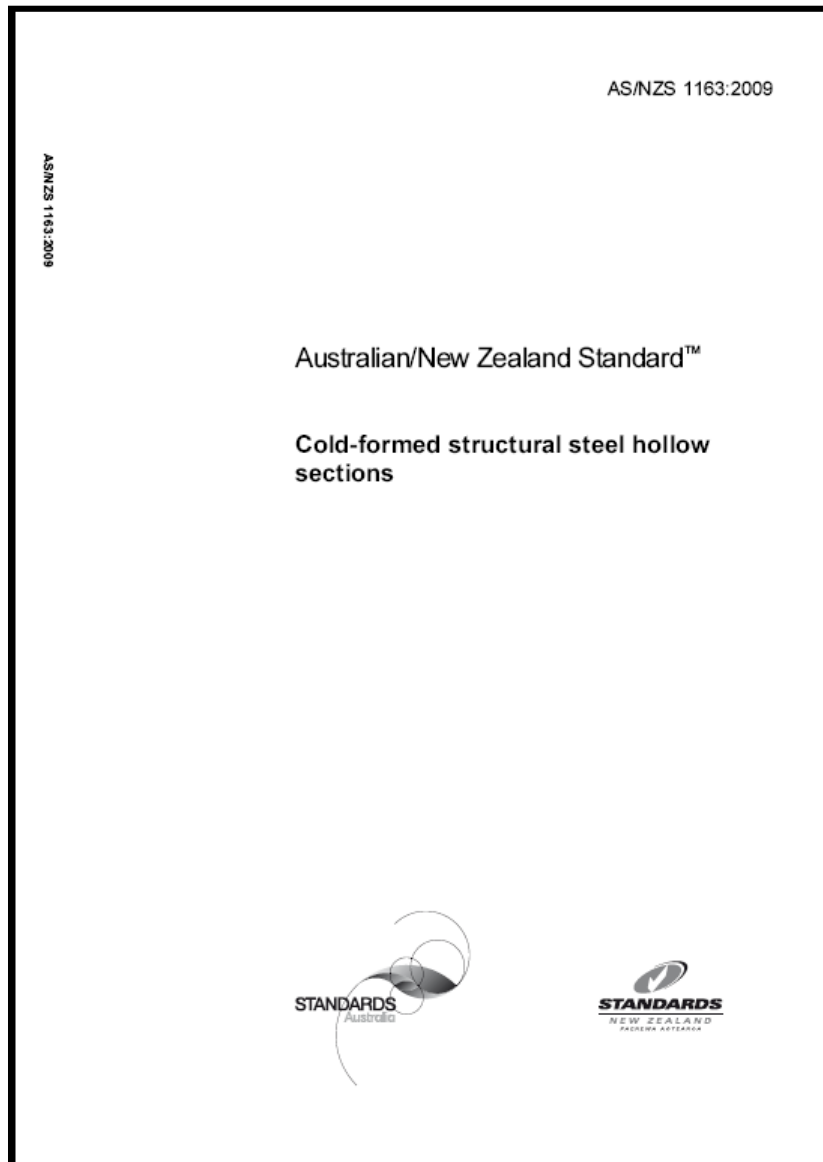
- The predominant Australian HSS product Standards are:
 - AS/NZS 1163 *Cold-formed structural steel hollow sections (SHS, RHS and CHS)*
 - AS 1450 *Steel tubes for mechanical purposes (Oval)*
 - AS 1074 *Steel tubes and tubulars for ordinary service (CHS)*
- A substantial amount of imported HSS are supplied to the above Standards.

Identifying alloyed goods



AS/NZS 1163:2009 *Structural steel hollow sections*

- Scope
- Designation
- Steelmaking process
- **Chemical composition**
- Dimensional tolerances
- Mass tolerance
- Mechanical testing
- Mechanical properties
- Traceability
- **Minimum information on Test Certificates**



AS/NZS 1163:2009



AS/NZS 1163:2009

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13.2.2 Minimum requirements for reports and test certificates

In addition to Clause 13.2.1, any report or test certificate shall be written in English alphanumeric characters, issued by the manufacturers and shall have the following:

