

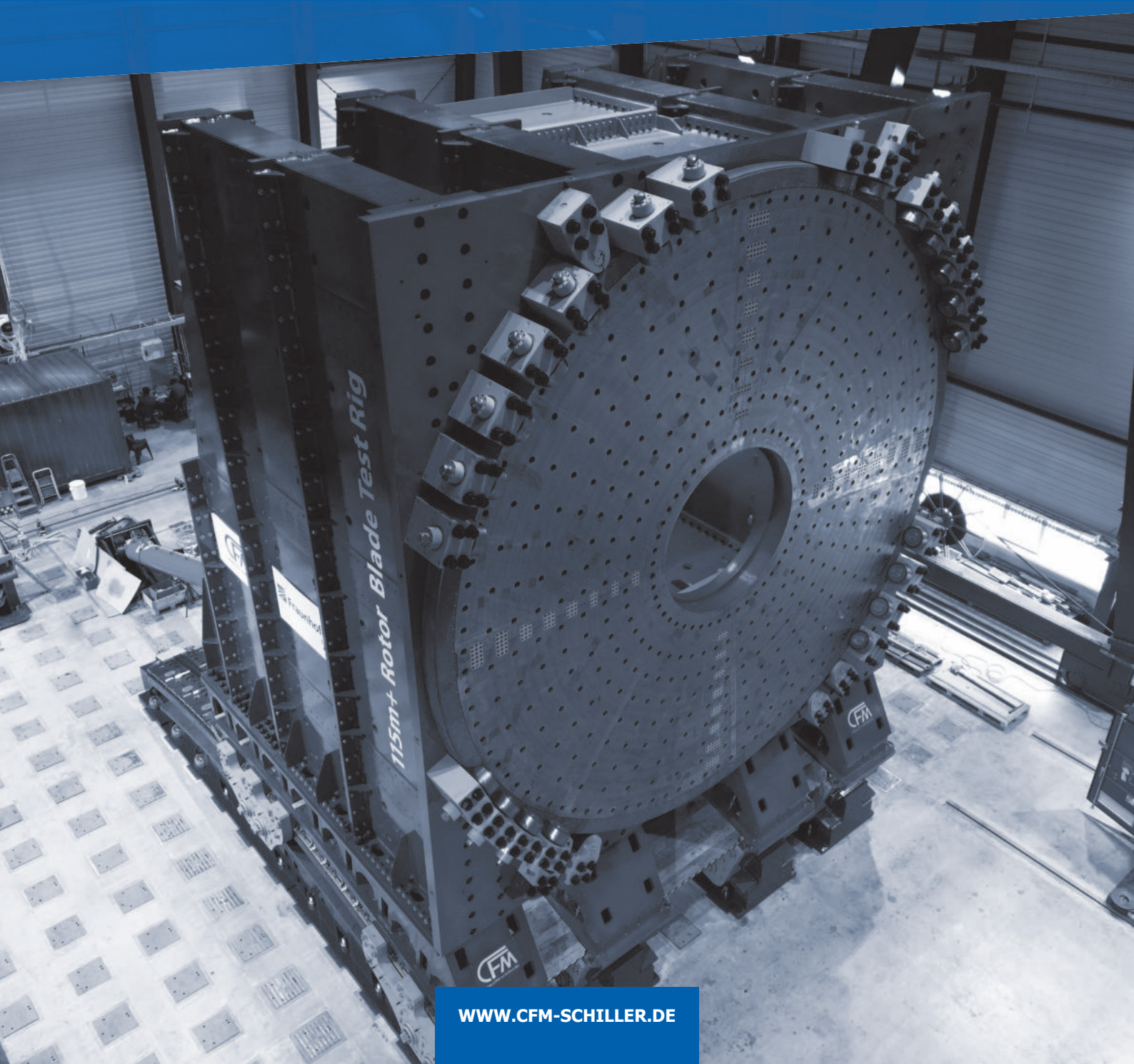


ENGINEERING TO MOVE YOU FORWARD

APRIL  
2023

# VIBRATION ISOLATION AND TEST BENCH SYSTEMS

Competency in development and production thanks to more than  
40 years of experience



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## INDUSTRIES

**CFM Schiller GmbH** is an internationally active special mechanical engineering company located in Roetgen in the border triangle of Germany - Belgium - Netherlands. In our two business units, Vibration Isolation and Test Bench Systems, we offer a wide variety of tailor-made products and services adapted to the individual requirements of our renowned customers from a variety of industries.

On the following pages you will find a product selection sorted by industry. We would also be happy to develop and manufacture an individual vibration isolation and test stand system for you.



*Automobile Industry*



*E-Mobility*



*Aviation Industry*



*Agricultural Machinery Industry*



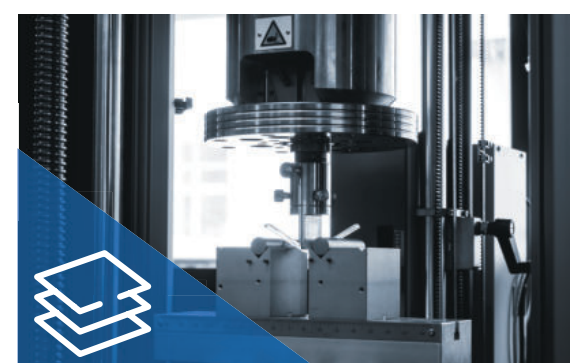
*Construction Machinery Industry*



*Rail Vehicle Industry*



*Energy Industry*



*Materials Research*



*Science & Universities*





# TEST BENCH SYSTEMS

Since 1978 **CFM Schiller** has been the world's leading manufacturer of seismic masses and air spring based vibration isolation systems in the field of test bench systems. High reliability and long life of our vibration isolation systems and their components are based on sound engineering and high-quality in-house production which are further enhanced by our professional on-site installation teams. Confidence in our quality allows us to offer a guarantee to our customers which goes far beyond the usual scope. We not only understand the technology of vibration isolation, but also the complex test bench technology. Without this know-how it's not possible to optimally design your vibration isolation system.

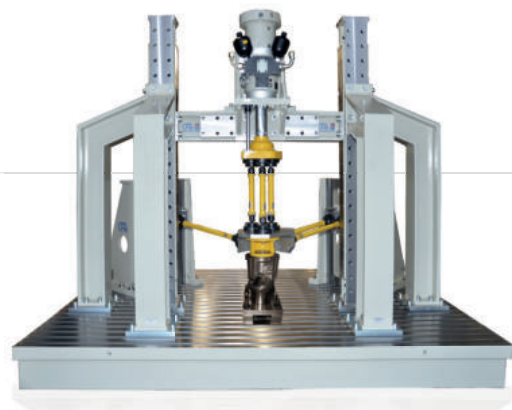




## MOCOKIT® MODULAR CONSTRUCTION KIT

... PROVIDES AN EFFICIENT SOLUTION FOR COMPONENT TESTING.

Are you operating your own testing laboratory for component testing or planning a new one? Apart from servo-hydraulic components like linear and rotary actuators, you also need appropriate fixtures to mount actuators and specimens flexibly and safely. When test setups are frequently modified, modular solutions are particularly useful in order to minimize investment costs. With our universal modular construction kit **MOCOKIT®**, we provide you with the flexibility you need in your daily business – high quality at affordable prices. **MOCOKIT®** is specially tailored to meet the requirements of component testing and fulfils the demands of state of the art test labs in terms of rigidity, mounting, and versatility. Design and completeness of the **MOCOKIT®** system are unmatched in the market. Actuators and specimens are easily mounted with customized adapter plates, which can be supplied by the customer or manufactured by us. Various sizes, graded by their maximum permissible static load, allow you to construct test frames for static forces up to 600 kN. All screw joints are slip resistant, thus guaranteeing a high stiffness of the joints even under reversed bending loads.



