SWP™

Mitsui Chemicals, Inc.

Synthetic Wooden Pulp Department
Nonwoven Fabric Division

Heat Seal Property of SWP™ -Based Synthetic Fiber Paper

SWP™-pulp mixed paper makes the best use of thermal adhesiveness of polyethylene fiber and has various heat seal uses.

1. PAPERMAKING PROCEDURE and EVALUATION METHOD

(1) Papermaking procedure of SWP™-pulp mixed paper

Ratio of materials：NBKP／SWP＝60／40、50／50
CSF of NBKP ：No beating, 430ml (Beated)
SWP Grade ：E620 (CSF：340ml、mp ：135°C)
E790 (CSF：680ml、mp ：135°C)
AU690 (CSF：680ml、mp ：120°C)
UL410 (CSF：600ml、mp ：125°C)
Basis Weight ：60g/m^2
Drying Condition ：110°C×2min. (Rotary Dryer)

(2) Evaluation Method of paper properties

Heat Seal Strength: After heat sealing by a heat seal tester (TESTER SANGYO CO., LTD.) the test pieces are evaluated by the method based JIS P8139 "Determination of Peel strength".

2. HEAT SEAL STRENGTH of SWP™- PULPMIXED PAPER

- Heat seal strength of SWP™ -pulp mixed paper (SWP grade; E620, E790, etc / SWP ratio; 40%, 50%, / Basis weight; 60g/m^2) is directly proportional to the CSF value of SWP™ as shown in Graph 1 (E790 > E620).
- Especially, AU690 has high CSF value and high heat bonding property, so mixed paper with AU690 improves heat seal strength while rising heat seal temperature .(Refer to Graph 2)
- Heat seal strength of SWP™ -pulp mixed paper is directly proportional to the SWP ratio in the mixed paper. Heat seal strength of SWP™ -pulp mixed paper doubles when SWP™ ratio is adjusted from 40% to 50%. (Refer to Graph 3)

