



Von der Industrie- und Handelskammer
Schwaben öffentlich bestellter und
vereidigter Sachverständiger für
Bodenuntersuchungen und
Bodenaufbau bei Sportplätzen

Georg Armbruster • Bauernstraße 8 • D-86391 Stadtbergen

Consagros W. Rosser
Hohgantweg 10
3612 STEFFISBURG
SCHWEIZ

Ihre Zeichen

Ihre Nachricht vom

Meine Zeichen

Stadtbergen, den

S-2450905/439

15. July 2006

AXIS[®] as additive in a topsoil-mixture

Testreport

1. Cause and order

We have been asked by the company CONSAGROS, Steffisburg Switzerland, in behalf of Eagle Pitcher Minerals, Münster to analyse how salted irrigationwater is adsorbed in a sandy topsoilmixture without AXIS® in comparison with a similar topsoilmixture containing AXIS®.

2. Material and methods

For the trial two topsoilmixtures (TM) respecting the FLL and the USGA guidelines for greens have been prepared. The two mixtures show the following properties:

Distribution of the particle-sizes:	see appendix 1
Organic mater :	1,1 % (by weight)
Waterpermeability:	0,0127 cm/s \equiv 7,62 mm/min
Value pH:	5,87

The entry with Axis® contained 10 % (by volume) of AXIS® Fine.

The two topsoilmixes have been put in polypropylenic tubes on a filtrationtable. The topsoilmixes have been compressed at a density of 1'600 g/cm³ (See picture **appendix 2**)

3. Execution of the test

The two topsoilmixes have been saturated first with ordinary tap water. Then rising quantities of water have been added and the electrical conductivity has been measured at the out coming water. When the conductivity of the out coming water was equal to the tap water, the two cylinders where irrigated by salted water. The electrical conductivity has been measured. (see graph **apendix 3**)

out coming water	electrical conductivity [mS/cm ⁻¹]	
	TM without Axis	TM with Axis
ordinary tap water	0,440	0,454
1 l	0,313	0,253
2 l	0,346	0,298
3 l	0,381	0,367
4 l	0,402	0,393
salted water	7,00	7,37
1 l	6,72	6,70
2 l	6,90	7,34

4. Discussion of the results

In a topsoilmix with a sufficient permeability and an optimal particle size-curve, salt dissolved in irrigation water is not adsorbed. By the addition of AXIS® Fine no differences have been found.

Constant irrigation with salted water can conduct to a crystallization of salt on the surface and in the pores of the topsoilmixture. These saltcrystals will be dissolved by water as long as the irrigation water is not saturated by salt.

Stadtbergen, the 15 th of July 2006
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Georg Armbruster



