

# Application of New Grade LUBMER™

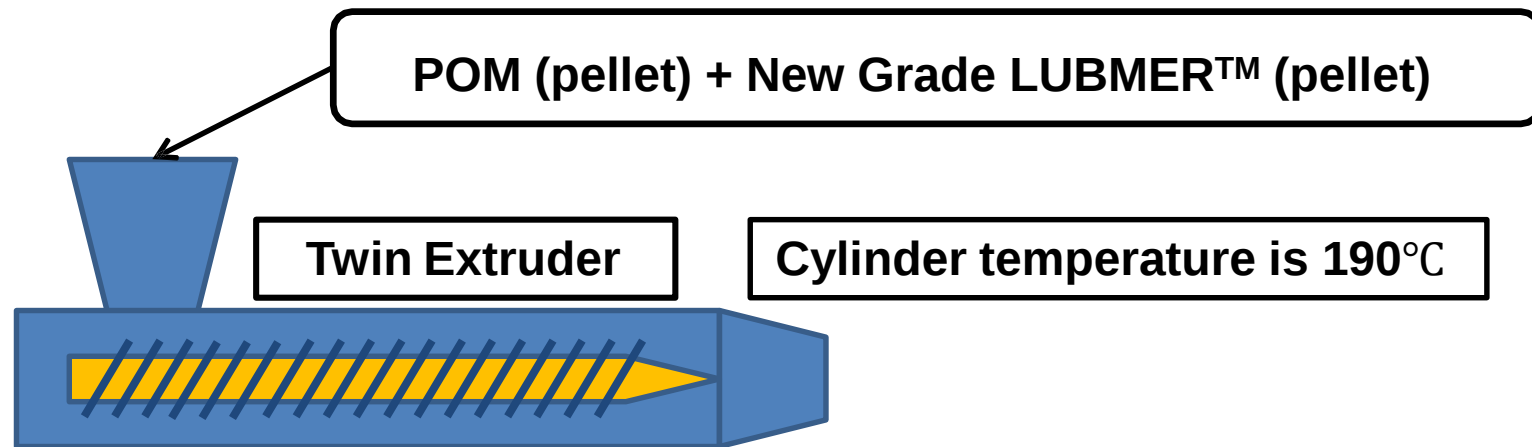
-Polyacetal modifier -

## Expected Effects by addition of New Grade LUBMER™.

- Improvement of abrasion resistance.
  - Decrease of friction coefficient.
  - Keeping excellent mechanical properties of the matrix resin.
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## Preparation of test samples.

