

CATERPILLAR: CONFIDENTIAL YELLOW TECHNICAL INFORMATION - YOU SHALL OBTAIN PERMISSION FROM THE CONTENT OWNER AND ESTABLISH THAT THE PERSON RECEIVING THE INFORMATION HAS THE NEED TO KNOW PRIOR TO SHARING THIS INFORMATION WITH ANYONE INSIDE OR OUTSIDE OF CATERPILLAR.

1.0 DESCRIPTION

Steel – Alloy

2.0 APPLICATION

Carburized Parts Requiring Extra Cleanliness

3.0 QUALIFYING SPECIFICATIONS

- 1E0024B Wrought Steel - General Requirements
- 1E0038 Steel Hardenability Calculation
- 1E2177 Mill Tolerances - Steel Products
- 1E2349 Materials Application - Substitute
- 1E2661A Steel Cleanliness - Ladle Refining
- 1E2700A Steel Quality - Caster Class 1B (Seamless Tubing)
- 1E2700C Steel Quality - Caster Class 1B (Bar)

4.0 FORM AND QUALITY

Semifinished for Forging
Hot Rolled Bars
Cold Finished Bars
Seamless Tubing

5.0 COMPOSITION (%) (HEAT ANALYSIS)

Carbon	0.19 - 0.23
Manganese	0.85 - 1.00
Phosphorus	0.020 MAX
Sulfur	0.015 - 0.025
Silicon	0.18 MAX
Chromium	0.85 - 1.00
Molybdenum	0.30 - 0.35
Aluminum	0.020 MIN (Ladle and Product)

Note: DI (calculated by 1E0038 multiplying factors) shall be 80.0 mm to 97.8 mm, based on ladle chemistry or 77.5 mm to 100.3 mm, based on product chemistry.

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STEEL - ALLOY (4122 MODIFIED - SPECIAL CLEANLINESS)	DATE 18 OCT 2018	CHG NO 13	NUMBER 1E1054

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6.0 STEEL CLEANLINESS

6.1 Ladle refining per 1E2661A is required for 1E1054.

7.0 AUSTENITIC GRAIN SIZE

ASTM E112 (McQuaid-Ehn) 5 or finer, grain refined with aluminum.

8.0 HARDENABILITY (FOR REFERENCE)

Jominy testing is permitted for those heats which fall just outside of the indicated DI ranges.

Normalizing Temperature 925°C
Austenitizing Temperature 925°C

Jominy Distance (mm)	1.5	7.0	15.0
MAX	48	--	36
RKW C			
MIN	43	38	--
Jominy Distance (Inch)	1/16	4/16	10/16
MAX	48	--	35
RKW C			
MIN	43	40	--

9.0 SUBSTITUTE MATERIALS

9.1 Substitute materials allow the chemical compositions of certain National Standard grade steels to be used in place of 1E specification chemistries, per the guidelines of 1E0024 and 1E2349 – Substitute Materials Application. **When procuring any of the following substitute grades, all other quality requirements of the original 1E specification shall be met, such as approved mill, reduction ratio, caster class, tensile strength, DI, grain size, etc.**

9.2 If steel purchasers do not understand these issues, they shall buy materials to the 1E material specification or employ the services of Caterpillar global Purchasing to assist in material acquisition.

9.3 1E2349 governs approval requirements and procedures. This specification shall be read and understood before using any of the substitute materials listed below.

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Specification		Type
Caterpillar	1E1727	1E2349A
Caterpillar	1E1698	1E2349B
GB/T 5216	20CrMnHH, 20CrMoHH, 22CrMoH 22CrMnMoH	1E2349B
JIS G4052	SCM822H	1E2349B
DIN EN 10084	20MnCr5+HH, 22CrMoS3-5	1E2349B

Figure 1

10.0 REFERENCES

Abbreviations	1E0011
Caterpillar	1E1698, 1E1727, 1E2349
ASTM	A534, E112
DIN EN	10084
JIS	G4105
GB/T	5216
JIS	G4052

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**STEEL - ALLOY (4122 MODIFIED - SPECIAL
CLEANLINESS)**

DATE
18 OCT 2018

CHG NO
13

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1E1054