- (a) Manufacturer's, supplier's and testing authority's name.
- (b) Test certificate number and test number.
- (c) Date.
- (d) Product, testing specification and grade, e.g. AS/NZS 1163-C350L0 (see Clause 5).
- (e) Product dimensions and size, e.g. 200 × 100 × 5.0 RHS
NOTE: See Appendix D.
- (f) Product steelmaking process, e.g. basic oxygen continuously cast, fine-grained, fully killed steels, and the like (see Clause 6).
- (g) Length, bundle, pack or unique identifier to which the test certificate applies (see this Clause).
- (h) Heat number (from steel feed casting).
- (i) Chemical analysis type, e.g. ladle and cast analysis 'L' or product 'P' (see Clauses 7.1, 7.2 and 7.3).
- (j) Chemical composition of carbon (C), silicon (Si), manganese (Mn), phosphorus (P), sulphur (S), chromium (Cr), molybdenum (Mo), aluminium (Al), titanium (Ti), niobium (Nb), vanadium (V), copper (Cu), nickel (Ni), carbon equivalence (CE) (see Clauses 7.1, 7.2 and 7.3) and any other element intentionally added.
- (k) Where relevant, mechanical or alternative information as noted below:
 - (i) Tensile tests to Clause 10.6.1: Orientation, i.e. longitudinal 'L' (see Clause 10.2.1), treatment, i.e. aged 'A' (see Clause 10.5.4) and results, i.e. yield strength in MPa, tensile strength in MPa and % elongation (see Clause 11.1).
 - (ii) Impact tests to Clause 10.6.2.1: Orientation, i.e. longitudinal 'L' (see Clause 10.2.1), treatment, i.e. aged 'A' (see Clause 10.5.4) and results (see Clause 11.2).
 - (iii) Impact test reporting to Clause 10.6.2.2(a): Statement of steel feed supplier name, grade/type, mill location, and other sizes with nominal thickness greater than or equal to 6 mm using the same steel feed type for compliance with Clause 10.6.2.1.
 - (iv) Impact test reporting to Clause 10.6.2.2(b): Statement of compliance with Clauses 6 and 10.6.2.2(b) with further statements of finished product ferrite grain size, use of aluminium killed steel feed and/or aluminium content in total or soluble form.
- (l) Additional tests agreed between the purchaser and the manufacturer.
- (m) Statement acknowledging material being supplied in accordance with Items (a) to (l) above.
- (n) Signatory from manufacturer, supplier or testing authority attesting to Items (a) to (m) above.

NOTE: Test certificates may be requested by the end purchaser or at the time of manufacture.