## LOAD FRAME/ LOAD PORTALS

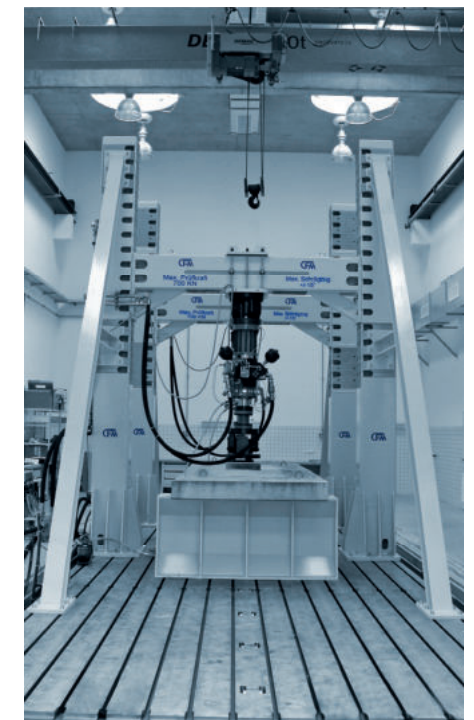
CFM Schiller has vast experience in the manufacturing of 2- and 4-column load frames for component structure tests. When using our **MOCOKIT®** Modular construction kit, cost effective solutions for small load portals with forces up to 500 kN can be created. Small load portals with forces up to 500 kN are based on our **MOCOKIT®** Modular construction kit resulting in cost-effective solutions. Large load frames of 1 MN to 30 MN are special solutions for which we can rely on our many years of extensive design experience. Fully automatic adjustment and clamping are also possible.

### INDIVIDUAL SPECIAL SOLUTION FOR LARGE PORTAL FRAMES

Load frames are used for a variety of static, dynamic, and in most cases vertical load applications and tests. **CFM Schiller** designs, calculates and manufactures load portals in the range of a few kN to 30 MN.

- » 2-column version
- » 4-column version
- » forces up to 30 MN
- » Electrically and hydraulically adjustable
- » Mechanical or hydraulic clamping
- » Round and rectangular columns
- » High-precision guide of crossbeam in linear guides in applications with extreme accuracy requirement

- » Smooth cylinder mounted on roller bearings for adjusting the cylinder position on the crossbeam
- » Rigidity in standard designs of approximately up to 1/1 000 deflection of crossbeam length per span
- » Very high rigidity up to 1/5 000 deflection of crossbeam length per span







## COMPONENTS

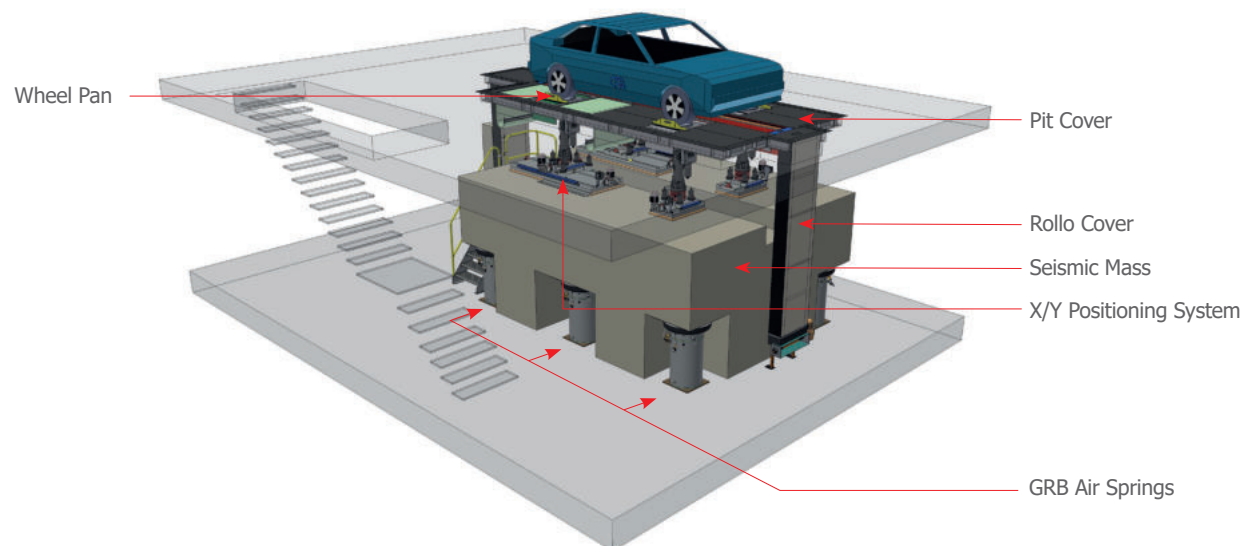
### FOR 4-/6-/7-POSTER SYSTEMS

CFM Schiller has been developing and supplying peripheral components for 4-/6-/7-poster systems for more than 25 years. These form the standard full-vehicle test bench for vehicles from cars to trucks and fully automated agricultural machinery.

With 4-/6-/7-poster systems we deliver:

- » Seismic masses with air spring system
- » X-Y positioning systems with fully automatic control
- » Pit coverings including central aisle roll-cover
- » Ground level roll-cover units for climatic chamber applications
- » Acoustic enclosures for servo actuators
- » Pit coverings for acoustic chambers (NVH)
- » Ground level pit coverings for climatic chambers
- » Vehicle lifts

The pit coverings of **CFM Schiller** are level and drivable. The pit covering can be adjusted for track widths and wheel bases using special roll-cover systems. We supply pit coverings in versions for normal situations, NVH applications and with acoustic lining, and for applications in temperature and climatic chambers. **CFM Schiller** has the suitable solution for you.



