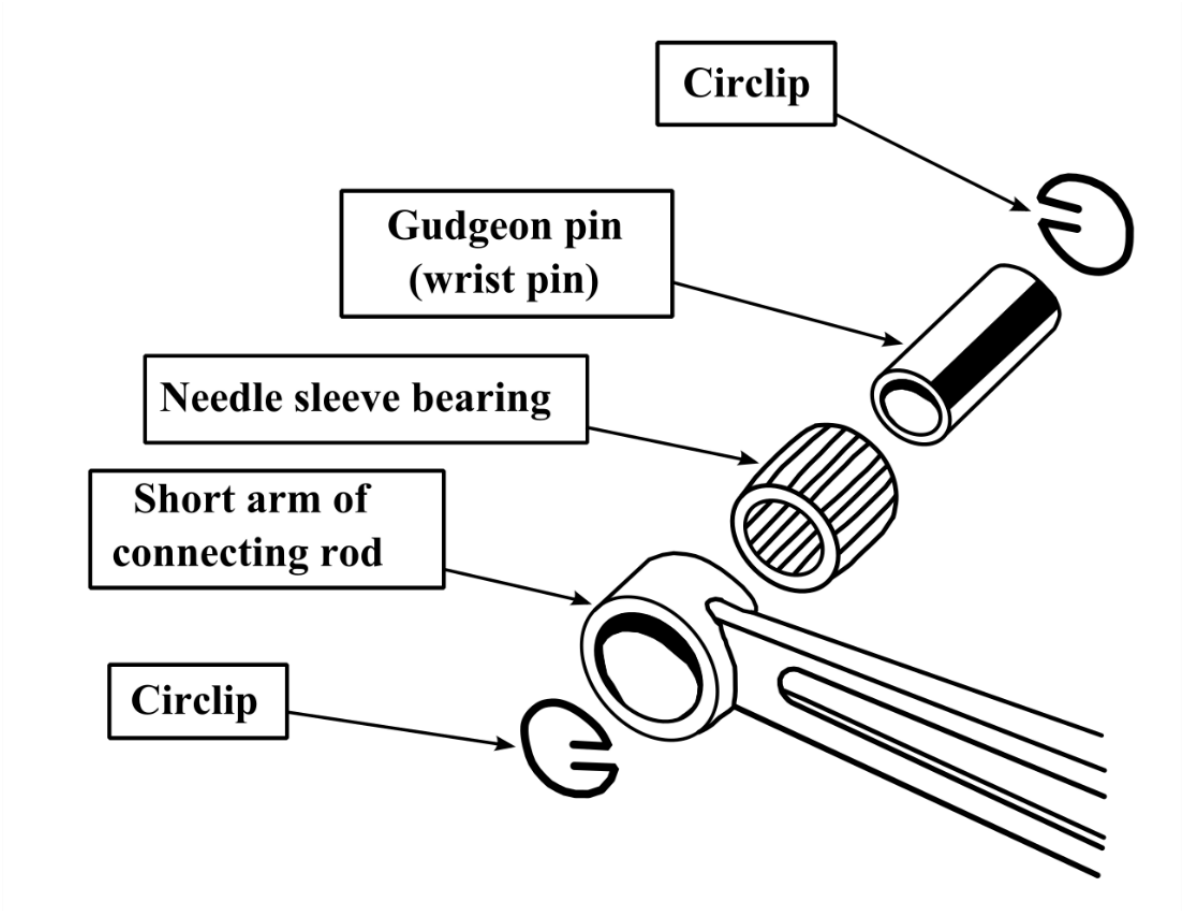
Group	Name	Neptun Code	Date
L2A	Michael Ugwu		5/12/2022

MATERIALS SELECTION REPORT PROJECT:

Wrist Pin

- **Dimension:** 10mm Diameter
- **Loads and requirements:** High wear resistance, maximal hardness in 1-1.5 mm depth, repetitive impact load
- **Service Parameters:**
- **Production:** Large series



[1]

SHORT DESCRIPTION OF PART/TOOL:

