



**COMPARATIVE WET AGEING TESTS
OF
MEDIUM VOLTAGE XLPE CABLES**

**ICC Meeting - May 1, 2002
Colorado Springs**

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Outline

1 Introduction

2 Accelerated Ageing Test Methods

- **Alcatel**
- **VDE**
- **AEIC**

3 Test Results and Service Experience

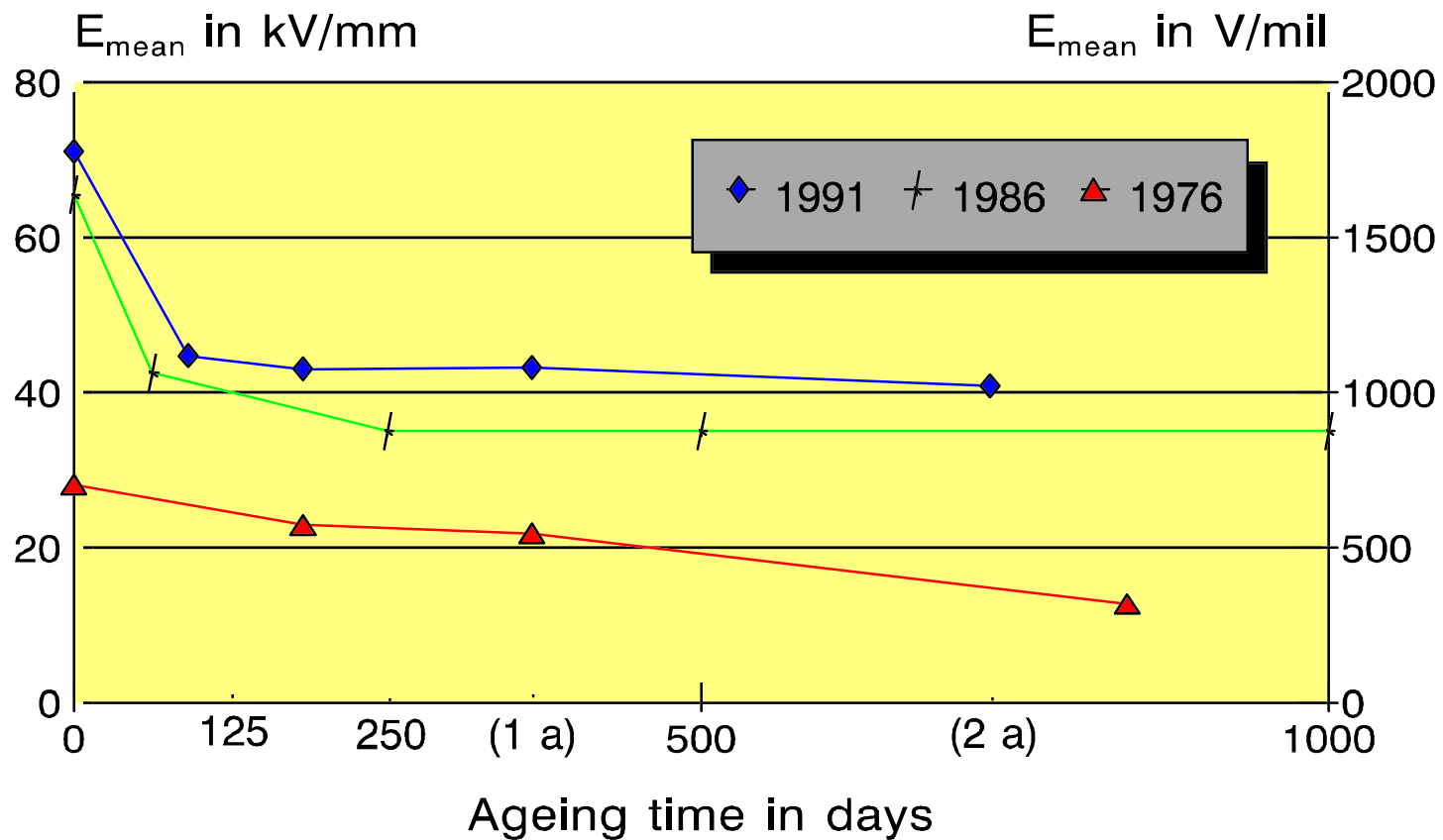
4 Comparison of VDE and AEIC Tests

5 Summary

Accelerated Ageing Conditions

	ALCATEL	VDE	AEIC
Cable	20 kV (5.5 mm insulation) 150 mm ² Al		15 kV (4.5 mm insulation) 53 mm ² Al or Cu
Active test length	10 m		4.5 m