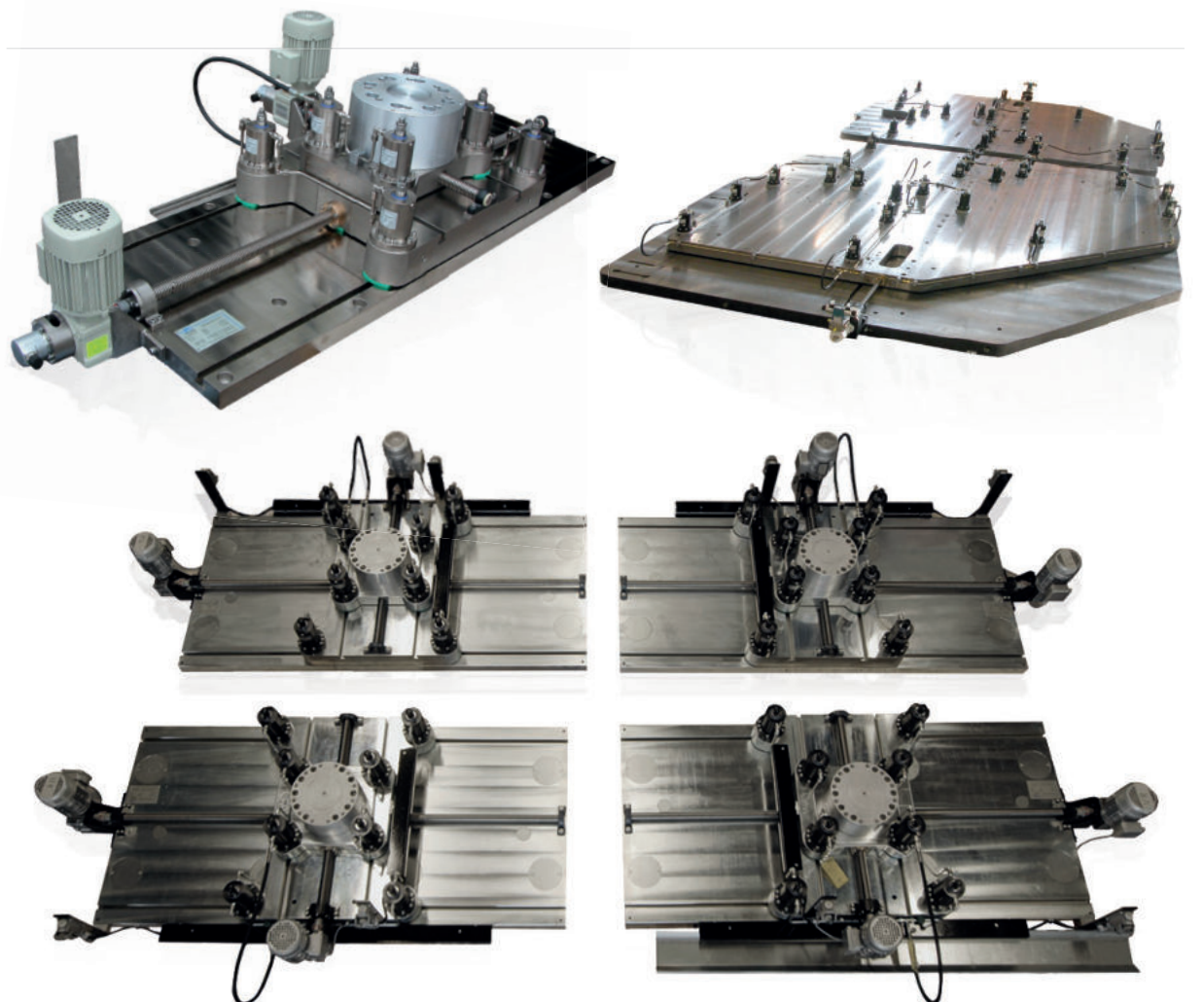
## POSITIONING SYSTEMS

### FOR 4-POSTER SYSTEMS AND FULL-VEHICLE TEST BENCHES

CFM Schiller positioning systems facilitate manual or fully automatic adjustment of track widths and wheel bases in 4-/6-/7-poster systems or full-vehicle test benches. The structure of the units is primarily made up of a base plate and two sliding plates which are equipped with a movement spindle drive.

The drive is operated either using electric or hydraulic motors. The individual sliding plates are clamped with the hydraulic spring clamping cylinder; manufactured in-house. Special products with regard to travel distances are possible almost without limitations. Other special applications such as for use in climatic chambers are implemented with fully nickel-plated units.

- » 4-/6-/7-poster systems
- » Full-vehicle test benches



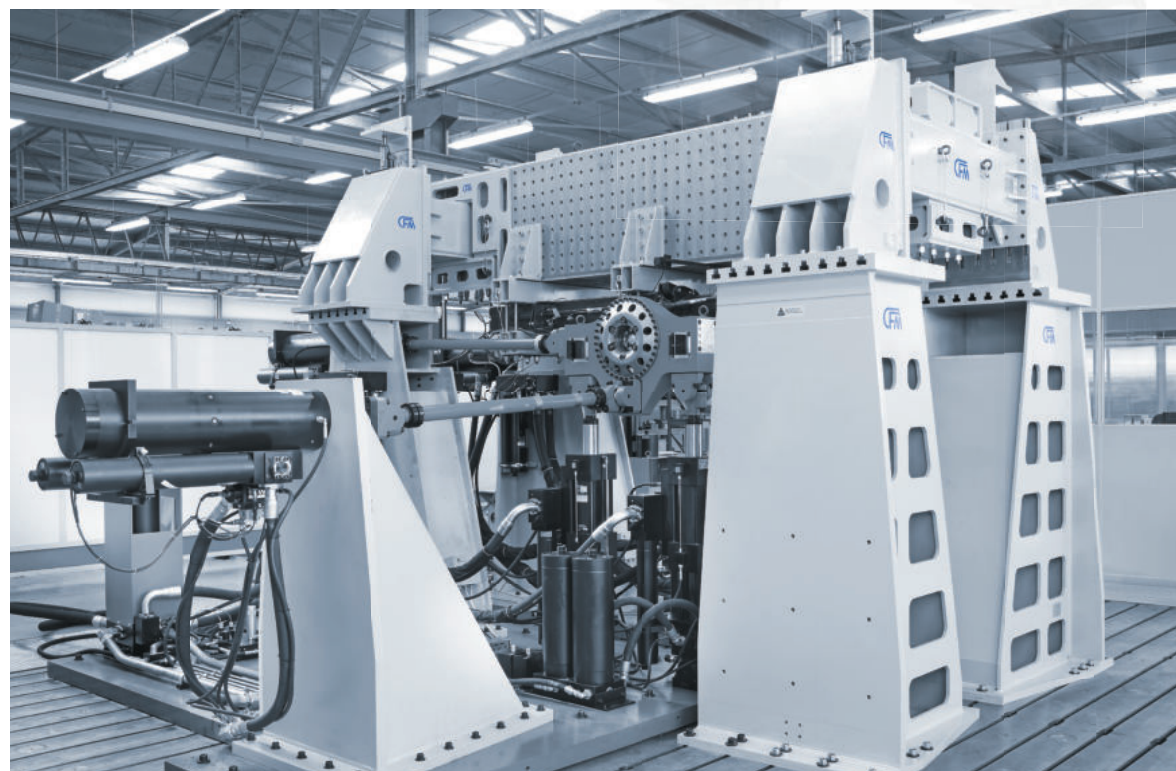
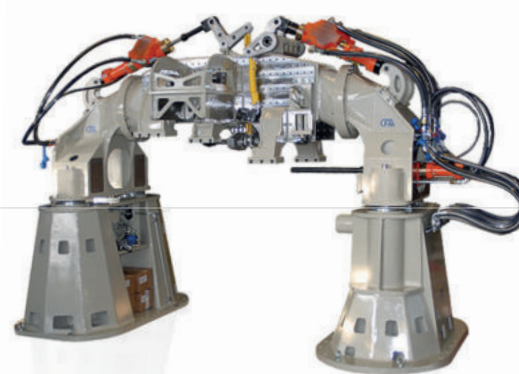




## AXLE SUPPORT SYSTEMS

For more than 20 years CFM Schiller has specialized in the design and development of axle support systems and the necessary adapters. Axle support systems are used along with dynamic axle test benches and include the vehicle axles. The axle support systems of CFM Schiller are designed in such a way that all the front and rear axles of the respective cars and trucks can be incorporated using specially manufactured adapters. Applications for climatic chamber tests with axle support systems are a part of our core competency.

In addition to a purely passive axle mount, **CFM Schiller** offers axle support systems which facilitate the simulation of forces on engine mounts, transmission of torque via the drive shaft and via differential gears. We also design and manufacture the necessary specific axle support systems. To implement this we need the CAD data of vehicle axle in 3D format \*sat, \*step or \*CATIA. *Please tell us your special requirements.*

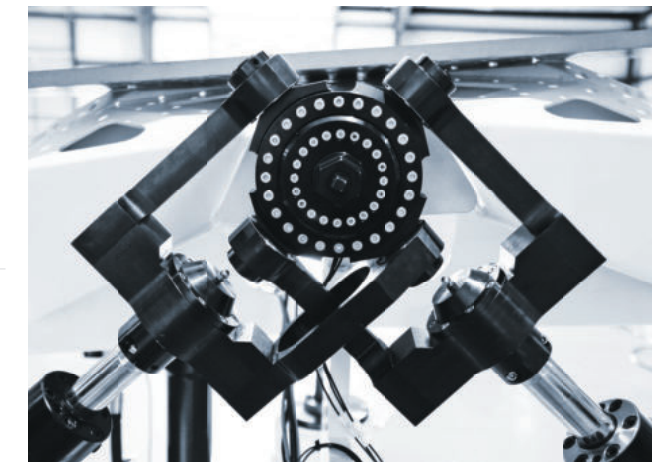


## VEHICLE INERTIA MEASURING MACHINE (VIMM)

Based on a draft by RWTH Aachen, CFM Schiller has developed an inertia measuring system for vehicles and components. It determines weight, center of gravity and mass, and deviation moment of inertia of the test piece accurately and in the shortest possible time. In addition to complete vehicles, test pieces can also be assemblies and sub-components.

**CFM Schiller** delivers this special system to customers and carries out in-house measuring services with **VIMM**. The measuring system is designed for a vehicle weight up to maximum of 3,5t.

*You can find further detailed information in our VIMM brochure.*



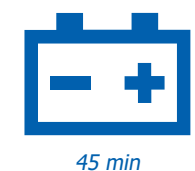




## MOBILE IMPACT BLOCK

To meet the demands of the ever increasing requirements of test series for monitoring crash safety of vehicles, CFM Schiller has designed and manufactured a new mobile impact block. The new battery powered impact block system significantly increases crash-test capacity and flexibility.