In internal combustion engines, the wrist pin connects the piston to the connecting rod and provides a bearing for the connecting rod to pivot upon as the piston moves. **[2]**

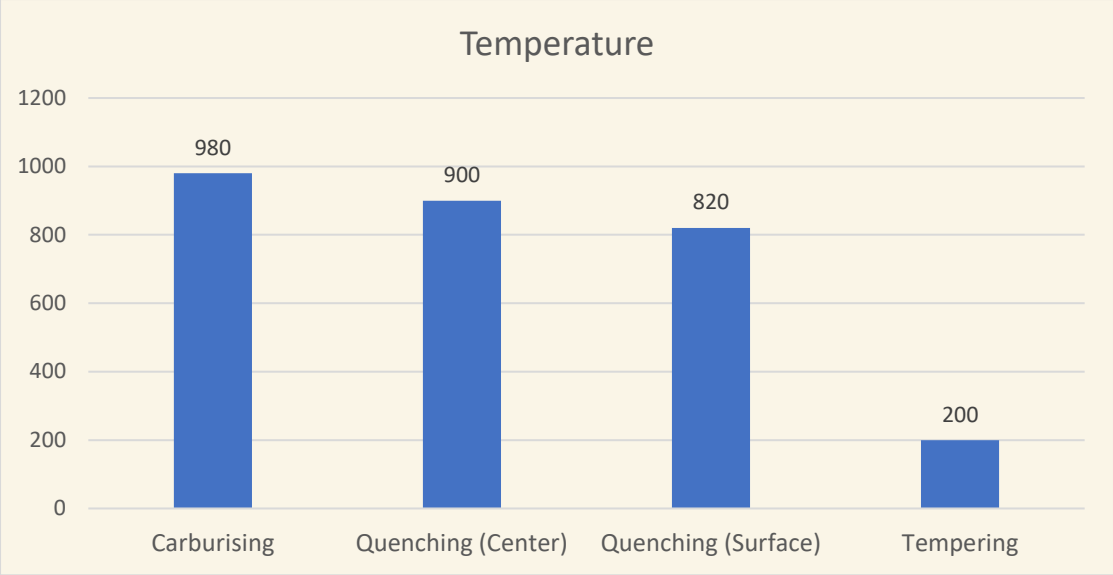
SELECTED MATERIAL [3]:

- **Type:** Case Hardening Steel
- **Material:** DIN: 17Cr3
  NO: 1.7016
  BS: 527M17
  SAE: 5117
- **Description:** The steel 17 Cr 3 is utilized for smaller parts in vehicles and mechanical engineering that require high wear resistance, such as camshafts, piston pins, and cylinders. It is suitable for applications in temperatures as low as -25 °C and for parts up to a n nominal size of 25 mm.
- **Chemical Composition [5]:**

Chemical elements	**C**	**Si max.**	**Mn**	**P max.**	**S**	**Cr**
%, by mass	**0,14-0,20**	**0,40**	**0,60-0,90**	**0,035**	**≤ 0,035**	**0,70 – 1,00**
Permissible deviation	**± 0,02**	**+ 0,03**	**± 0,04**	**+ 0,005**	**+ 0,005**	**± 0,05**

<u>Processing technology steps and parameters</u>

- **Machining**
- **Forging or hot rolling:** 1150-900°C
- **Normalising:** 850-880°C
- **Soft annealing:** 650-700°C
- **Carburising:** 880-980°C
- **Quenching (centre):** 860-900°C
- **Quenching (surface):** 780-820°C
- **Tempering:** 150-200°C
- **Grinding**



***Quenching is done in water/oil**

- **Image:** https://en.wikipedia.org/wiki/File:Gudgeon-pin-and-connecting-rod-drawing.svg
- **Wrist pin:** https://en.wikipedia.org/wiki/Gudgeon_pin
- **Standards:** http://www.steelnumber.com/en/steel_composition_eu.php?name_id=225
- **Description:** https://matmatch.com/materials/minfm30270-din-1652-3-grade-17cr3-cold-drawn
- **Chemical composition:** http://www.bebonchina.com/Products/17Cr3.html
- **Heat Treatment**