1. POM and New Grade LUBMER™ were compounded with twin extruder.



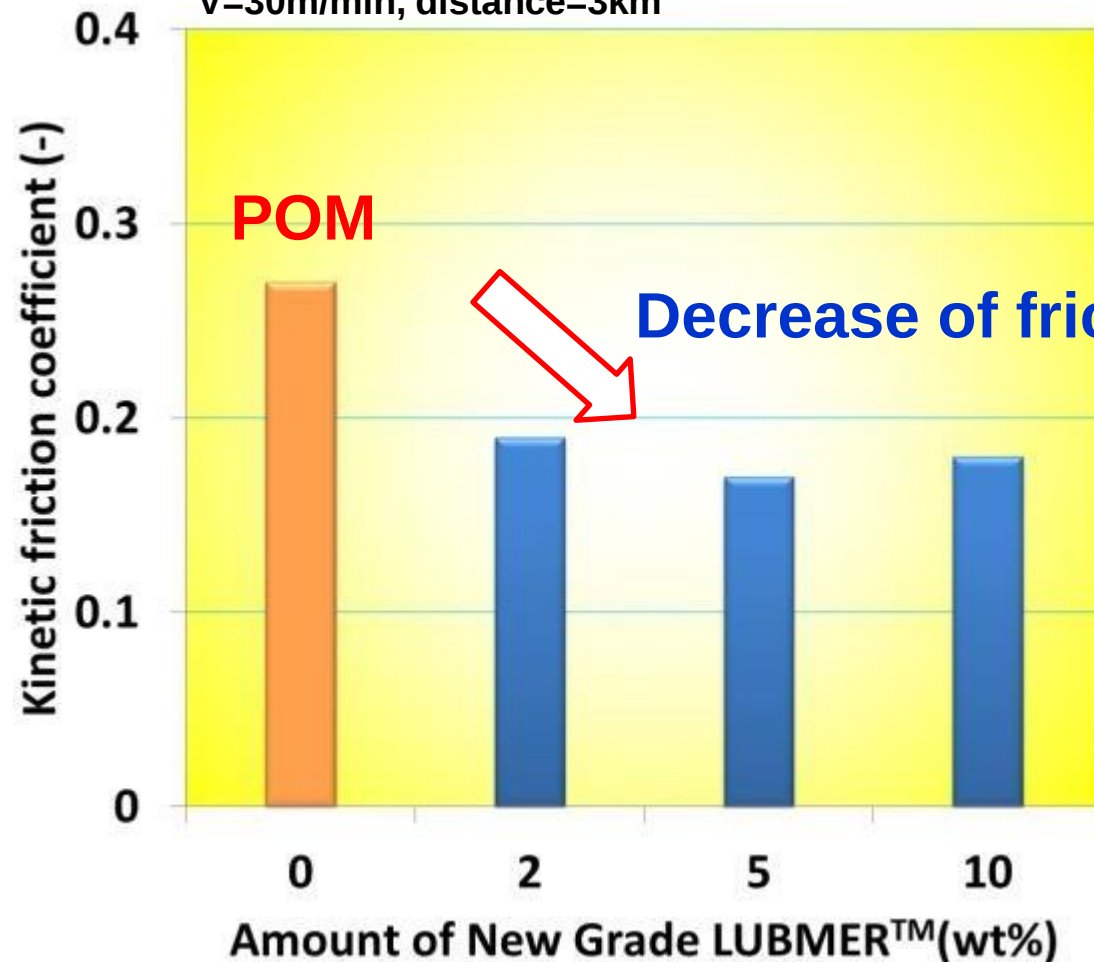
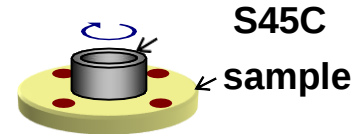
2. Injection-molded specimens were used to measure physical properties.

# Polyacetal modifier ~Friction coefficient ~

## Expected Effects by addition of New Grade LUBMER™.

【Evaluation Condition】

Temp.=23°C, Counter material=S45C, Load=15kg(0.75MPa),  
V=30m/min, distance=3km

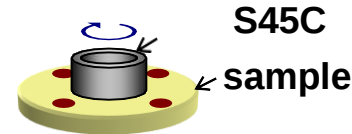


# Polyacetal modifier ~Abrasion resistance~

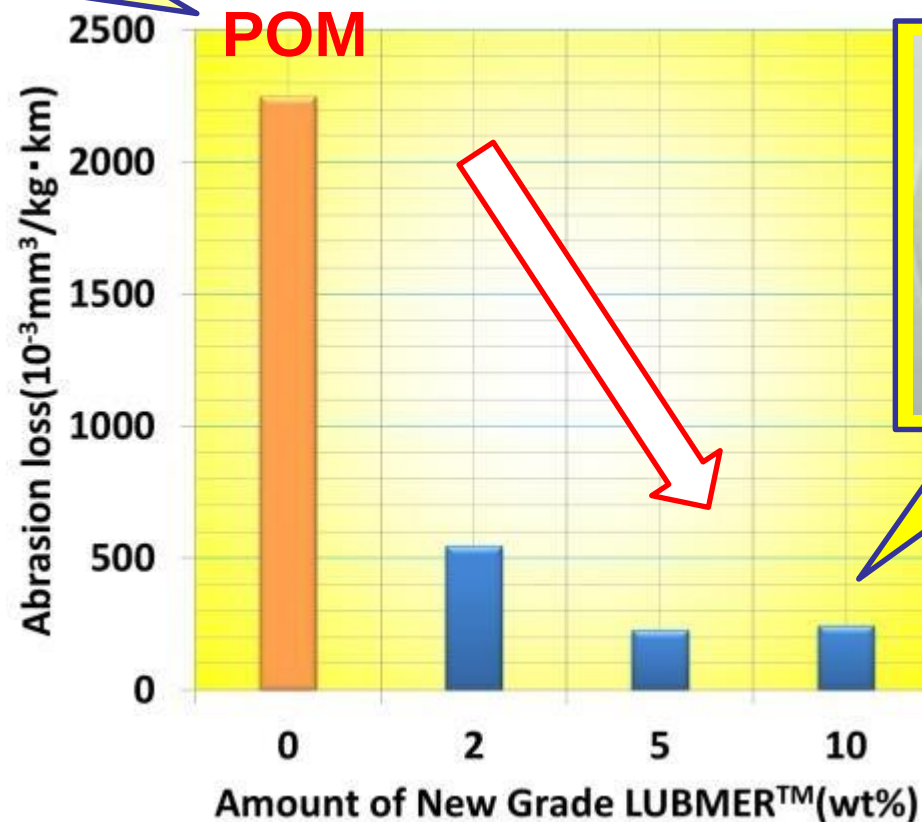
## Expected Effects by addition of New Grade LUBMER™.

