Technical Literature C-01

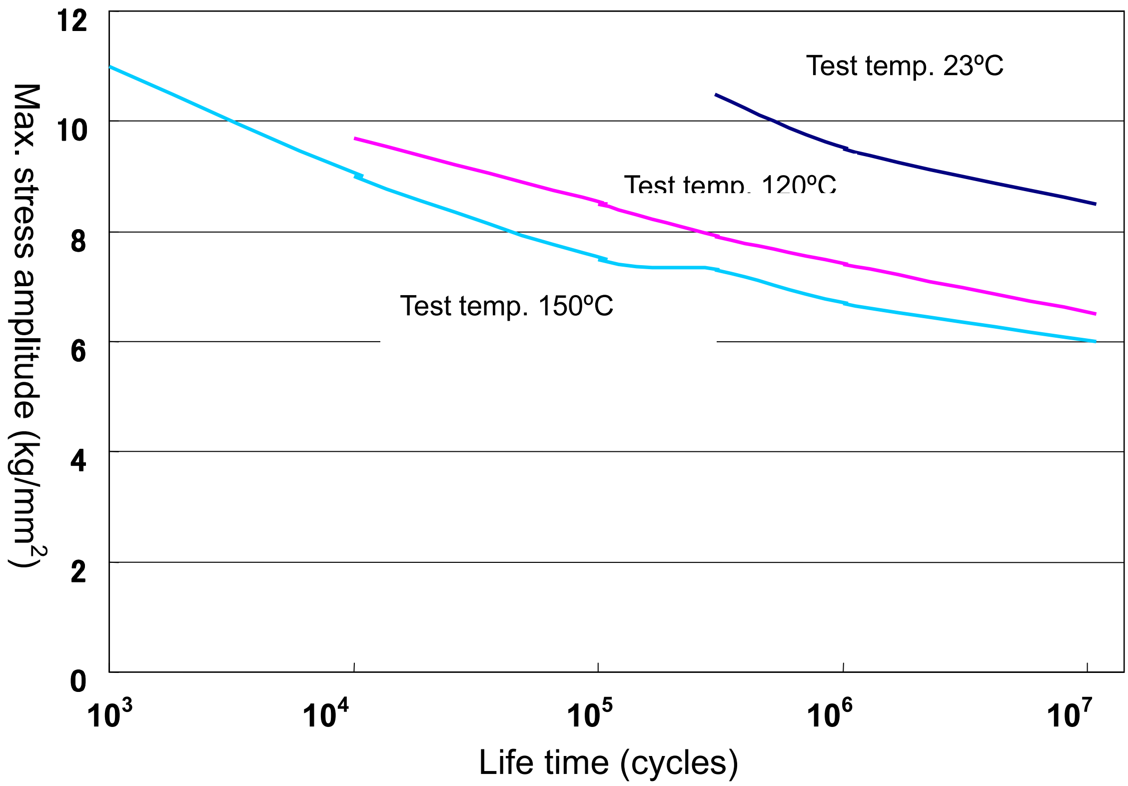
Fatigue Resistance of AURUM®

Engineering plastics are used for a variety of moving parts because of their excellent mechanical properties. As one of the properties required of such parts, reliability in stable long-term use can be cited.

Fatigue resistance is used as a measure for judging the reliability of a resin in use (under load). It is commonly evaluated by repeatedly stressed fatigue or repeatedly flexed fatigue.

Fig. 1 shows the repeatedly stressed fatigue properties of AURUM® JCN3030.

Fig. 1 Stressed Fatigue Properties of JCN3030



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Technical Literature C-02

Impact Properties of AURUM®

Engineering plastics are often used for moving parts, and impact resistance is considered as an important item of evaluation in selecting a proper resin. Generally, for the purpose of judging the brittleness or toughness of a material, fracture energy is determined by conducting an Izod impact test.

The notch dependence and thickness dependence of the Izod impact strength (fracture energy) of AURUM® are shown in Figs. 1 and 2, respectively.

The natural resin showed some notch and thickness dependence, but the GF- and CF-reinforced grades remained relatively stable. Further, it can be seen that the impact strength of the cut-notched articles was somewhat lower than that of the molded-notched articles. This is assumed to be due to a decline in the surface roughness caused by cutting and the occurrence of flashes, micro-cracks, etc.

