

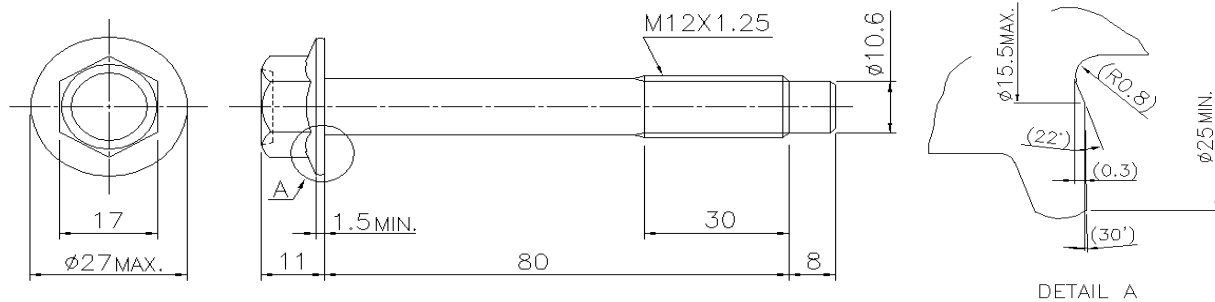
Investigation Report

Item	Investigation flange cracks and shank defects on items made from U.S. billetcast material trial	November 3, 2016
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1. Overview

An investigation was launched following flange cracks and shank defects found on bolts made from U.S. billet-cast material.

【Bolt】



【Material: Charter】
Grade: SAE10B23
Original Size: $\phi 12.7\text{mm}$

【Wire Processor: GBP】
Phos/Lube Coating

【Header: Dextech】
Inline Drawing $\phi 11.7\text{mm}$
Blank Diameter $\phi 11.05\text{mm}$

2. Conclusion

Flange cracks occurred on 7.6% of the items made in this trial, and some flange cracks were over 1 mm and shank defects over 0.2 mm. Therefore, it is judged that this U.S. material is not of the same quality level as Japan-made material. Currently this bolt is mass produced with Japan-made material, but cracks have never occurred.

3. Data

3-1. Sorting for flange crack results

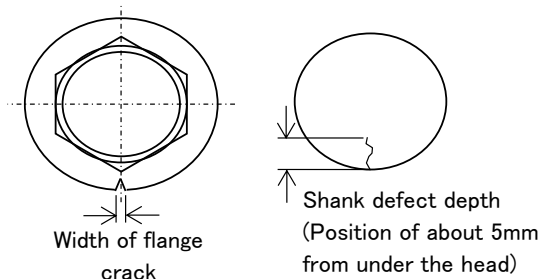
Number and ratio of flange cracks sorted as sorted by sight

Grade	Total amount	Total w/ cracks	
		Number	Ratio
SAE10B23	20,236	1,537	7.6%

3-2. Defect depth

Depth of flange cracks and shank defects on North American billet material

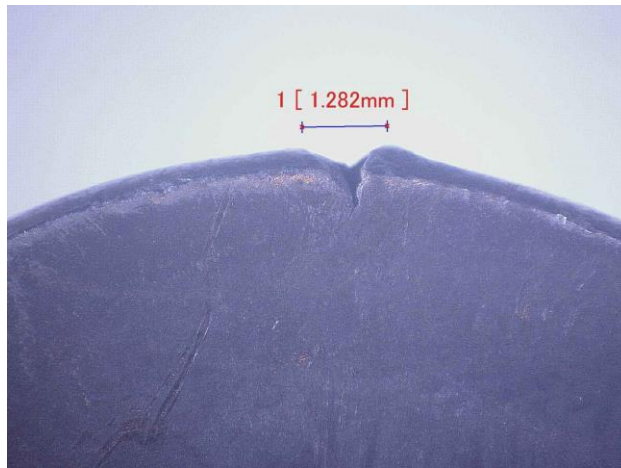
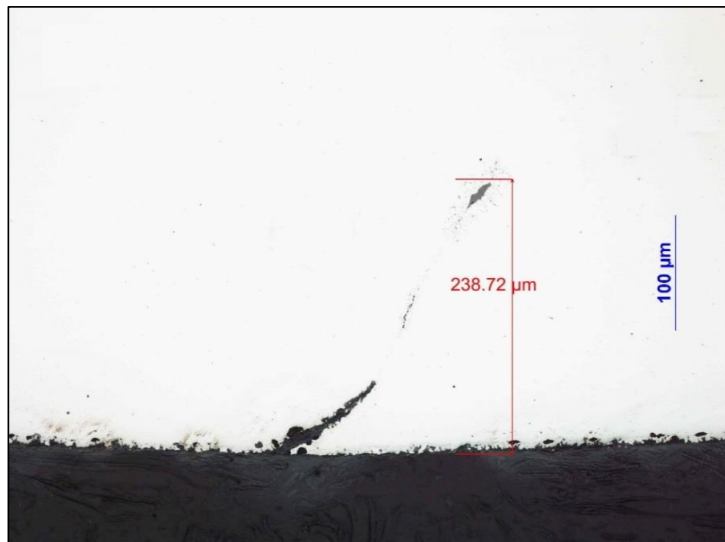
Grade	Item	No.1	No.2	No.3	No.4	No.5	No.6	Unit [mm]
SAE10B23	Flange Crack Width	1.282	1.200	1.035	0.588	0.459	0.494	
	Shank Defect Depth	0.239	0.260	0.228	0.130	0.146	0.135	



