New generation of FKM compounds for low temperature resistance

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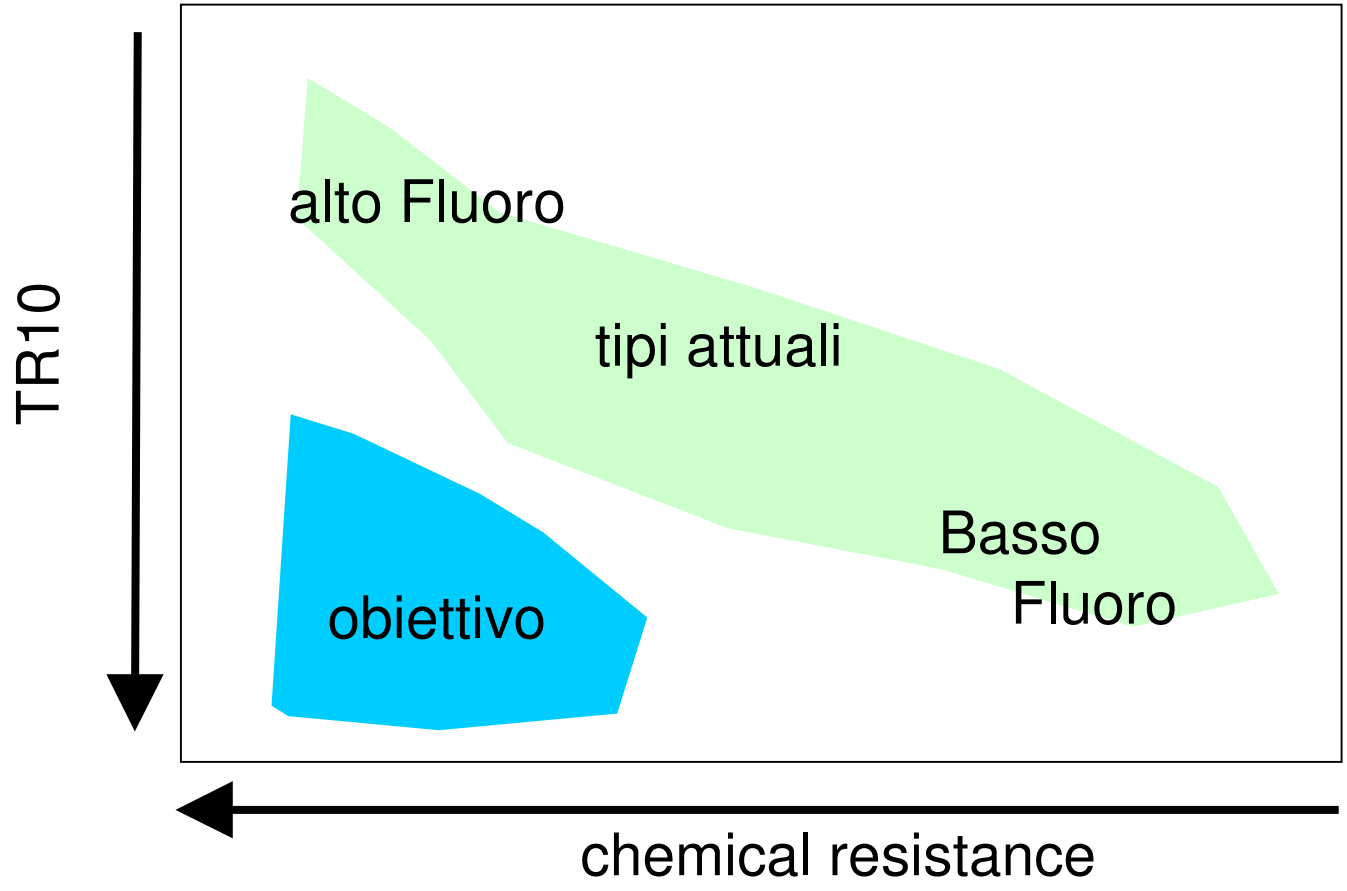
The challenge

- **Can we have good low temperature properties and high chemical resistance as well?**



MARKET NEEDS

Automotive

- **Lower Sealing Temperature (cold environments)**
- **High pressure generates Tg shift → GDI engines require FKM with lower Tg compared to standard solutions**
- **Increased chemical resistance (biofuels) maintaining Low T performance**

