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Nothing compares

DSM Elastomers Polymers for Viscosity Index Improver Applications

Steve Brice, Errol Olivier
Moscow, September 23, 2009

DSM in 2008
a record year, but downturn visable in Q4-08

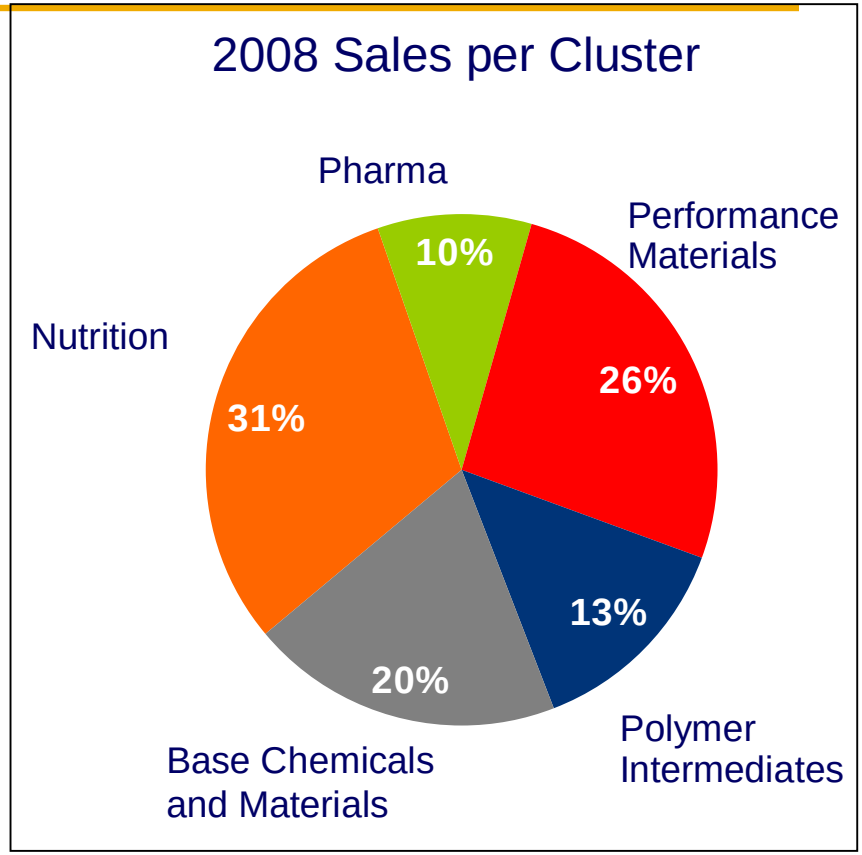
Annual Sales	€ 9.3 billion
EBIT	€ 0.9 billion
Net Profit	€ 0.57 billion
Employees	~ 23.600

=> in *Global* top 25 of chemical industry

Leadership positions
=> in ~75% of product portfolio

Innovation driven
=> R&D spend ≥ € 300 mln / year
=> 2000 R&D talents (9% of total)
=> Innovation top priority

Financially sound
=> solid balance sheet; A credit rating



Keltan® - today

- Global leader in EPDM
  - presence in all leading markets
- State of the art Ziegler Natta technology
- New breakthrough ACE technology launched
- Strong customer focus
- Committed to EPDM growth & innovation
- Cost efficient producer

- **Production Facilities:**
  - **Geleen, The Netherlands**
  - **Triunfo, Brazil**
- **Head Sales Offices**
  - **Detroit, USA**
  - **Sao Paulo, Brazil**
  - **Sittard, The Netherlands**
  - **Singapore**
  - **Shanghai, China**

Keltan® Value Proposition

Three pillars that underpin DSM Elastomers' business philosophy

HIGH PRODUCT QUALITY

HIGH SECURITY OF SUPPLY

HIGH SERVICE LEVEL

It is the *combination* that differentiates Keltan® from the rest!

Keltan® - Growth & Innovation agenda

- Next to confirming our commitment to the key value pillars for the existing EPDM business

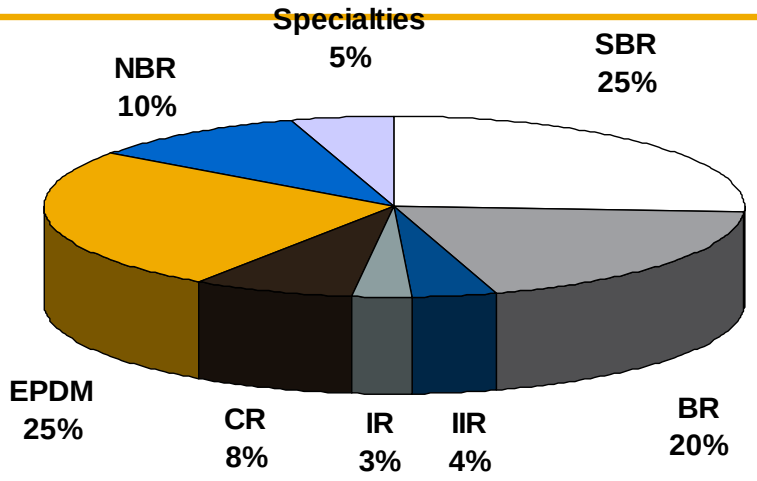
- We also have defined Three Technology Platforms for growth