The mobile impact block consists of a reinforced concrete structure which is equipped with T-slot mounting plates on the vertical outer surface. The specially anchored T-slot plates act as mounting plates on which obstacle contours can be attached. The entire impact block stands on four hydraulically driven wheels enabling any required procedure to be carried out in the test lab area. The driving and steering units with integrated lifting cylinder and drives are fully hydraulically powered. The hydraulic power supply is supplied with a hydraulic unit inclusive of a switch cabinet. They are mounted on a concrete block with shock insulation. They are operated in the basic configuration using a handheld control with color touch display for the functions steering and driving.



## ANCHOR TENSILE TEST RIG

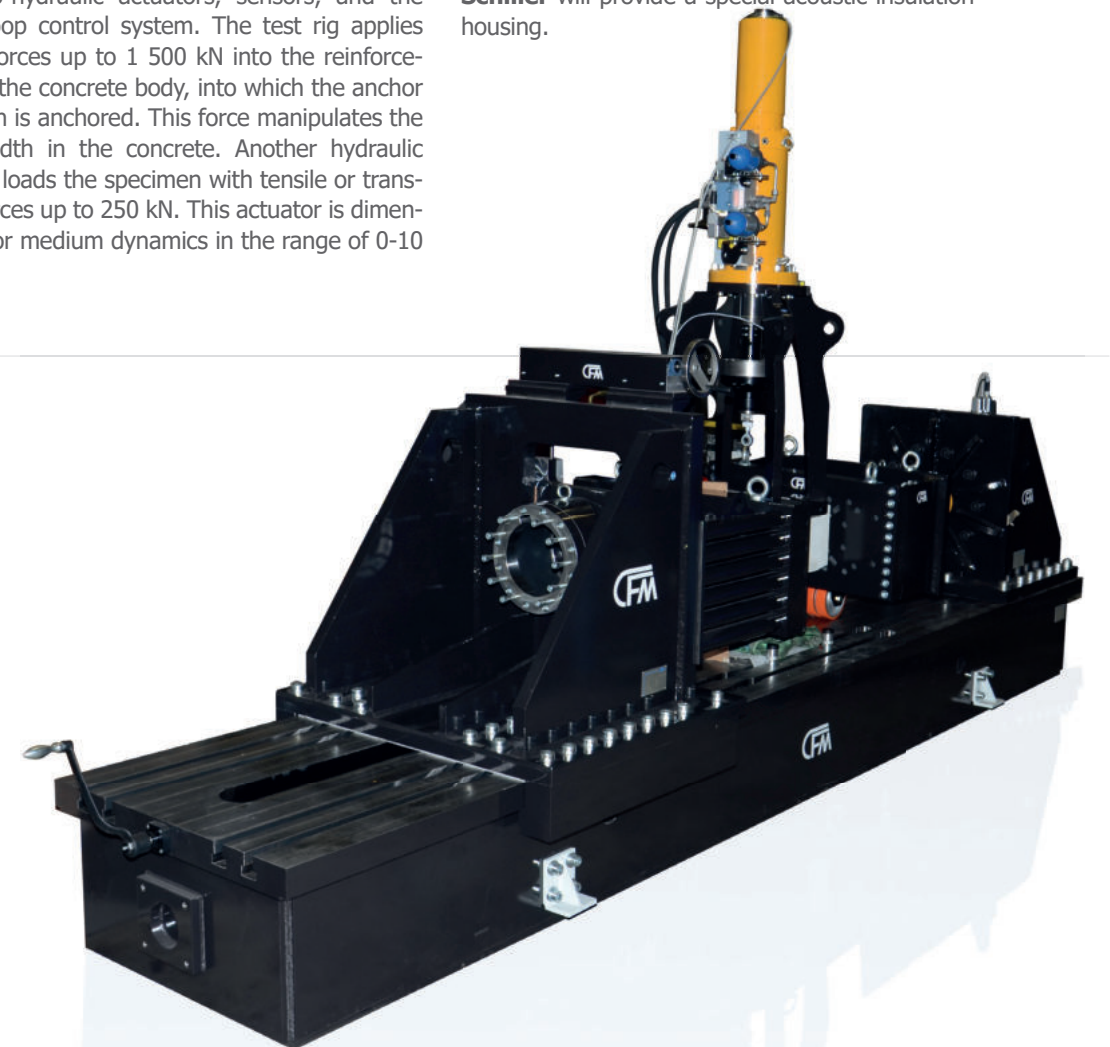
### DEVELOPMENT

The European guideline ETAG 001 precisely defines requirements to experimental examinations of the load bearing behaviour and the fatigue limit of metal anchors. There is also a high demand for precision testing of plastic anchors. In this context, **CFM Schiller** has developed and manufactured an anchor test rig for tensile and shear tests, applicable for cracked and non-cracked concrete. The test rig is capable of applying, varying, and evaluating all relevant load cycles for the fastener and the concrete body.

### BRIEF DESCRIPTION

Basic components are the mechanical load frame structure comprising a highly stiff clamping plate and thereon mounted reaction brackets as well as servo-hydraulic actuators, sensors, and the closed-loop control system. The test rig applies testing forces up to 1 500 kN into the reinforcement of the concrete body, into which the anchor specimen is anchored. This force manipulates the crack width in the concrete. Another hydraulic actuator loads the specimen with tensile or transverse forces up to 250 kN. This actuator is dimensioned for medium dynamics in the range of 0-10 Hz.

Concrete specimens of various sizes can be tested due to the extensive hole pattern for reinforcement bars and the adjustment possibilities. This means the actuator which applies the shear load can be adjusted in height and the reaction bracket can be horizontally moved to adapt it to the length of the concrete body. The hydraulic power unit has also been designed under consideration of maximum flexibility and efficiency. The energy consumption can be adapted to the effectively needed power by adjusting the parameters operating pressure and rotational speed of the pump. In Eco Mode, the control system automatically adjusts the power consumption. The quiet internal gear pump is also part of the environment-friendly design. If an additional acoustic insulation is required, **CFM Schiller** will provide a special acoustic insulation housing.







## DROP TOWER TEST RIG

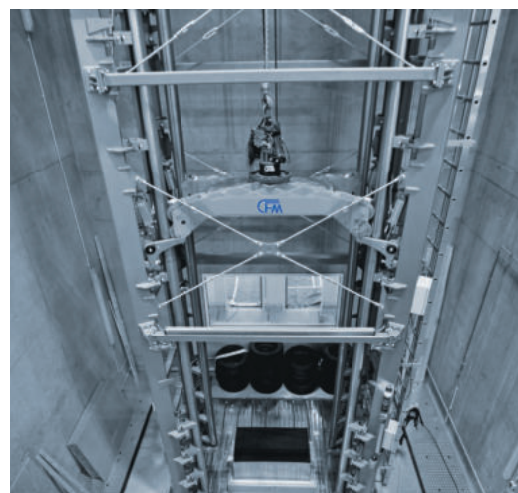
Test rigs for the execution of crash tests. Drop tower test rigs allow for an analysis of work piece structures and materials regarding their deformation behavior. CFM Schiller has successfully designed and manufactured multiple drop tower test rigs. Depending on the customer's requirements, the specifications of the test rigs vary.

### DROP TOWER TEST RIG 22 M

The distinctive feature of this test rig is the guided free fall, even in the impact zone. The drop tower comprises of an approx. 22 m high steel structure with precision guiding. The impactor's height of fall can be adjusted automatically over a range of more than 18 m. Specimen up to 1.25 m in height can be tested with an application of force up to 1 MN in the moment of impact. The achievable maximum impact velocity is 56 km/h.

### DROP TOWER TEST RIG 15 M - FOR EXAMINATION OF ROCK IMPACTS ON COATED SURFACES

The drop tower comprises of an approx. 15 m high tube with an outer diameter of 323 mm. Lifting and release mechanisms for the free fall are integrated at a particular position inside the tube. This test rig allows dropping samples with a maximum weight of 0.20 kg and maximum dimensions of 25 x 25 mm. **CFM Schiller** provides system solutions for both the metrology and control technology.