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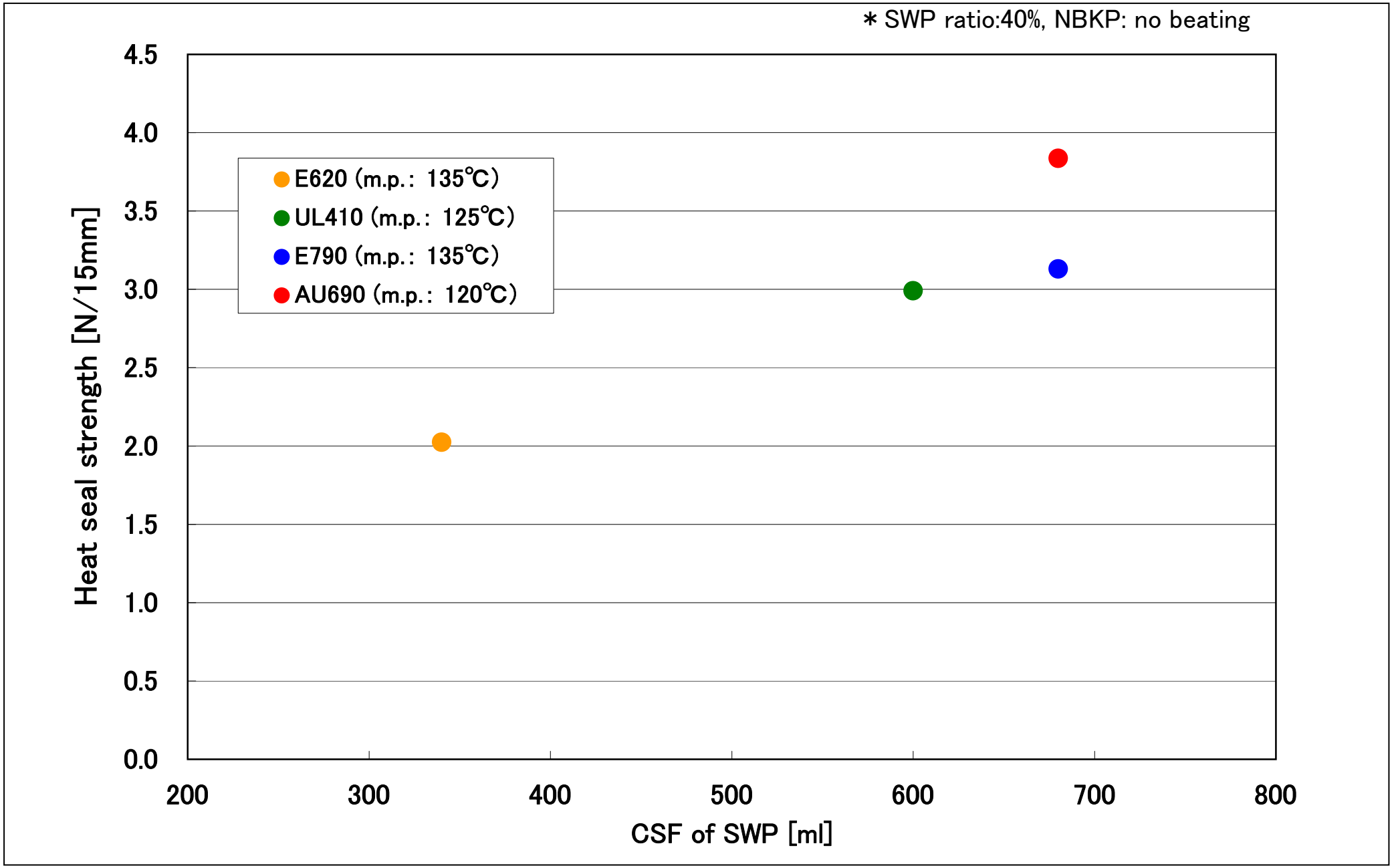
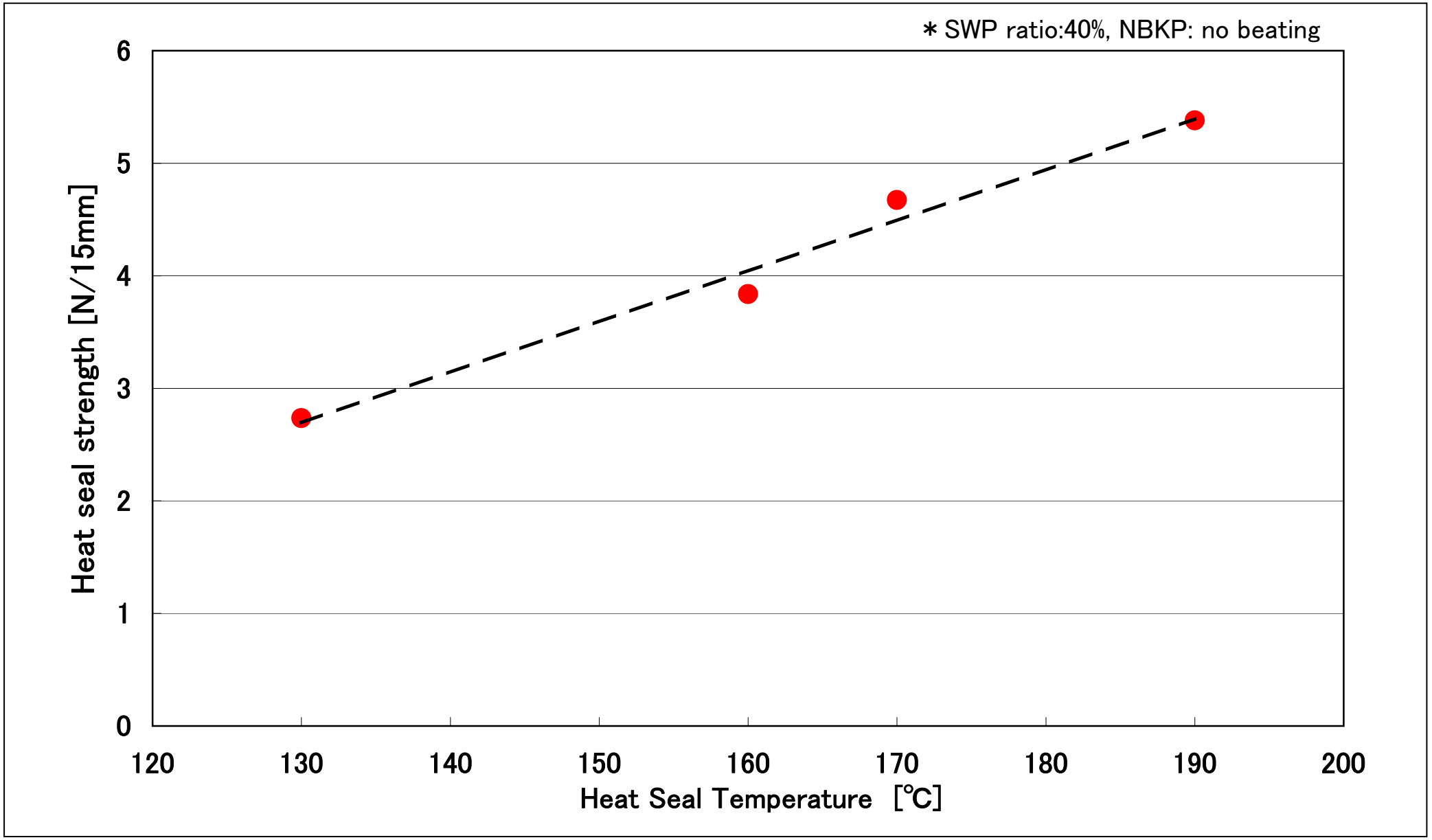
3. RELATION BETWEEN HEAT SEAL STRENGTH AND CSF of MATERIALS