【Evaluation Condition】

Temp.=23°C, Counter material=S45C, Load=15kg(0.75MPa),  
V=30m/min, distance=3km



### Improvement of abrasion resistance.



# Abrasion resistance improving agent. (New Grade LUBMER™)

|                                        | Method                   | Unit                                    | POM            | POM/LY1040<br>=98/2 | POM/LY1040<br>=95/5 | POM/LY1040<br>=90/10 |
|----------------------------------------|--------------------------|-----------------------------------------|----------------|---------------------|---------------------|----------------------|
| MFR<br>(190°C, 2.16kgf)                | MCI method               | g/10min                                 | <b>9.0</b>     | <b>8.0</b>          | <b>7.5</b>          | <b>7.0</b>           |
| Density                                | MCI method               | Kg/m <sup>3</sup>                       | <b>1408</b>    | <b>1392</b>         | <b>1364</b>         | <b>1340</b>          |
| Tensile strength at yield point        | ISO527-1,2               | MPa                                     | <b>60</b>      | <b>60</b>           | <b>55</b>           | <b>50</b>            |
| Tensile strength at break              | ISO527-1,2               | MPa                                     | <b>55</b>      | <b>50</b>           | <b>50</b>           | <b>45</b>            |
| Tensile elongation at break            | ISO527-1,2               | %                                       | <b>30</b>      | <b>20</b>           | <b>20</b>           | <b>15</b>            |
| Flexural Strength                      | ISO178                   | MPa                                     | <b>90</b>      | <b>90</b>           | <b>85</b>           | <b>75</b>            |
| Flexural Modulus                       | ISO178                   | MPa                                     | <b>2540</b>    | <b>2520</b>         | <b>2500</b>         | <b>2300</b>          |
| Charpy impact strength<br>(V/ notched) | ISO179                   | kJ/m <sup>2</sup>                       | <b>6.0</b>     | <b>3.5</b>          | <b>3.0</b>          | <b>3.0</b>           |
| HDT (0.45MPa)                          | ISO75-1,2                | °C                                      | <b>150</b>     | <b>150</b>          | <b>150</b>          | <b>140</b>           |
| Mold shrinkage (MD/TD)                 | MCI method               | %                                       | <b>2.1/2.1</b> | <b>2.2/2.6</b>      | <b>2.3/2.6</b>      | <b>2.5/2.4</b>       |
| Kinetic Coefficient of friction        | MCI method <sup>1)</sup> | -                                       | <b>0.27</b>    | <b>0.19</b>         | <b>0.17</b>         | <b>0.18</b>          |
| Abrasion Loss                          | MCI method <sup>1)</sup> | 10 <sup>-3</sup> mm <sup>3</sup> /kg km | <b>2250</b>    | <b>550</b>          | <b>230</b>          | <b>240</b>           |
| Limit PV value                         | MCI method <sup>2)</sup> | MPa/m·min                               | <b>10</b>      | <b>25</b>           | <b>&gt;30</b>       | <b>&gt;30</b>        |

1) Counter material S45C, Load=15kg, V=30m/min, distance=3km, 2) Counter material SUS, V=12m/min, Load stay time 30min (Step up)