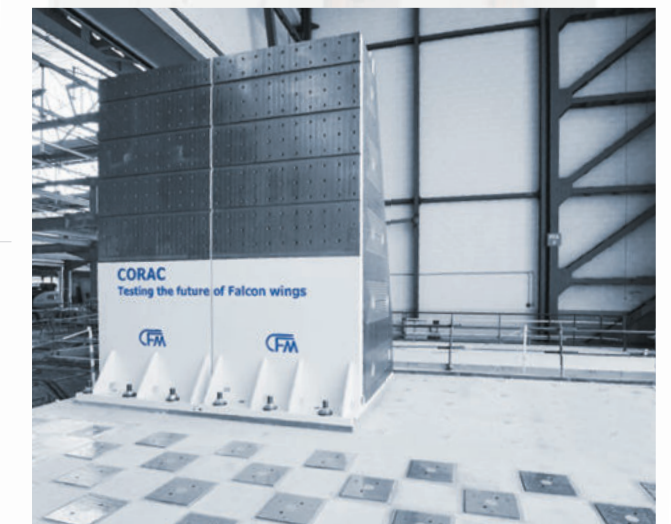


## AVIATION TESTING TECHNOLOGY

The field of aviation testing technology is a continuously developing competency field for CFM Schiller. We develop and produce testing technology for components made of fibre-reinforced composites.

Large high-precision testing systems for generating multi-axial stress conditions in individual components have been successfully implemented. As the aeronautical industry is a key industry with extremely high degree of innovation and therefore confidentiality our many projects cannot be presented here.

*Do not hesitate to approach us to talk about your special requirements!*





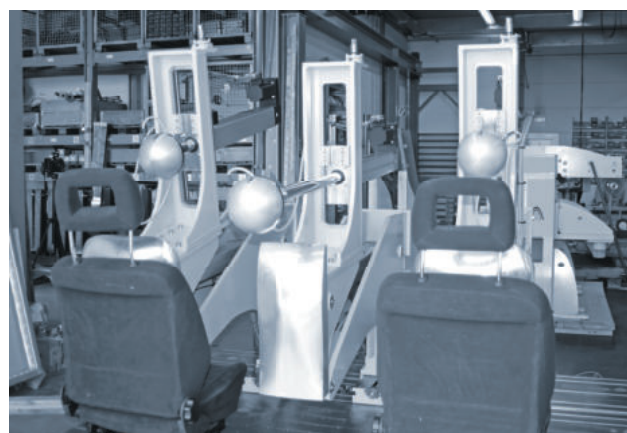


## SEAT- AND SIDE DOOR INTRUSION TEST BENCHES

### PASSIVE SAFETY

For testing vehicle components, CFM Schiller offers testing systems, which satisfy the requirements of FMVSS 202-A and ECR17-R25. This includes systems for monitoring seat backrests and headrests.

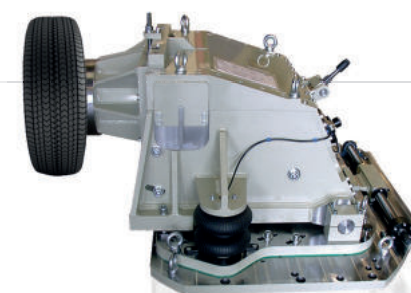
The testing system can generate constant torque on the backrests in terms of "H-point". The force is applied using specially shaped back dummies. Loads can be simultaneously applied to one, two or three seats. The same is applicable for headrest actuators. In-house test benches are developed and manufactured for car body development as well. Here are a few examples of lateral and roof intrusion test benches.



## TIRE TEST RIGS

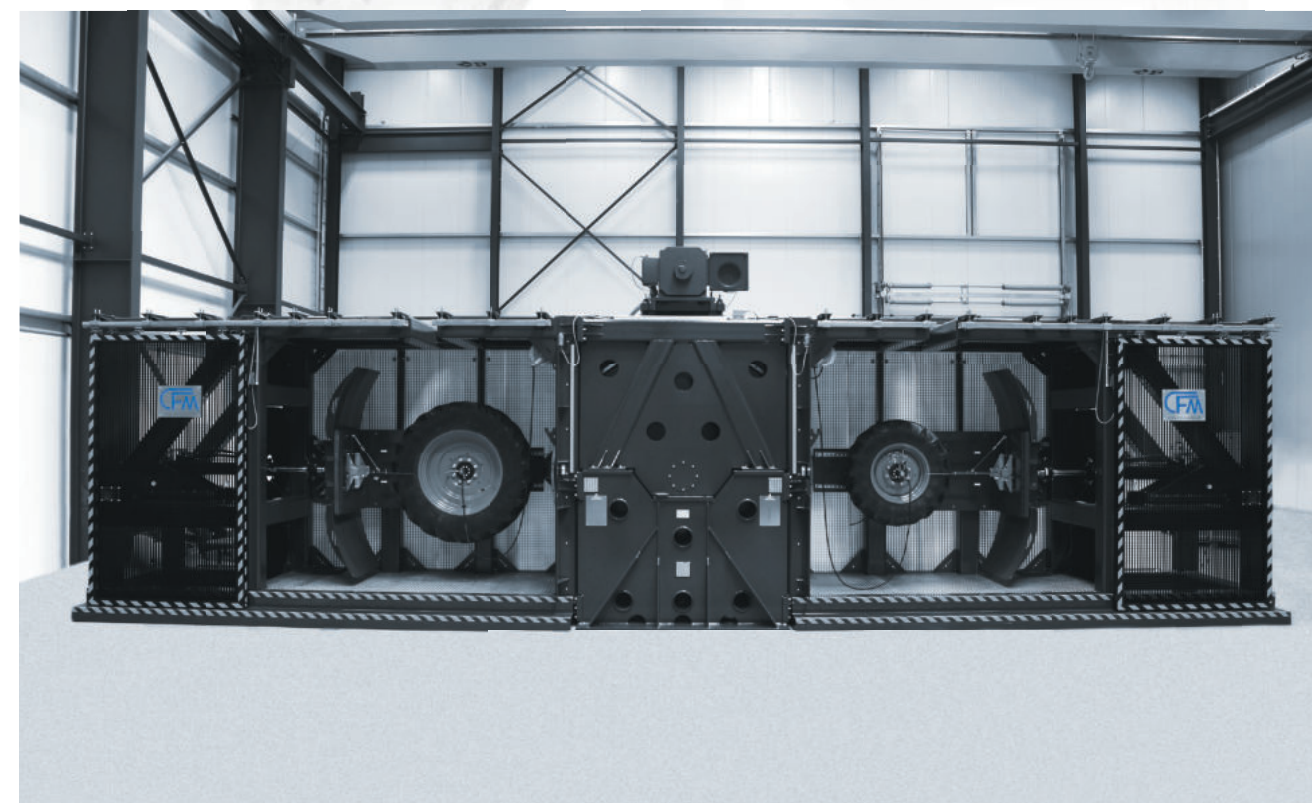
### TEST RIG FOR ENDURANCE TESTING

Over the past years, CFM Schiller has successfully designed and manufactured several test rigs for tire research and development. In particular, a test rig for endurance testing of commercial vehicle tires has been developed and successfully delivered to the customer. In this case, a maximum force of 250 kN is applied to tires with a diameter between 1 000 and 2 500 mm and a width of up to 1 000 mm. The velocity is continuously adjustable to a maximum value of 160 km/h. This test rig allows the simultaneous examination of two tires.



### ACOUSTIC TEST RIGS

CFM Schiller has realized tire test rigs for the examination of operating noises. One particular test rig was realized with an automatic or manual application of preload for tires from 13" to 22" diameter. The steering angle ( $\pm 15^\circ$ ) and the camber angle ( $-5^\circ$  to  $+2^\circ$ ) are both continuously adjustable.







## CLUTCH PLATE TEST BENCH

The dynamic clutch plate test bench from CFM Schiller helps test the fatigue strength of vehicle couplings, especially the mechanical components.

