



ACRYSOL™ TT-615 Rheology Modifier

Description

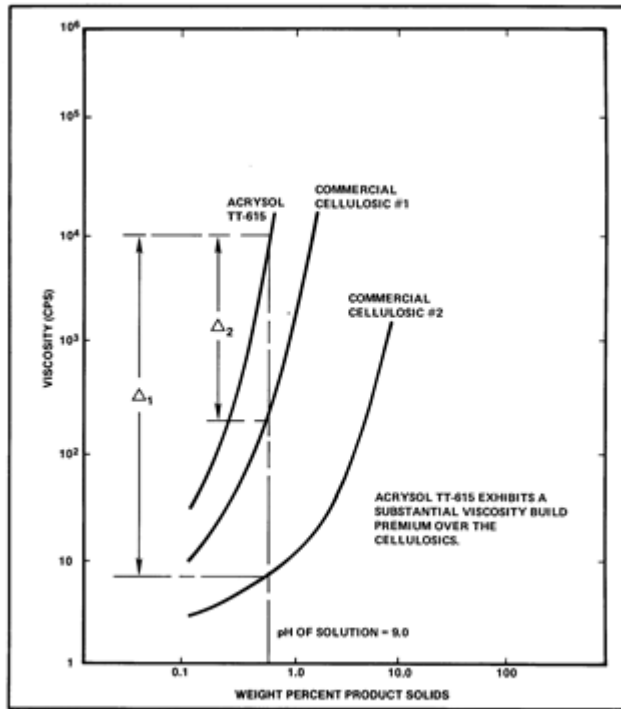
ACRYSOL™ TT-615 Rheology Modifier is an alkali swellable acrylic polymer emulsion used as either a primary or ancillary thickener in coatings. This product exhibits viscosity build comparable to high molecular weight HEC thickeners at low shear levels (Graph 1). Viscosity is developed by neutralization to a pH of 7 to 10 (Graph 2). ACRYSOL TT-615 Rheology Modifier demonstrates greater roller spatter resistance than the cellulose, but with a more pseudoplastic rheology profile (Graph 3). The liquid physical form of ACRYSOL TT-615 Rheology Modifier facilitates its incorporation into grinds and letdowns.

Typical Physical Properties

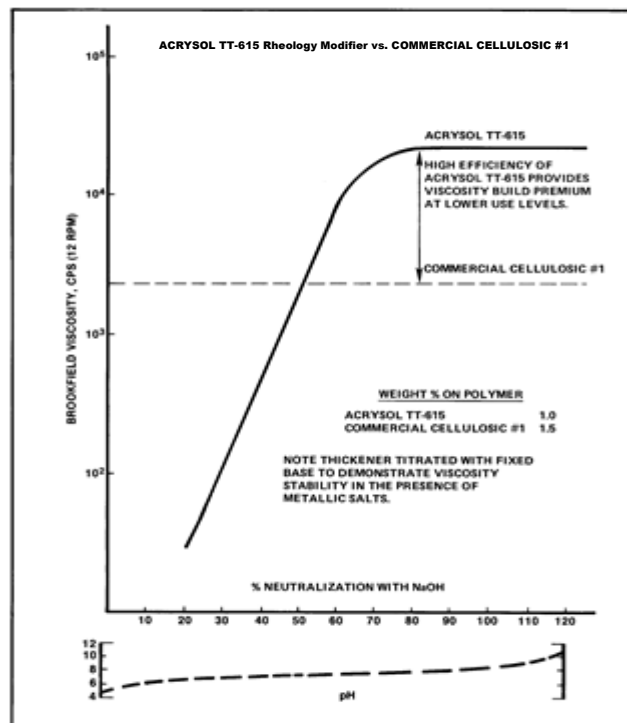
(These properties are typical but do not constitute specifications).