Aerospace

- **Low T Service combined with high thermal resistance**
- **Low T combined with Fuels and HTS oils compatibility**

FKM for low Temperature Sealing

Oil & Gas

- **Drilling in cold environments**
- **ED Resistance**
- **Chemical Resistance**

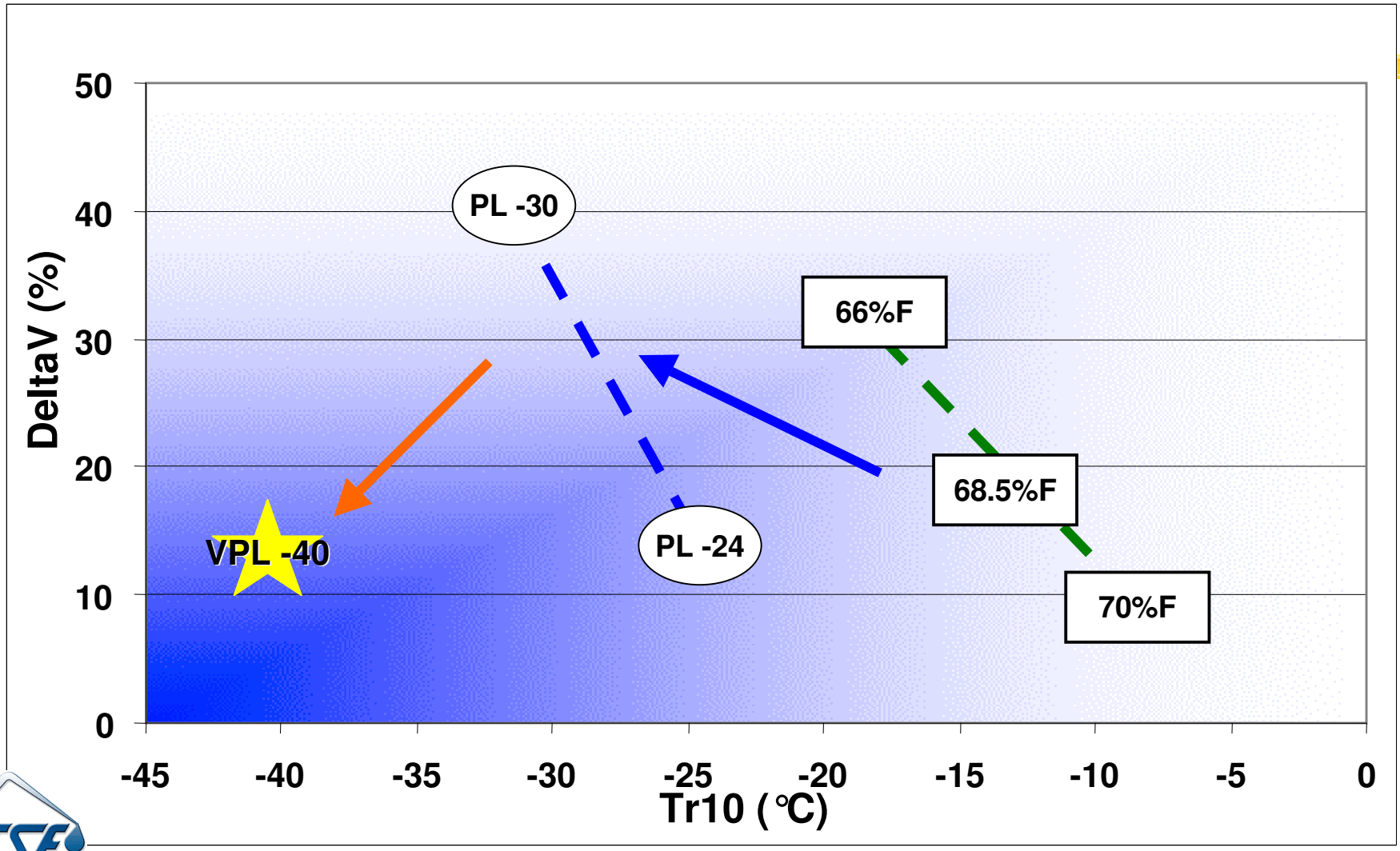
…and good processing compounds!

