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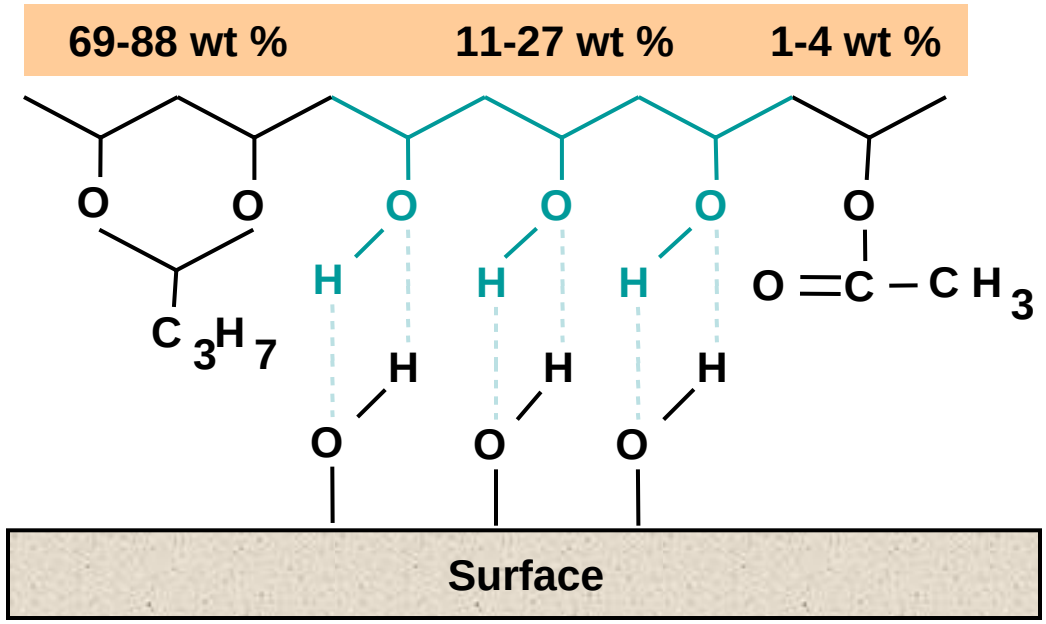
Mowital® for Metal Primers & Coatings

Mowital® - General Properties

Mowital®, “Polyvinyl butyral”;

- Excellent adhesion to substrates, like “metal”, “wood”, “glass” etc…



- Well react with cross-linkers like “phenolic resin”, “epoxy”, “isocyanate” etc…
- Well soluble in alcohols and many other organic solvents
- Thermoplastic resin

