

Heat Treatment Hardness Comparison Report

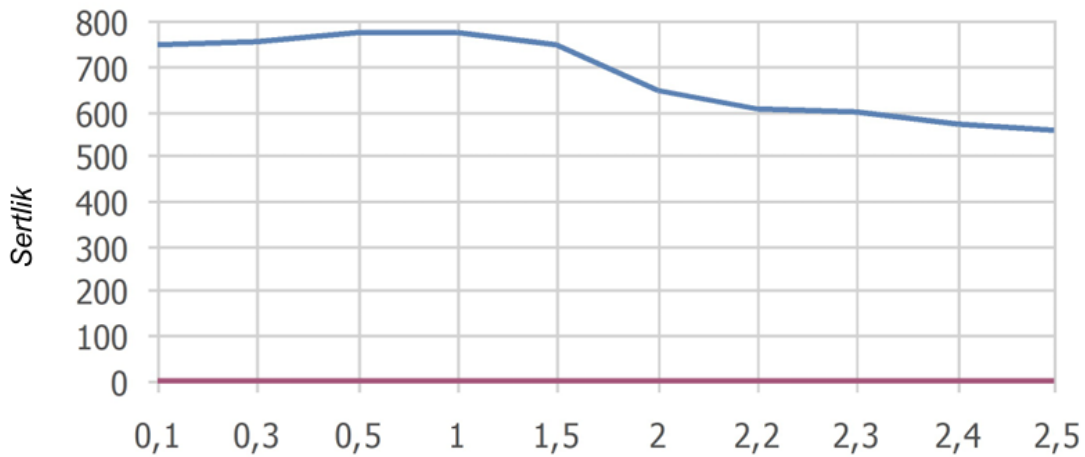
Report Details

- **Part Name:** Hardness and Depth Analysis (Including Post-Grinding Evaluation)
- **Date:** December 24, 2024
- **Reports Reviewed:**
 - **Report 1:** Hardness and depth measurements for the material **17NiCrMo6**.
 - **Report 2:** Hardness and depth measurements for the material **8620**.
- **Additional Note:** Evaluations are based on **post-grinding hardness values beyond 0.5 mm depth**.

1. Hardness and Depth Comparison Table (Report 1 - 17NiCrMo6)

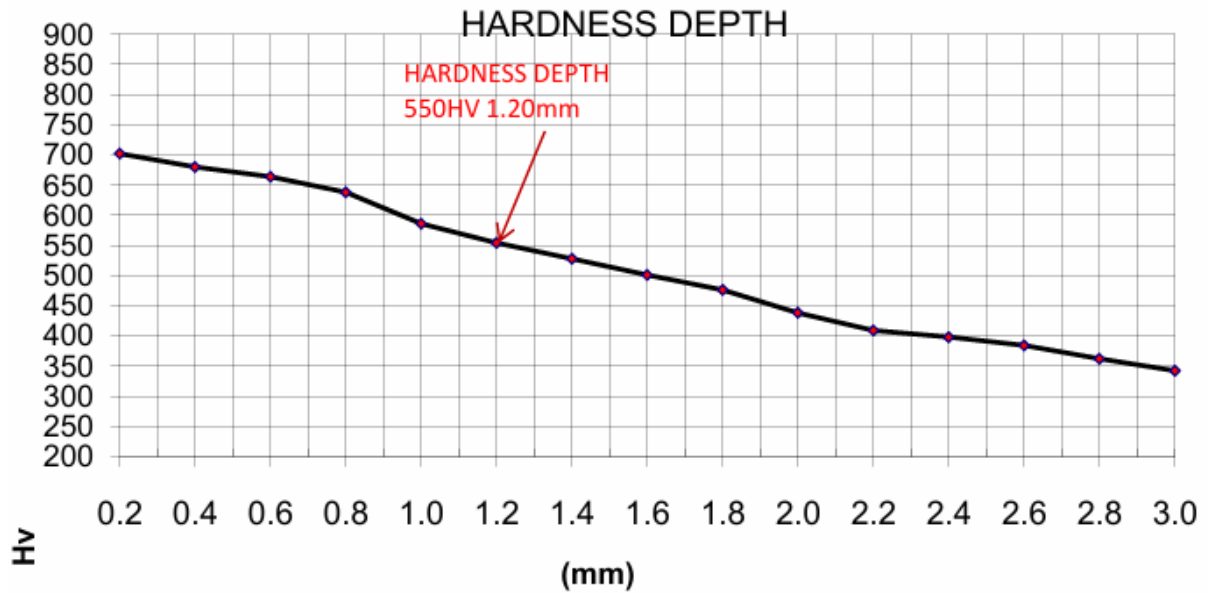
Depth (mm)	Hardness (HV)	Hardness (Approx. HRC)	Comments
0.5	776	~63 HRC	High surface hardness maintained after grinding.
1.0	776	~63 HRC	Hardness remains stable and high.
1.5	746	~61-62 HRC	Gradual decrease begins.
2.0	644	~58 HRC	Hardness begins to decline significantly.
2.5	557	~52 HRC	Hardness reduction continues, lower resistance in deeper layers.
3.0	503	~48 HRC	Deeper layers are softer, reduced durability.