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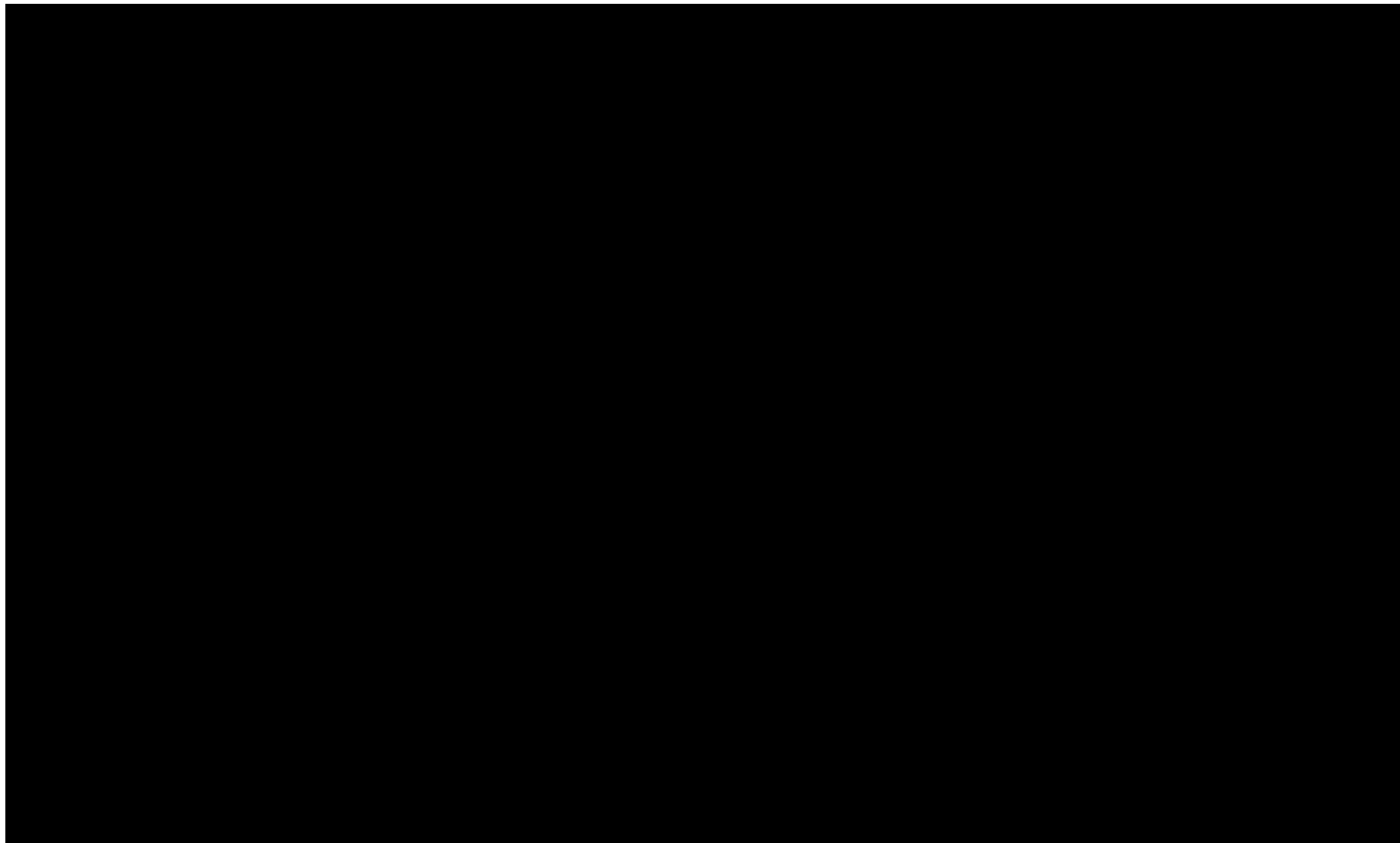
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Test Certificate

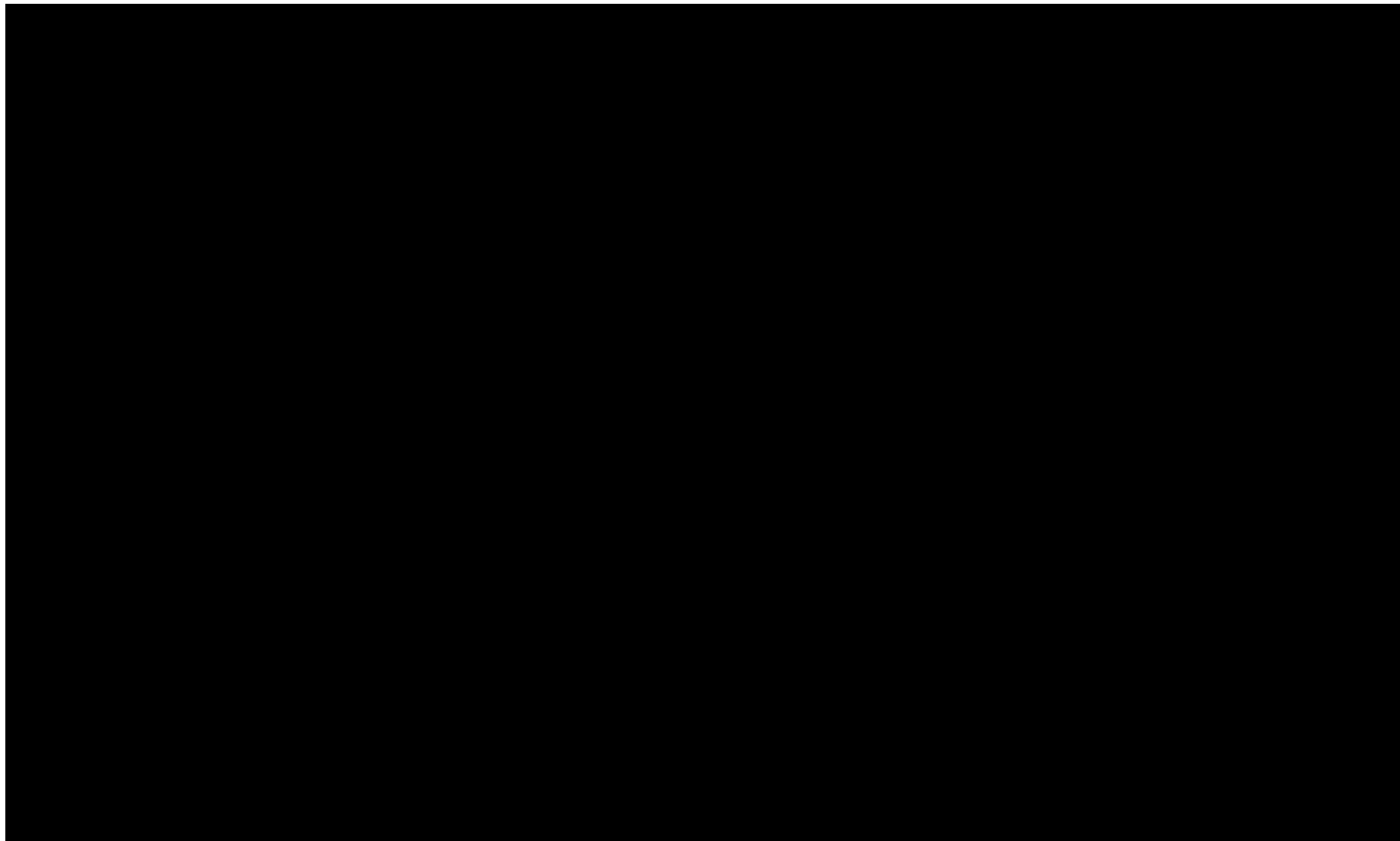
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Test Certificate –