1. Further expanding on Product and Application Development of ZN Technology

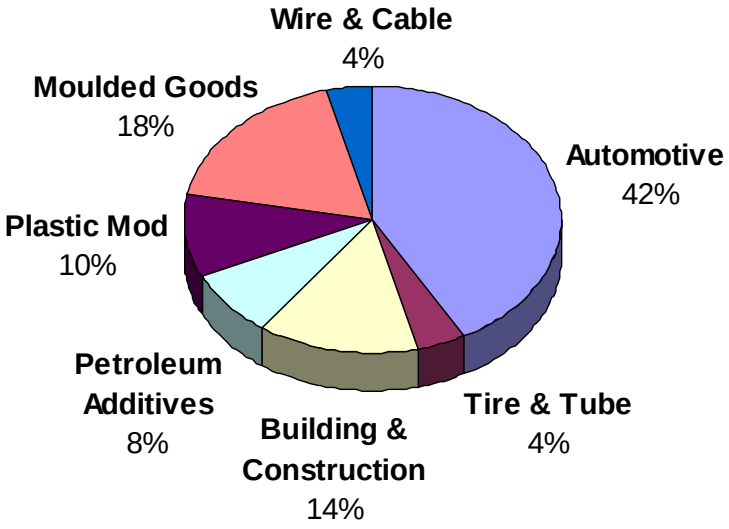
2. Implementation of Reactive Extrusion Technology

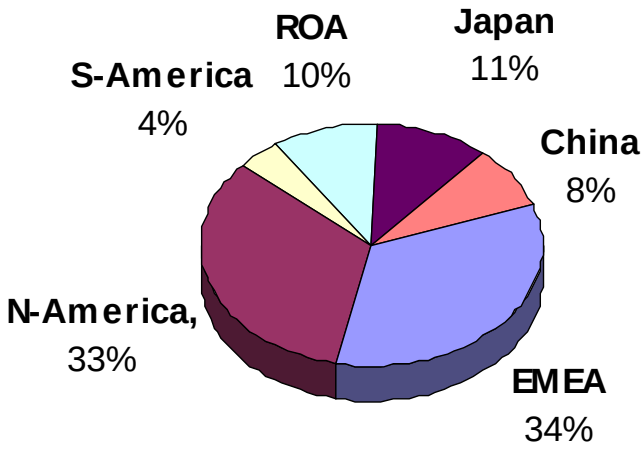
3. Implementation of Keltan ACE™ Technology

Synthetic rubber / EPDM market



Note: Non tire market





DSM Elastomers Petroleum Additives Experience

- 30+ Years as polymer supplier to the lubricants market
- Investment REX plant for secure supply of solid shear stable grades
- Dedicated technical resources
  - Viscosity testing capability: KV, SSI, CCS, MRV
- Backed by DSM Corporate Research capabilities
  - Analysis, rheology, etc.

DSM Elastomers

Viscosity Index Improver Polymers

Keltan® - VII Polymers

Grade	*Form*	M_L* (1+4@100ºC)	*Melt Index* (g/10 min) 190ºC, 2160g*	C2* (wt%)
K1200A	25 kg bale	10	11	49
PA1305	22.7 kg bale	30	2.5	49
K3200A	22.7 kg bale	50	---	49

*Typical values

Keltan® - VII Polymers

Grade	SSI (%)	*Treat Rate* (%) For 1000 cSt KV @ 100ºC*	*1% blend KV* @ 100ºC, cSt*
K1200A	22	12.0	9.2
PA1305	35	8.8	10.8
K3200A	52	6.7	14.0

