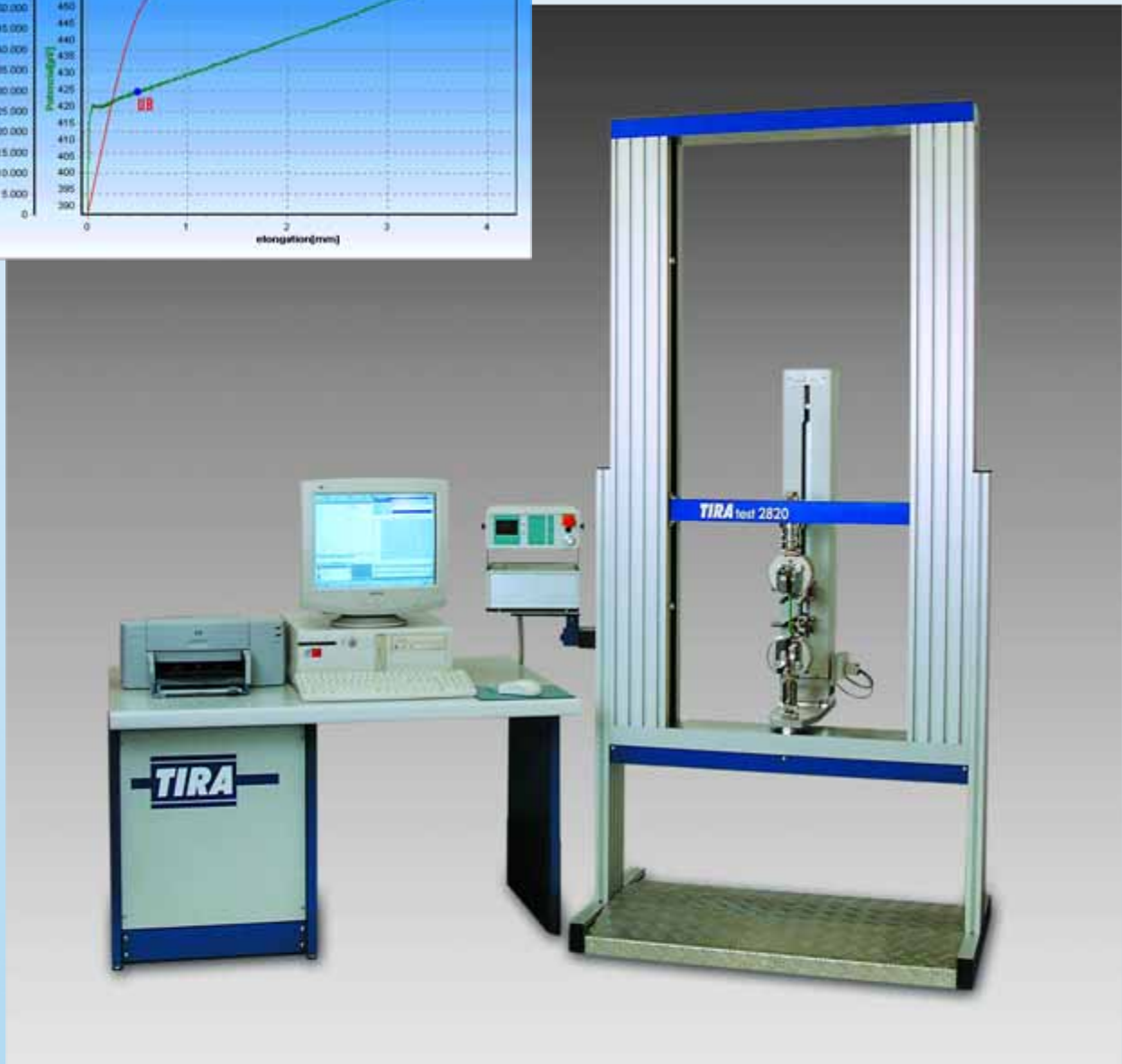
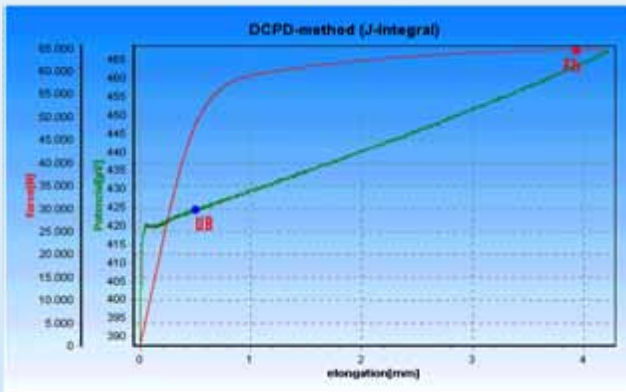