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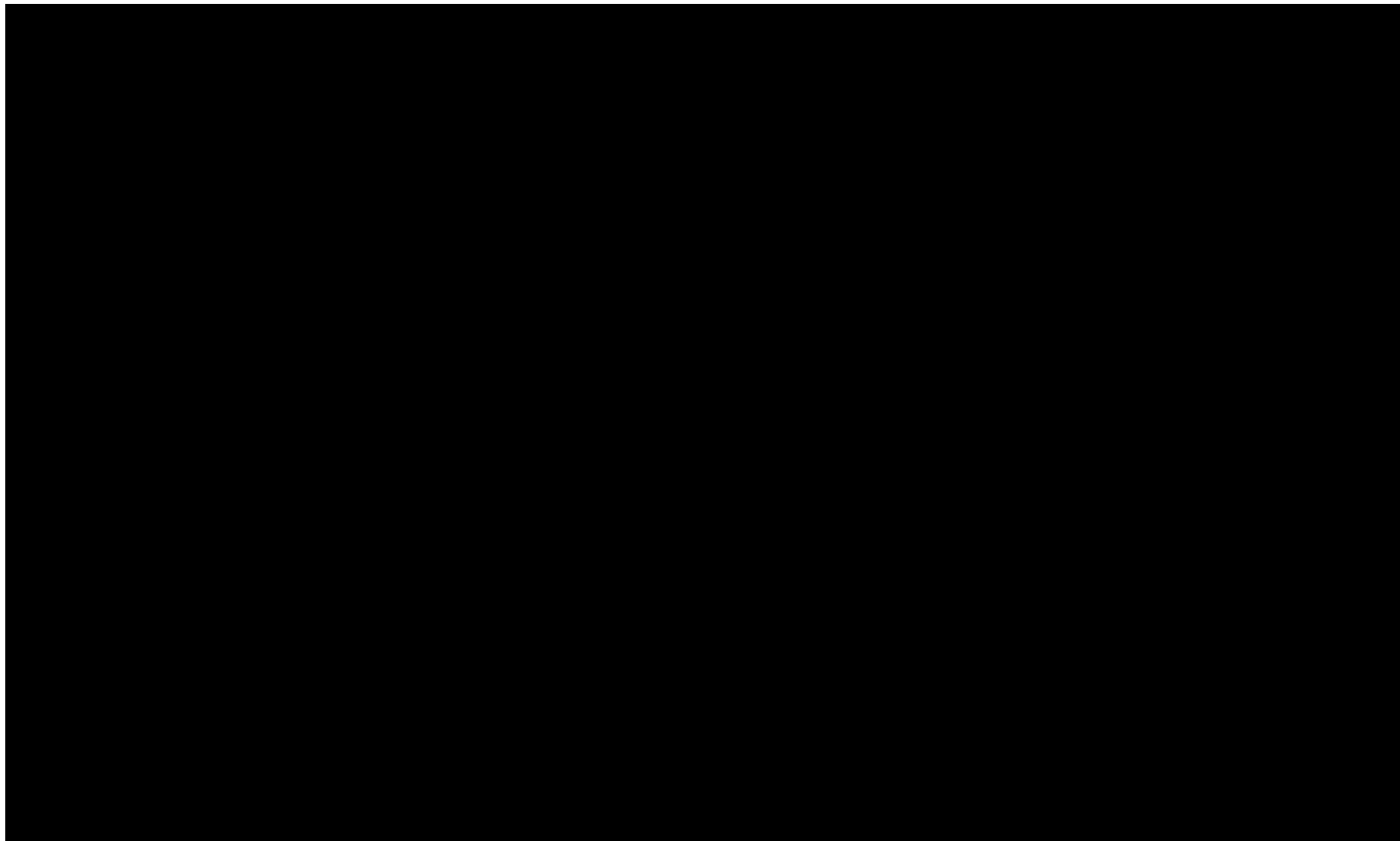
([REDACTED])