*Typical values in 150SN Group I base oil

Packaging

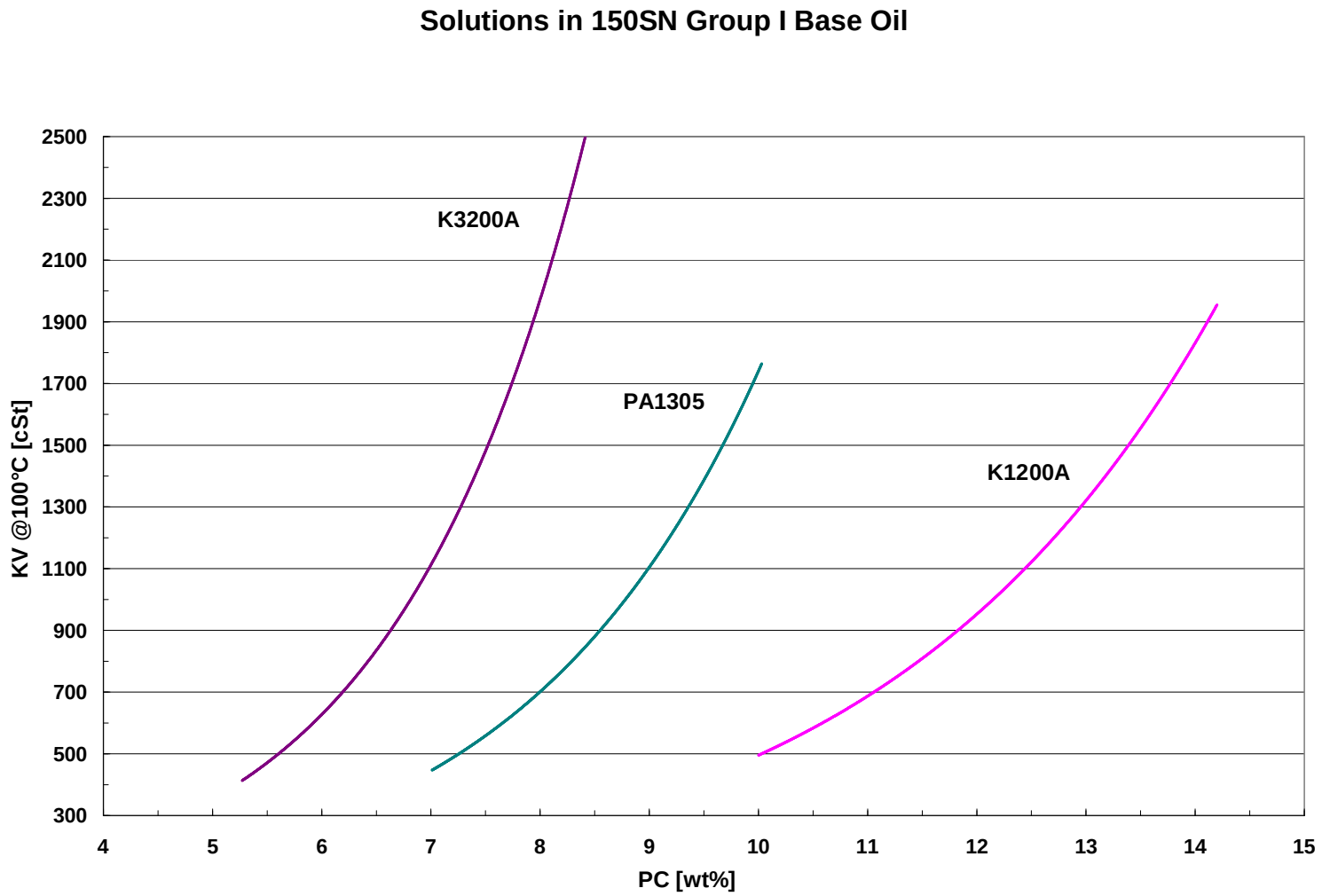
Grade	Bale container	kg Rubber /bale	Bales/pallet	kg Rubber /pallet
K1200A	Individual cardboard boxes with non-stick coating	22.7	30	681
PA1305	Individual cardboard boxes with non-stick coating	22.7	30	681
K3200A	Dissolvable EVA filmwrap	25	36	900

Dissolving in oil

- Must grind, chop, or cut rubber into blocks for addition to hot oil
- ~120ºC temperature
  - High temperatures and long times may degrade polymer or discolor oil
  - Nitrogen blanket will protect against degradation but creates other safety risks
- Observe safety precautions for base oil
  - Especially concerning fire hazard (follow MSDS guidelines for oil)
- Time depends upon particle size, mixing efficiency, and temperature
  - Dissolve to target, constant viscosity

Concentrate handling: DE Polymer Viscosities

(Typical values)



Multi-grade* Preparation

- Factors to consider
  - Choice of base oil
  - Choice of polymer (SSI) grade
  - Choice of PPD and level
- Method
  - Prepare solution to meet high temperature viscosity range
  - Demonstrate ability to meet low temperature requirements