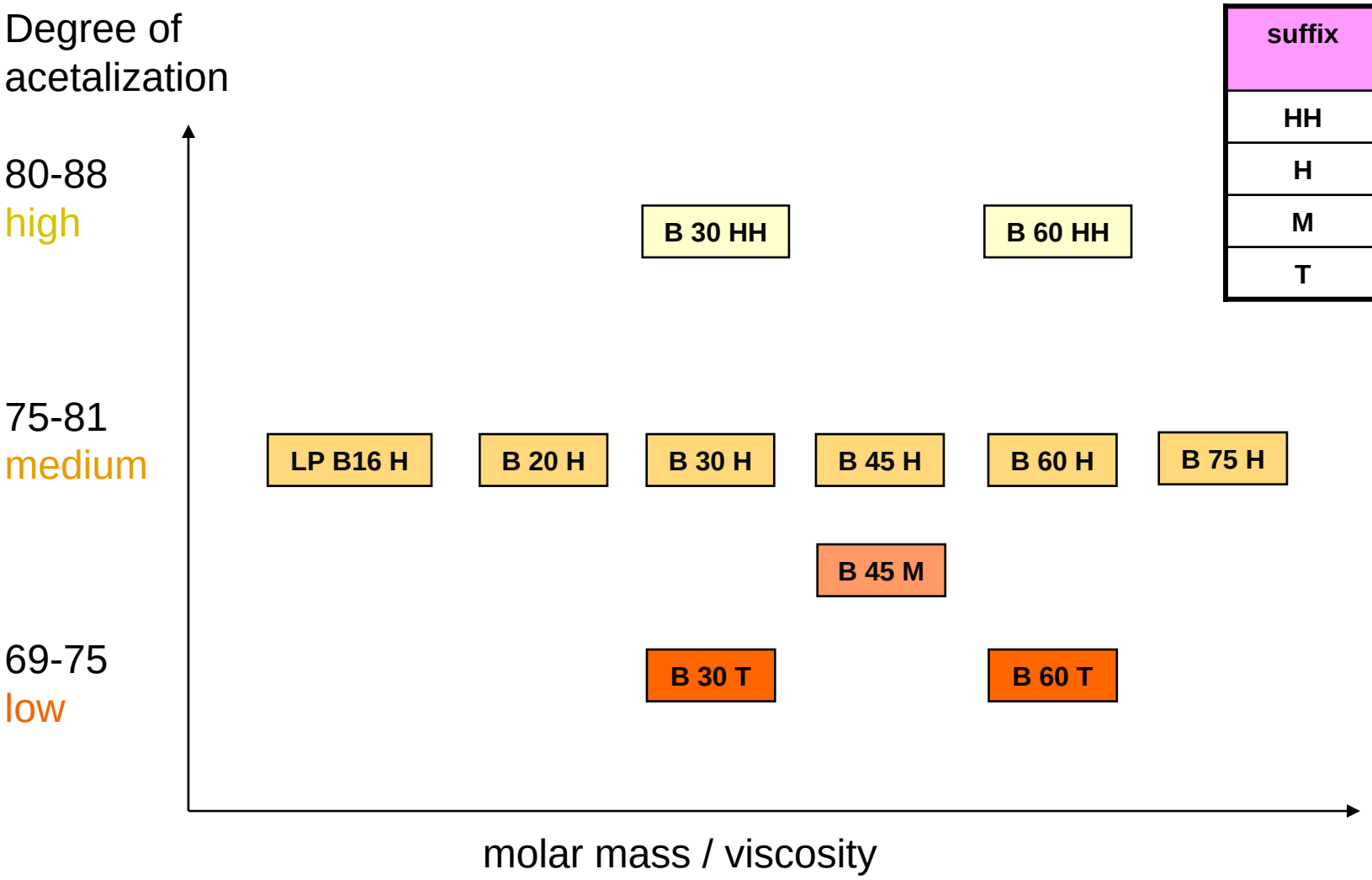
Mowital® - Nomenclature

Example of nomenclature; "Mowital B60H"

Trade name:	**Mowital**
Capital B:	**Stating the used aldehyde (butyraldehyde)**
Number :	**Refering to the molecular weight, the higher the number the higher the molecular weight**
Suffix:	**Indicating the residual PVOH content, T being the highest and HH being the lowest. PVOH content and degree of acetalization depend on each other (high degree of acetalization corresponds to low PVOH content and vice versa).**

suffix	wt.-% PVOH
T	24 – 27
M	21 – 24
H	18 – 21
HH	11 – 14

Scheme of the Mowital® - Range



suffix	wt.-% PVOH
HH	11 – 14
H	18 – 21
M	21 – 24
T	24 – 27

Mowital® - General Properties

		Mowital B20H	Mowital B30T	Mowital B30H	Mowital B30HH	Mowital B60HH
Powder						
Bulk Density	g / cc	0.326	0.299	0.277	0.231	0.229
MI	g / 10min 190 degC, 2.16kg	109.5	28.7	16.2	11.3	1.6
Film						
Film property	Strength (kg/cm^2)	105	433	443	410	494
	Elongation (%)	1	5	5	7	10
Water Absorption	20 degC x 24hrs	4.4	10.5	6	2.4	2.2
Pencil hardness	JISK5400	H	H	H	F	H

Film property; 20degC, 65%RH, speed 10 mm/min

Mowital® - Applications

➢ Anti corrosion primers (Etch-primer, shop-primer and wash-primer)

2 pack primers (best storage stability)