[REDACTED] Test Certificate – [REDACTED]

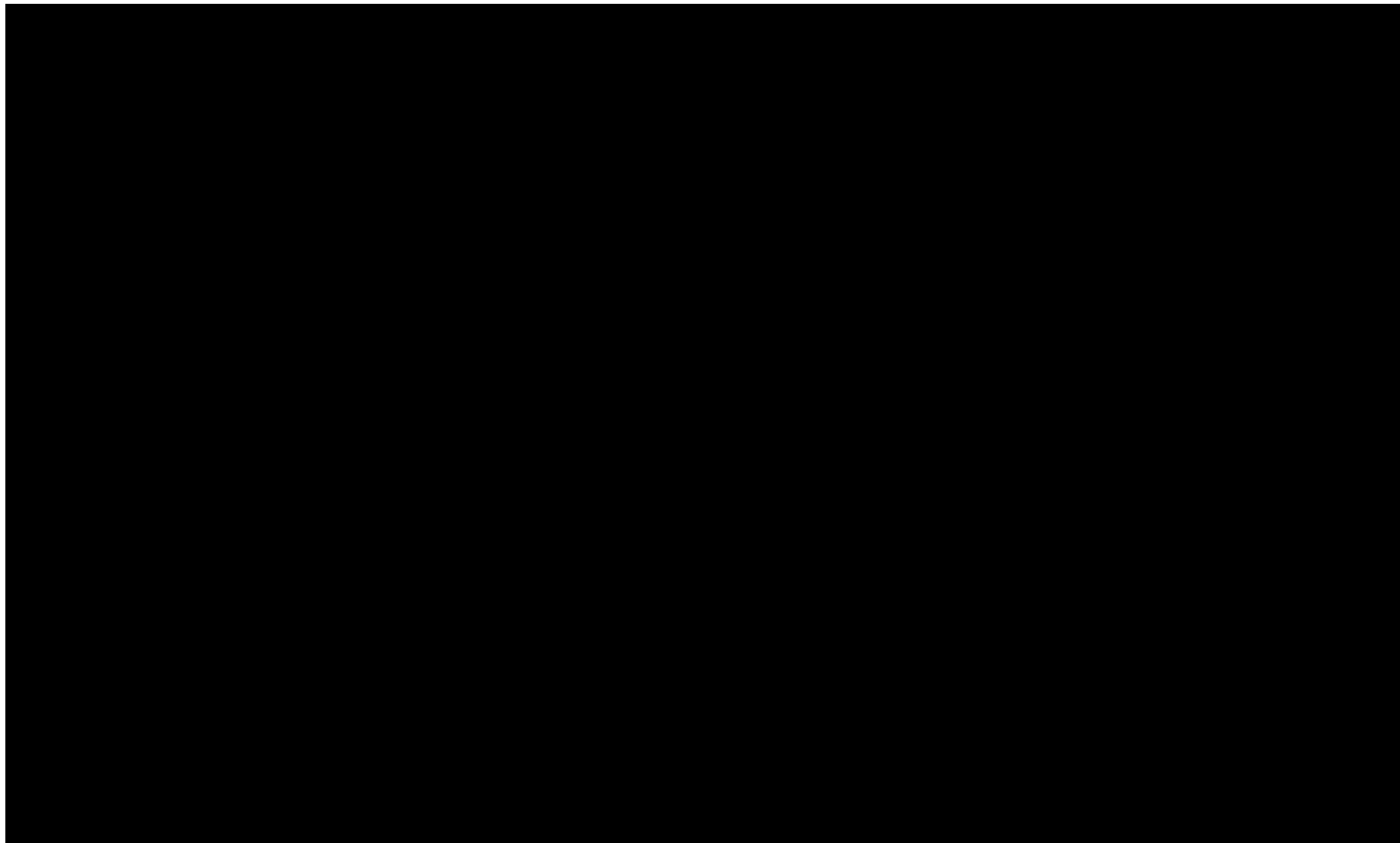
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