*Excludes effects of DI Package

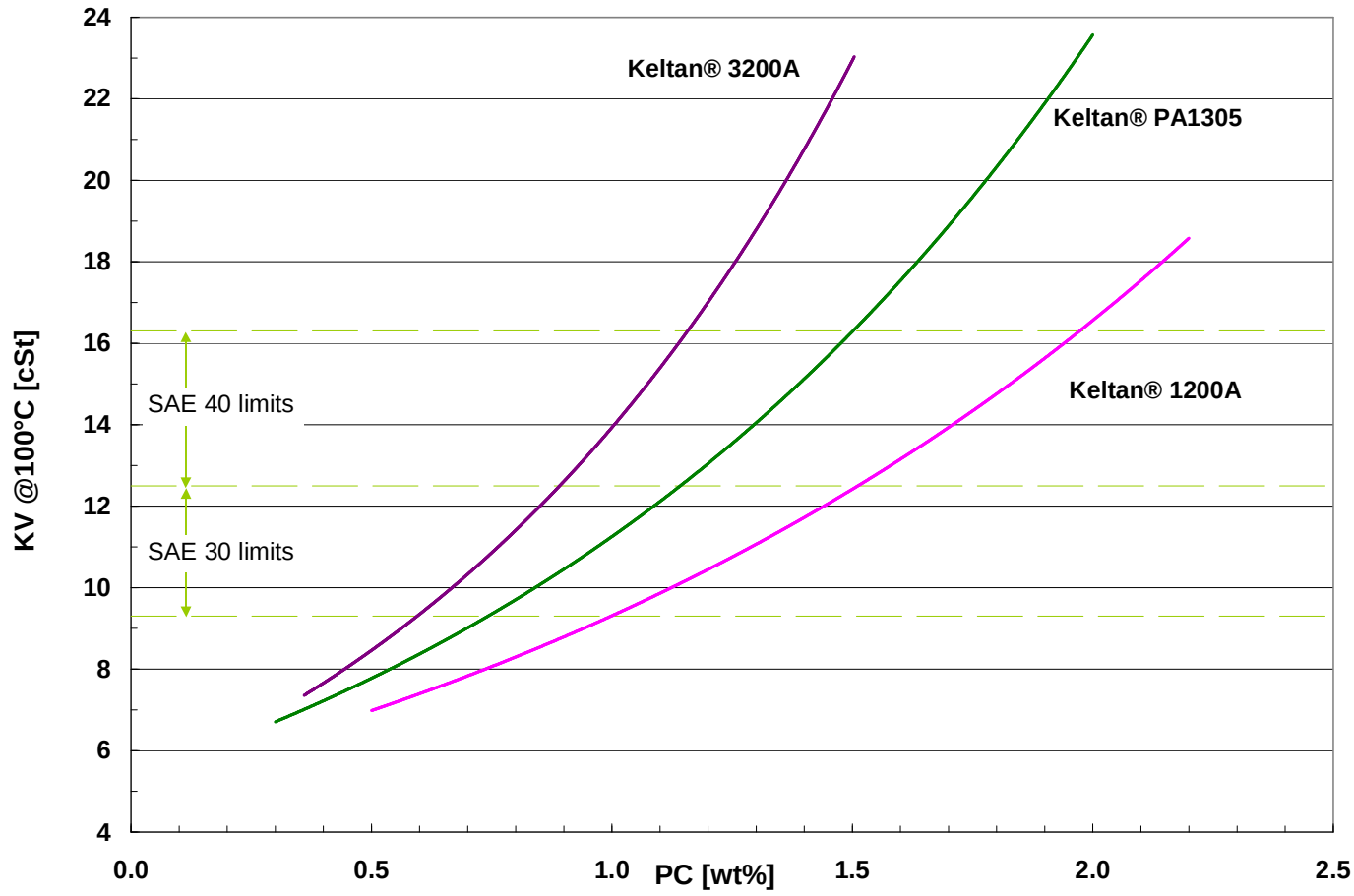
Basis current report

- Viscosity mapping DE polymers
  - K1200A, PA1305, K3200A
  - Two base oils
    - ExxonMobil 150SN (10W-30)
    - Chevron 100R (10W-40, 5W-30)
  - One pour point depressant (PPD)
    - Paraflow 385, 0.3 wt%