- Heat seal strength of SWP™ -pulp mixed paper is different according to CSF value (i.e. beating degree) of wood pulp (NBKP). Even if the SWP™ ratio in mixed paper is the same, heat seal strength of mixed paper with no beating NBKP is higher than the strength of paper with beating pulp . (Refer to Graph 4)
- SWP™ -pulp mixed paper including NBKP of high CSF value has larger pore size. As SWP™ in the mixed paper is easy to melt and flow, heat seal strength of the bonding interface becomes high.
- The mechanism of high heat seal strength of SWP™ -pulp mixed paper including NBKP of high CSF value as follows.

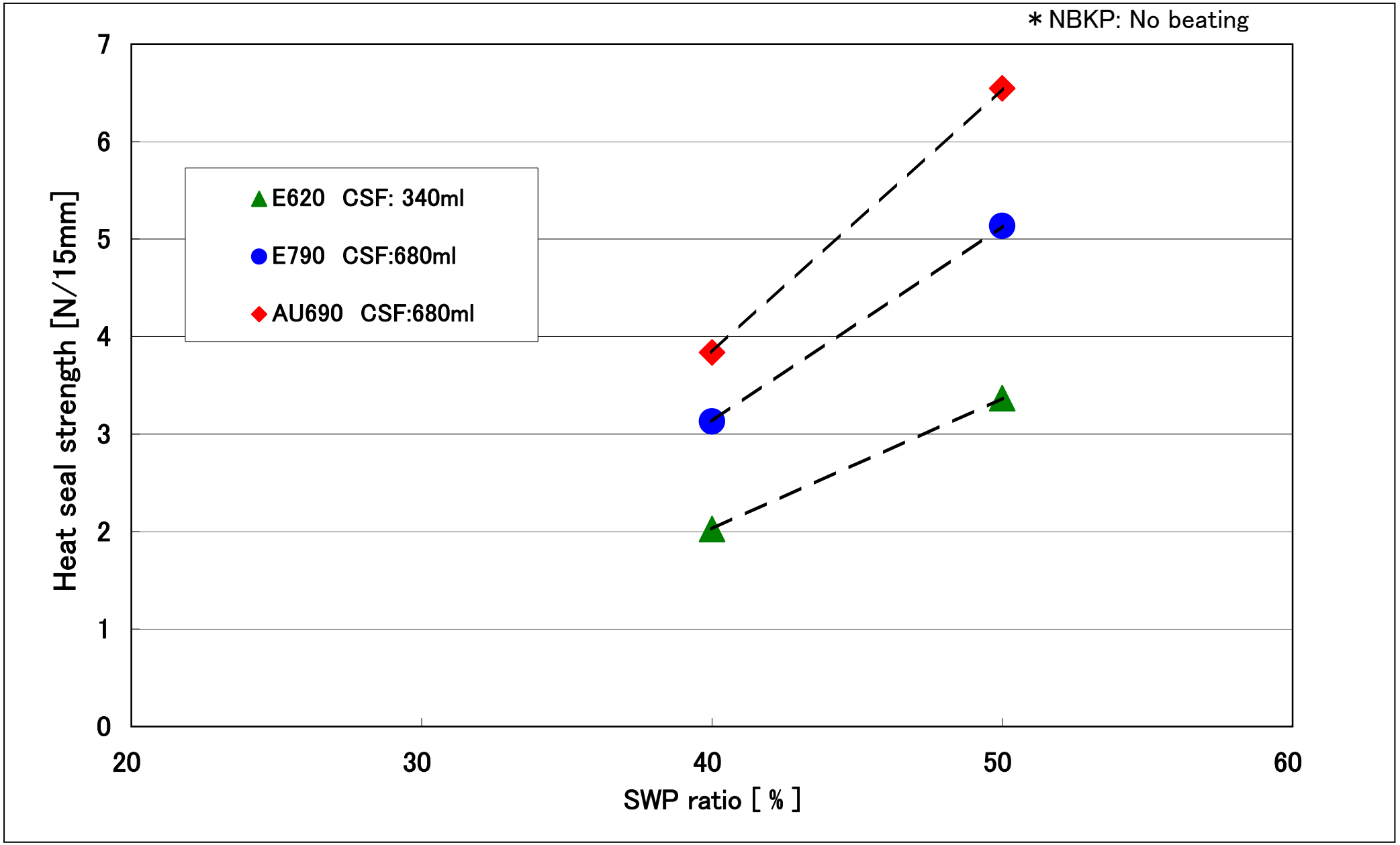
  The mixed paper including NBKP of high CSF value has wide pore size, so SWP™ easily melts and easily flows through the pores. As the result, bonding strength of the seal interface is high.