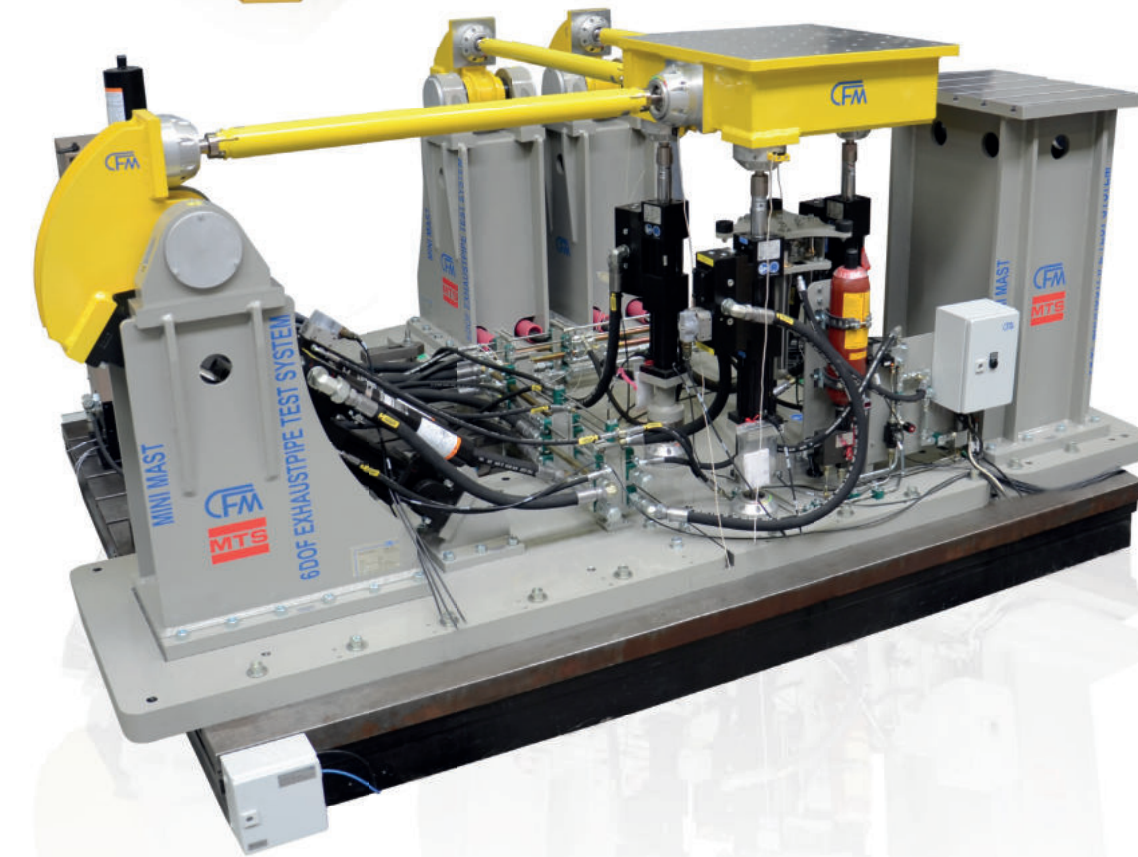
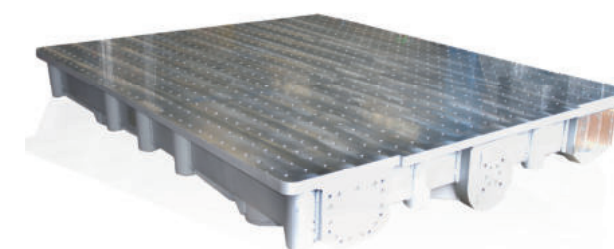
A servo hydraulic rotary actuator serves as the drive enabling operating frequencies up to 30 Hz. The clutch plate (test piece) is placed in a temperature chamber which can be heated and regulated up to 150°C. Vibratory torque is introduced in the test piece depending on the required material stress of the rotary cylinder. In order to prevent the transmission of vibrations into the surroundings the test bench is separated from the base frame using 4 piece CFM-MAS membrane air springs.



## ALUMINIUM VIBRATION TABLES

Single and multi-axial vibration testing applications have been important test benches for decades for dynamically examining the functionality of components in assemblies or individual components.

CFM Schiller has specialized in the manufacturing of aluminium tables for more than 20 years. We mainly develop and manufacture tables of up to 6 000 x 6 000 mm in size; constructed of welded aluminium. We offer you all the mechanical components of the table including ball joints and coupling rods with reversing levers and their support angles. Our six-axial hexapod tables, in particular, have very high natural frequencies above 250 Hz thanks to their optimized core structure.







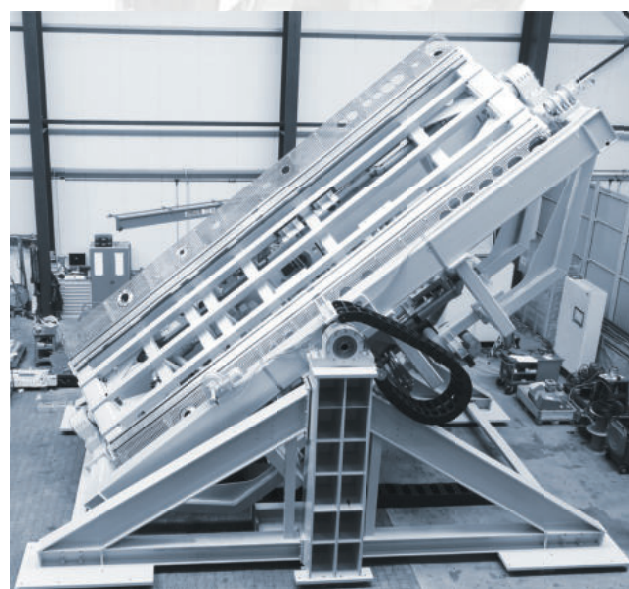
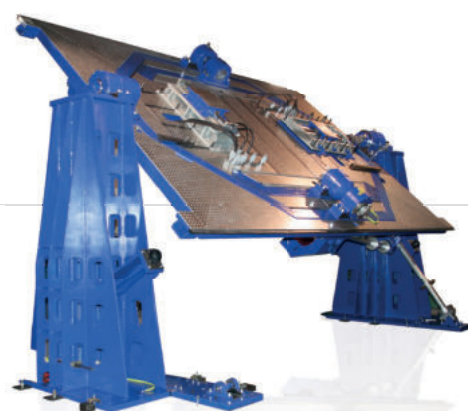
## TILTING TEST BENCHES

CFM Schiller has concentrated on the design and manufacturing of dynamic tilting test benches for examining the operational and lubrication properties of internal combustion engines and gears for the last 20 years.

Swiveling platforms are used in many fields of vehicle and engine development. The operating behavior can be simulated in inclined positions or braking and accelerating processes. These swiveling platforms are designed and manufactured by us for quasi-static to highly dynamic testing requirements. In applications from cars to large ship diesel engines, **CFM Schiller** designs and

supplies tilting test benches as per individual customer requirements. The typical swivel angles are  $\pm 30^\circ$ ,  $\pm 45^\circ$  or  $\pm 60^\circ$  in both swivel axes.

The drives work electrically or hydraulically depending on their application. Our control systems for test benches are based on PLC and offer an interface for superior engine test bench control.



### FOR LARGE SHIP DIESEL ENGINES AND ENGINE GENERATOR UNITS

The marine and offshore business is subjected to very strict and high requirements with regard to operational safety of technical equipment and machinery. Even small failures can lead to catastrophes. The new high standard directives for evaluation tests require that marine engines operate flawlessly and reliably at an angle of up to  $25^\circ$  whilst ensuring power supply to marine platforms and ships at all times. The water and oil circulation system is the primary area for testing.

**CFM Schiller** has developed a mobile two-axial tilting test bench on behalf of a world-renowned large diesel engine manufacturer; designed that the required heeling of ship or offshore platforms can be simulated. The large tilting test bench can offer an inclined angle of  $25^\circ$  in two axes (X and Y). The maximum weight of the test piece, comprised of the diesel engine and generator, is 200 t. This tilting test bench is the first of its kind in the world. The entire test bench, including the test, piece is moved on air cushions.