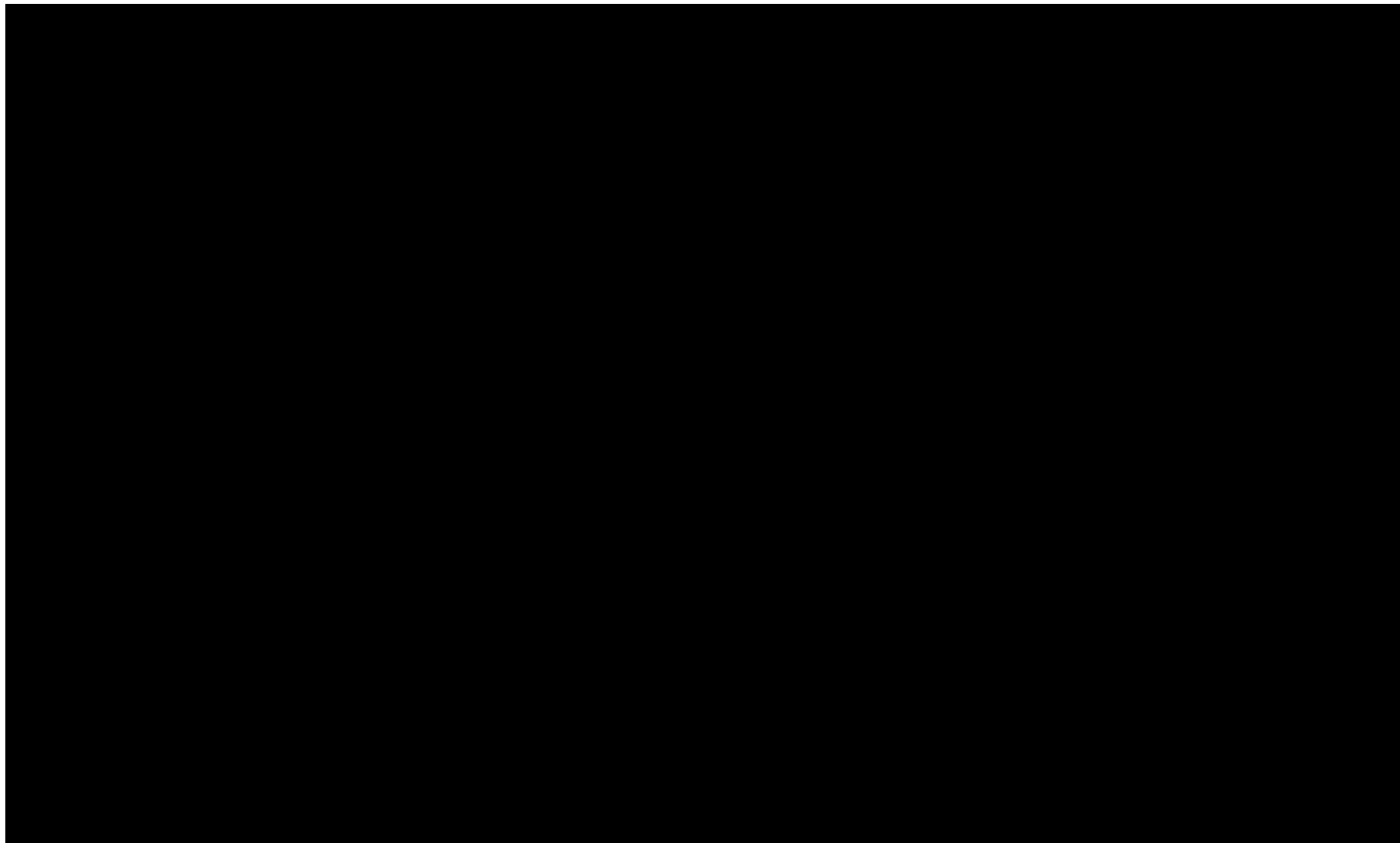
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Test Certificate