- ◆ MEASURING
- ◆ TESTING
- ◆ BALANCING
- ◆ CNC- MACHINING



TIRAtest Universal Testing Machines

INTRODUCTION

TIRA GmbH is a company offering test and measurement technology with high potential for innovation to meet very complex customer requirements.

The firm was founded in 1947 as Thüringer Industriewerk Rauenstein and renamed TIRA GmbH in the 80's.

In its more than 45 year history TIRA has supplied many thousands of equipment and apparatus for the most varied industries. TIRA products are used worldwide.

Destructive testing as the oldest branch of material testing has greatly increased in importance with the introduction of modern computer solutions into this highly sensitive test and measurement technology. Therefore innovative developments are inconceivable without high performance testing and measuring equipment.

The construction in 1998 of a new building was the response to these changed conditions.

The headquarters of the company are in Schalkau, the „green heart“ of Germany.

Qualified and highly motivated teams guarantee the renowned high quality of the products for industry and science.

Production and products meet the strict requirements of DIN EN ISO 9001:2000 and CE-certification and enable tests to be carried out according to national, international and individual customer standards. In this TIRA co-operates with leading manufacturers of measurement technology, drives and climatic cabinets.

TIRA GmbH operates a calibrating laboratory according to DIN EN ISO / IEC 17025:2005 for the calibration of material testing machines (DKD-K-16401).

TIRAtest material test machines allow

simple and complex testing including special solutions according to individual customer standards.

They can be ***universally used*** in research, gauging and quality control of production for metals, plastic, textiles, construction materials, wood, ceramics, composite materials, component parts and many others.

They are ***efficient and reliable*** through the latest digital data-processing techniques and use of high quality components.

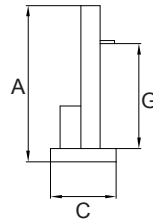
They are ***simple to operate*** by means of graphic user interfaces under Windows® with many help texts.

They ***can be expanded*** due to modular systems.

This catalogue gives an overview of the performance capability of TIRA material testing in regard to:

Basic models / Load bearing frames
Drives
Measurement and control technology
TIRA Software

Sensors
Clamping tools
Modernisation of test machines
Special test machines



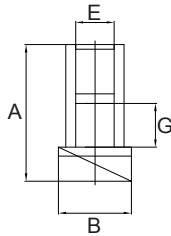
Single spindle table-top models

		28005	28025
Max. test force (N)		500	2500
Space requirement:	Height (G) mm	640	980
	Width (E) mm	-	-
	Depth (F) mm	38	90
Max. stroke (mm)		550	900*
Total height (A) (mm)		840	1200
Total width (B) (mm)		450	450**
Total depth (mm)		400	500
Weight (kg)		35	55
Crosshead resolution better		0,1 um	0,1 um
Max. test speed (mm/min)		750	1200
Power consumption (VA)		200	200

* without force transducer and flange
 ** including EDC but without control cabinet

Table-top model TIRAtest 28025

Two spindle table-top models



		2803	2805	2810	2820	2850
Max. test force (kN)		3	5	10	20	50
Space requirement:	Height (G) mm	1000	1080	1080	1060	1080
	Width (E) mm	390	450	450	450	450
	Depth (F) mm	-	-	-	-	-
Max. stroke (mm)		880	960	960	940*	990
Total height (A) (mm)		1250	1410	1410	1430	2080
With sub-frame (mm)			2000	2000	2020	
Total width (B) (mm)		900		1000 1000	960**	1000
Total depth (C) (mm)		340	500	500	560	610
Weight (kg)		85	185	200	225	330
Crosshead resolution better		0,1um	0,1um	0,1 um	0,1 um	0,1 μm
Max. test speed (mm/min)		750	750	750	800	500
Power consumption (VA)		200	200	400	700	1500