Property	Typical Values
Appearance	Off-white milky liquid
Type	Alkali swellable Emulsion
Charge	Anionic
Solids Content	30%
pH (as packed)	3.0
Density (25°C)	8.75 Lbs/U.S. Gallon
Viscosity as packed (Brookfield LVF, 1/60)	20 cps.
Mechanical Stability	Satisfactory
Storage Requirements	Protect From Freezing
Equivalent Weight*	218

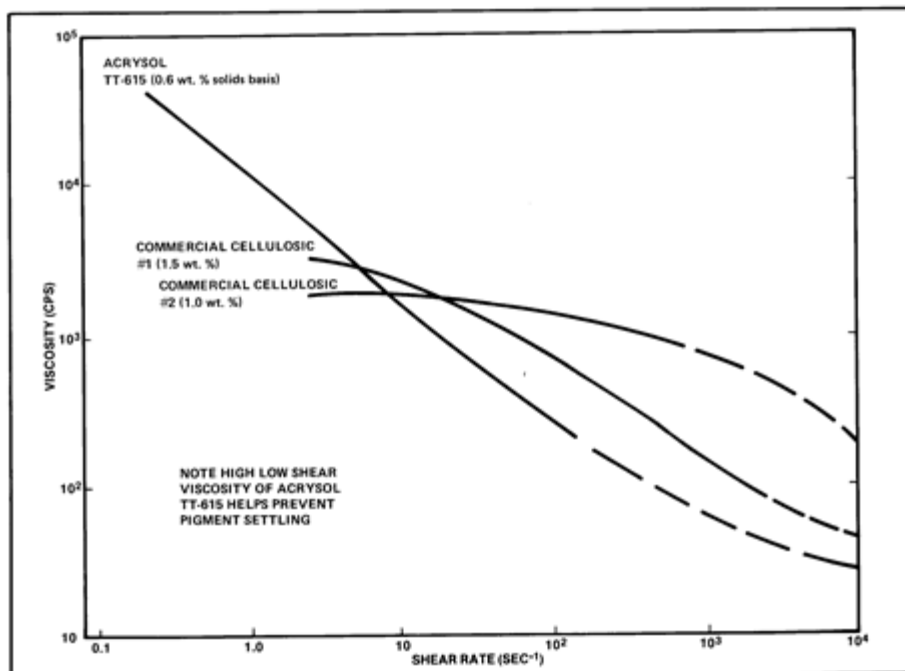
* Weight of polymer solids exactly neutralized by 40 grams of solid Sodium Hydroxide.



GRAPH 1 – THICKENER VISCOSITY DEVELOPMENT IN WATER



GRAPH 2 – VISCOSITY VERSUS PERCENT NEUTRALIZATION AND PH



GRAPH 3 – VISCOSITY/SHEAR RATE PROFILE OF THICKENERS IN WATER

TABLE I
ACRY SOL™ TT-615 RHEOLOGY MODIFIER—AN HEC SUBSTITUTE FOR INTERIOR FLATS FORMULATIONS

Features	Benefits
A 30% solids emulsion; ease of incorporation.	Reduced labor costs as no predilution or preneutralization required.
Cost-effective versus low and medium molecular weight HECs.	Lower RM costs.
Higher low shear viscosity.	Prevents pigment settling.
Does not itself support microbial growth	Reduced RM and overhead costs resulting from lower biocide levels and fewer product returns.

TABLE II
ACRY SOL™ TT-615 RHEOLOGY MODIFIER VS. HEC IN AN INTERIOR FLAT
FORMULATION
FORMULATION 343, 54.4% PVC/29.8% V.S.

	Level (Dry Lbs/ 100 Gal)	KU Initial/HS/ SH ¹	ICI Initial	Appearance In The Can
RHOPLEX™ AC-417 Emulsion Formulation				
Thickener:				
ACRY SOL TT-615 Rheology Modifier	2.3	74/82/80	0.4	Creamy
Commercial Cellulosic #4	2.9	74/75/72	0.9	Creamy
Commercial Cellulosic #3	6.2	71/74/70	0.9	Creamy
Commercial Cellulosic #1	3.3	74/78/74	0.9	Creamy
Vinyl Acrylic Formulation				
Thickener:				
ACRY SOL TT-615 Rheology Modifier	2.7	74/85/80	0.5	Creamy
Commercial Cellulosic#4	3.5	74/78/74	0.7	Creamy
Commercial Cellulosic #3	7.6	71/75/72	0.9	Creamy
Commercial Cellulosic #1	3.8	74/79/76	0.7	Creamy