Fig. 1 Notch Dependence of Impact Strength

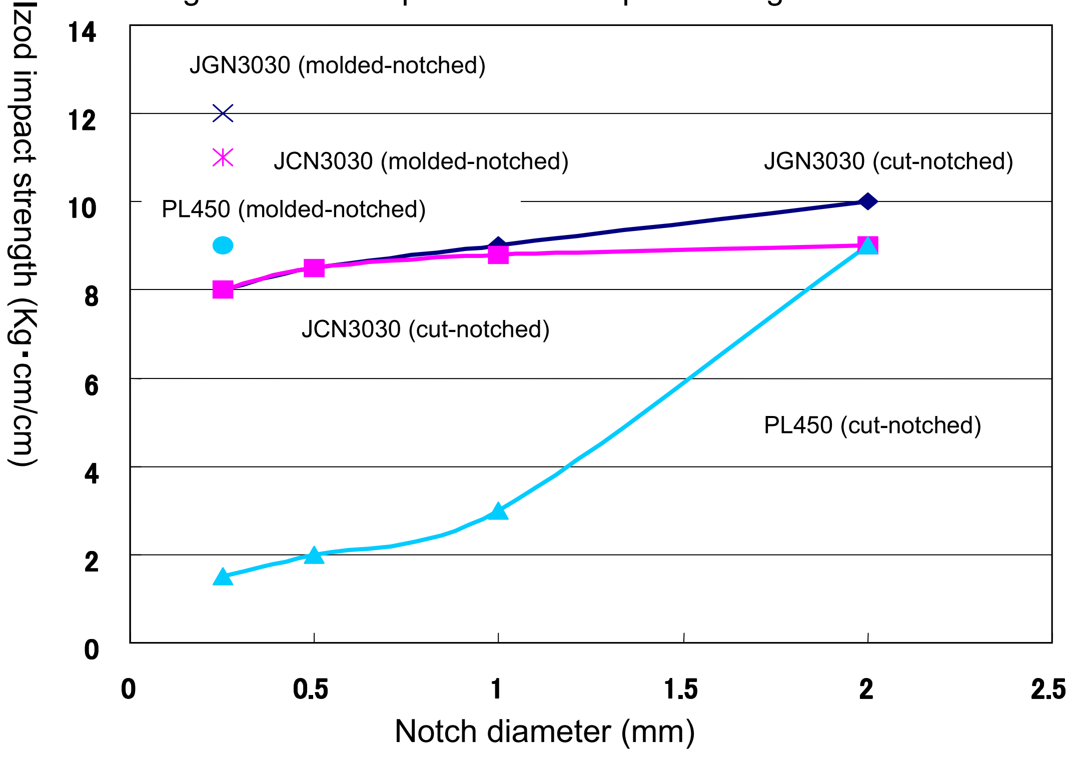

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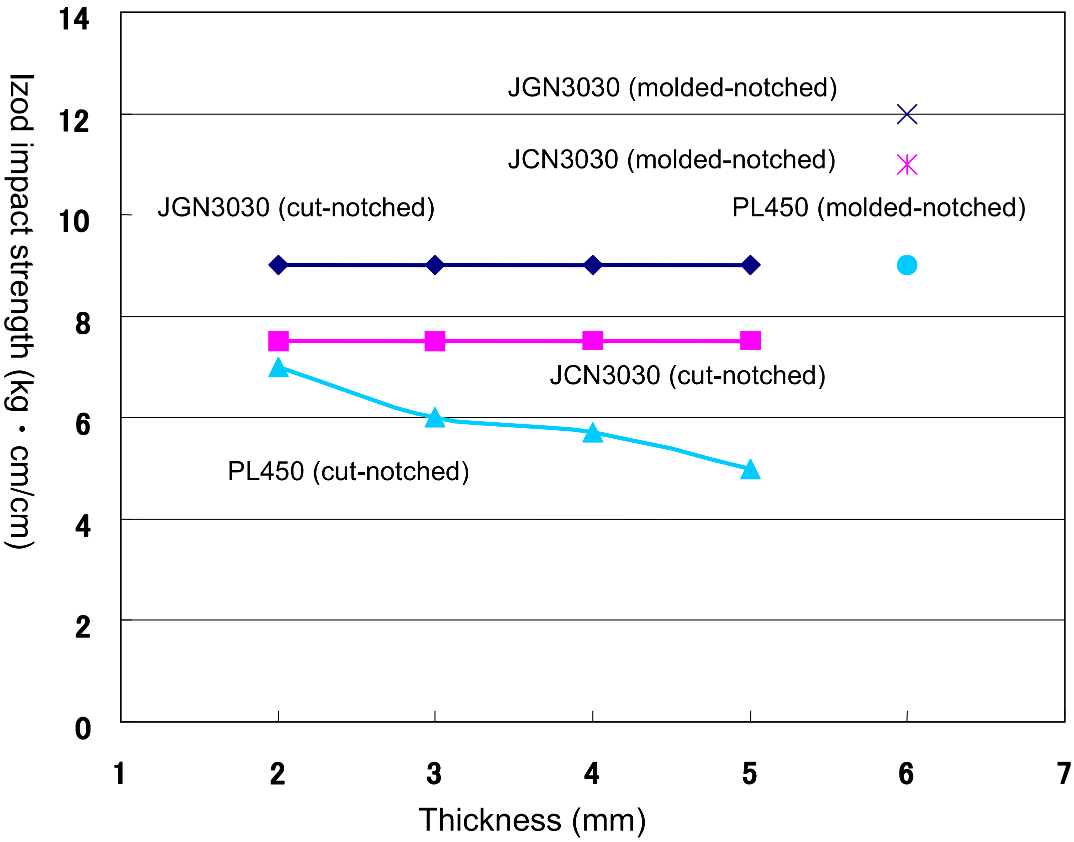
Fig. 2 Thickness Dependence of Impact Strength