10W-30 Viscosity Grade Performance

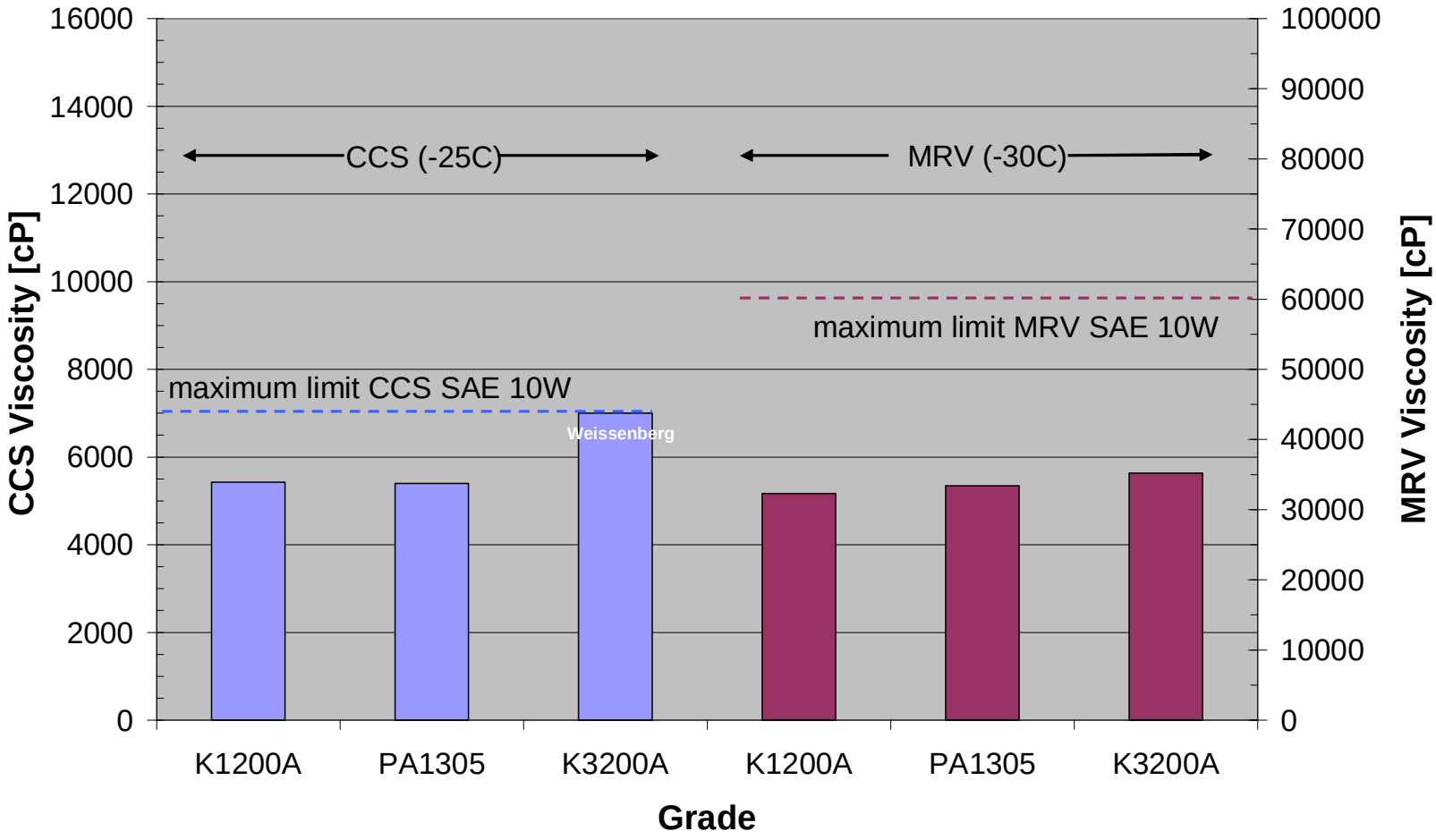
SAE Viscosity Grade (J300)	Max Lo Temp Cranking Viscosity (cP)	Max Lo Temp Pumping Viscosity (cP)	Min KV @ 100°C (cSt)	Max KV @ 100°C (cSt)
0W	6200 @ -35C	60,000 @ -40C	3.8	---
5W	6600 @ -30C	60,000 @ -35C	3.8	---
10W	7000 @ -25C	60,000 @ -30C	4.1	---
15W	7000 @ -20C	60,000 @ -25C	5.6	---
30	---	---	9.3	12.5
40	---	---	12.5	16.3
Multi-Grade Oils satisfy more than one viscosity requirement				

DE Polymers in 150N Group I Base Oil



150SN Group I Base Oil 10W-30 Behavior

(KV@100ºC = 11 cSt)