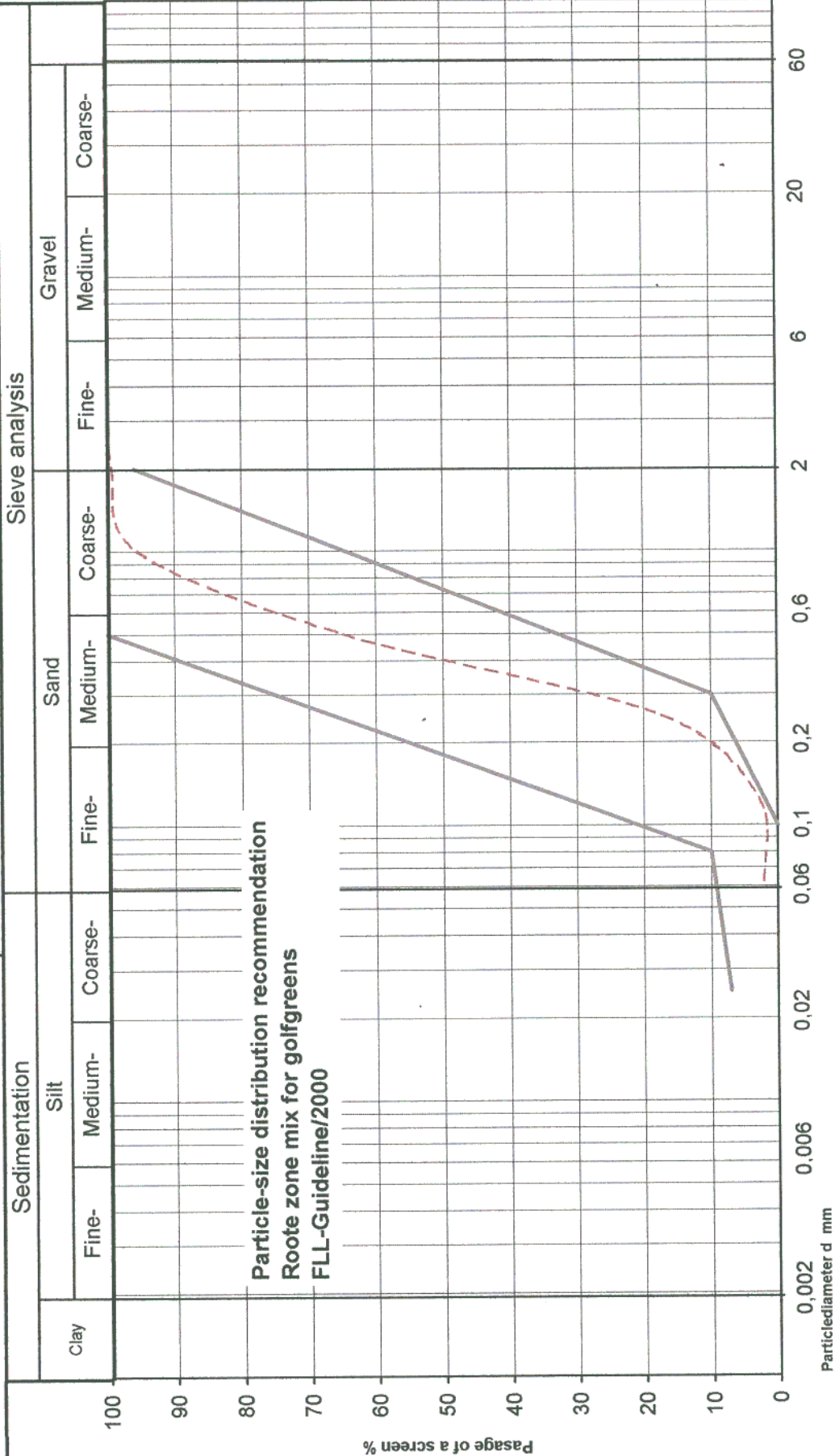
Translation by Werner Rosser

Particle-size distribution

Projekt: Cosnagros W. Rosser
Topsoilmixture

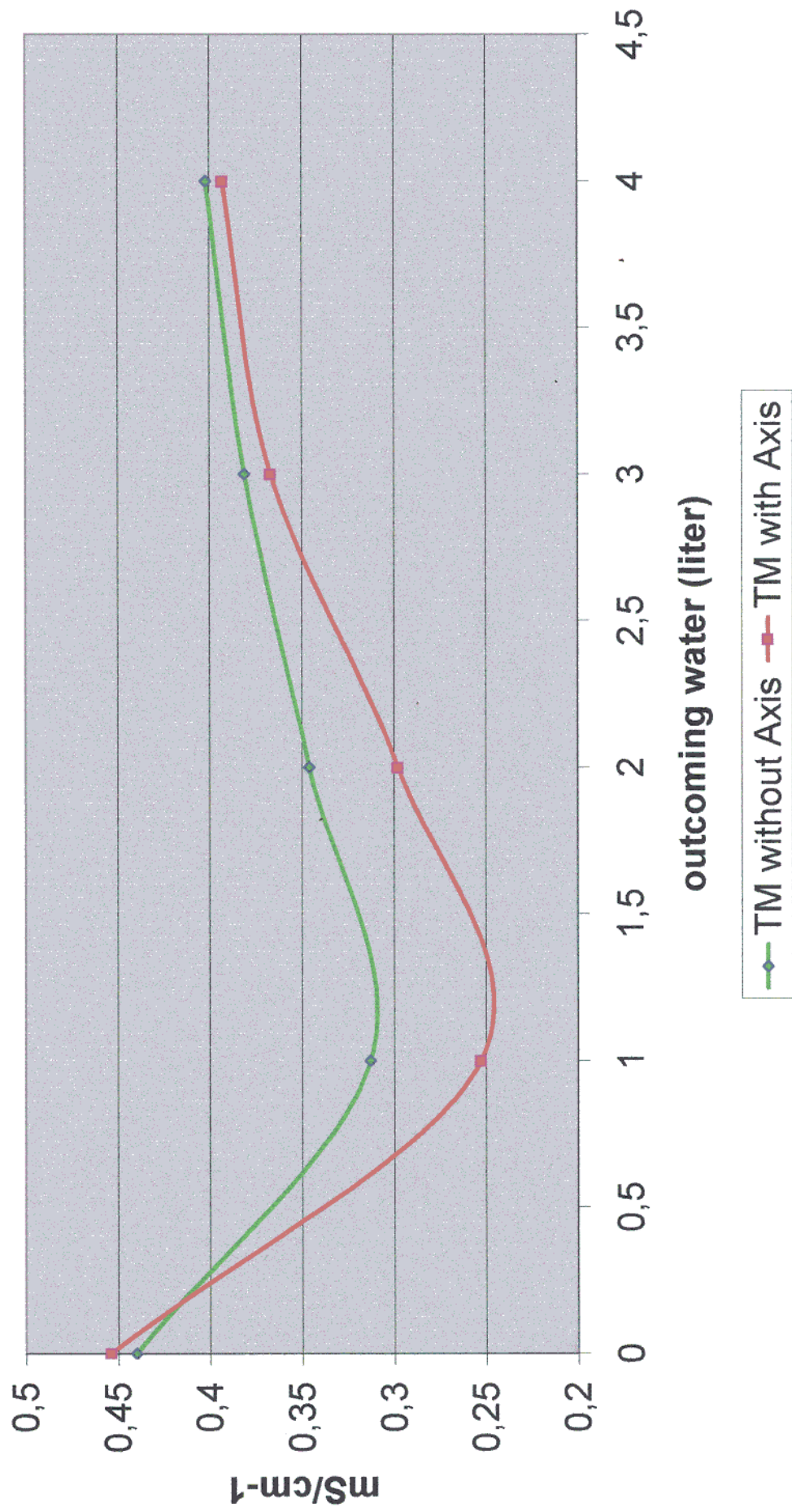