Original Product Diameter $\phi 12.7\text{mm}$
→ Drawn Diameter $\phi 11.7\text{mm}$
→ Bolt Blank Diameter $\phi 11.05\text{mm}$
(Defect depth unknown at original and drawn diameters.)

Billet SAE10B23 Flange Crack and Shank Defect Depth**SAE10B23 Flange Crack No.1**

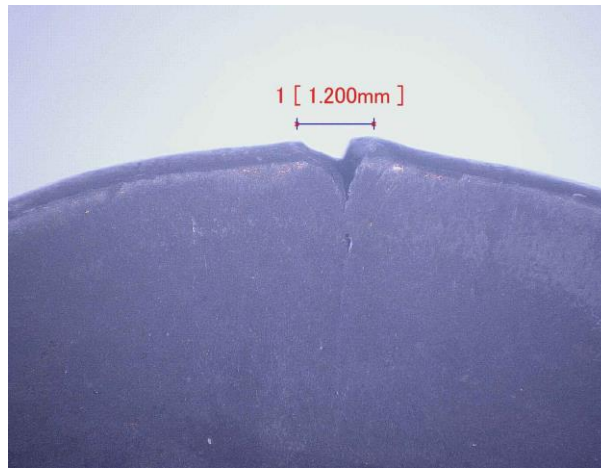
Flange Crack View

Flange Crack Magnification (Photo from surface in)
(Magnification: X40; Free of display magnification)Shank Cross Section Shank length ~5mm
(Magnification: X200; Free of display magnification)

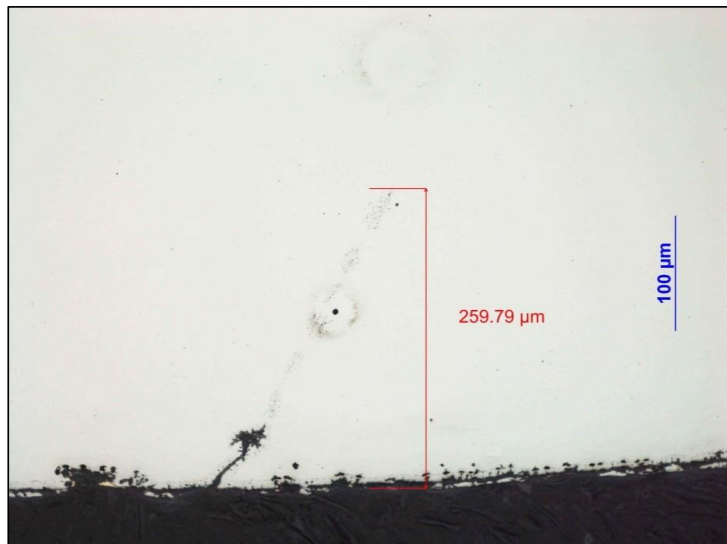
SAE10B23 Flange Crack No.2



Flange Crack View



Flange Crack Magnification (Photo from surface in)
(Magnification: X40; Free of display magnification)