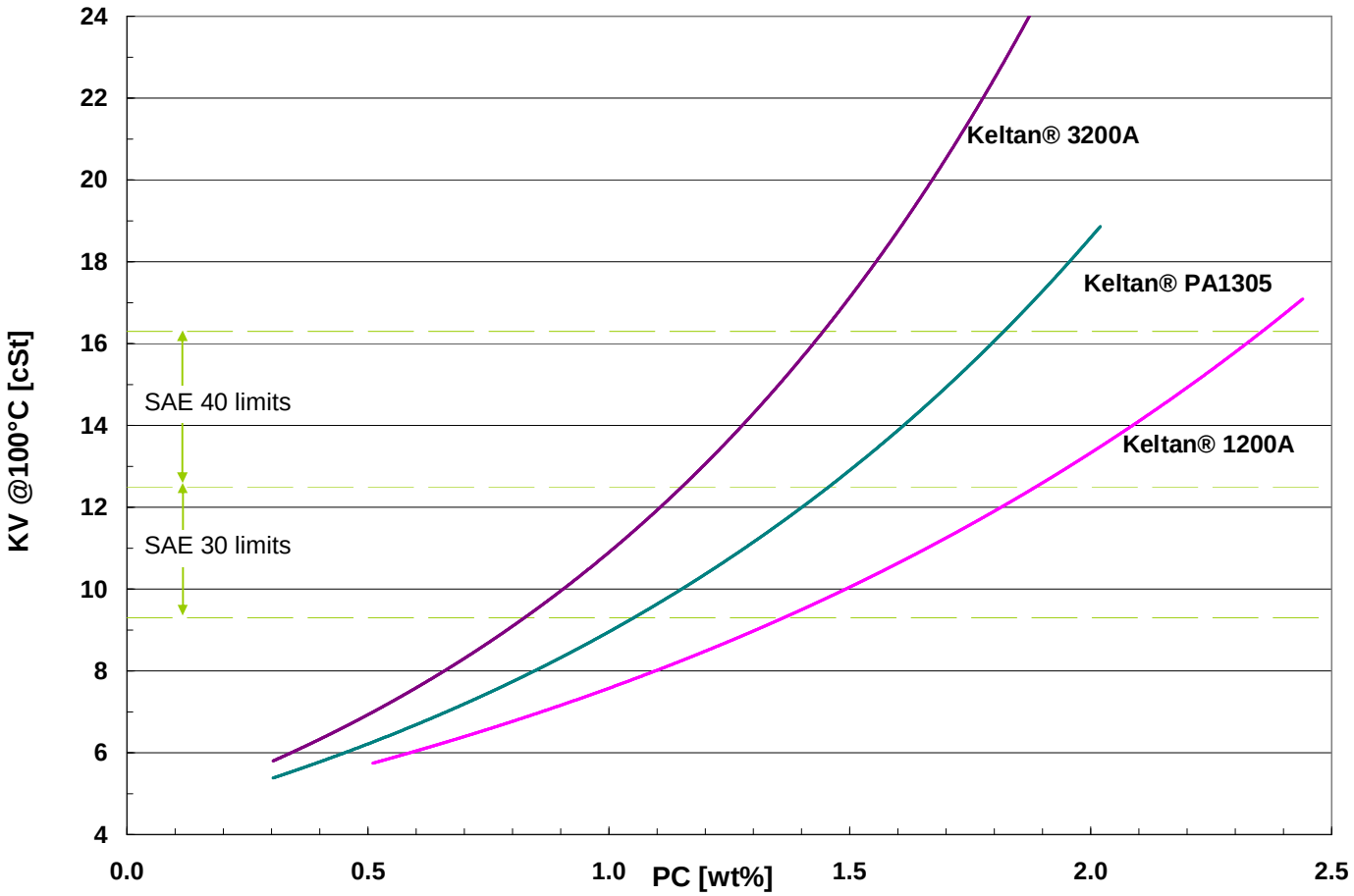


10W-40 Viscosity Grade Performance

SAE Viscosity Grade (J300)	Max Lo Temp Cranking Viscosity (cP)	Max Lo Temp Pumping Viscosity (cP)	Min KV @ 100°C (cSt)	Max KV @ 100°C (cSt)
0W	6200 @ -35C	60,000 @ -40C	3.8	---
5W	6600 @ -30C	60,000 @ -35C	3.8	---
10W	7000 @ -25C	60,000 @ -30C	4.1	---
15W	7000 @ -20C	60,000 @ -25C	5.6	---
30	---	---	9.3	12.5
40	---	---	12.5	16.3

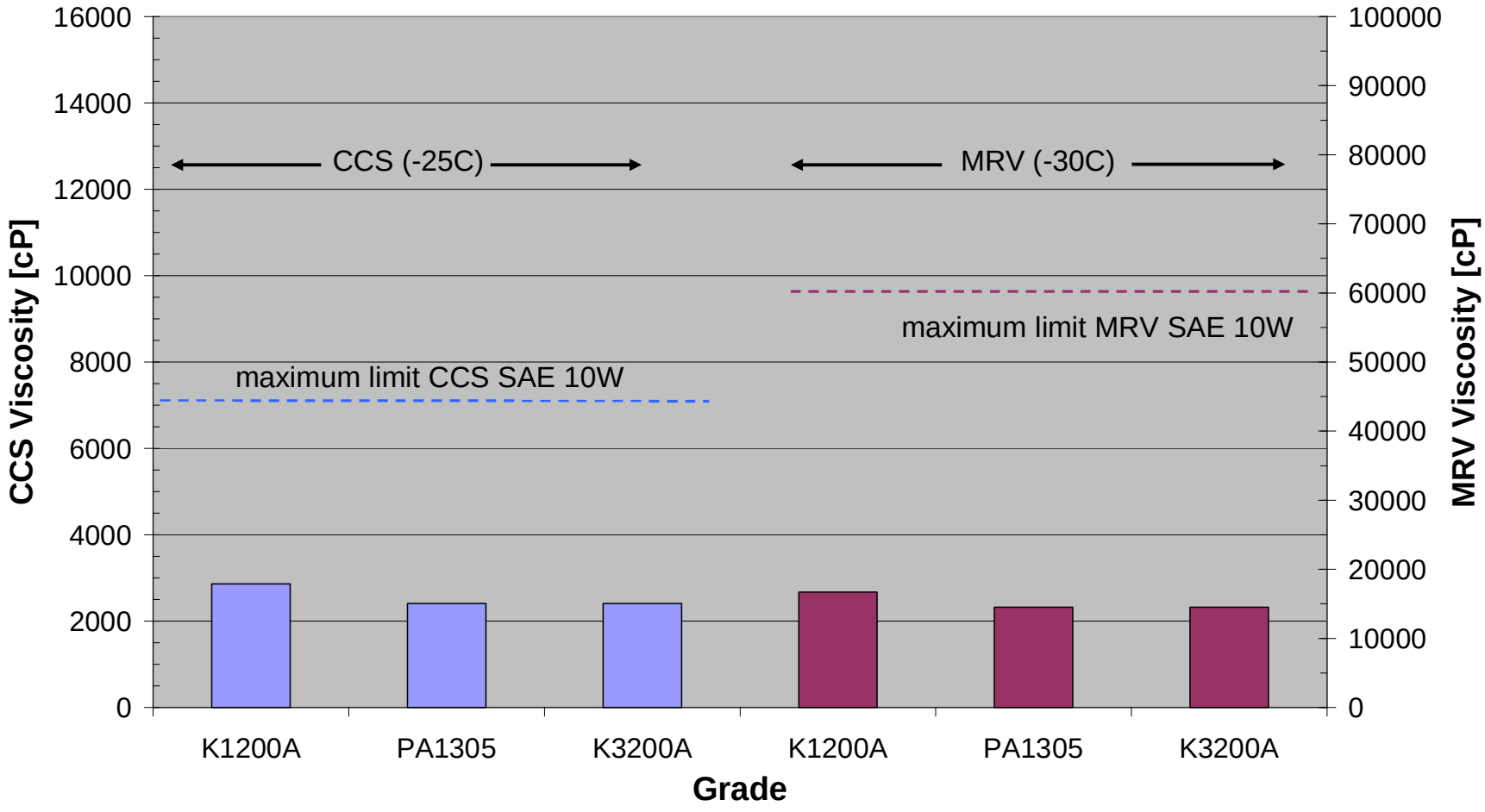
Multi-Grade Oils satisfy more than one viscosity requirement

