



**CSI**  
Certificazione e Testing

DIVISIONE:  
DIVISION:

**PHYSICAL- CHEMISTRY**

LABORATORIO:  
LABORATORY:

**PACKAGING**

**RAPPORTO DI PROVA**  
(Test Report)

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N°  
**422h-ING/LCF/PKG/04**

Data:  
Date: 30/07/04

IDENTIFICAZIONE E DESCRIZIONE DEL CAMPIONE:  
SPECIMEN DESCRIPTION:

**Expanded corks signed "SIGILLO"**

DATI IDENTIFICATIVI DEL CLIENTE:  
CLIENT:

**OREMPLAST s.r.l.**  
Via Martiri della libertà, 60  
48024 MASSA LOMBARDA (RA)

NORMA DI RIFERIMENTO:  
REFERENCE STANDARD:

**Evaluation of decay of radial stress. CSI Procedure**

DISTRIBUZIONE ESTERNA:  
OUTSIDE DISTRIBUTION:

**OREMPLAST s.r.l.**  
**to Mr. CASADEI LELLI**

DISTRIBUZIONE INTERNA:  
INSIDE DISTRIBUTION:

**Copy to: Division Head**

ENTE DI ACCREDITAMENTO:  
ACCREDITATION BODY:



**RAPPORTO DI PROVA**  
(Test Report)

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N° 422h-ING/LCF/PGK/04

Data: 30/07/04  
Date:

**GENERALITIES:**

- Date sample receipt: 05.06.02
- Date Analysis beginning : 25.07.02
- Date Analysis end: 05.09.02
- Normalized internal procedure: YES
- Deviation from test methods: NO
- Calculations check and data transfer: YES

**SAMPLES DESCRIPTION :**

**Expanded corks signed "SIGILLO"**

**PERFORMED DETERMINATIONS:**

**Evaluation of decay of caps radial stress.**

The test was carried out by a special device made of a stainless steel bottle, equipped with strain gages and connected to a data logger.

The cork was inserted in the neck of the device by using a manual corking machine.

By a data logger (Mikromec multisens) the deformation values of the strain gages, proportional to the radial stress of the cork against the neck wall, are recorded.

At the same time a thermocouple was connected to the data logger to check the temperature during th test

**DECLARATION:**

- The test results of the present report are related exclusively to the tested sample.
- The present test report cannot be partially reproduced without the authorization of CSI Managing Director



## RESULTS:

### **Evaluation of decay of caps radial stress.**

The decay of the radial stress is expressed as ratio between the experimental value recorded at time X and the maximum value , which is recorded when the cork is inserted into the neck:

$$(\Delta mV_x \times 100) / \Delta mV_{\max} = (mV_x - mV_{in}) \times 100 / (mV_{\max} - mV_{in})$$

$mV_x$  = mV recorded at time x

$mV_{in}$  = mV recorded without cork (baseline)

$mV_{\max}$  = maximum signal in mV recorded at the insertion time

Plotting the experimental data of stress decay in function of log time, it is possible to interpolate data by a linear equation , excluding the first data recorded during the first hour of acquisition

By using the first degree equation (coefficient  $R^2 > 0.90$ ) it is possible to estimate the radial stress at higher time

In the following table we report the experimental values extrapolated until 10000 hours:

<b>decay of cap radial stress%</b>		
time	log(h)	Y2=- 9,21x + 84,70
h		%
100	2,0	<b>66,3</b>
1000	3,0	<b>57,1</b>
5000	3,7	<b>50,6</b>
10000	4,0	<b>47,9</b>



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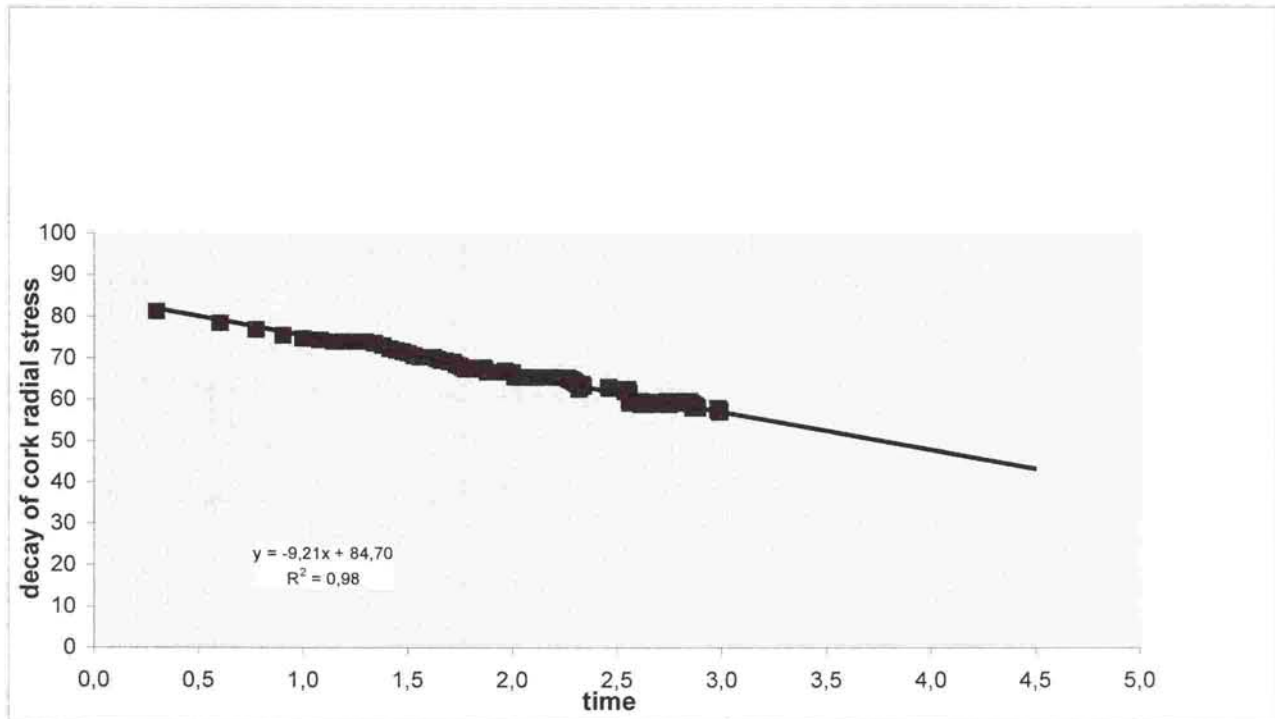
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Data: 30/07/04

Date:



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Laboratory Head

Dr. Gianluigi VESTRUCCI

RESP. CENTRO

Managing Director

Ing. Pasqualino CAU