Test bench weight and dimensions:  
Length: 16 500 mm | Width: 6 350 mm | Height:  
4 500 mm | weight: 197 t







## AGRICULTURAL MACHINE TEST SYSTEMS

For implementing operating load real time tests for components of agricultural technology

### TESTING REQUIREMENTS

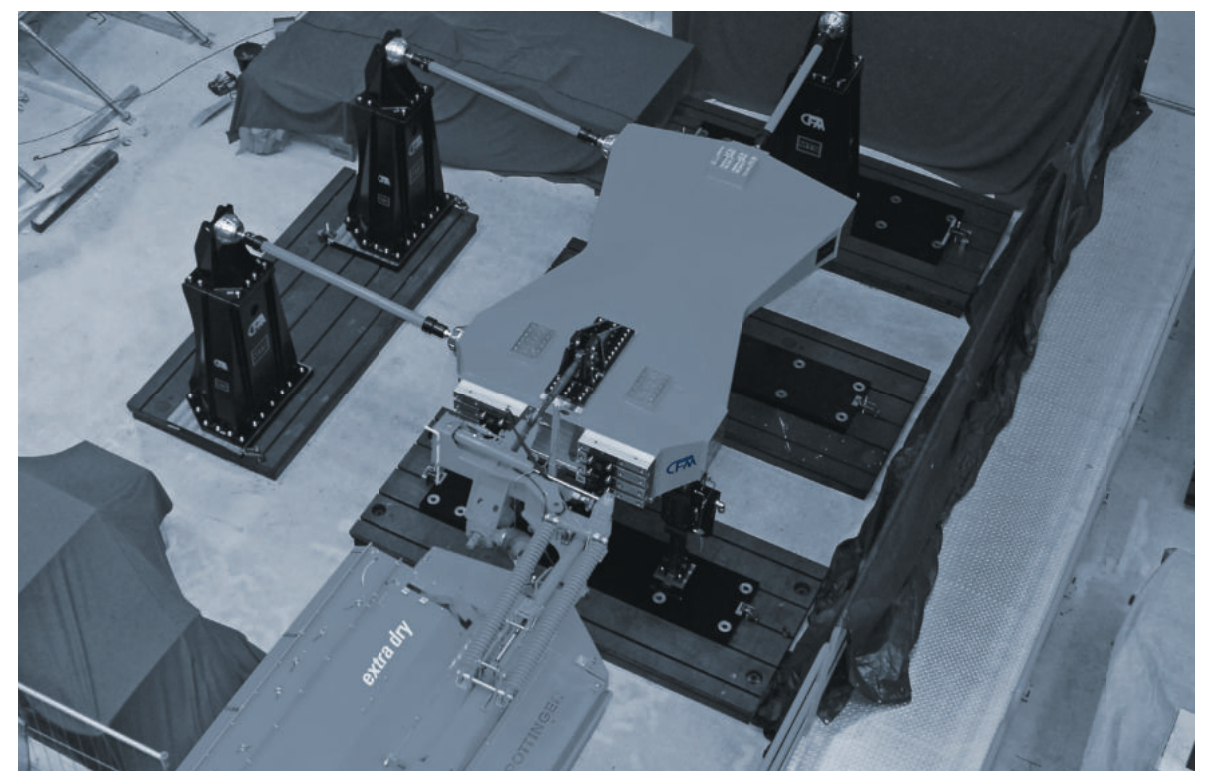
- » Quality standard for premium manufacturers
- » Customer satisfaction thanks to reliable products
- » Increasing requirements with regard to performance and weight
- » Shorter and more efficient development processes
- » Quicker series production
- » Timely detection of flaws in components
- » Validation of FE analysis and creation of validated calculation models for future developments
- » Large surface technology combining large working widths and higher or other loads and run times
- » Risk minimization when introducing new materials
- » Reduction in service costs
- » Reduction of expensive recalls due to high quantities of common parts



## 3-LINKAGE AGRICULTURAL EQUIPMENT TEST BENCH

This system test bench has been developed and built in order to analyze the durability of agricultural accessory equipment such as ploughs, harrows, grubbers or similar soil cultivation devices.

In the basic configuration the test bench is designed for a movement with 3 degrees of freedom; 6 degrees of freedom can be implemented in the optional expansion stage. The necessary mechanical mounting flanges on load frames are already taken into consideration in the basic configuration. The system is mainly made of a rigidity-optimized symmetric load frame engineered as a high-quality welded structure. The necessary movements are created using servo hydraulic actuators, provided by the customer, via connected coupling rods. The load frame is designed for accessory equipment of categories 3, 4L and 4H.







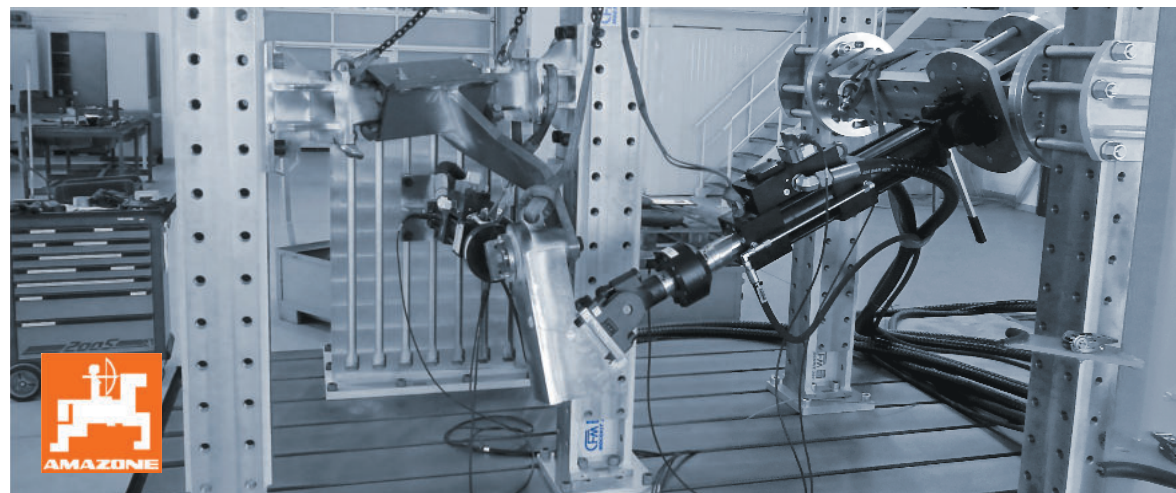
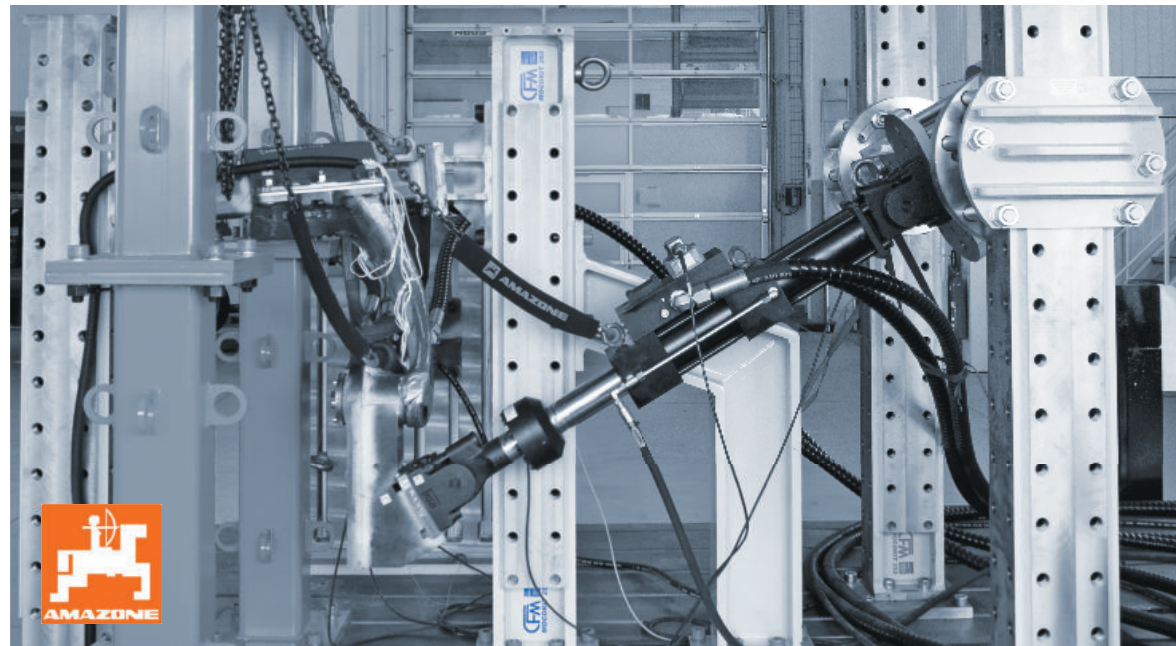
## CULTIVATION MACHINE TEST BENCH

### STRUCTURE

The basic frame is made up of components from our modular construction kit **MOCOKIT® 250**. The interfaces between the test piece and actuator are implemented using an individually designed adapter. Alternatively, when designing the interfaces components from our modular construction kit, **MOCOKIT®** such as coupling rods and ball joints can be used.

