Approval Date: April 23, 2020

Code Cases will remain available for use until annulled by the applicable Standards Committee.

Case 2864-2
9Cr–1Mo–V Material
Section I

Inquiry: May seamless tubes, seamless pipes, forged and bored pipes, fittings, forgings, and plates with the chemical composition shown in Table 1, otherwise conforming to the specifications listed in Table 2 for Grade 91, be used in Section I construction?

Reply: It is the opinion of the Committee that 9Cr–1Mo–V seamless tubes, seamless pipes, forged and bored pipes, fittings, forgings, and plates with the chemical composition shown in Table 1, otherwise conforming to the specifications listed in Table 2 for Grade 91, may be used in Section I construction, provided the following additional requirements are met:

(a) The material shall be austenitized within the temperature range of 1,900°F to 1,975°F (1 040°C to 1 080°C). The rate of cooling from 1,650°F to 900°F (900°C to 482°C) shall be no slower than 9°F/min (5°C/min).

(b) The maximum allowable stress values shall be those shown in Table 3 and Table 3M.

(c) Welding procedure and performance qualifications shall be conducted in accordance with Section IX. This the material shall be considered P-No. 15E, Group 1.

(d) For PWHT, the material shall be considered P-No. 15E, Group 1.

(e) Cold-forming rules for Grade P91 in PG-20 shall apply.

(f) Weld strength reduction factors for the creep strength-enhanced ferritic (CSEF) steel group in Table PG-26 shall apply.

(g) Lead (Pb) content shall be measured and reported.

(h) The materials shall be marked with this Case number.

(i) This Case number shall be shown on the Manufacturer's Data Report Form.

Table 1
Chemical Requirements

Element	Composition Limit, %
Carbon	0.08–0.12
Manganese	0.30–0.50
Phosphorous, max.	0.020
Sulfur, max.	0.005
Silicon	0.20–0.40
Chromium	8.00–9.50
Molybdenum	0.85–1.05
Tungsten, max.	0.05
Nickel, max.	0.20
Vanadium	0.18–0.25
Columbium	0.06–0.10
Nitrogen	0.035–0.070
Copper, max.	0.10
Aluminum, max.	0.020
Boron, max.	0.001
Titanium, max.	0.01
Zirconium, max.	0.01
Arsenic, max.	0.010
Tin, max.	0.010
Antimony, max.	0.003
N/Al ratio, min.	4.0

Table 2
Specifications

Material	Specification
Fittings	SA-234/SA-234M
Forged and bored pipe	SA-369/SA-369M
Forgings	SA-336/SA-336M
Plate	SA-387/SA-387M
Seamless pipe	SA-335/SA-335M
Seamless tube	SA-213/SA-213M

Add SA-182/SA-182M to allowed forging specifications.

Material	Specification
Forgings	SA-182/SA-182M
	SA-336/SA-336M

Rev. 1
Date: 5/13/2021

Table 3
Maximum Allowable Stress Values

For Metal Temperature Not Exceeding, °F	Maximum Allowable Stress Values, ksi
1,000	16.3
1,050	12.6
1,100	9.1
1,150	6.1
1,200	3.7

Table 3M
Maximum Allowable Stress Values

For Metal Temperature Not Exceeding, °C	Maximum Allowable Stress Values, MPa
550	102
575	78.2
600	57.6
625	39.2
650 [Note (1)]	25.1

NOTE:
(1) The value provided at 650°C is for interpolation use only. The maximum use temperature is 649°C.

Rev. 1
Date: 5/13/2021