Number of specimens	3 to 5	5	3
Preconditioning	None		14 load cycles
Voltage	3 U ₀ = 36 kV	4 U ₀ = 48 kV	3 U ₀ = 26 kV
Temperature	outdoor ambient	(50 ± 5) °C	5 load cycles per week, insulation shield temperature: (45 ± 3) °C
Water influence	local tap water in conductor and under sheath		
Time period	63; 250; 500; 1000 days	0.5; 1; 2 years	120; 180; 360 days
Breakdown test	5 min steptest, U ₀ = 12 kV		5 min steptest, 1.6 kV/mm-steps

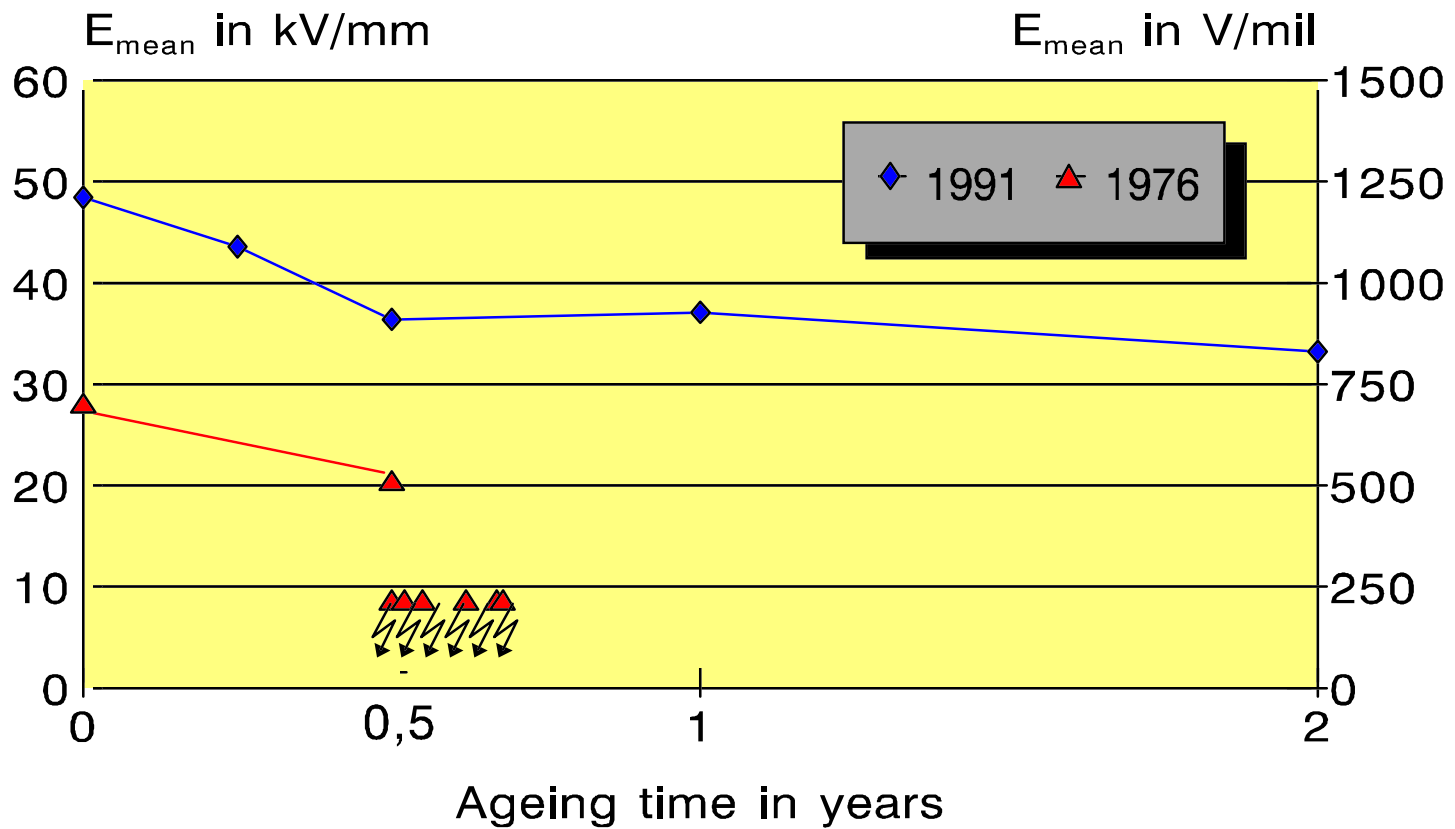
AC Breakdown Strength of 20 kV XLPE Cables Before and After Ageing (Alcatel Method)