* without force transducer and flange
 ** including EDC but without control cabinet



Table-top model TIRAtest 2805/10/20



TIRAtest 2805/10/20 as standing model with base



TIRAtest 28600 with hydraulic clamping tool

Free standing models

	28100	28300	28500	28600	281300	
Max. test force (kN)	100	300	500	600	1300	
Space requirement:	Height (G) mm	1100	1250	1500	1700	2300
	Width (E) mm	580	650	650	650	700
	Depth (F) mm	-	-	-	-	-
Max. stroke (mm)	1080	1100*	1300	1500*	2000	
Total height (A) (mm)	2120	2300	2600	2800**	3700	
Total width (B) (mm)	1260	1550**	1550	1700	1500	
Total depth (mm)	750	950	1100	1100	1300	
Weight (kg)	870	1600	2500	2800	6500	
Crosshead resolution better	0,1 µm	0,1 µm	0,1µm	0,1µm	0,1µm	
Max. test speed (mm/min)	500	200	200	200	200	
Power consumption (VA)	3000	3000	6000	6000	10000	
	3~400	3~400	3~400	3~400	3~400	

* without force transducer and flange
 ** including EDC but without control cabinet

LOAD BEARING FRAME

Depending on customer requirements the necessary load bearing frame configuration can be selected from the tables in the brochure.

The precise construction with guide pillars and re-circulating ball spindles free from clearance guarantees a high degree of rigidity and tensile, compression and alternating load testing in a lower test space. As an option all models can be supplied with a second upper test space.

The large test area width and height (can be expanded on request) enables highly ductile specimens to be tested as well as complete sub-assemblies including the fitting of a large variety of accessories such as force, path and elongation sensors as well as heat chambers and tube furnaces.

For individual customer testing of particular sub-assemblies, we can supply a number of special designs of horizontal, extended and extra wide load bearing frames e.g. for pallets and packaging materials. All load bearing frames can be fitted with corresponding operator protection, depending on individual test requirements.

DRIVES

The electromechanical drives of TIRAtest machines allow precise loading of the specimen in conjunction with the corresponding load bearing frame.

The test piece can be loaded adjusted for path, force or expansion with the aid of digital regulation. In this case the target values and control parameters can be adapted over a wide spectrum both manually as well as software-aided to the particular test requirement. It is possible to change the type of control during the test without problems.

The crosshead speed range quoted for the individual basic models is only shown as an example; any other range can also be supplied. Practically any speed from $v_T = 0$ to $v_T = \max$ can be used.

MEASUREMENT AND CONTROL TECHNOLOGY

TIRAtest – test machines of the series 2800 are equipped with high performance intelligent measurement and control electronics, with which precise test control and high measurement accuracy are guaranteed.

2 operating modes are provided to control the test machine

- Stand-alone for simple test requirements
- PC-controlled for higher demands and universal application

The measurement and control electronics are installed in a separate aluminium housing on the front of which a screen digitally displays the force and path measurement variables as well as buttons to operate the test machine and enter the test parameters.

In addition two different configurations for varying requirements are offered as an option, the performance parameters of which are quoted in the following table.