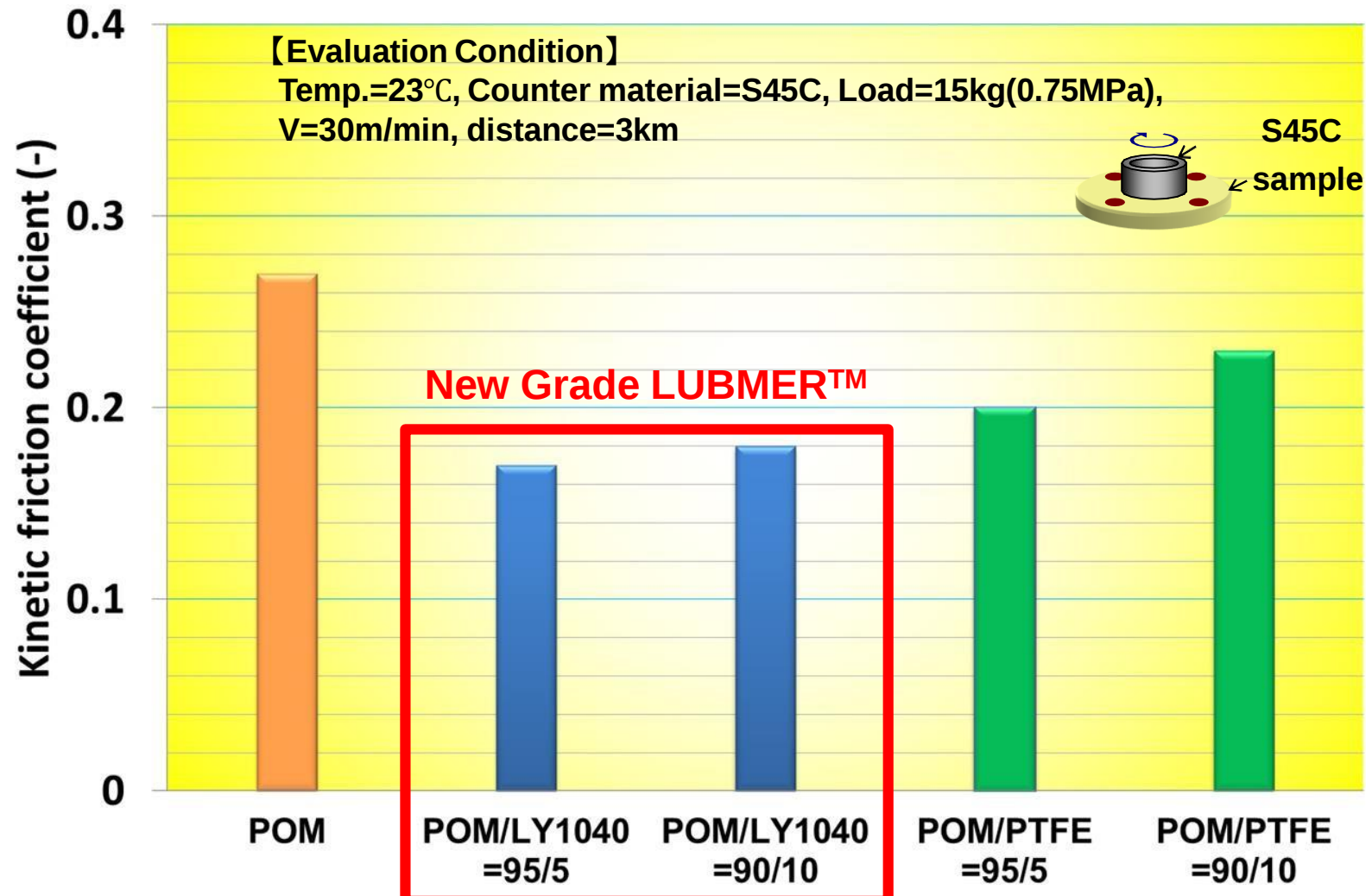
**New Grade LUBMER™ is a solution as an additive to improve Polyacetal resin properties.**

- Improvement of abrasion resistance.**
- Decrease of friction coefficient.**
- Keeping excellent mechanical properties of the matrix resin.**