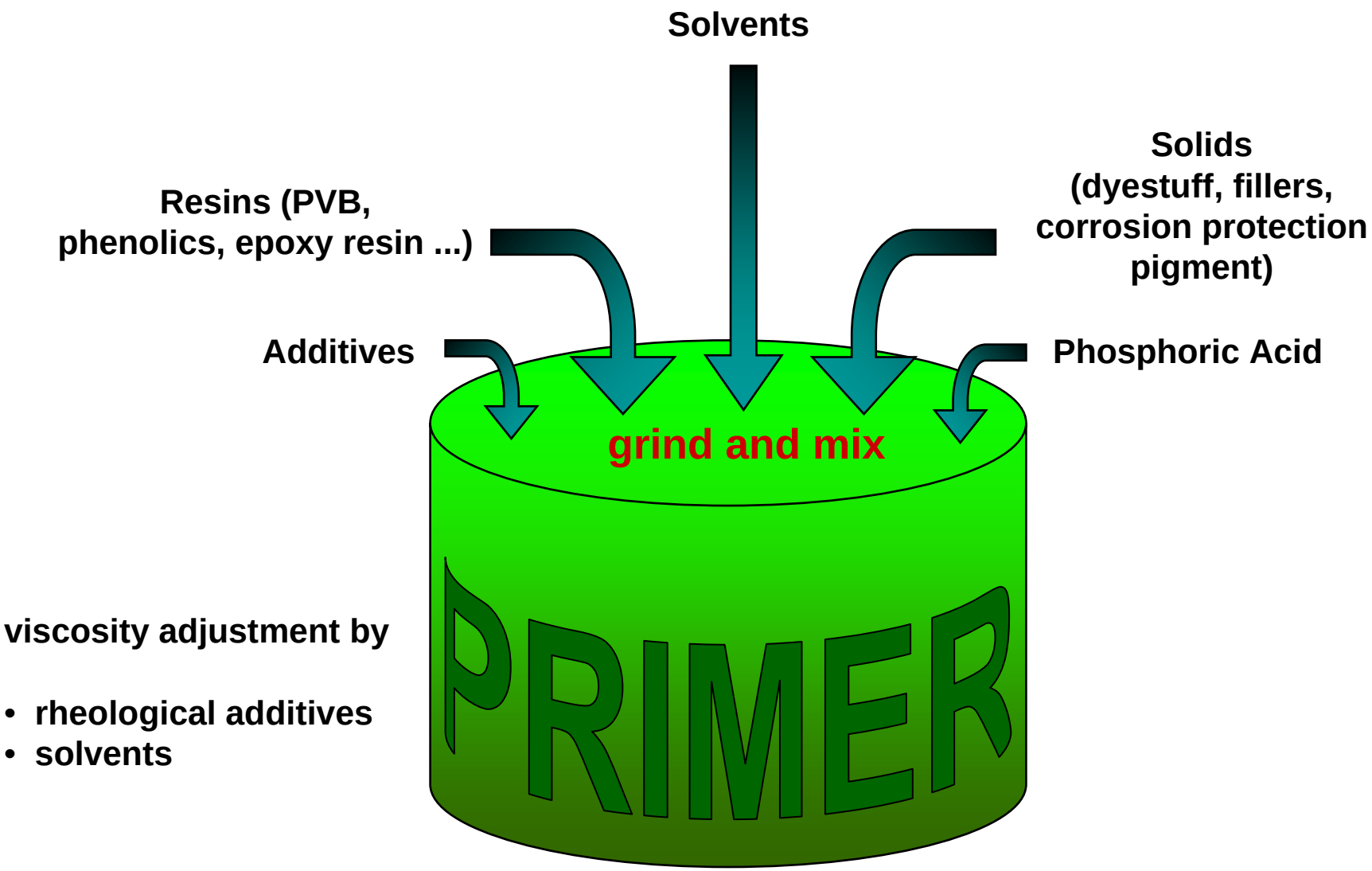
- Chromate free
  - Corrosion protection by special zinc phosphate pigments
- Chromate containing
  - Best corrosion protection
  - Reactive system