DE Polymers in 100R Group II Base Oil



100R Group II Base Oil 10W-40 Behavior

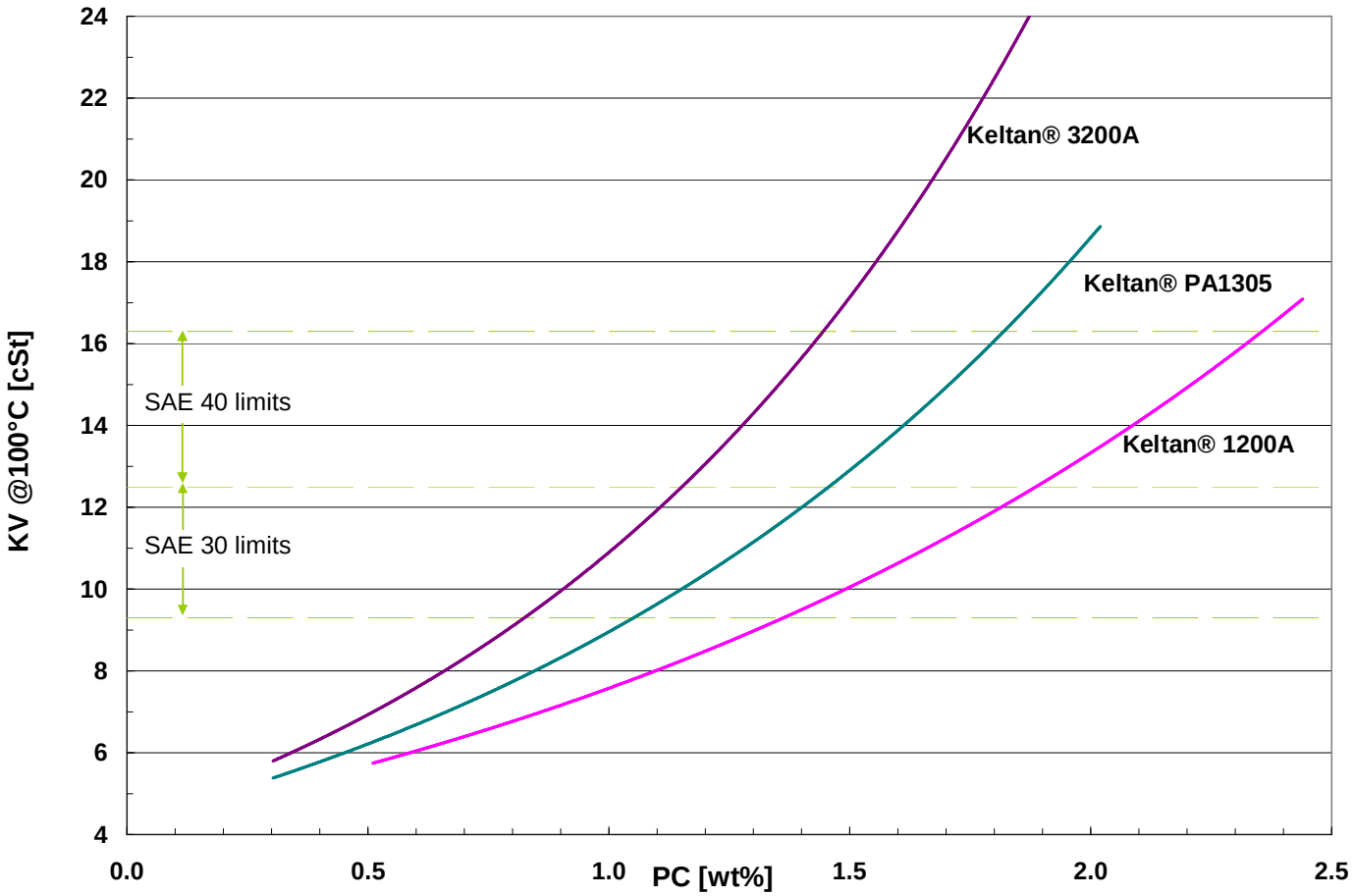
(KV@100ºC = 14.5 cSt)