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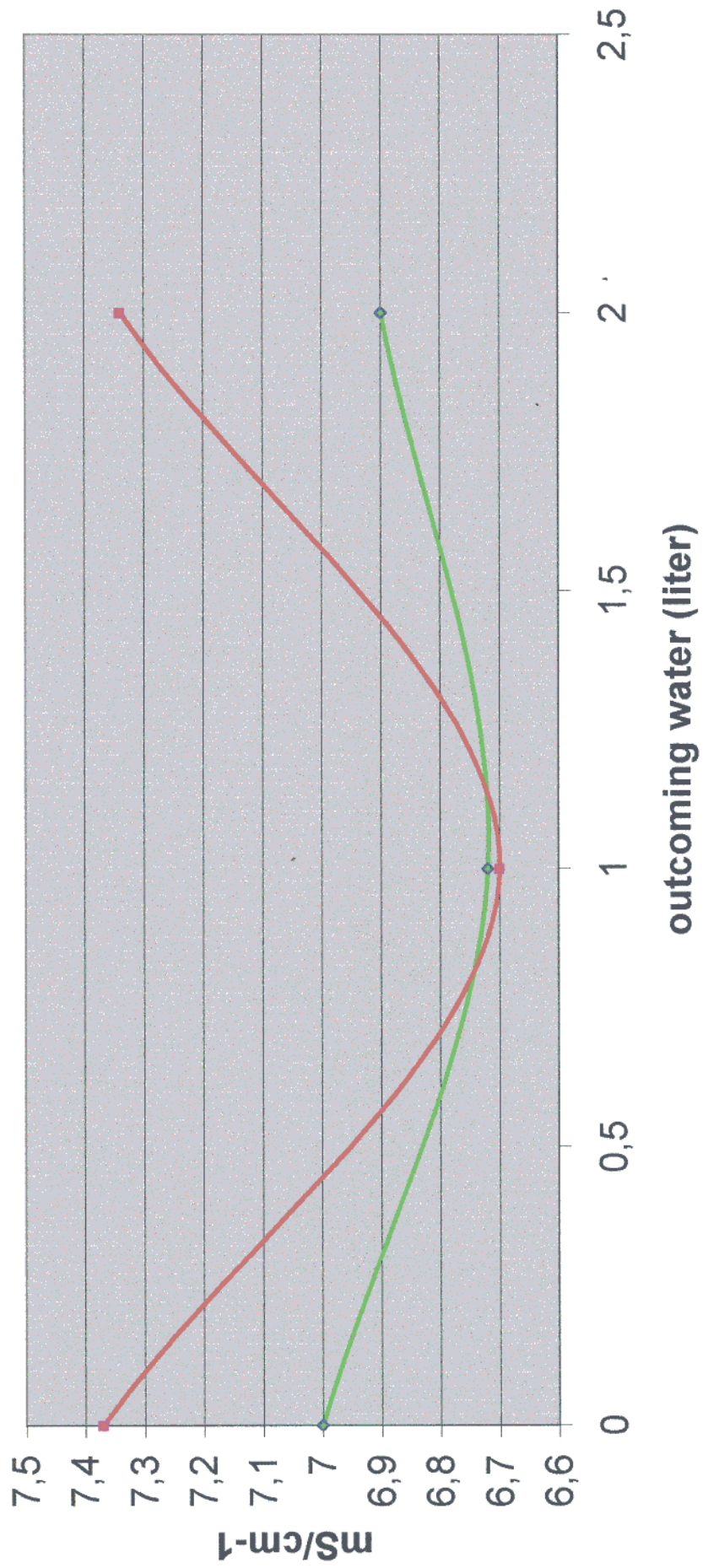


Topsoilmixture

Electrical conductivity



Electrical conductivity in salted water



—◆— TM without Axis —■— TM with Axis