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Technical Literature C-03

Creep Resistance of AURUM®

Within the range of accuracy for practical use, a product of metal can be generally designed on the assumption that they are isotropically elastic bodies. However, since plastics display a viscoelastic behavior even at room temperature in many cases, the creep resistance of the plastics becomes a very important item of evaluation in designing general products as well as products to be used primarily as substitutes for metal products.

AURUM® shows a high glass transition temperature (250ºC). In this respect, AURUM® is considered to have an advantage over other engineering plastics, exhibiting excellent creep resistance even at high temperatures.

Fig. 1 shows a comparison of the creep resistance at 150ºC of AURUM® and representative engineering plastics U polymer (glass transition temperature: 193ºC) and PEEK (glass transition temperature: 143ºC).

AURUM® has satisfactory creep resistance even under heavy load.

Furthermore, Fig. 2 shows changes in the creep resistance of fiber-reinforced resins. Fig. 2 suggests that the AURUM® resin reinforced with glass fiber or carbon fiber is suitable for those applications requiring very high creep resistance.

Fig. 1 Changes with Time in Tensile Creep (150ºC)

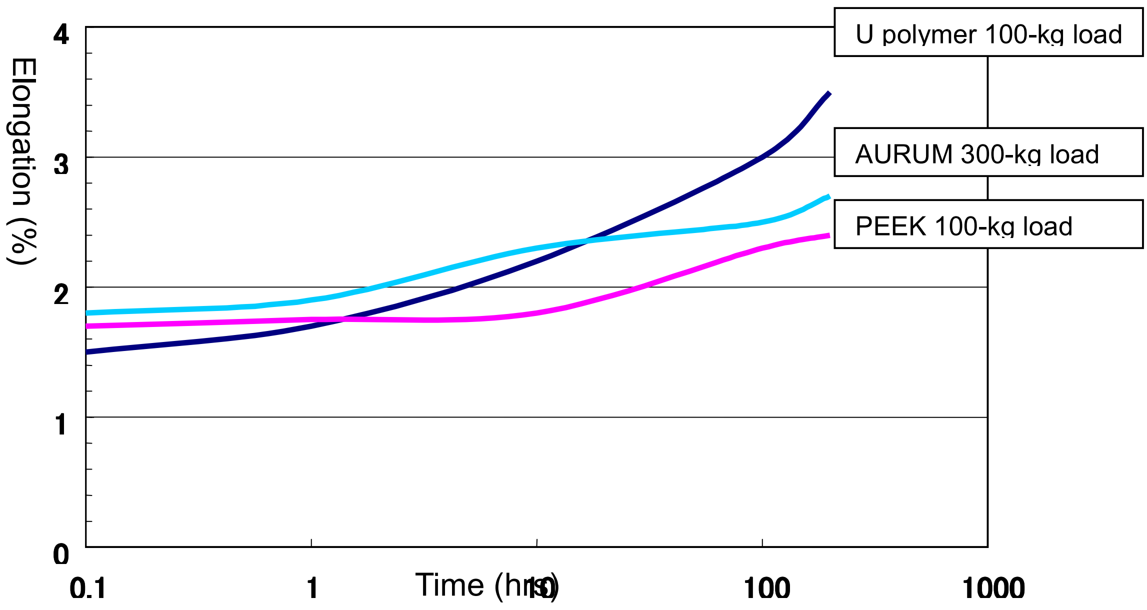

Fig. 2 Changes with Time in Tensile Creep (150℃)