¹Initial—viscosity on formulating; HS—Hand stirred; SH—Sheared on mechanical shaker

TABLE III
INTERIOR FLAT FORMULATIONS
RESISTANCE PROPERTIES

	<u>Scrub Resistance</u>		<u>Stain Removal</u>		<u>Burnish Resistance</u>
	Break	Thru	Hydro- Phobic	Hydro- Philic	85° Gloss Increase 200 Cyc/Dry Wipe (%)
RHOPLEX™ AC-417 Emulsion Formulation					
Thickener:					
ACRY SOL TT-615	223	290	fair -	fair - good	191
Commercial Cellulosic #4	302	373	fair +	fair	184
Commercial Cellulosic #3	228	319	fair	fair	216
Vinyl Acrylic Formulation					
Thickener:					
ACRY SOL TT-615 Rheology Modifier	173	229	fair -	fair - good	200
Commercial Cellulosic#4	199	278	fair +	fair	203
Commercial Cellulosic #3	171	225	fair	fair	210

Results:

Comparable scrub resistance, stain removal, and burnish resistance to alkyd.

TABLE IV
SUMMARY PROPERTY PROFILE
ACRYSOL™ TT-615 RHEOLOGY MODIFIER VERSUS HEC

	Superior	Equivalent	Inferior
ACRYSOL TT-615 Rheology Modifier versus HEC	Ease of incorporation all liquid form	Scrub resistance	Lower ICI
	Less spatter	Stain resistance	
	Ease of roller application	Burnish resistance	
	2X more efficient	Adhesion to alkyd	
	Enzyme resistance	Thickener efficiency	
	Helps prevent pigment settling		

Product Addition

Product Addition

ACRYSOL™ TT-615 Rheology Modifier is an alkali swellable thickener, which achieves its thickening effect when it is neutralized. When added full strength to the letdown, care must be taken to avoid local shock or gross paint instability. There must be sufficient base in the system before addition of ACRYSOL TT-615 Rheology Modifier to fully neutralize the thickener and still remain on the alkaline side over the normal shelf life of the paint. ACRYSOL TT-615 should be added slowly with good agitation.

If this approach is not sufficient, ACRYSOL TT-615 Rheology Modifier can be diluted 1:1 or 2:1 with water prior to addition to the letdown to reduce the chance for shocking.

**STARTING POINT FORMULATION 343 (MODIFIED)
INTERIOR FLAT WHITE PAINT**

Materials	Weight Ratio*	Parts Per Hundred (Volume Basis)
Water	158.7	19.04
TAMOL™ 960 Dispersant	6.3	0.59
TRITON™ CF-10 Surfactant	2.0	0.22
PAG-188	1.0	0.13
Ethylene Glycol	15.0	1.61
Ti-Pure R-901 pigment	230.0	6.97
Icecap K extender	150.0	6.84
1160 Silica	52.5	2.38

Grind the above for 15 minutes, then letdown at a slower speed:

Water	93.5	11.22	
PAG-188	3.0	0.39	
RHOPLEX™ AC-417 Emulsion (48%)	274.8	30.86	
or Vinyl Acrylic (55%)		239.8	26.50
Texanol ester alcohol	9.4	1.19	
Super-Ad-It fungicide	1.0	0.12	
Thickener/Water/NH ₄ OH* ¹			
with RHOPLEX AC-417 Emulsion	153.7	18.44	
with Vinyl Acrylic		<u>190.0</u>	<u>22.80</u>
	1150	1152.2	100.00
			100.00

Formulation Constants

PVC	=	54.4%
VS	=	29.8%
Initial Viscosity	=	74 KU
Initial pH	=	9.0

¹Based on the use of 2.3 lb/100 gallons and 2.7 lb/100 gallons (Dry lbs ACRY SOL™ TT-615 Rheology Modifier) respectively in paints based on RHOPLEX AC-417 Emulsion and vinyl acrylic latex.

NOTE: The pH of the paint was adjusted to 9.0 with NH₄OH prior to thickener addition.

**Handling
Precautions**

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

Storage

Store products in tightly closed original containers at temperatures recommended on the product label.

**Disposal
Considerations**

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Coating Materials Technical Representative for more information.

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