	Series 2800/E22	Series 2800/E58
Resolution of force measurement	180.000 digit at 20 ms integration time	180.000 digit at 20 ms integration time
Crosshead distance measurement / Resolution	Incremental / better < 0,1 µm	Incremental / better < 0,1 µm
Measured value acquisition	max. 1 kHz	max. 5 kHz
Number of Inputs / Outputs	One interface for serial sensors, 8 digital inputs and 8 digital outputs	One interface for serial sensors, 8 digital inputs and 8 digital outputs
Expansion	2 optional equipment slots	7 optional equipment slots

Options:

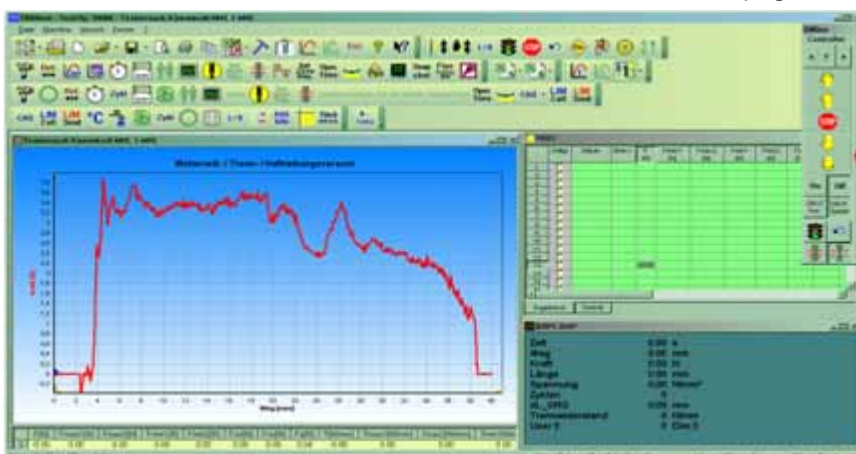
- TF/FA – module Measurement amplifier cards, sensitivity adjustable by software, for connecting analog sensors
- INC - module 2 incremental sensor inputs / 6 outputs, 1 relay and 5 inputs 24V
- IOs - modul 6 outputs, 1 relay and 5 inputs for control purposes with external 24V supply
- Manual keyboard for controlling the test machine

TIRAtest Software

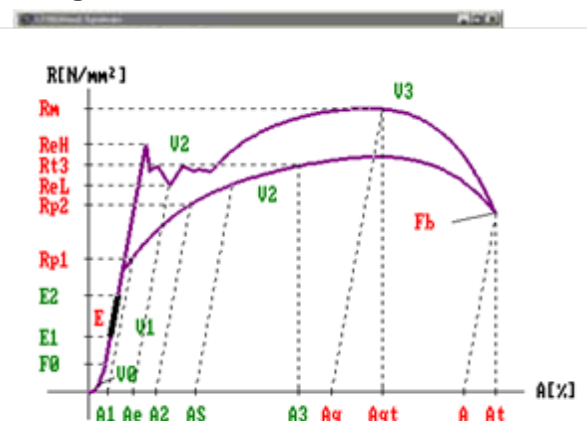
In PC controlled mode we offer a modern and simple to use software package under **Microsoft @Windows**. Our continually updated software library contains a large selection of application programmes for standard (e.g. DIN, EN, ASTM, ISO) and individual customer tests. The software can be supplied in many different languages (including English, German, French, Spanish, Russian, Czech, etc.)

The main menu window clearly shows the test data diagrams, numerical test results and statistics in tabular format. All software functions can be easily and quickly accessed via menus and a tool bar (set-up, test configuration, test protocol etc.).

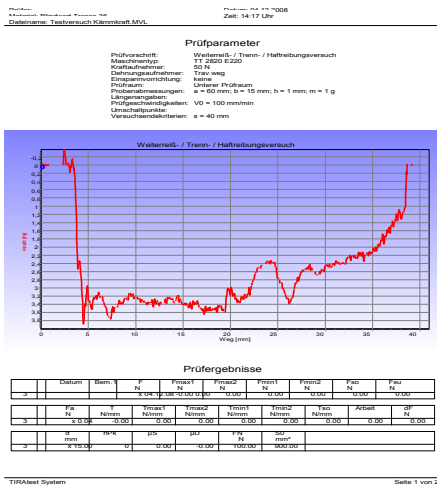
An *Online – help system* explains all functions and gives detailed advice about individual test standards. As well as the standard variables of path, force, elongation, extension and tension further measurement parameters can be defined by the user himself. For this purpose the simple programming language *TIRAscript* for TIRAtest testing machines was developed with which individual standards for special test processes and evaluation can be programmed completely freely. You will find further information about TIRAtest software on our internet pages www.tira-gmbh.de.