A new Tecnoflon® FKM family and new TSF compounds for low temperature sealing

Tecnoflon®	VPL 85540 (45 MU) VPL 55540 (25 MU)	*TSF compounds PXLT*
TR10 (°C)	**-40**	*Developed for compression and injection molding*

The new technology allows improved low temperature and chemical resistance

Swell in M15 after 168h @ 23 °C



RHEOLOGY

Tipycal compound 70 Shore A black			compound PLT (-30℃)		compound PXLT (-40℃)
Polymer viscosity ML (1+10) @ 121℃		MU	54		45
Compound viscosity ML (1+10) @ 121℃		MU	58		47
MDR 6 minutes @ 160℃	ML	lb*in	1,7		1,1
	MH	lb*in	27,5		26,2
	Ts2	min	0.9		0.9
	T50	min	1.8		1.9
	T90	min	3.6		3.7

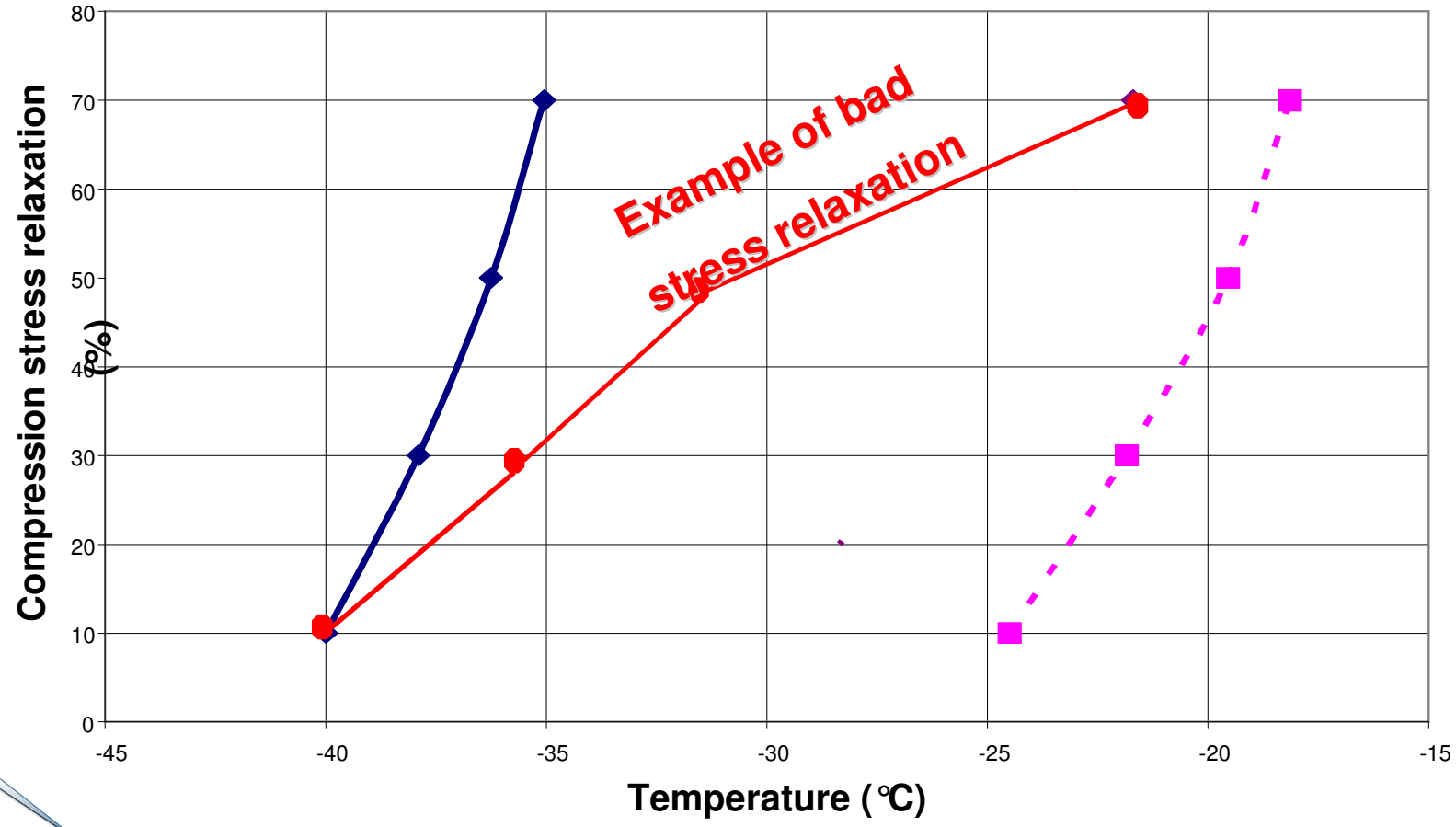
Physical properties

Compound *70 Shore A black*		PLT -30 °C		PXLT -40 °C
Shore A	**pts**	69		67
tensile	**MPa**	20.8		15.0
Modulus @ 100%	**MPa**	4.8		6.2
elongation	**%**	248		186
C-Set 70h @ 200 °C **O-Rings #214, 25% comp.**	**%**	**23**		**21**

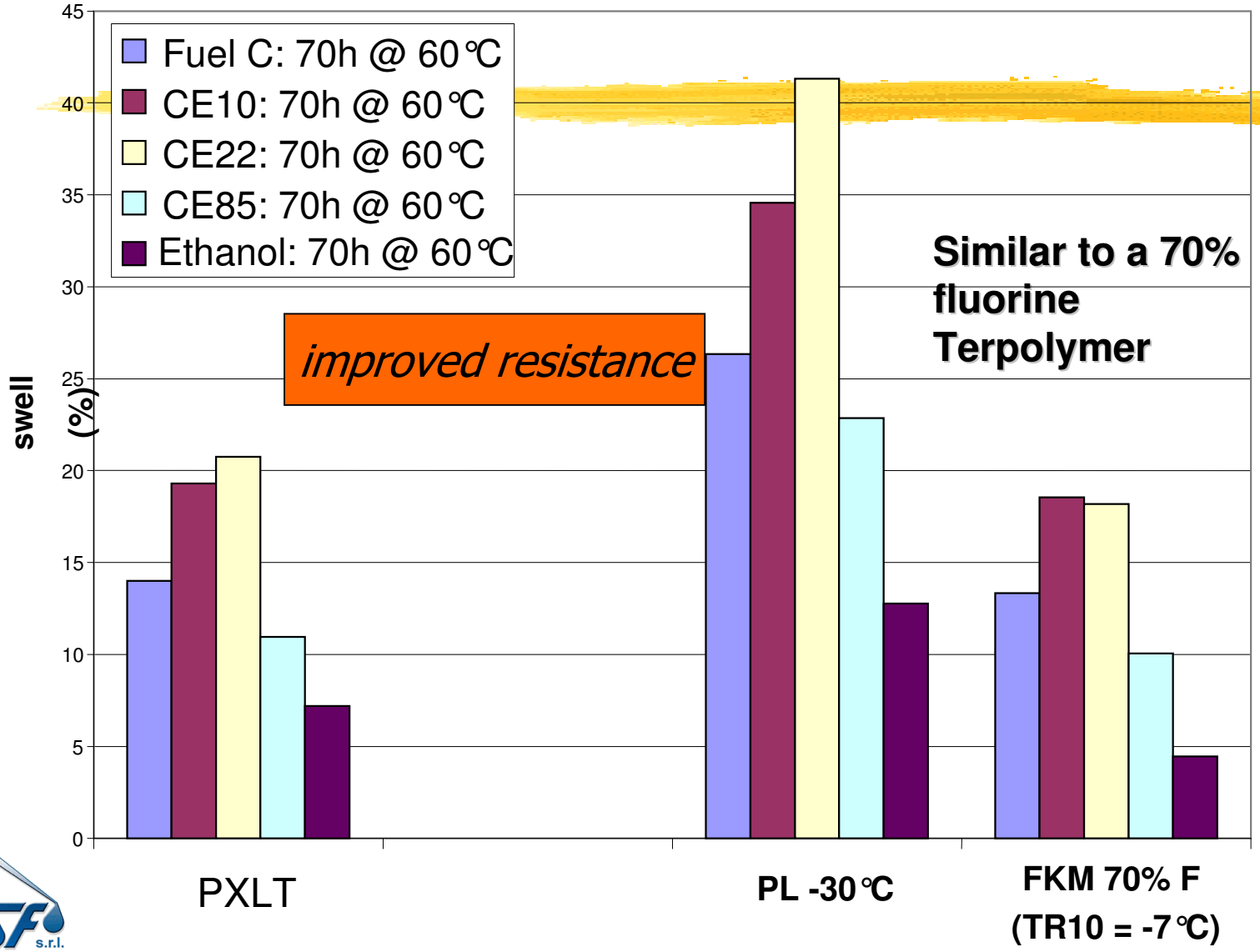
Sealing properties are not worsened !!