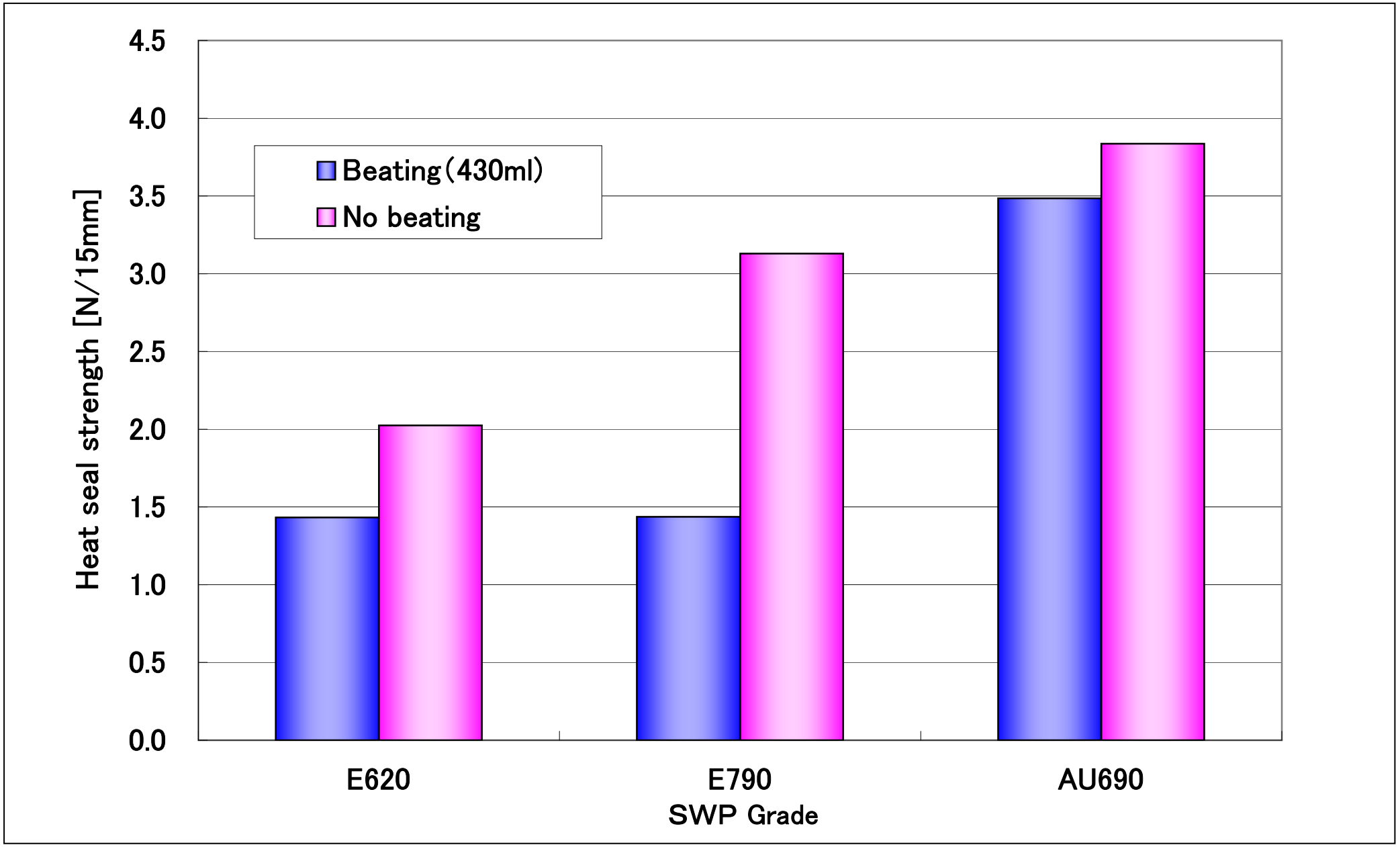
Graph1： Correlation between Heat Seal Strength and CSF of SWP
(Heat seal temperature：SWP's m.p. + 35℃)



Graph2： Correlation between Heat Seal Temperature and Heat Seal Strength （AU690）



Graph3： Correlation between SWP ratio and Heat Seal Strength
(Heat Seal Temperature ：m.p. + 35℃)



Graph4 : Difference of Heat seal strength
by beating condition of NBKP