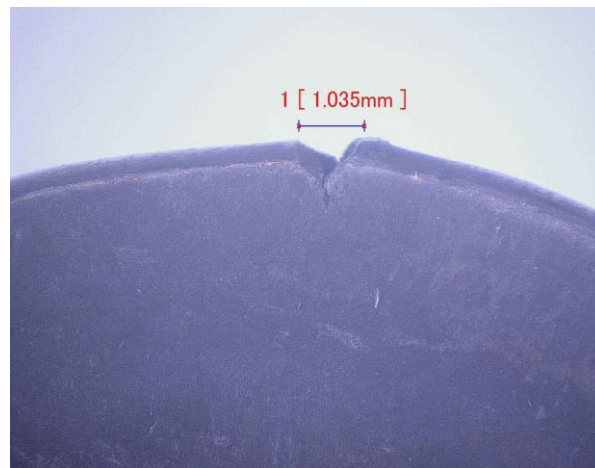
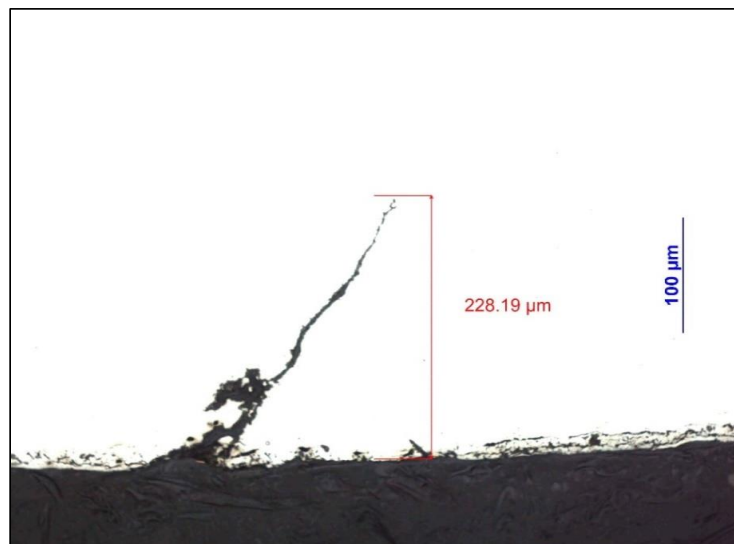


Shank Cross Section Shank length ~5mm
(Magnification: X200; Free of display magnification)

SAE10B23 Flange Crack No.3



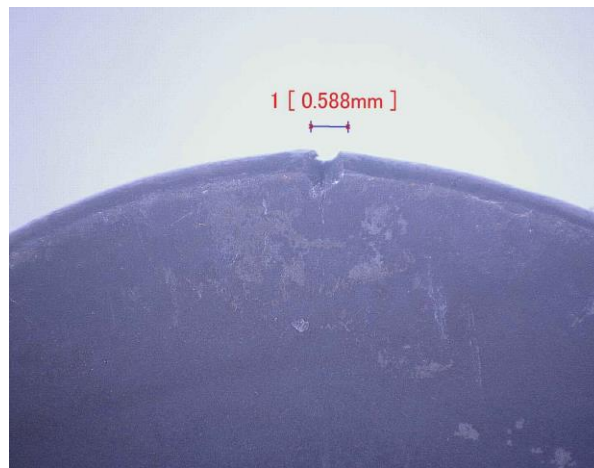
Flange Crack View

Flange Crack Magnification (Photo from surface in)
(Magnification: X40; Free of display magnification)Shank Cross Section Shank length ~5mm
(Magnification: X200; Free of display magnification)

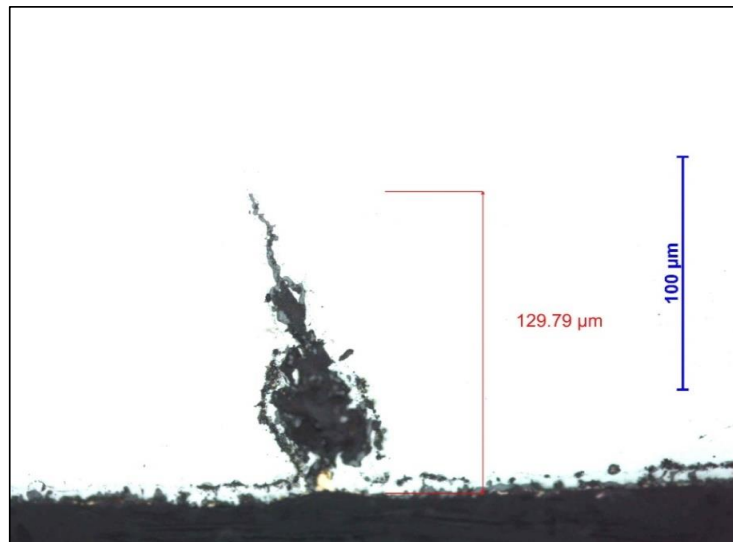
SAE10B23 Flange Crack No.4



Flange Crack View



Flange Crack Magnification (Photo from surface in)
(Magnification: X40; Free of display magnification)

