Agenda Item 650-2060

Title: Add EN 10025 and ISO 630 Grade S355 Structural Shapes

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Revision: 0

Handled By: Doug Miller
CB&I Storage Solutions
14105 S. Route 59
Plainfield, IL 60544-8984
Telephone: 630-809-98010
Email: doug.miller@mcdermott.com

Purpose: To permit the use of EN 10025 and ISO 630 Grade S355 structural shapes in API 650.

Source: Sean Cochrane (CB&I Storage Solutions) March 30, 2021 email to Justin Kline.

Impact: Greatly improved availability of material in eastern hemisphere.

Discussion:

History:

- ISO 630 structural shapes (as well as plates) in the E275 strength grade have been in API for many years.
- EN 10025 materials were added to API 650 via agenda item 650-684 in 2009.
- The EN spec and the ISO spec in latest editions they have become almost identical.
- In 2009 the grades of EN plate (S275 and S355) and shapes (S275) added corresponded to the grades of ISO plate (E275 and E355) and shapes (E275) that were already in API 650.
- Shapes in EN S355 and ISO E355 existed in the EN and ISO specs but in 2009 our SCAST agenda item simply matched EN coverage of shapes to the ISO coverage already in 650.

Rationale:

- The 355 grades of shapes under EN10025 and ISO 630 both are now widely used in many locations worldwide in the same way that stronger A992 shapes have taken over much market share from the mild steel A36 shapes in the ASTM world.
- Composition limits and mechanical test requirements for the 355 grades are the same for both plate (which are currently recognized in API 650) and sections. So there is no big technical issue with these sections. This is mainly an administrative change.

Below table is provided for information as part of the rationale for the item. It is not for publication.

	CVN Test Temp (F)	min YS (ksi)	min TS (ksi)	book Carbon (%max)	book Mn (%max)	book Deox
ISO630 S355B	+68[d]	51.5[b]	68.1	0.24	1.60	Non-rimming
EN10025 S355JR	+68[d]	51.5[b]	68.1	0.24	1.60	Non-rimming
ISO630 S355C	+32[e]	51.5[b]	68.1	0.20[c]	1.60	Non-rimming
EN10025 S355J0	+32[e]	51.5[b]	68.1	0.20[c]	1.60	Non-rimming
ISO630 S355D	-4[e]	51.5[b]	68.1	0.20[c]	1.60	Fully Killed
EN10025 S355J2	-4[e]	51.5[b]	68.1	0.20[c]	1.60	Fully Killed

[a] Information provided from EN 10025-2:2019 and ISO 630-2:2021
[b] 50.0 ksi for T >16 mm
[c] 0.22% for T> 30mm
[d] Actual test verification only when specified in order
[e] Impact tests carried out for T >= 6 mm, frequency is one test per each 60 to 80 tonnes.

Proposed Changes:

4.4 Structural Shapes

4.4.1 Structural steel shall conform to one of the following:

a. ASTM A 36M/A 36.

b. ASTM A 131M/A 131.

c. ASTM A 992M/ A 992.

d. Structural Steels listed in AISC *Manual of Steel Construction.*

e. CSA G40.21, Grades 260W(38W), 300W(44W), 350W(50W), 260WT(38WT), 300WT(44WT), and 350WT(50WT). Imperial unit equivalent grades of CSA Specification G40.21, shown in parenthesis, are also acceptable.

f. ISO 630, Grades ~~E~~S275 and S355, Qualities B, C, and D.

g. EN 10025, Grades S275, and S355, Qualities JR, J0, and J2.

h. Recognized national standards. Structural steel that is produced in accordance with a recognized national standard and that meets the requirements of Table 2-2 is acceptable when approved by the purchaser

Note to Editor: In the 2021 edition of ISO 630 all the grades referenced in API 650 are now all designated SXXX. Previously they were EXXX. This should be corrected in a number of places in API 650, section 4.