# Appendix

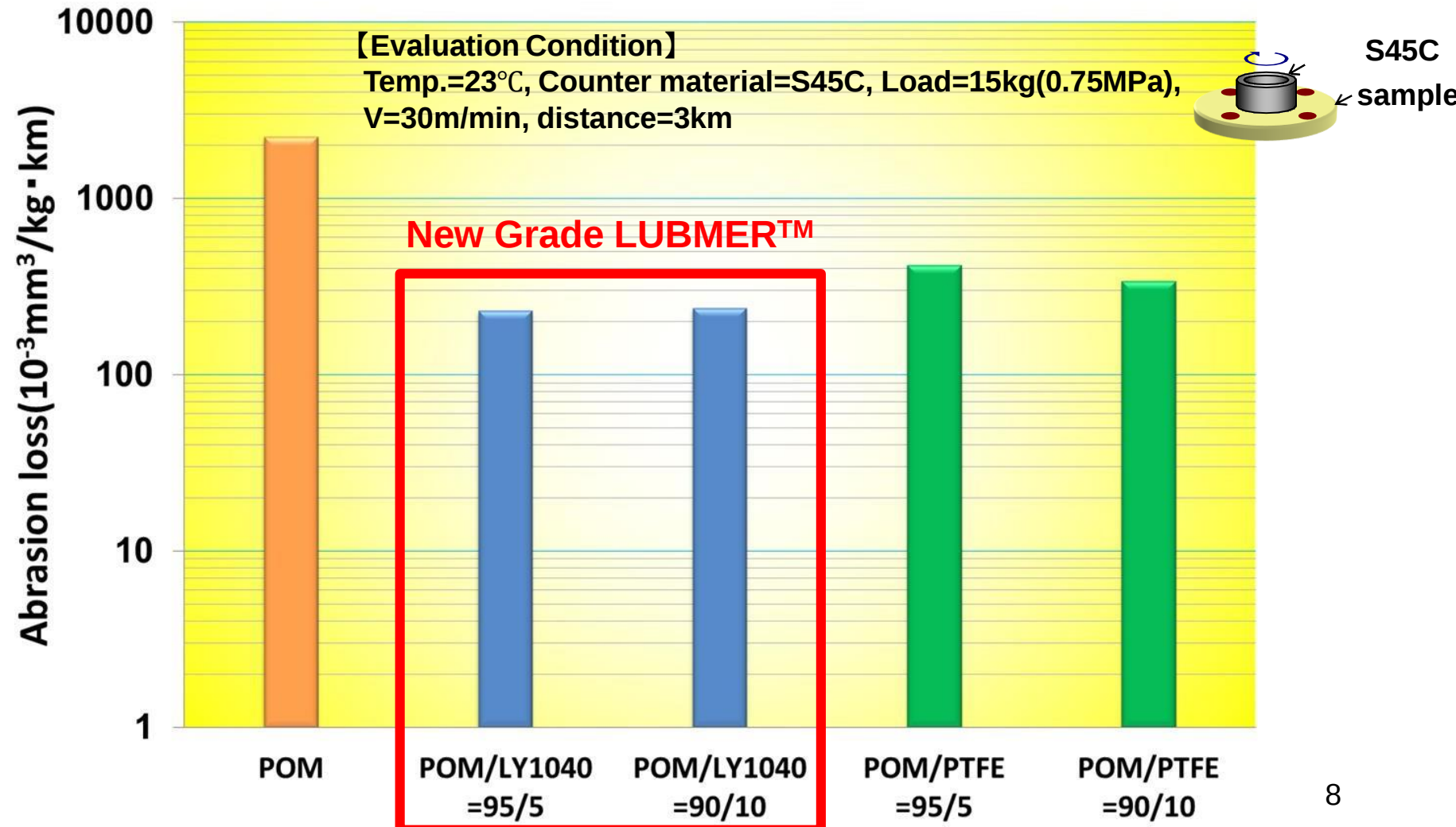
# Polyacetal modifier ~Competing comparison ~