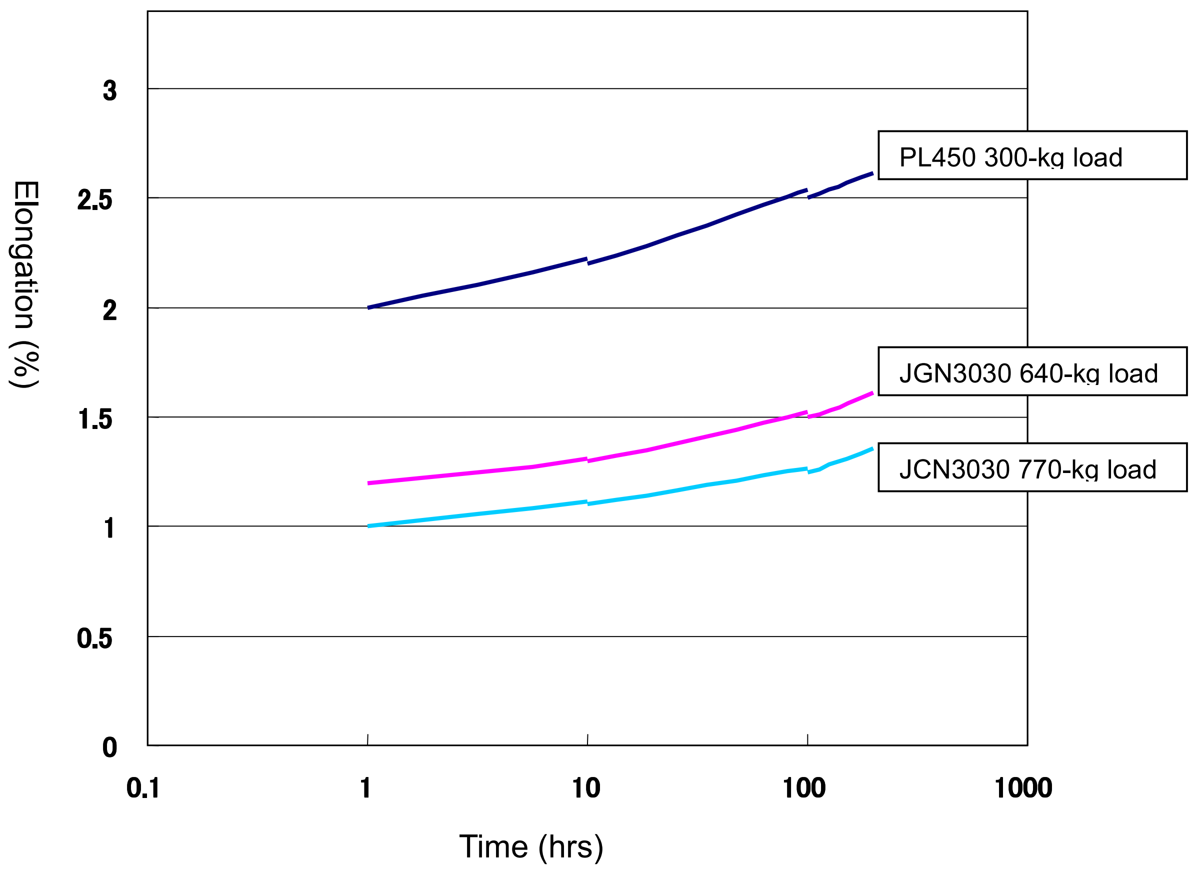

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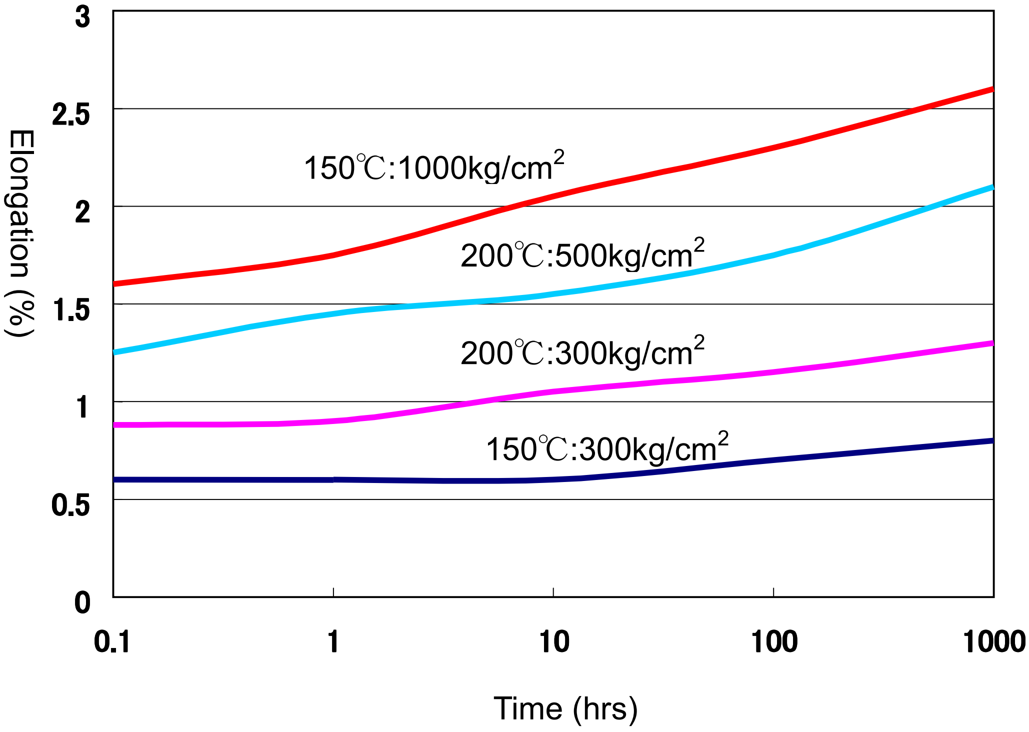
Fig. 3 Tensile Creep Proper Resistance of JCN3030



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Technical Literature C-04

Weld Strength of AURUM®

It is evident from various test results that AURUM® has excellent mechanical strength. Injection-molded