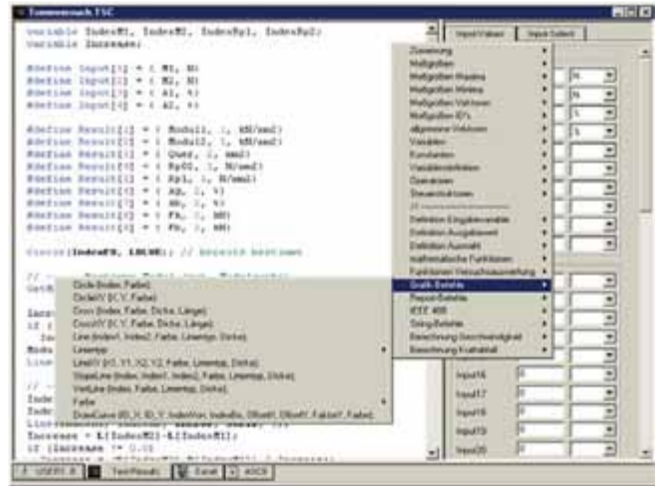
Main menu window



Online-help



Printout



FORCE TRANSDUCERS

We use exclusively precision wire strain gauge sensors for all measurements in tensile, compression and bending tests. Sensors particularly stable against lateral forces are employed for loads with increased side forces. In addition we can adapt individual customer force transducers to our measurement system.

PATH MEASURING ELONGATION TRANSDUCERS

are used for path measurement in compression and bending tests and also for thickness measurement. Depending on the particular application we offer inductive and wire strain gauge sensors for individual measurement paths and temperature ranges. We can supply a wide range of electronic calipers to determine specific dimensions.

CLIP-ON EXTENSOMETER



MFA 2 with large measurement length



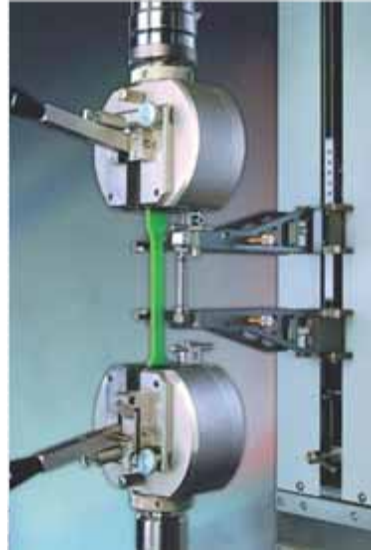
MFA 25

We offer a wide range of hand-clamped sensors for measurement of fine extension up to a maximum of 3 mm as well as for measurement of medium extension up to 25 mm. The inductive or wire strain gauge sensors are suitable for round and flat specimens up to 30 mm thickness/diameter and for standard as well as special measurement lengths up to 100 mm on plastic, rubber and metallic specimens. For measuring Young's modulus, yield point and permanent limit of elongation, reference and rupture extensions, they are also used at abnormal temperatures as width change sensors and in fracture mechanics.

ELONGATION TRANSDUCERS FOR LARGE EXTENSIONS



LA 800



MFN-A

The automatic extensometer LA 800 meet the requirement of large extensions up to 800 mm of plastics and elastomers in tensile and alternating tensile tests:

Gauge length: 10 ... 200 mm
 Accuracy: < 0,01 mm
 Carrying force: < 200 mN

Automatic closing/opening of the arms.

The half-automatic MFN-A is a two-range-measuring extensometer for very small extensions to determine Young's modulus, Yield points and strain limits in the range up to 4 mm as well as to calculate elongation without necking and rupture elongation values up to 300/500/800 mm (in each case depending on selected type) without interrupting the test process. Suitable for specimens up to 50 mm thick/diameter and 100 mm width up to rupture and automatic return.

Special versions with only one measurement system; longer measurement arms for use in temperature installation sets; r- and n-value determination together with MFQ.