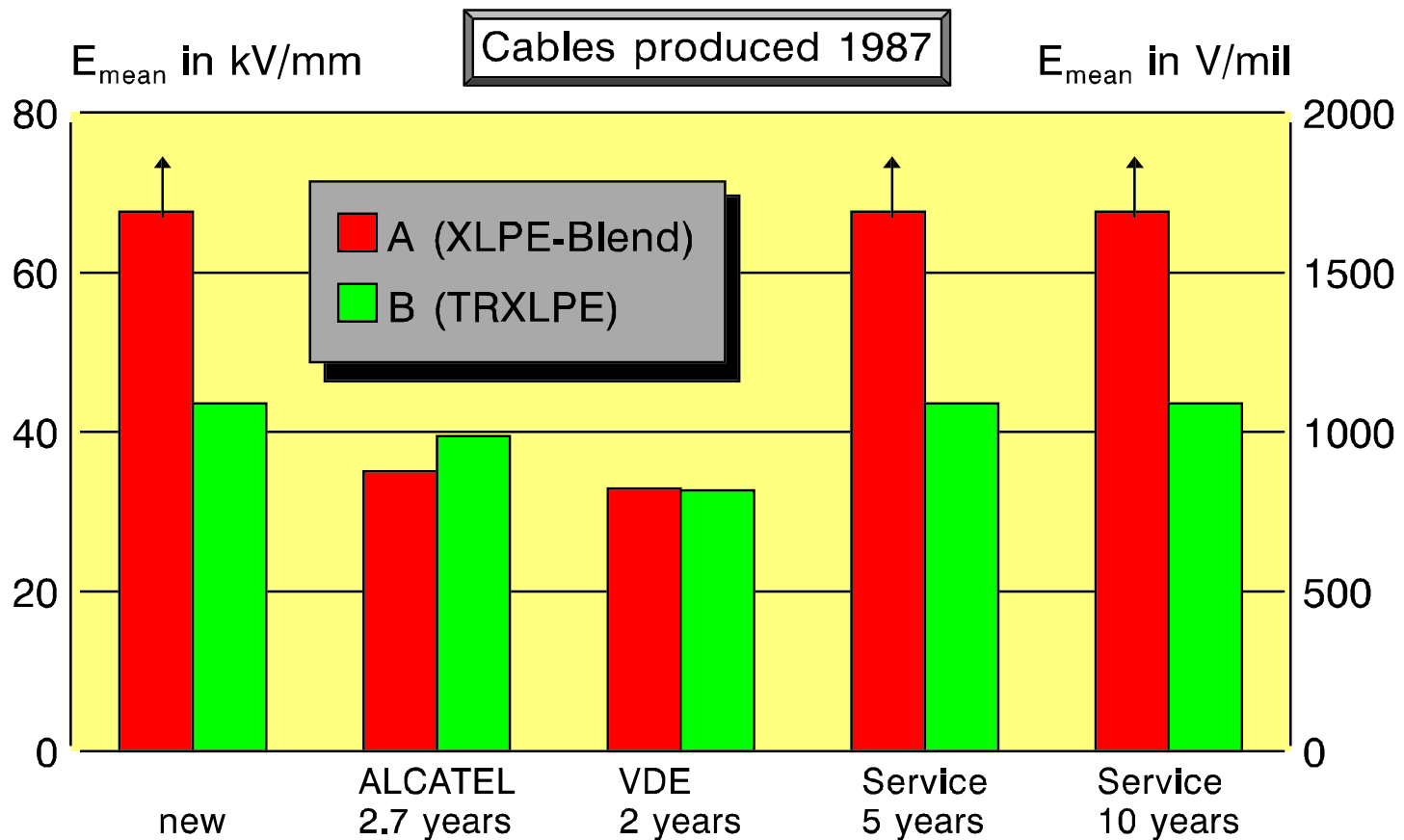
VDE



AC Breakdown Strength of 20 kV XLPE Cables Before and After Ageing (VDE Method)