TR 10

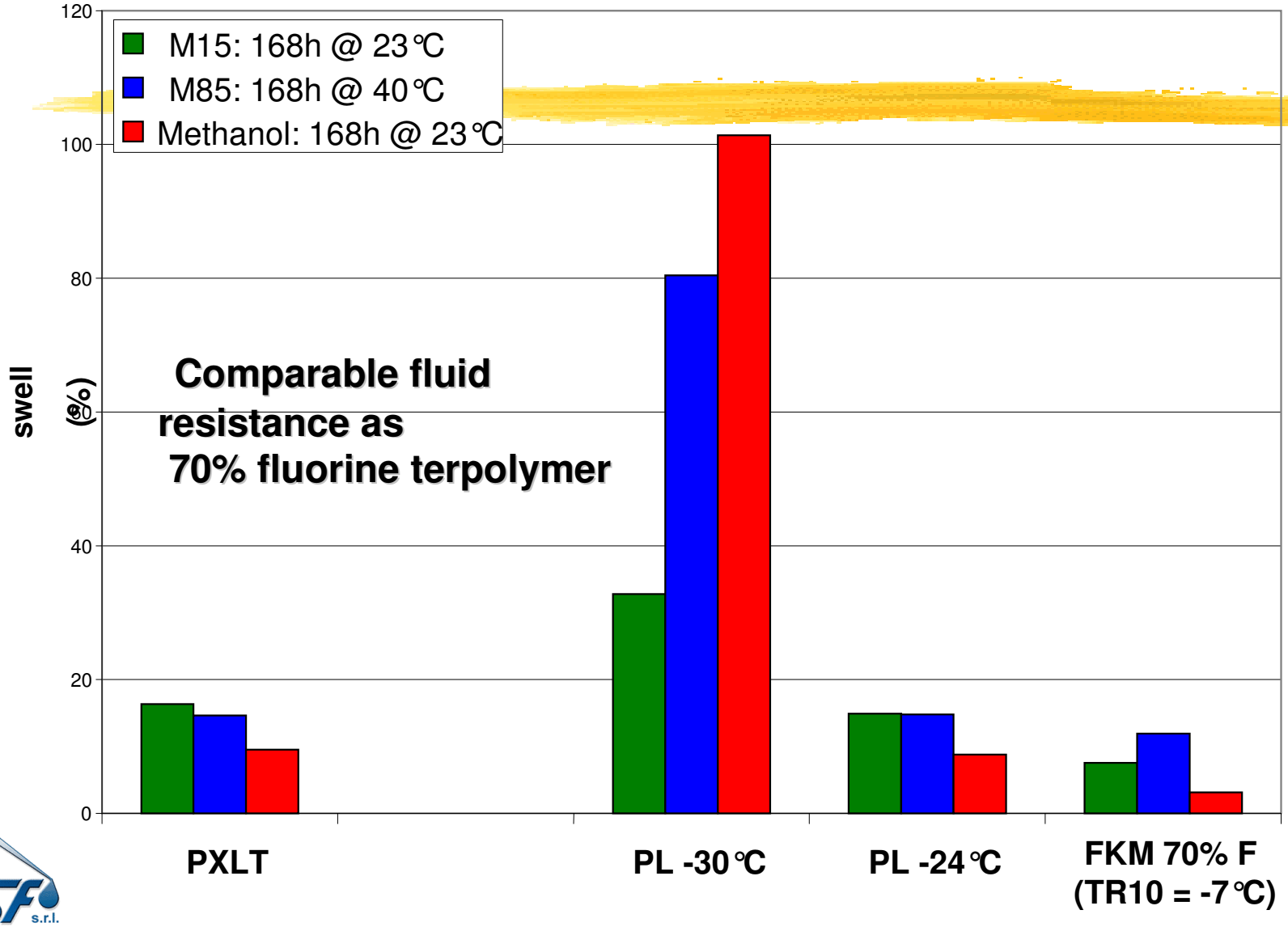
Tr10 e Tr 70 are very close thanks to an appropriate handling of chemistry