FULLY AUTOMATIC TRANSDUCER MFL 300

Fully automatic transducer MFL 300 with computer-controlled servo motor, especially suitable in combination with hydraulic clamping tools for specimens up to 30 mm thick, 50 mm wide and 80 mm diameter. Automatic start up of measurement path, opening and closing of feeler arms and return positioning path 200 mm, measurement path 300 mm, resolution 1 µm or 0,1 µm.

CONTACT-FREE ELONGATION SENSOR

Contact-free elongation sensor to detect large length changes up to 800 mm for contact-sensitive materials, highly rigid specimens up to rupture point or in temperature installation sets. Ask us for more information about laser- and video-extensometers.

MANUAL CLAMPING TOOLS



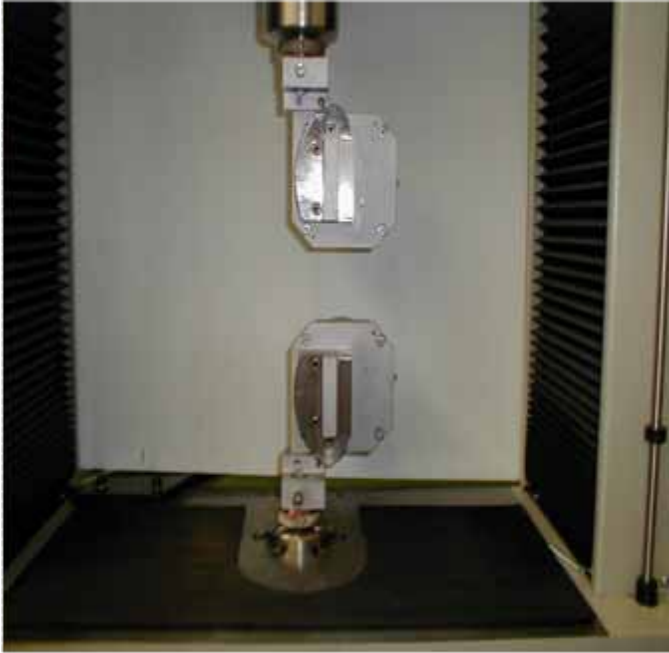
Wedge clamp 20 kN



Excentric clamp 1 kN

A large selection ensures secure clamping for almost all specimen, shapes and materials. Suitable jaw inserts (smooth, corrugated, serrated, coated) guarantee together with the work principles (parallel, wedge-shaped, wrap-arounding, etc.) an optimized test performance.

PNEUMATIC CLAMPING TOOLS

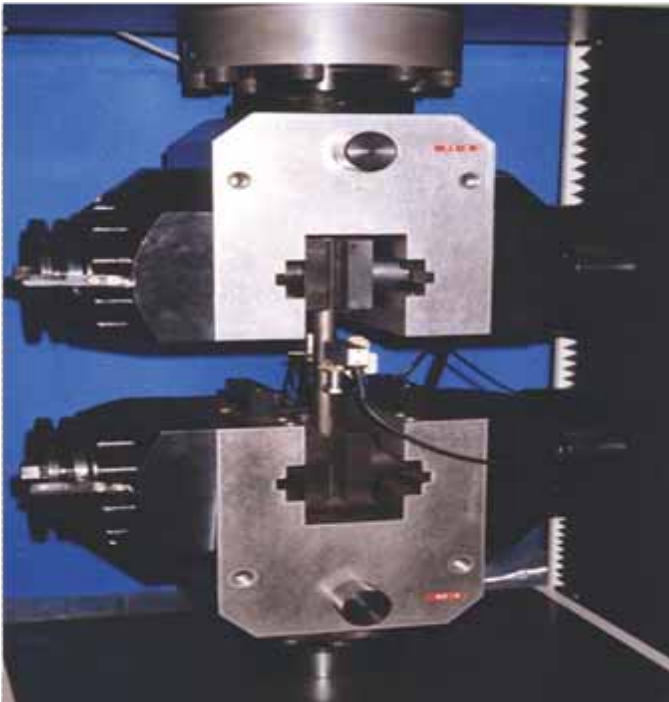


Textile testing with grip 2523 and friction curve

Large range of pneumatic clamps featuring:

- Simple operation and high efficiency
- Variable clamp pressure, even for sensitive test materials
- Easy to change clamp inserts
- Manual and/or foot controlled operation
- Computer-aided solutions

HYDRAULIC CLAMPS COMPRESSION AND BENDING DEVICES



Hydr. Clamp 2616

Hydraulic clamps with high safety standards (two-hand operation) and variable clamping pressure for uniform specimens (clamping on one side) and variable-size specimens (clamping on two sides) in the range of 20-600 kN.