(issued )



Modification – technical matters

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Boron Levels

How high could these be and still be like non-alloyed?

- 20 ppm (i.e. 0.0020%) to 30 ppm (0.0030%)
- The higher Boron level the more potential for welding problems

Modification – technical matters

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Other alloys

What could be used and at what levels

- Customs Tariff Schedule 3 – Section XV Base metals and articles of base metal
- Steels not complying with the definition of stainless steel and containing by weight one or more of the following elements in the proportion shown:
 - 0.3% or more of aluminium
 - 0.0008% or more of boron
 - 0.3% or more of chromium
 - 0.3% or more of cobalt
 - 0.4% or more of copper
 - 0.4% or more of lead
 - 1.65% or more of manganese
 - 0.08% or more of molybdenum
 - 0.1% or more of other elements (except sulphur, phosphorus, carbon and nitrogen), taken separately.
 - 0.3% or more of nickel
 - 0.06% or more of niobium
 - 0.6% or more of silicon
 - 0.05% or more of titanium
 - 0.3% or more of tungsten (wolfram)
 - 0.1% or more of vanadium
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Modification – technical matters

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Modification – technical matters

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Modification – technical matters

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Other alloys

Alloys not suitable for modification of HSS

- Some alloying elements may have a detrimental effect on the steel.
- If anything is added, possible detrimental effects would need to be considered.

Modification – technical matters



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Other alloys

Effects of various alloys on steels

Modification – technical matters



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Other alloys

Effects of various alloys on steels

Modification – technical matters



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Other alloys

Effects of various alloys on steels

Modification – technical matters


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Other alloys

Element	AS/NZS1163 (C350)	AS/NZS1163 (C450)	Tariff Ch 72 Note
Cr Chromium	Max 0.30%	Max 0.50%	0.30% or more
Mo Molybdenum	Max 0.10%	Max 0.35%	0.08% or more
Nb Niobium	Max 0.15%*	Max 0.15%*	0.06% or more
Zr Zirconium	No limit specified	No limit specified	0.05% or more
B Boron	No limit specified	No limit specified	0.0008% or more
Other elements	No limit specified	No limit specified	0.1% or more

* other alloying elements Vanadium and Titanium need to be allowed for in this maximum.

Modification – technical matters

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How do the boron-added goods differ from the non-alloyed physically?

- There is no discernible physical difference to a consumer to distinguish boron-added HSS from non-boron added HSS.
- The only way to distinguish would be by reference to a chemical analysis.

3. Purpose, end use and marketing

- End use
- Interchangeability
- Standard product offerings of exporters
- Market differences
- Customers of importers
- Why would some importers still have a mix of alloy and non-alloy?



Purpose, end use & marketing



End use

Structural steel for general use only require limited use of alloying elements to obtain the required mechanical properties. This is normally achieved through the addition of Manganese and for high strength steel Niobium.

Does the addition of boron make the HSS for any end use that non-alloy steel would be suitable for?

- The bona fide addition of boron is primarily used to increase hardness, strength and wear resistance.
- If boron is added it also requires heat treatment (such as quench and tempering) during manufacture which would render it not suitable for general structural applications (ie to AS/NZS 1163:2009)
- there are application such as slurry pipes (wear resistance) and automotive side intrusion bars (very high strength) where these quench and tempered products are used

Purpose, end use & marketing



End use

Does the addition of Other Alloys make the HSS for any end use that non-alloy steel would be suitable for?