5W-30 Viscosity Grade Performance

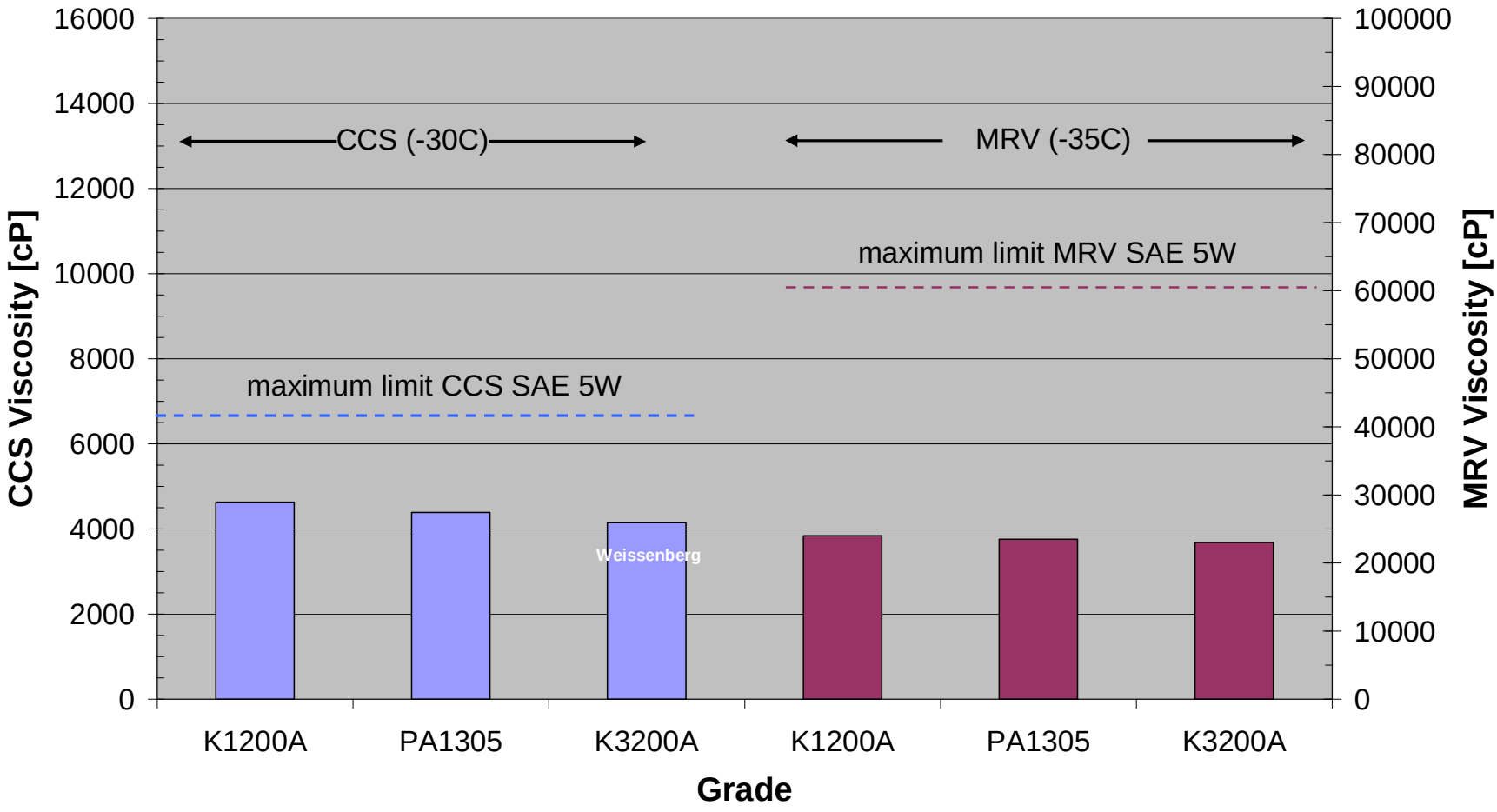
SAE Viscosity Grade (J300)	Max Lo Temp Cranking Viscosity (cP)	Max Lo Temp Pumping Viscosity (cP)	Min KV @ 100°C (cSt)	Max KV @ 100°C (cSt)
0W	6200 @ -35C	60,000 @ -40C	3.8	---
5W	6600 @ -30C	60,000 @ -35C	3.8	---
10W	7000 @ -25C	60,000 @ -30C	4.1	---
15W	7000 @ -20C	60,000 @ -25C	5.6	---
30	---	---	9.3	12.5
40	---	---	12.5	16.3
Multi-Grade Oils satisfy more than one viscosity requirement				

DE Polymers in 100R Group II Base Oil



100R Group II Base 5W-30 Behavior

(KV@100ºC = 11 cSt)



Conclusions*

- 10W-30 formulations demonstrated in Group I 150SN base oil
- 10W-40 and 5W-30 formulations demonstrated Group II 100R base oil
- Main viscosity factors
  - Base oil
  - Polymer molecular weight/SSI

*Excludes effects of DI Package

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End of presentation