

# High-Strength 430 Stainless Steel for Large-Scaled Premium Home Appliances

## Member company

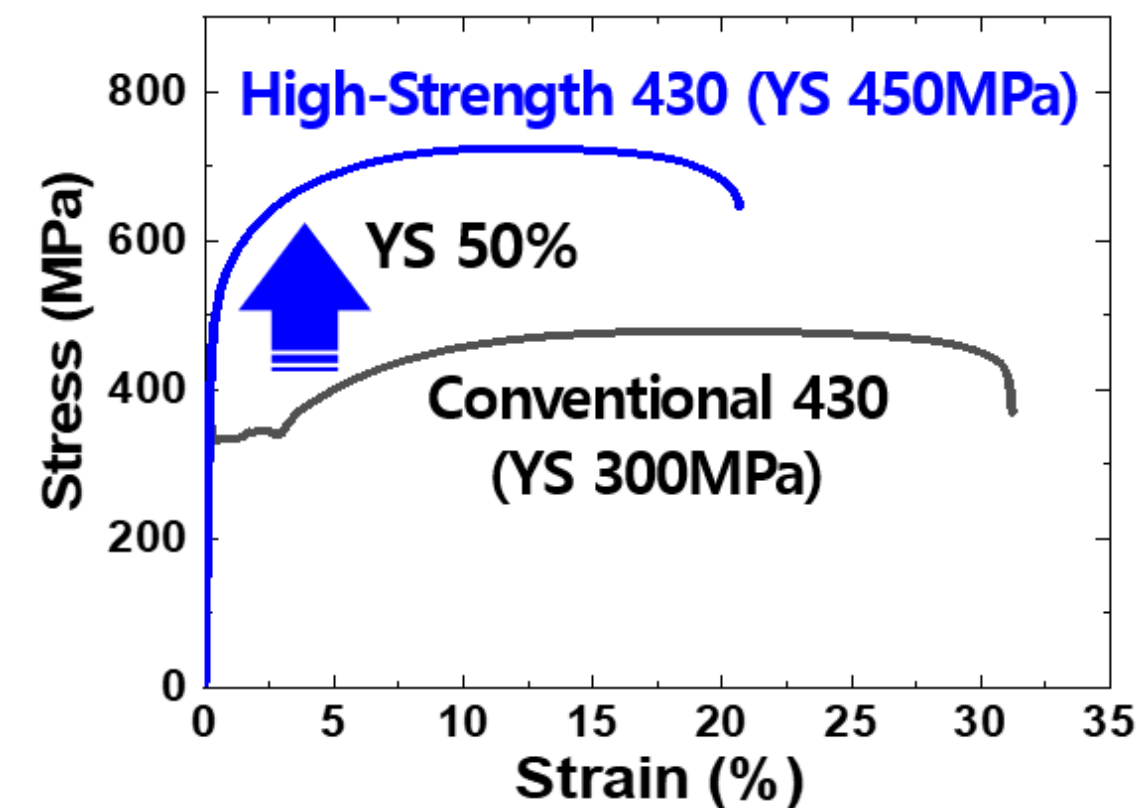
**POSCO**

## The Challenge

Recently, global home appliance companies such as Samsung Electronics etc, require the high strength of material to cut-down the total material cost in large premium home appliances by using thinner one.

Ferritic stainless steels which are usually applied to home appliances have a level of yield strength about 300MPa. Thus, to meet the customers' requirement of high yield strength, it is generally used to work hardening by cold rolling or solid solution hardening by adding Si, Mo and so on. However, these methods result in increasing the manufacturing cost.

In this development, the yield strength

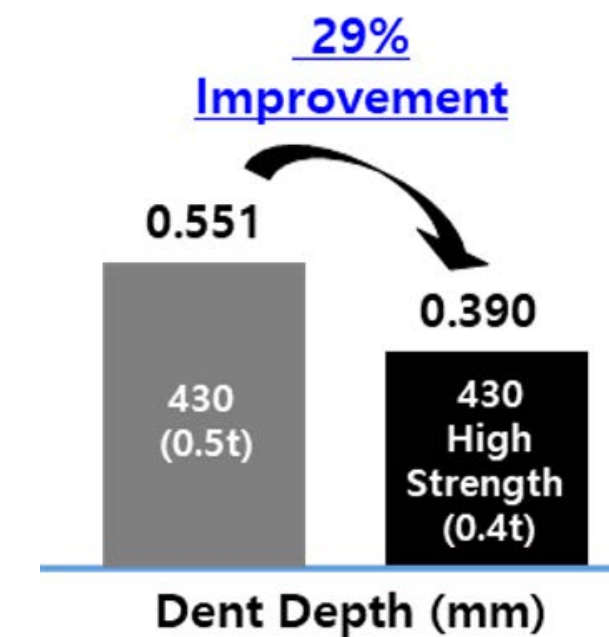


Stress-strain curves of high-strength and conventional 430

is improved by using the phase transformation technology of conventional 430 stainless steel without changing its composition.

## Why?

By utilizing the martensitic transformation of the conventional 430 stainless steel, it is possible to obtain the high strength,



Dent resistance of high-strength and conventional 430




and achieve the thinner thickness of exterior material with excellent dent resistance.

## Needed action

To develop the high-strength 430 with about 450MPa yield strength

1. Establishment of CAP (cold rolling and annealing process) conditions to secure the suitable fraction range of martensite in conventional 430 steel
2. Optimization of Tension-levelling conditions to adjust the wave of the



SST test		
#1	#2	#3
		
<b>Pass</b>		

Salt spray test result of high-strength 430

high strength coil.

### Action review

*Specific:* High-strength 430 stainless can be applied to the refrigerator door for the premium home appliances

*Measurable:* Yield strength (MPa), Dent resistance (measured by dent depth, mm @200N load), Steel thickness (mm)

*Achievable:* An increment by about 50% (300 → 450MPa) in the yield strength of developed technology compared with that of conventionally produced 430

*Realistic:* An increment by about 29% in dent resistance due to increasing the yield



Examples of refrigerator & dishwasher door

strength, and also reducing the thickness by 20% at the same level of dent depth.

*Time-bound:* From 2021 to 2022, POSCO successfully developed the strengthening technology to meet the requirements of global home appliance companies.

### Horizontal Expansion Capability

It can be applied as a refrigerator or dishwasher door, and other exterior materials for large home appliances required a high strength.

### Outcome

High-strength 430 stainless steel is successfully developed by utilizing the martensitic phase transformation of conventional 430 without deteriorating the corrosion resistance.

In addition, the thickness reduction is contributed to cut-down the material cost for home appliance companies.

POSCO plans to apply high strength 430 stainless steel for refrigerator doors in collaboration with Samsung Electronics.