Supply of **compression devices** of all types (round, rectangular) with upper adjustable compression plate and 3-point and 4-point bending devices according to standard and individual customer requirements.



Bending device for glass, tiles and bricks

For this purpose we offer **temperature installation sets** for varying test chamber sizes to reproduce cold and heat in a range of -150°C up to $+350^{\circ}\text{C}$. We will be pleased to advise on the optimum specification for your particular use in the test machine, as for example most suitable cooling medium, handling ease of clamping tools and if required expansion sensors, possibility of efficient change-over from room temperature to heat chamber testing, low operating costs etc. Here individual customer solutions are often necessary.



Temperature chamber in 250 kN machine

The retractable furnaces for our TIRAtest-equipment are especially recommended for metallurgical investigations at medium and high temperature, such as heat expansion limits, elongation limits and long-term / creep behaviour.

The **retractable tube furnaces** are heated in 3 zones and the pre-selectable temperature is set with modern controllers. Special stands fit the tube furnaces exactly in the test chamber.

The scope of delivery includes heat-resistant brackets to hold the specimens, cooling devices for the force transducers and a choice of high temperature extensometers.

We offer various versions in a single temperature range from $+500^{\circ}\text{C}$ up to $+1500^{\circ}\text{C}$. Please ask for more details.



Examination of through-hardening of gas concrete by means of autoclaves to $+150^{\circ}\text{C} / 50 \text{ bar}$ at Bergakademie Freiberg, Institute for silicate technology (Germany)

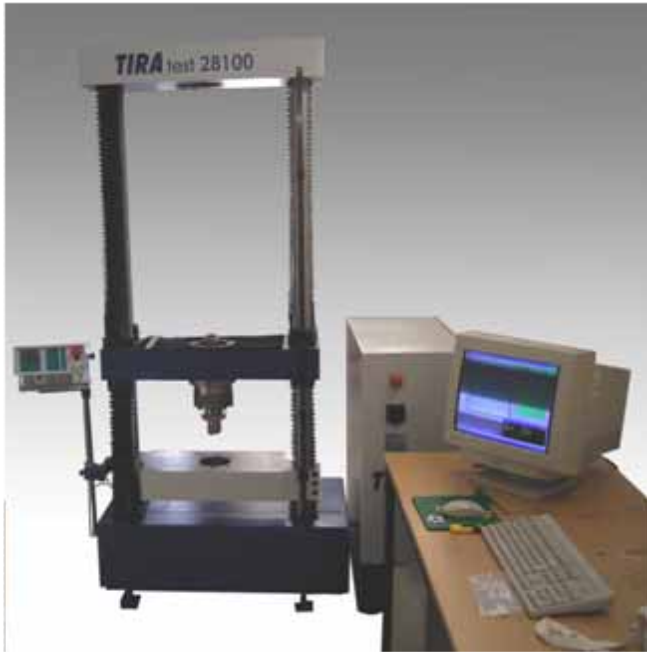


Retractable tube furnace up to $+1100^{\circ}\text{C}$ including a high-temperature extensometer with 10 mm measurement path.

Our measurement technology-, drive-, sensor- and software-modules both **electromechanical** as well as **hydraulic testing machines** can be brought up to date economically and to the latest state of art.

The **modernisation modules** contain the following components:

- digital data processing and control corresponding to our latest models in the series 2800
- PC-control using our full range of application programmes
- position regulated DC- and AC-drives
- possible connection of other modern transducers



Modernisation of Tiratest 2300 to Tiratest 28100



Tiratest 2410/20 Modernisation
with external 1000 W output stage

As the result of modernization all requirements according to EN ISO 7500-1 in regard to force measuring equipment, DIN EN ISO/IEC 17025 in regard to calibration and the test standards of EN 10002 are met.