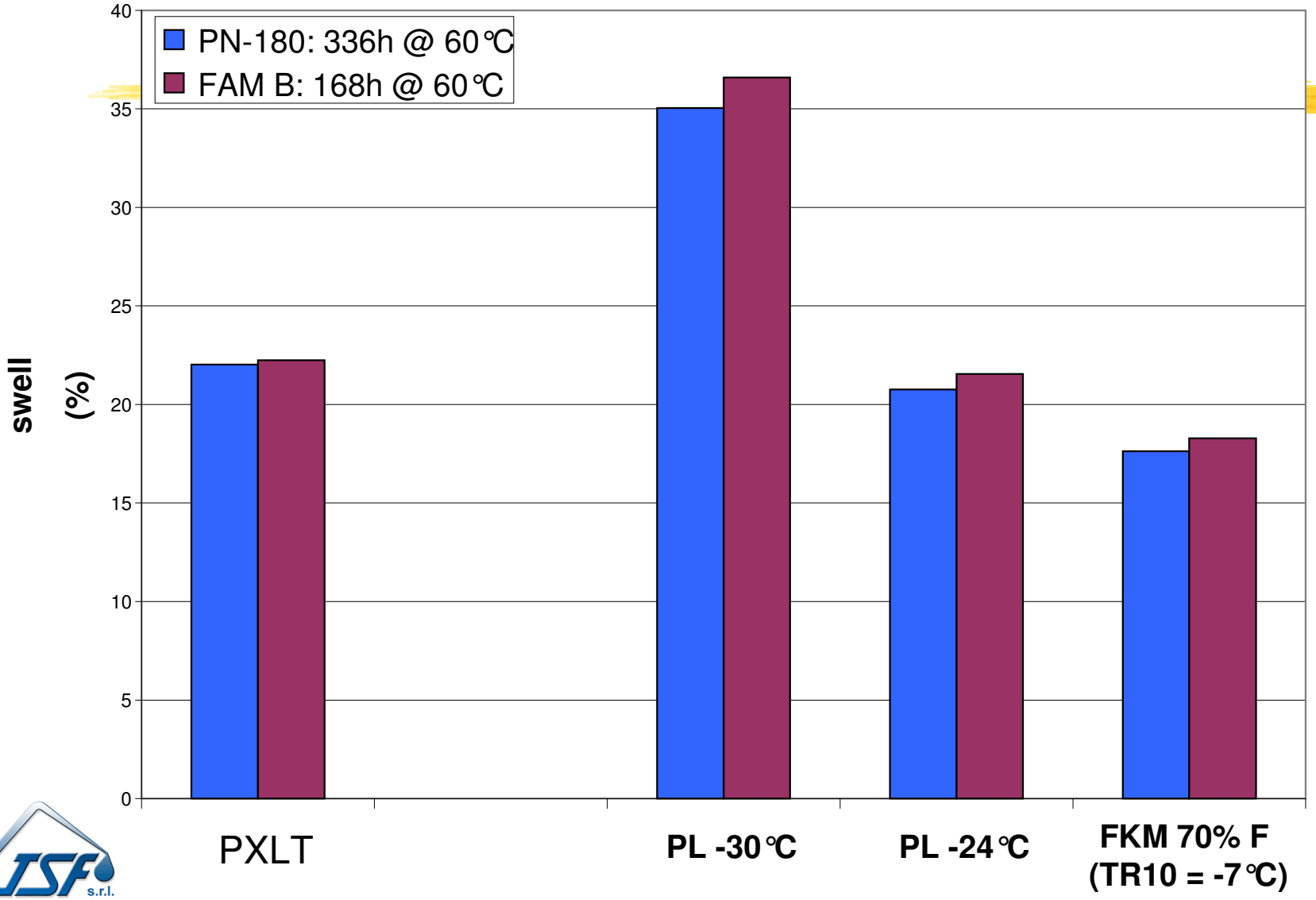
Chemical resistance in ethanol blends



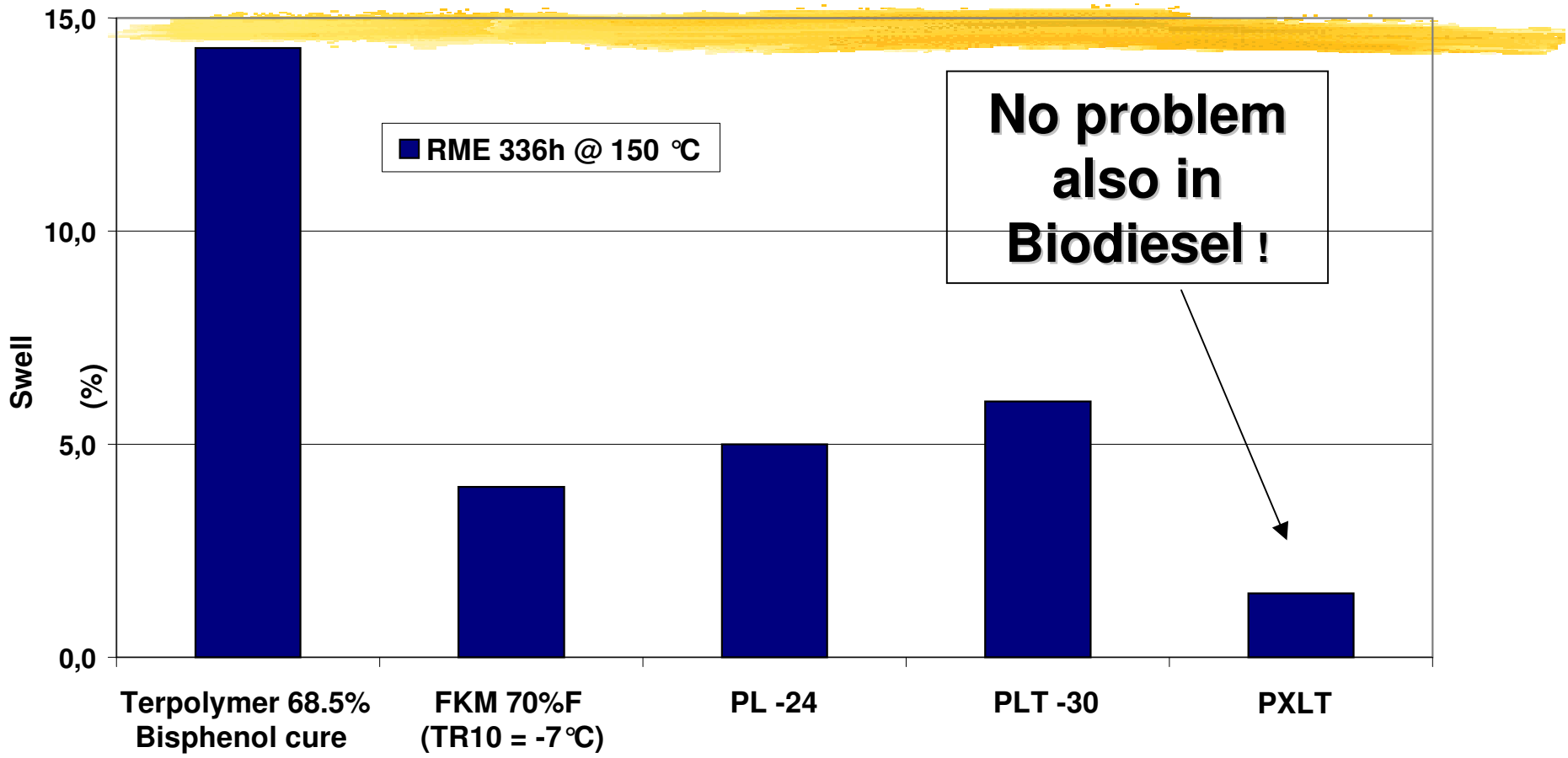
Chemical resistance in Methanol blends



Other fluid resistance



Biodiesel


15,0
10,0
5,0
0,0
Swell (%)
RME 336h @ 150 °C
No problem also in Biodiesel !
Terpolymer 68.5% Bisphenol cure
(TR10 = -13°C)
FKM 70%F
(TR10 = -7°C)
PL -24
PLT -30
PXLT