# New rheology modifier for Water borne coating
## DISPARLON AQH-810, AQ-633E

### 1 . Summary

There are many types of rheology modifiers in the market for water borne formulations such as cellulosics, urethanes, acrylics and bentonites. A new polyamide type of rheology modifier is now available which gives formulations the optimum rheology profile for smooth application. The DISPARLON AQ-600 series and AQH-800 provide excellent shear thinning properties and improve anti-settling and spray atomization. Kusumoto Chemical has launched DISPARLON AQH-810 and AQ-633E which are new, easy to incorporate polyamide rheology additives.

### 2 . DISPARLON AQH-810, AQ-633E property and features

**Table-1 AQ-600 series and AQH series property**

<table>
<tr><th></th><th>AQ-600</th><th>AQ-607</th><th>AQ-610</th><th>AQ-630</th><th>AQ-633E</th><th>AQH-800</th><th>AQH-810</th></tr>
<tr><td>Component</td><td colspan="5">Polyamide</td><td colspan="2">Polyamide<br>＋Fatty acid amide</td></tr>
<tr><td>Appearance</td><td>Light amber<br>Paste</td><td>Light amber<br>Paste</td><td>Light amber<br>Soft paste</td><td>Amber<br>Paste</td><td>Light amber<br>Gel</td><td>Light yellow<br>Gel</td><td>Light yellow<br>Gel</td></tr>
<tr><td>Solid %</td><td>20%</td><td>15%</td><td>15%</td><td>18%</td><td>22.5%</td><td>10%</td><td>15%</td></tr>
<tr><td rowspan="2">Solvent</td><td>Methoxy<br>propanol,</td><td colspan="2">Butoxy propanol</td><td colspan="4">Methoxy propanol</td></tr>
<tr><td colspan="6">Water</td></tr>
<tr><td>Application</td><td>Water<br>soluble<br>Emulsion</td><td>Water<br>dispersion<br>Emulsion</td><td>Water<br>dispersion<br>Emulsion</td><td>Water soluble<br>Emulsion</td><td>Water soluble<br>Emulsion</td><td>Water soluble<br>Emulsion</td><td>Water<br>soluble<br>Emulsion</td></tr>
<tr><td rowspan="3">Property</td><td colspan="3" rowspan="3">Excellent<br>thixotropy</td><td colspan="2">Storage stability</td><td colspan="2">Best storage stability</td></tr>
<tr><td>Excellent<br>thixotropy</td><td>Easy<br>incorporation</td><td colspan="2">Easy<br>incorporation</td></tr>
<tr><td></td><td></td><td>For<br>solventless</td><td>With<br>solvent</td></tr>
</table>

## 2-1. AQH-810 features.

①It can be incorporated into a wide variety of resin types from water soluble to emulsion. It can be formulated with low and high co-solvents content.

②AQH-810 provides a high shear thinning rheology and easy spray atomization. This pseudo plasticity feature improves the anti-settling and anti-sag effect.

③The product as supplied can easily be incorporated by low shear (even 3-5m/sec). It is easily dispersed and can be post added.

④The AQH-810 network structure is created by a hybridized amide consisting of hydrophilic and hydrophobic amide structures. It helps maintain long anti-settling and coating storage stability without hard caking.

## 2-2. AQ-633E features

①AQ-633E is the easier incorporation version of AQ-630.

②Easy handling soft gel.

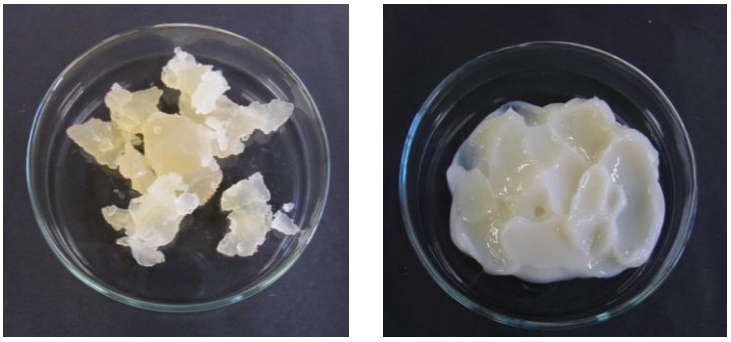
③Provides excellent anti-settling and anti-sagging effect with higher N.V.

④Improves aluminum orientation with improved spray atomization.

⑤Provides excellent coating storage stability without hard caking or pigment settling through it's strong network structure.