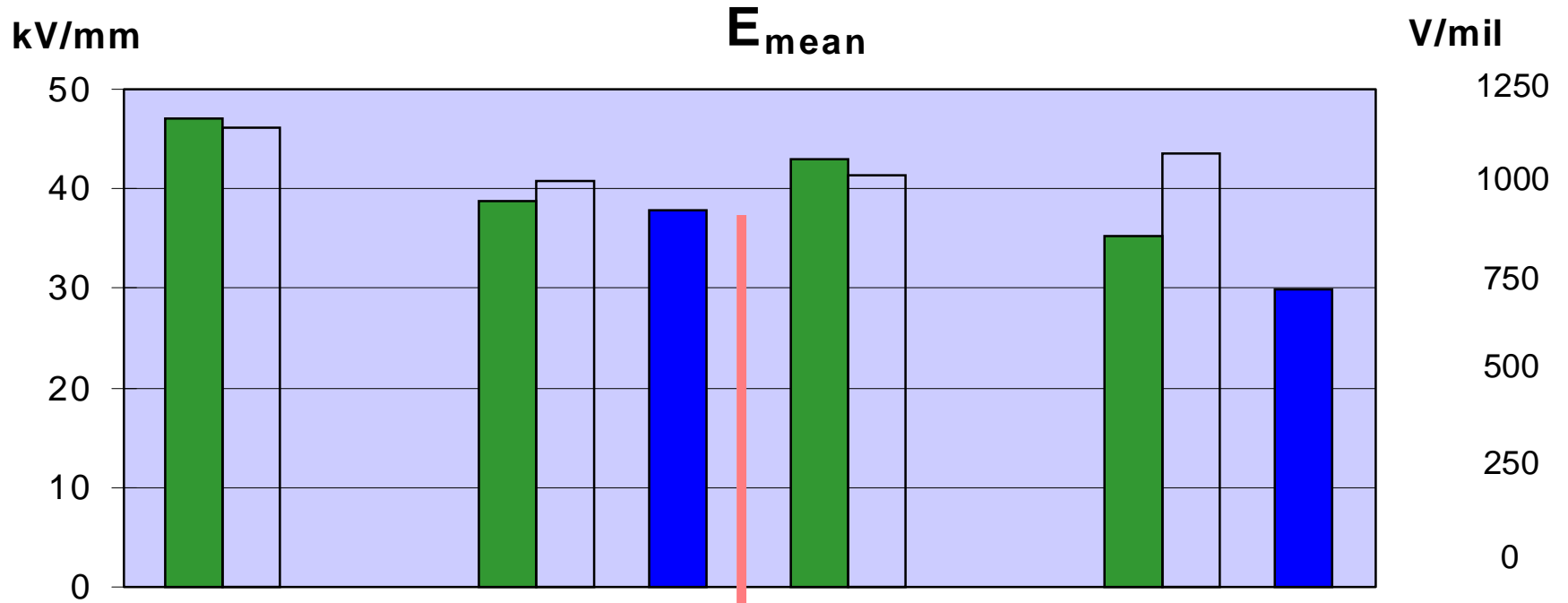
AC Breakdown Strength of 20 kV XLPE Cables Before and After Ageing (Accelerated vs. Service)



AEIC



AC Breakdown Strength of 15 kV XLPE Cables After Ageing According to VDE and AEIC



Cable	HR	HR		HR	HR	WN		HR	HR		HR	HR	WN
	1	2		1	2	1		1	2		1	2	1
Test Method	VDE			AEIC				VDE			AEIC		
Time Period	0.5 year							1 year					

Summary

- 1 Standardized wet ageing test methods are able to differentiate between insulation systems**
- 2 Retained AC breakdown strength after ageing is the most important criterion**
- 3 Water tree investigations only provide additional information**
- 4 North American TRXLPE and European copolymer blend XLPE are equivalent**
- 5 Cables with good test performance should have a life expectancy of more than 50 years**