1 pack primers (only chromate free)

Applications;

- Utility vehicles Busses Vans, lorries, Agricultural machines (tractors, harvesters .....)
- Automotive repair
- Aircrafts
- Metal constructions
- Marine coatings

Mowital® for Primers



viscosity adjustment by

- rheological additives
- solvents

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raw material	function	LS 0002 parts by wt.	LS 0003 parts by wt.
Mowital B 30 H	binder	**8.8**	**6.5**
Uravar FB 250 52%	binder	**-**	**13.3**
Bakelite EPR 191	binder	**8.8**	**4.8**
Talkum IT extra	filler	**8.6**	**8.9**
Heucophos ZPO	filler	**8.6**	**8.9**
Bayferrox 130 M	pigment	**5.3**	**5.4**
Aerosil R 972	rheology modifier	**0.4**	**0.4**
Additol XL 270	dispersing agent	**0.2**	**0.2**
Xylene	solvent	**27.6**	**23.8**
n-Butanol	solvent	**16.7**	**14.8**
2-Methoxypropanol	solvent	**14.1**	**12.1**
phosphoric acid 85%	acid	**0.9**	**0.9**
total:		**100.0**	**100.0**
resin solid		**17.6**	**18.2**
total solid content		**39.6**	**42.0**

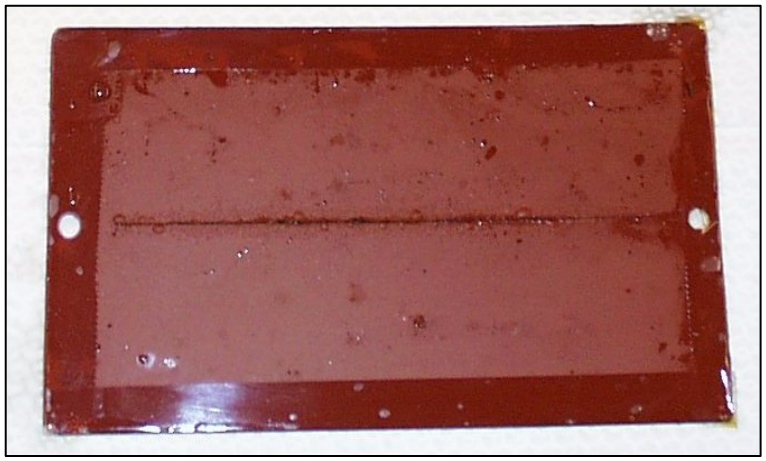
Mowital® for Primers - Advantages

- Excellent adhesion to aluminum, steel and galvanised steel
- Good corrosion protection, even without zinc chromate
- Very fast drying and low solvent retention
- Good sandability
- Overcoatable with almost every kind of paint
- Capability for pore-free welding
- FDA regulated under parts of 21 Code of Federal Regulations (section 175.300 Resinous and Polymeric Coatings)