Products appearance

AQ-600　　AQ-607　　AQ-610　　AQ-800&810



AQ-630　　AQ-633E

## 3． Wood furniture white coating with AQH-800series

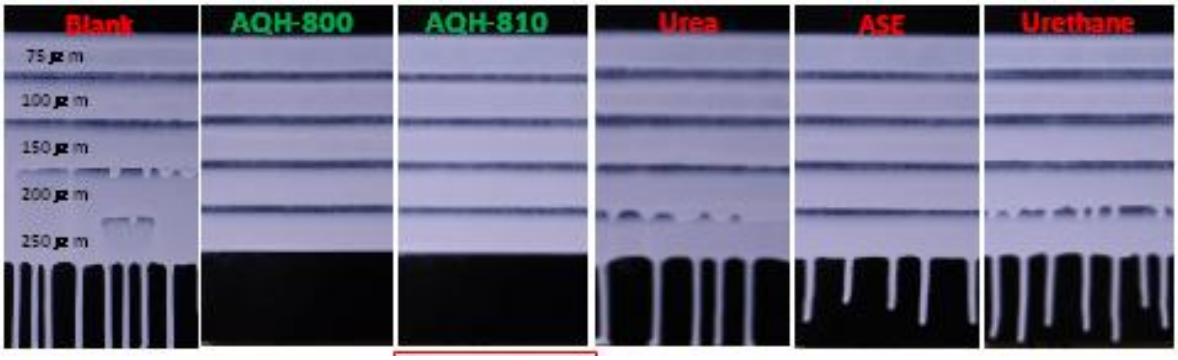
Pigment slurry

| Component | Parts | Function, Supplier |
|---|---|---|
| CR-93 | 22.29 | Titanium dioxide, Ishihara |
| Distilled water | 12.83 | |
| DISPARLON AQ-380 | 36.98 | Dispersant, Kusumoto |

Wood furniture white coating formulation

| Component | Parts | Function, Supplier |
|---|---|---|
| NeoCryl XK-12 | 56.18 | Acrylic emulsion, DSM |
| Butyl glycol | 3.18 | Co-solvent |
| Butyl di-glycol | 2.98 | Co-solvent |
| Propylene glycol | 0.41 | Co-solvent |
| Pigment slurry | 36.98 | |
| DISPARLON LS-430 | 0.21 | Leveling agent |
| DMEA | 0.2 | Neutralizer |
| Additive | α | |
| | 100+α , | pH 7.8 |

**Anti-sagging effect**




| | | | | | |
|---|---|---|---|---|---|
| Dosage (By total formulation) | 4.5% | 2.0% | 4.5% | 4.5% | 4.5% |

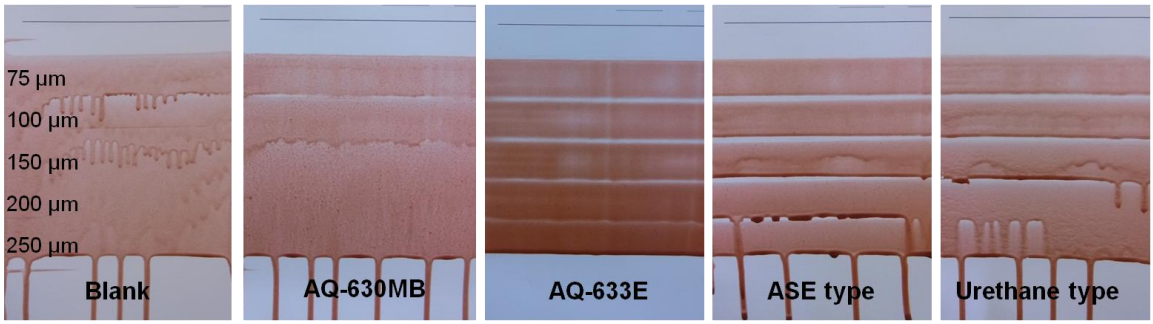
AQH-810 showed an excellent anti-sag effect even with lower dosage levels compared to conventional thickeners in this wood coating formulation.