**New Grade LUBMER™ is the best solution as an additive to decrease Polyacetal resin's friction coefficient.**

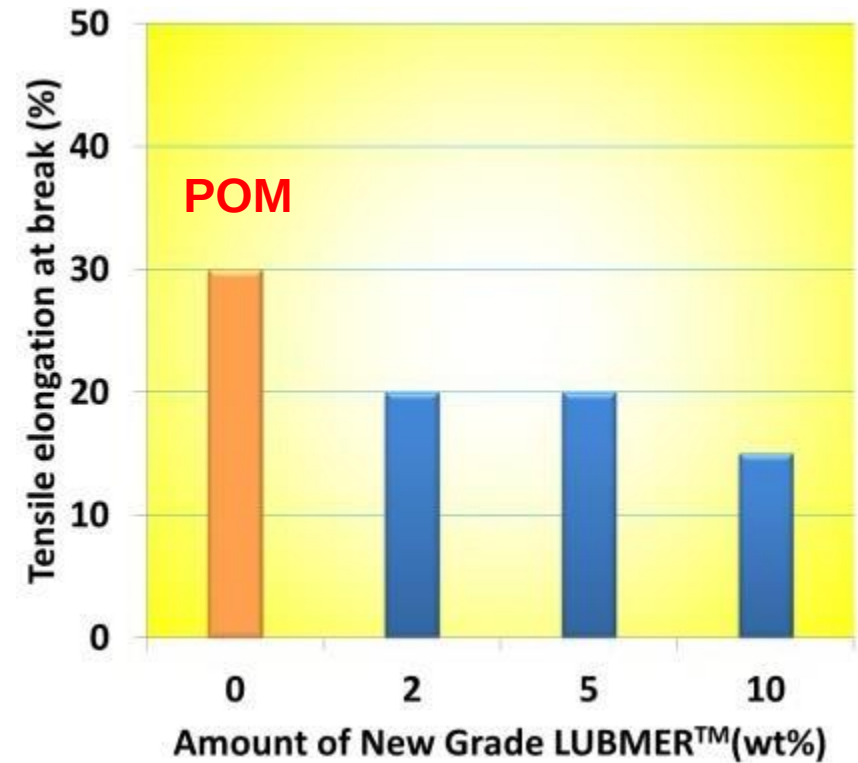
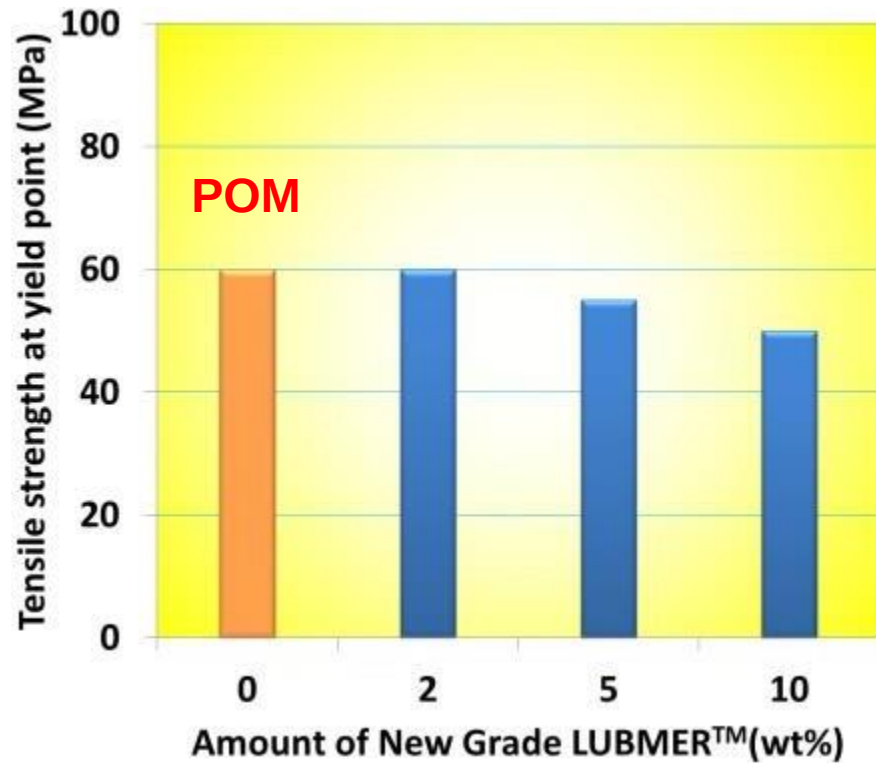