Often it is possible apart from the load bearing frame to continue to use existing force transducers, clamping tools, extensometers and hydraulic sub-assemblies for the most economic solution. We will gladly advise you on modernisation of many different makes.

TIRAtest Special testing machines



Wire testing machine up to 300 kN, travel 2 m, length 20 m



Clamping device for high-voltage cable up to 300 kN

As a result of the globalisation of industry apart from new test standards being introduced the demand for individual customer solutions in regard to test technologies, clamping tools, sensors, software and automation of test equipment is continually rising.

This has led to a clear increase in the number of **special testing machines** in total production. Therefore TIRA makes every effort to turn your specific requirements into effective solutions.

The examples below show a small selection of the large number of projects already undertaken:

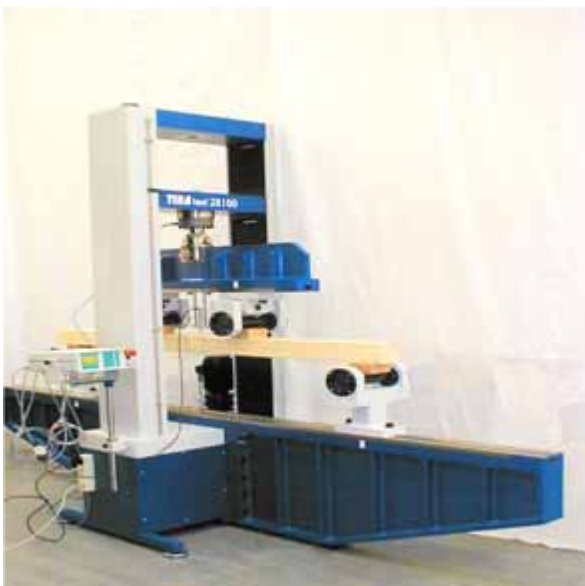
- Multiaxial testing systems
- Compression and bend testing of timber beams
- Multiaxial testing systems
- Tensile testing of electricity supply lines and cables with horizontal load bearing frames
- Stressing of cartons, containers and pallets of all types in wide compression presses
- Rubber spring testing machine for railcars, brake cables, clutch discs, plastic accessories
- Fatigue and bend testing of cables
- Torsion testing 0,01 ... 500 Nm
- Testing at abnormal temperatures and in climatic cabinets
- Fracture mechanics investigation
- Testing and measuring of insulators
- Customised automation solutions
- Special designs for flow limit determination of metal



Examination of rubber springs from railcars
TIRAtest 200 S



Flow limit determination TT 2820 with vacuum high-temperature kiln



Testing of timber beams



Testing of packaging material



Photo: Aerial view Heye 31863 Coppenbrügge

Product range of TIRA GmbH

- Electromechanical universal testing machines up to 1,5 MN
- **Special testing machines** on customer's request
- **Hydraulic testing machines** up to 3 MN
- **Mechanical Engineering**
- **Vibration test systems**
Vibration exciters up to 300 kN and slip table systems
- **Balancing machines**
for horizontal and vertical balancing up to 20 t
- **Climatic- and temperature systems**
for environmental simulation

TIRA GmbH operates a calibrating laboratory according to DIN EN ISO / IEC 17025:2005 for the calibration of material testing machines (DKD-K-16401).

Address



- ◆ MEASURING
- ◆ TESTING
- ◆ BALANCING
- ◆ CNC-MACHINING

Eisfelder Straße 23/25
D-96528 Schalkau
Phone: 036766 / 280-0
Fax: 036766 / 280-99
E-mail: WPT@tira-gmbh.de
Internet: www.tira-gmbh.de



Product range of TIRA – Material testing

- **Basic models / Load bearing frame Drives Measurement - and Control technology TIRA Software**
- **Sensors**
- **Clamping tools**
- **Modernisation of testing machines**
- **Maintenance (also at external machines)**