- Each alloying element will have a unique “alloying effect” on the steel if added in sufficient concentrations
- Some applications will require these alloying effects which includes higher strength, fatigue resistance, toughness, and wear resistance
- As with Boron these steels generally require Heat treatment to achieve the properties
- for hollows sections the main applications are as high strength steels used in automotive and other mechanical applications (i.e. power generation etc).
Example: 41xx Chrome Moly tube which contain approx Chromium (1%) and Molybdenum (0.20%) (Chrome – Moly).
- Seamless tube is the generally the product of choice for critical applications

Purpose, end use & marketing



Interchangeability

- The limited addition of micro-alloying elements such as boron are interchangeable in end-use with general HSS.
- Other elements can also be added and still maintain structural properties for use in general structural application (eg Chromium and Molybdenum)

Purpose, end use & marketing



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Standard product offerings of exporters

Would these include boron-added?

- Yes.

Purpose, end use & marketing



Standard product offerings of exporters

Would these include boron-added?

- Yes.

Would these include other alloyed?

- Not above the Customs Tariff Schedule 3 levels for alloys steel

Would it need to be a special request of the manufacturer/ special offer by manufacturer?

- No.

Purpose, end use & marketing

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Marketing differences

Would the importer be selling it as an alloy or would it be likely be marketed and sold the same as non-alloy?

- Marketed / promoted the same as non-alloy.
- Manufacturers using the bona fide addition of boron specifically state the presence, benefits, processing and handling procedures (e.g. welding) required for Boron added steel.

Specified alloyed or boron offers in market?

- No – unless from the manufacturers using boron to change properties.

Purpose, end use & marketing



Marketing differences

Offer/order process

- **Importers** do not advertise the presence of Boron in their steel
- There are no marketed benefits
- **Importers** publications and website have not been revised since they started using boron-added HSS steels.

Purpose, end use & marketing



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Customers of importers

Awareness of modification?

- Only shown on Test Certificates (Mill certificates).
- Otherwise no mention of boron addition.
- Most end-users would not be aware of any effect from boron addition unless they are an astute purchaser with significant knowledge of metallurgy.

Purpose, end use & marketing



Number of references by **Importers** in their publicly available *marketing & downloadable media* to:

- addition of Boron
- benefits from the addition of Boron
- how to handle Boron during fabrication, processing & welding

NONE !!

Purpose, end use & marketing



Number of references by **Importers** on their website to:

- addition of Boron
- benefits from the addition of Boron
- how to handle Boron during fabrication, processing & welding

NONE !!

Purpose, end use & marketing

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Customers of importers

Uses

- Same as non-boron HSS
- There is no discernible physical difference to a consumer to distinguish Boron added HSS from non-boron added HSS. The only way to distinguish would be by reference to a chemical analysis.
- Commercially the Boron added HSS are being sold to the same end users through the same distribution channels on the same terms as the non-boron added HSS.
- The Boron added HSS are functionally the same as the non-Boron added HSS as they are being used in the same end use applications.

Purpose, end use & marketing

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Customers of importers

Any reason why customers may prefer alloy over non-alloy HSS?

- No reason unless they require very high strength and/or very high hardness (as in wear applications)
 - **Importers** do not obtain such properties (as noted in their test certificates)
 - **Importers** do not market / promote their products on these increased properties (which they don't achieve)
- If alloying elements are not added to achieve a bona fide beneficial alloying effect (as in legitimate alloy steels), then there is no reason for a customer to buy an alloy HSS over a non-alloy HSS.

Purpose, end use & marketing



Why would some importers still have a mix of alloy and non-alloy?

For HSS in the size range of the application:

CONFIDENTIAL REASONS

4. Legitimate trade



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Legitimate trade



What would alloyed HSS be legitimately imported for (boron and other alloys)?

- Slurry pipe (wear resistant)
- Very high strength pipe & tube – Automotive
- high performance mechanical applications (Chrome Moly tube)

but **Importers** boron-added HSS products are not marketed or used in such applications.

5. Impact on other Commission activities



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Impact on other Commission activities



Question to Commission

Thank you



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