articles of AURUM® also show excellent strength. Here are given results of a comparison of resin strength using injection-molded dumbbell specimens.

Specimen shape

2-point gate
(with weld)

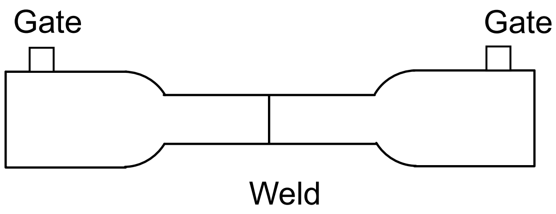
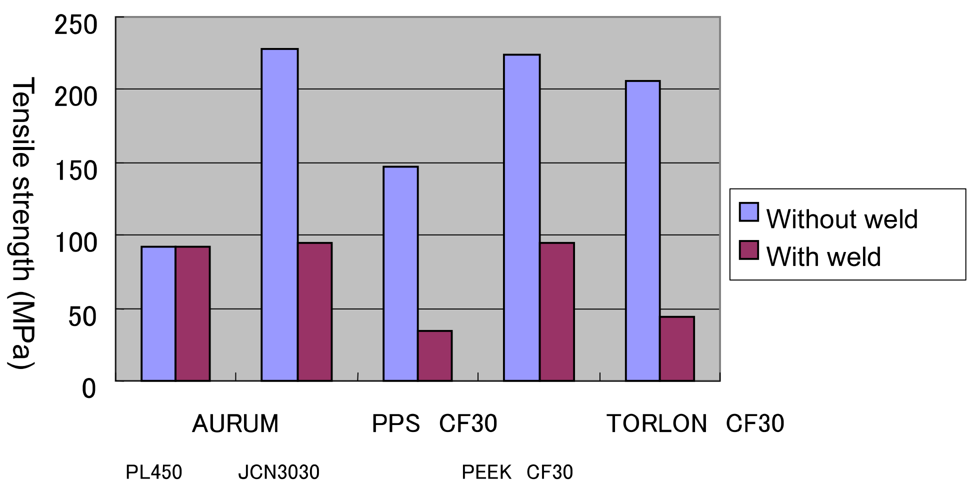


Fig. 1 Changes in Tensile Strength of Specimens with/without Weld



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