Challenge Time for Materials Engineers (6)

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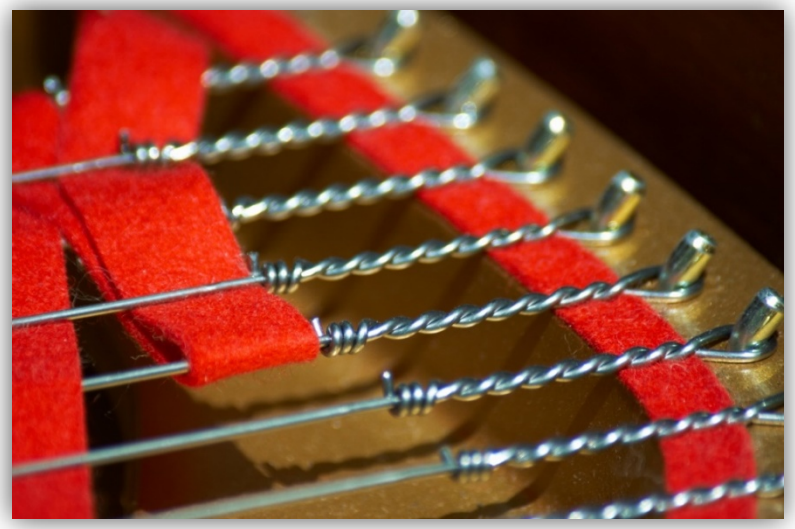
What is the amount of carbon in the steel used to produce piano wire?

A. 0.1- 0.4

B. 0.4 - 0.7

C. 0.7 – 1

D. 1 - 1.3



Please think first and then go to the next page for the answer.

The correct answer is C

Steels with pearlitic (eutectoid composition) or near-pearlitic microstructure (near-eutectoid composition) can be drawn into thin wires. Such wires, often bundled into ropes, are commercially used as piano wires, ropes for suspension bridges, and as steel cord for tire reinforcement.

Element	Composition, %
Carbon	0.70–1.00
Manganese	0.20–0.70
Phosphorus, max	0.025
Sulfur, max	0.030
Silicon	0.10–0.30

In Table 1 of this five-page standard, you will see that the tensile strength of a 0.4 mm diameter wire, which can be a piano wire, is 2750 MPa!