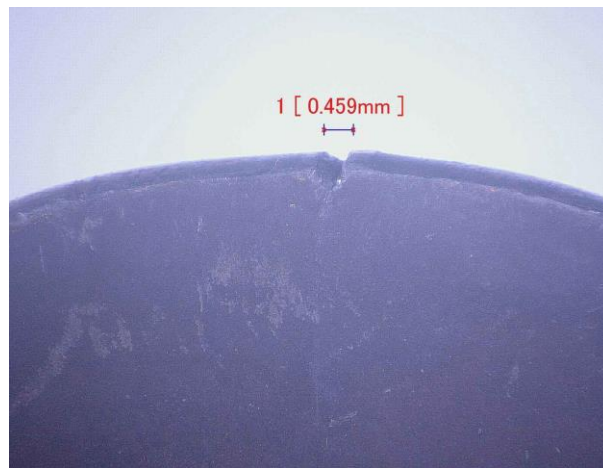
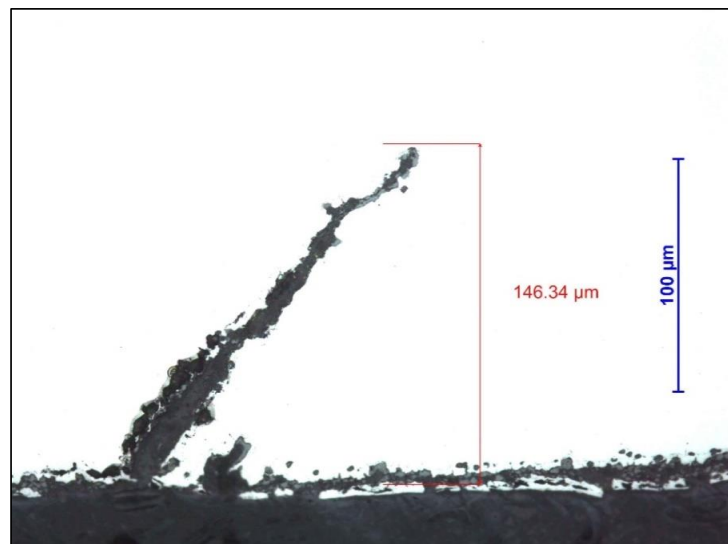


Shank Cross Section Shank length ~5mm
(Magnification: X200; Free of display magnification)

SAE10B23 Flange Crack No.5



Flange Crack View

Flange Crack Magnification (Photo from surface in)
(Magnification: X40; Free of display magnification)Shank Cross Section Shank length ~5mm
(Magnification: X200; Free of display magnification)

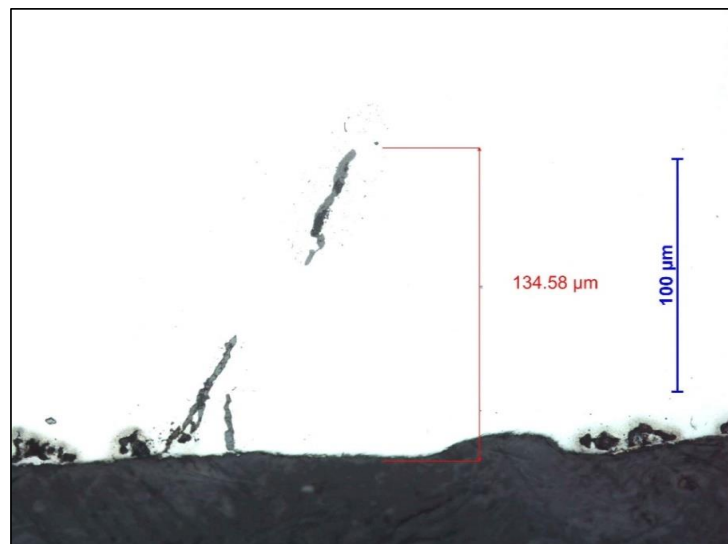
SAE10B23 Flange Crack No.6



Flange Crack View



Flange Crack Magnification (Photo from surface in)
(Magnification: X40; Free of display magnification)



Shank Cross Section Shank length ~5mm
(Magnification: X200; Free of display magnification)