Mowital® for Primers - Performance

After 1000 hours “Salt Spray Test“

Substrate: Bonder steel



Primer Formulation based on

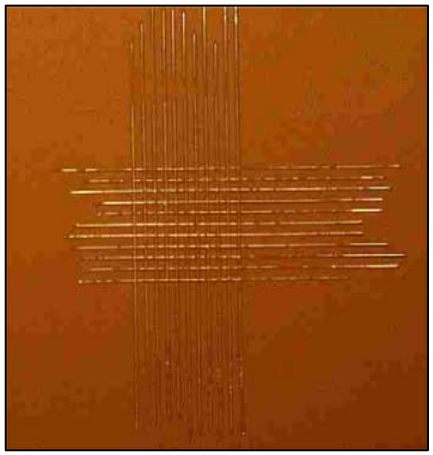
Binder: Mowital B 30 HH

Primer formulation (water based) based on an acrylic emulsion

Mowital® for Primers - Performance

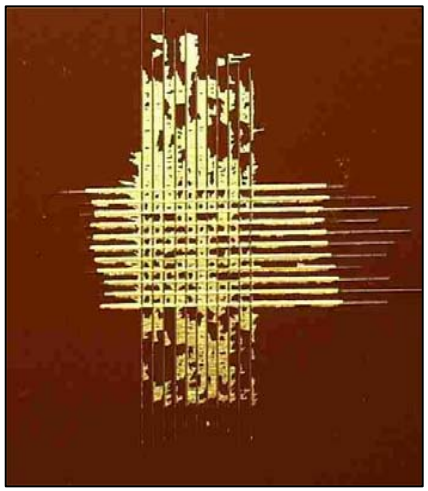
Adhesion determined by cross cut

Substrate: Bonder steel



Primer Formulation based on

Binder: Mowital B 30 HH



Primer formulation (water based) based on an acrylic emulsion

Mowital® - Applications

- **Powder coatings**
  Advantages: improved adhesion, hardness of the coating
  Additive to influence the surface structure
  Additive to improve elasticity of the coating, wetting of edge domains,
  phase compatibility during extrusion

- **Strippable packaging lacquers** (+ release agent)

- **Plastic Coatings** - primer for more adhesion of top coating

- **Wood Coatings** - primer for more adhesion of top coating

- **Stoving Enamels**
  Advantages: improved adhesion, flow and elasticity in combination with amine-, epoxy- and phenol formaldehyde resins

- **Lacquer for container interiors**

- **Wire enamels**
  Advantages: low ion conttent for high resistivity, high flexibility

Mowital® for Powder Coatings - Advantages

- Excellent adhesion to metal substrate even without primer
- Hardness of the coat (compared to Nylon 11)
- Transparent coating

As an additive;

- Additive to influence the surface structure (“Hammer finish“)
- Additive to improve elasticity of the coating
- Additive to improve wetting of edge domains
- Additive to improve phase compatibility during extrusion

Mowital® for Powder Coatings - Performance

Powder formulation	Mowital B30H / pigment 100 / 3	Mowital B30HH / pigment 100 / 3	Commercially available Nylon 11 based powder
Coating condition	Fluidized bed Pre heating temp.; 310 degC (exact temp. of substrate is about 280 degC) Dipping time; 5 sec. After heating; 200 degC for 2 min		
Coating thickness	400 μm	400 μm	400 μm
Adhesion （1mm crosscut method, adhered part / 100）	100/100 (without primer)	100/100 (without primer)	100/100 (with primer)
Pencil hardness	H	H	B
Impact resistance （Ball drop method, 300g）	> 100cm	> 100cm	> 100cm
Weather ability (Sunshine weather meter; 3000hrs)	No change	No change	Chalking
Water absorption (20 degC / 24h)	6 %	2.4 %	1.3 %

Mowital® for Powder Coatings - Application

Formulation; Mowital B30H / pigment = 100 / 3
Coated by fluidized bed
Thickness; 400 μm

- Excellent adhesion to metal substrate even “without primer”
- Higher hardness of the coat compared with Nylon 11
- Better weather stability compared with Nylon 11

Mowital® for Powder Coatings – as an Additive

Powder ingredients:

Crylcoat 2428;	polyester resin (functionalized by carboxyl groups)	45.0 g
Araldit GT 6064;	epoxy resin	28.5 g
Kronos 2160;	titanium dioxide	25.0 g
Resiflow PV 88;	flow agent	1.0 g
Benzoin;	degasser	0.5 g
	total:	100.0 g
Mowital;	modifier	x g

Extrusion:

T_1= 100 degC, T_2= 110 degC, T_3= 112-13 degC

Stoving conditions:

10 min at 180 degC object temperature

Mowital® for Powder Coatings – as an Additive

Coated by Electrostatic Spraying;

Influence of Mowital B 60 H in powder coatings based on polyester / epoxy hybrid binder

content of Mowital B 60 H:

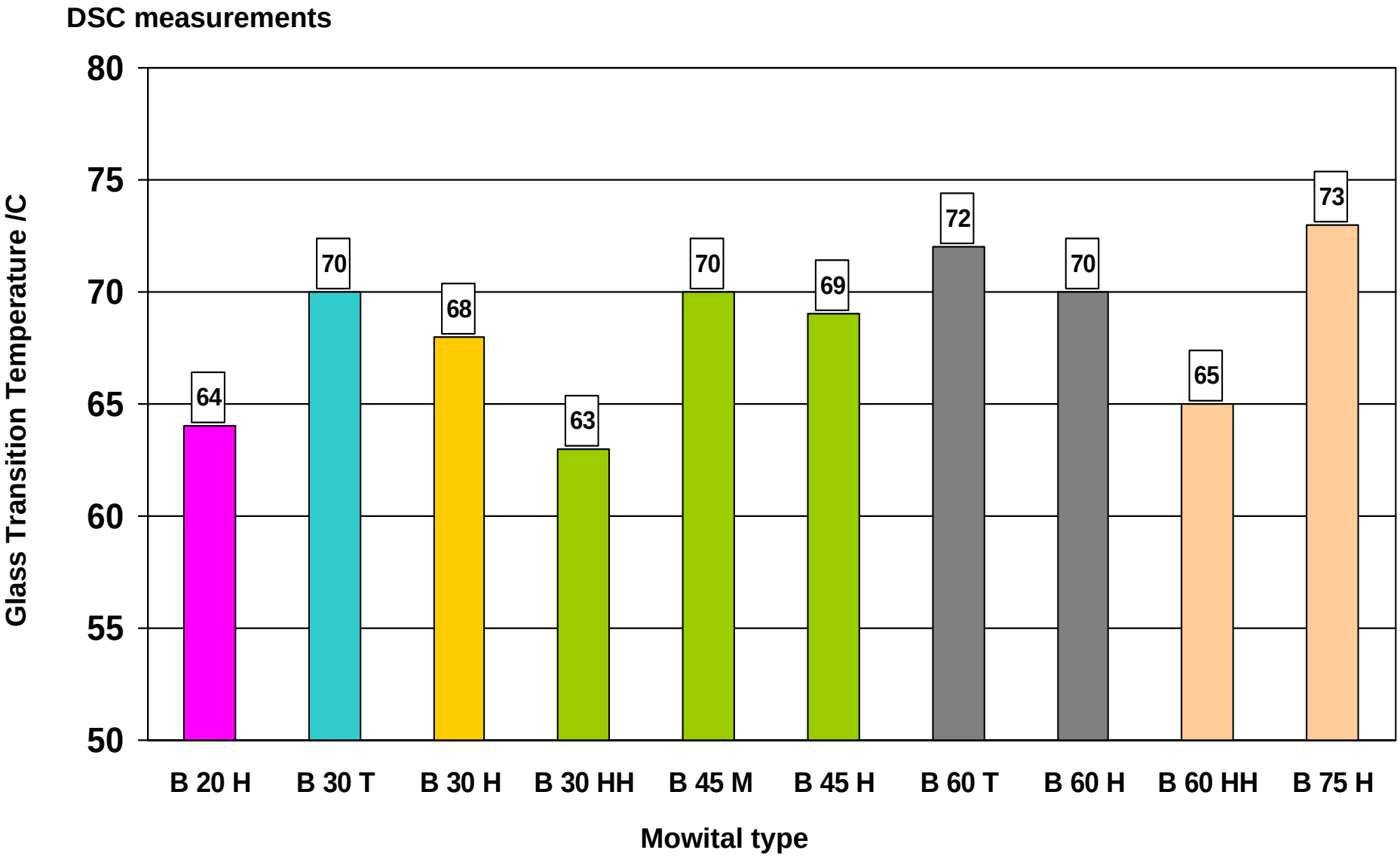
0.5% **1.0%** **2.0%**

Influence of Mowital B 30 T in powder coatings based on epoxy binder

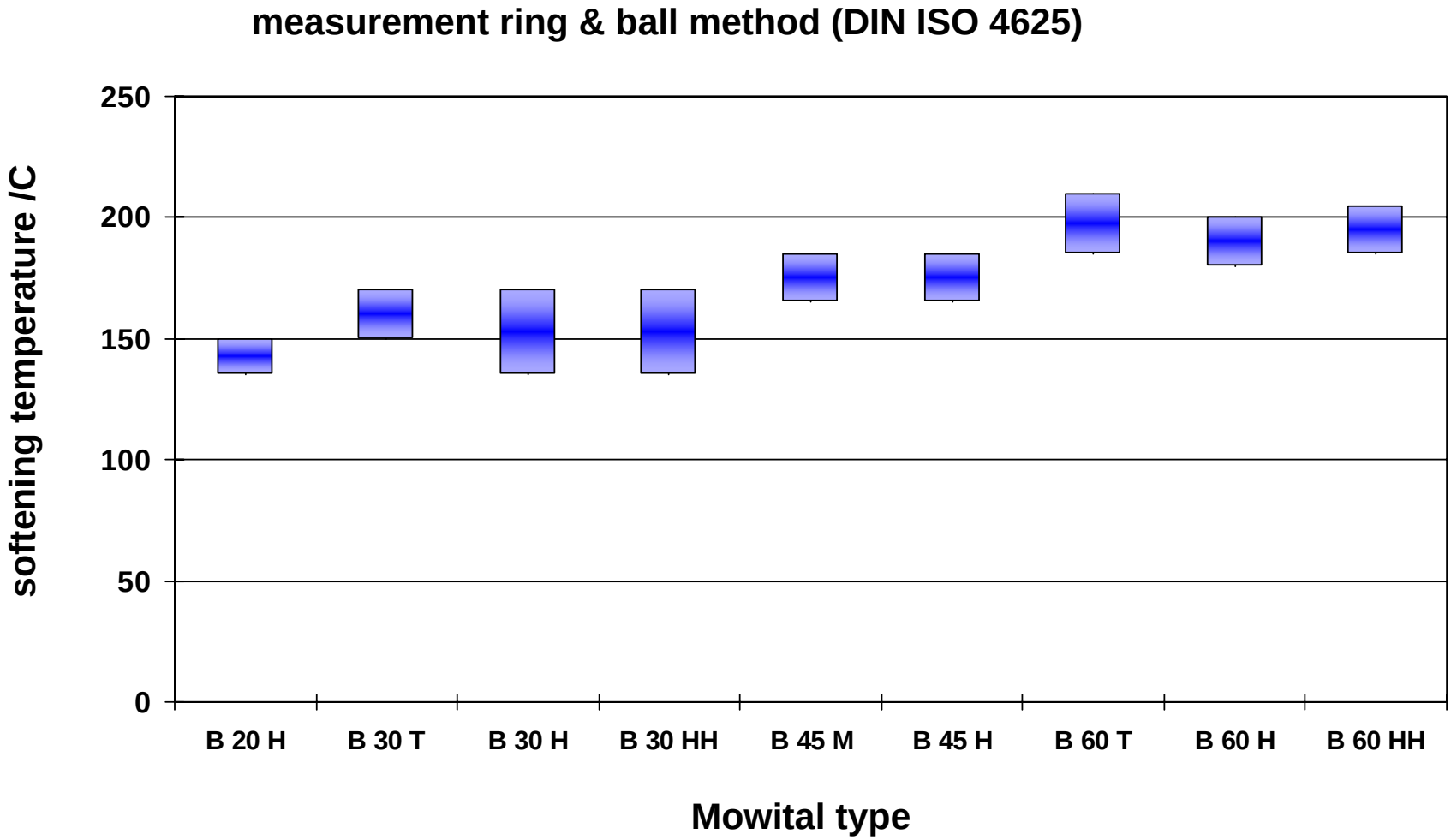
content of Mowital B 30 T:

1% **5%** **10%**

Glass Transition Temperatures



Softening Temperatures



Molecular weight B14 < B16 < B20 < B30 < B45 < B60

Melt Rheology

Melt Flow Rate (MFR) measurements
conditions: weight: 2.16 kg, temperature: 190 degC, melting time: 5 min
***) temperature: 150 degC**