Sertlik Profili
Hardness Profile



2. Hardness and Depth Comparison Table (Report 2 - 8620)

Depth (mm)	Hardness (HV)	Hardness (Approx. HRC)	Comments
0.5	638	~58-59 HRC	Lower hardness after grinding compared to Report 1.
1.0	586	~55-56 HRC	Hardness levels are significantly lower.
1.2	550	~54 HRC	Maximum depth is reached at this point.
1.5	476	~48-49 HRC	Sub-surface layers are soft, limited hardness.
2.0 and beyond	-	-	Hardness depth is limited to 1.2 mm.



3. Post-Grinding Hardness Comparison (Beyond 0.5 mm)

Depth (mm)	Report 1 (17NiCrMo6) - Hardness (HV)	Report 2 (8620) - Hardness (HV)	Comparison
0.5	776	638	Report 1 has higher surface hardness.
1.0	776	586	Report 1 is superior.
1.5	746	476	Report 1 is superior.
2.0	644	-	Report 1 has deeper hardness.
2.5	557	-	Report 1 has deeper hardness.
3.0	503	-	Report 1 has deeper hardness.

Analysis and Findings

Report 1 (17NiCrMo6):

- Surface Hardness:** After grinding, surface hardness at 0.5 mm depth is 776 HV (~63 HRC). Hardness remains **above 60 HRC up to 1.5 mm depth**.
- Hardness Depth:** Maximum hardness depth is **3.0 mm**, with a gradual and consistent decrease in hardness.
- Advantages:** Wider hardness depth provides enhanced durability and resistance. Suitable for applications requiring a balanced hardness profile.

Report 2 (8620):

- Surface Hardness:** After grinding, surface hardness at 0.5 mm depth is 638 HV (~58-59 HRC), which is lower compared to Report 1.
- Hardness Depth:** Hardness is maintained up to 1.2 mm depth but drops significantly beyond this point.

3. **Advantages:** Suitable for applications requiring high surface hardness, but limited in depth performance.
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General Comparison

Criterion	Report 1 (17NiCrMo6)	Report 2 (8620)
Surface Hardness	Higher (776 HV, ~63 HRC)	Lower (638 HV, ~58-59 HRC)
Hardness Depth	Maximum 3.0 mm	Maximum 1.2 mm
Uniformity	Gradual and consistent decline	Rapid drop-off in hardness.
Surface Performance	Excellent	Moderate
Depth Performance	Superior	Limited

Recommendations

1. **For Depth Requirements:** If the part requires deeper hardness, **Report 1 (17NiCrMo6)** is the better choice. It provides a consistent and extended hardness profile.
 2. **For Surface Applications:** If surface wear resistance is the primary requirement, **Report 2 (8620)** may suffice. However, the limited depth should be considered.
 3. **Optimization Needs:** In both cases, cementation parameters (time and temperature) could be optimized to enhance performance.
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Conclusion

Report 1 (17NiCrMo6) demonstrates superior performance in both surface hardness and depth. It is particularly suitable for applications requiring wear resistance and impact strength at deeper layers. Report 2 (8620) is adequate for applications prioritizing surface hardness but is not recommended for applications requiring significant hardness depth.

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