## 4． Wood furniture pearl color coating with AQ-633E.

Wood furniture pearl color coating formulation

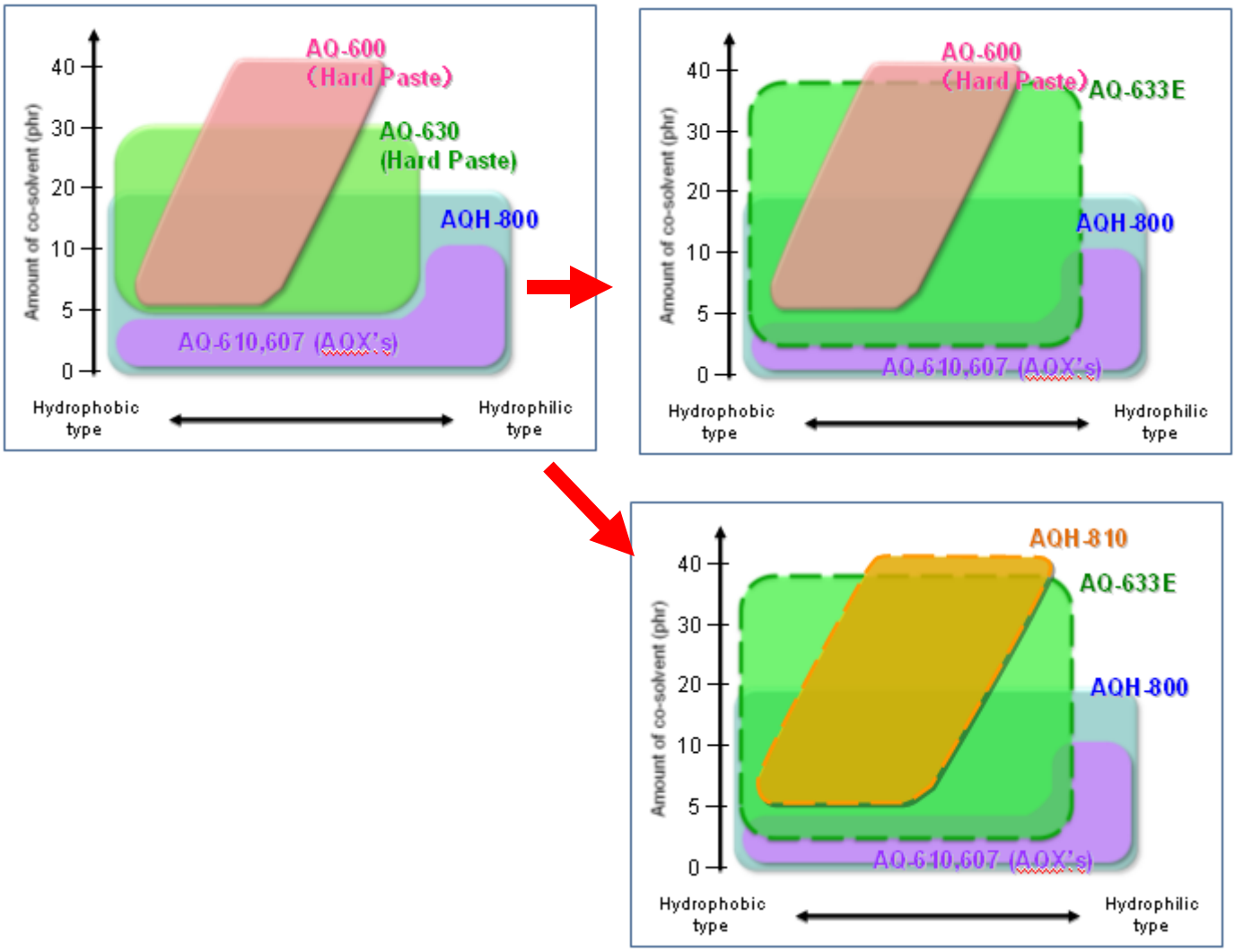
| Component | Parts | Function, Supplier |
|---|---|---|
| NeoCryl XK-98 | 93.6 | Acrylic emulsion, DSM |
| DMEA | 0.2 | Neutralizer |
| BDG | 2.8 | Coalescent |
| DISPARLON AQ-7533 | 0.6 | Defoaming agent |
| DISPARLON LS-430 | 0.4 | Leveling agent |
| Acematt TS-100 | 0.7 | Matting agent |
| Iriodin 504 Red | 1.8 | Pearl mica pigment |
| Additive | α | |
| | 100.0 +α | pH 8.5 |

### Anti-sagging effect




AQ-633E showed an excellent anti-sagging in the wood furniture pearl coating above. Conventional thickeners showed less anti-sagging than AQ-633E.

## 5． Recommendable range view from co-solvent amount and hydrophilicity




As indicated in the graph above, AQ-633E and AQH-810 can be applied into wide range of water borne coatings ranging from co-solvent less to co-solvent rich formulations. In addition, they are effective with a wide range of resin types from hydrophobic to hydrophilic.

## 6. Suggestion

AQ-633E and AQH-810 recommendations for best performance:

①Optimum pH range is 8 to 9. Performance is lost in the acid range with agglomeration formation.

②Direct incorporation by post addition is recommended.

③20 - 40℃ is recommendable dispersing temp. Some performance may be lost at dispersing temperatures above 40C.

④Optimum dosage is around 2.0～8.0% (on total formula weight). To reach the target viscosity, a combination of thickeners may be required.