# Polyacetal modifier ~Competing comparison ~

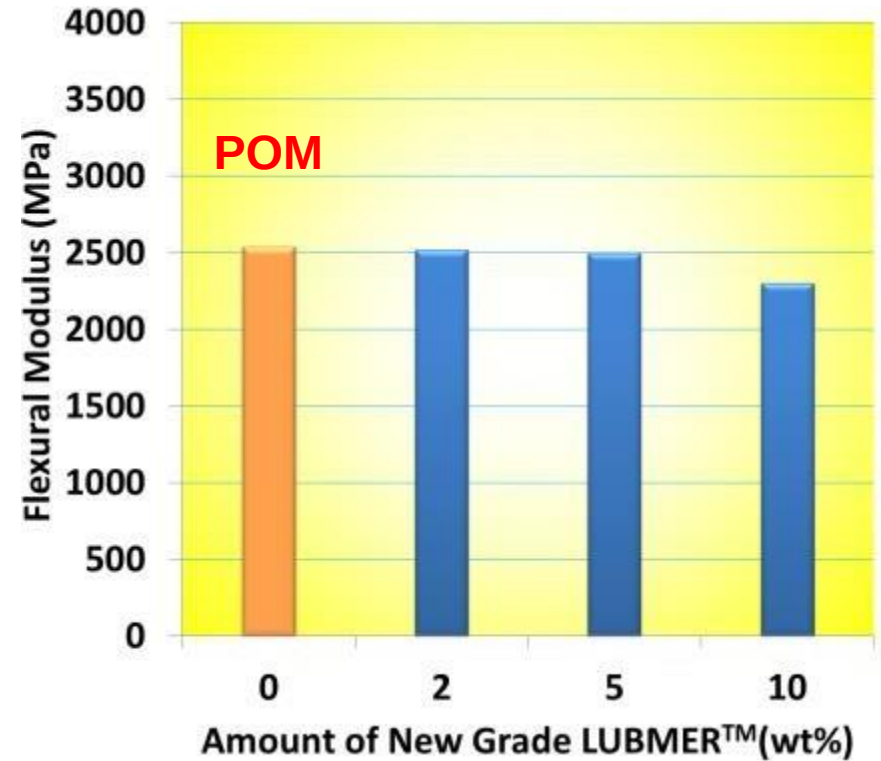
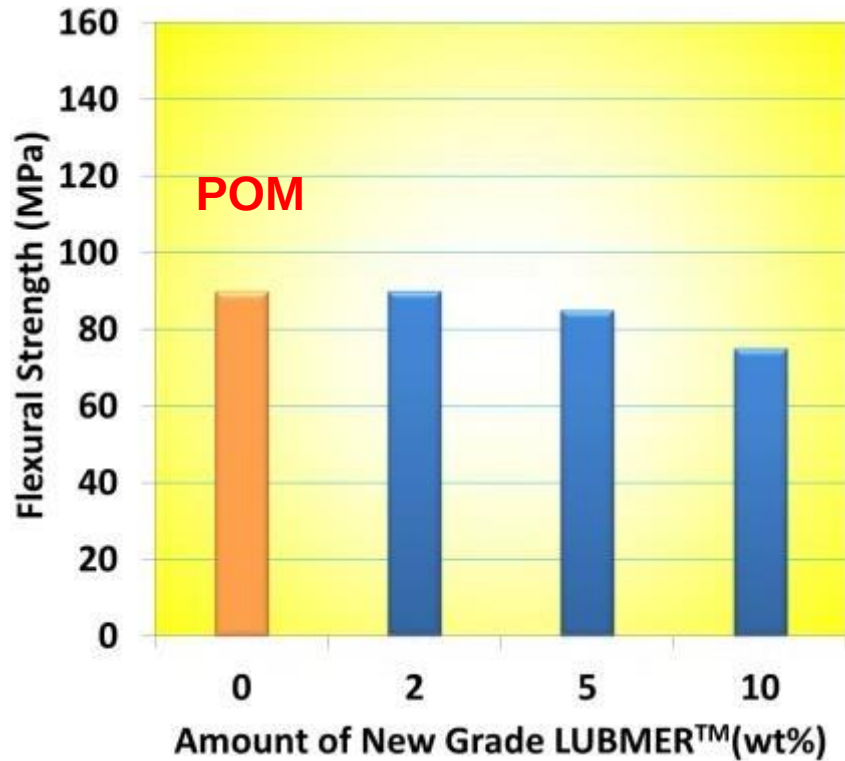
**New Grade LUBMER™ is the best solution as an additive to improve Polyacetal resin's abrasion resistance.**



# Polyacetal modifier ~Tensile properties~



# Polyacetal modifier ~Flexural properties~



# Polyacetal modifier ~HDT~