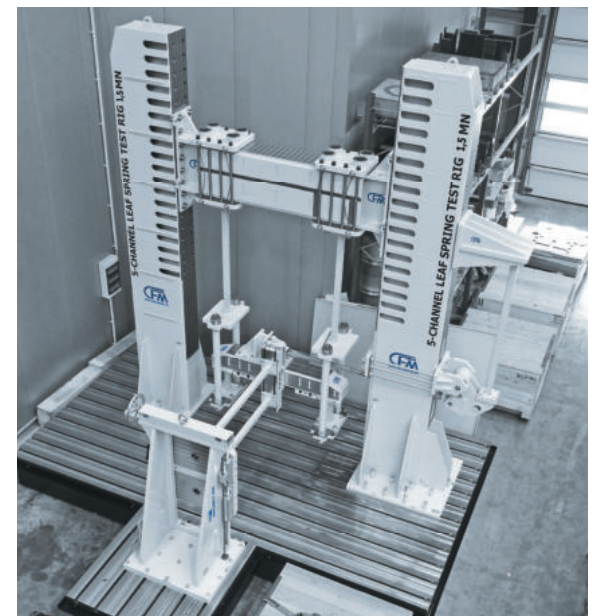
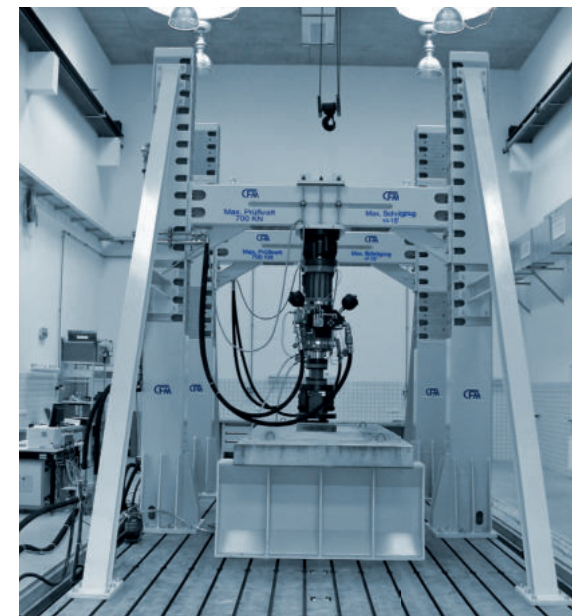
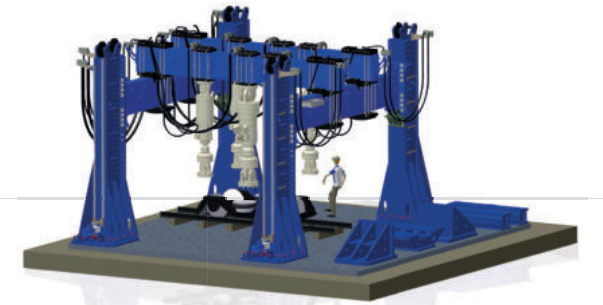
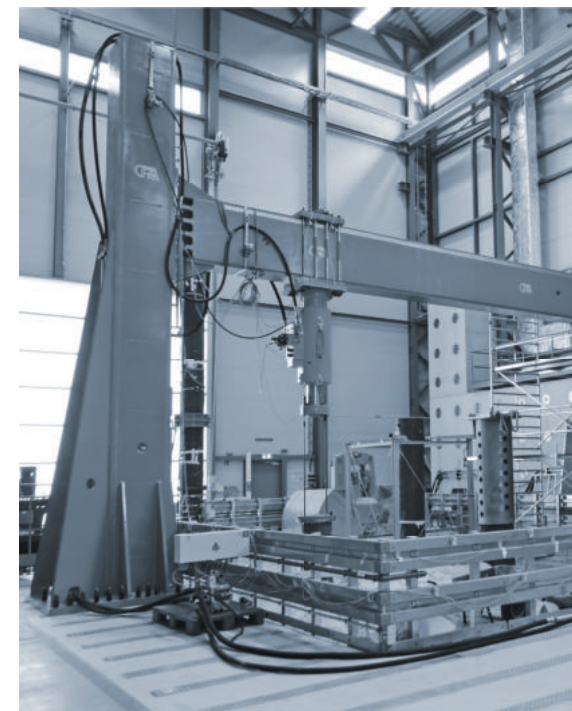
### THE LOAD APPLICATION

takes place via two test actuators provided by the customer. One actuator excites the force component in the Fx-direction and the second actuator excites the resulting force in Fy- and Fz-direction into the test piece. Both forces are applied dynamically with several load cases. In case of a component failure a modular frame system is used in order to prevent the test piece or the testing actuator from falling. These are developed in-house.



## RAILCAR TEST SYSTEMS

CFM Schiller also offers mechanical testing equipment for railcar components. They can be created from our **MOCOKIT® 400-** and **MOCOKIT® 600** modular kit systems. CFM Schiller has also implemented diverse solutions for bogie test benches which are mostly comprise of 4-column load frames and reaction angle brackets. Systems up to 5 MN total vertical forces are available.



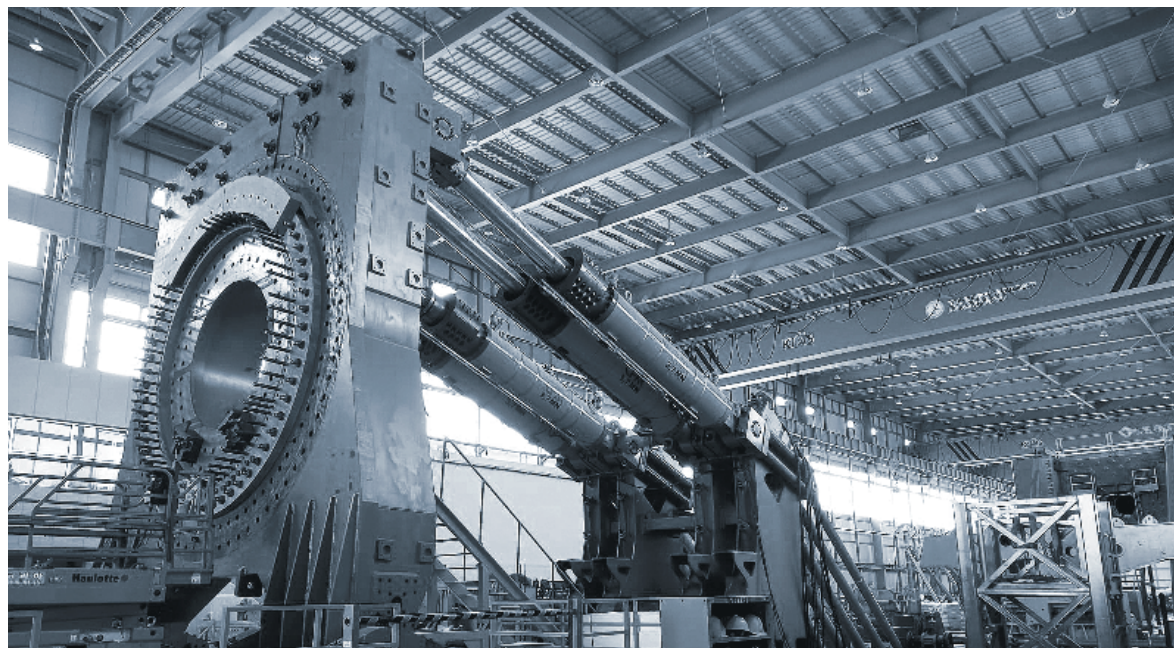
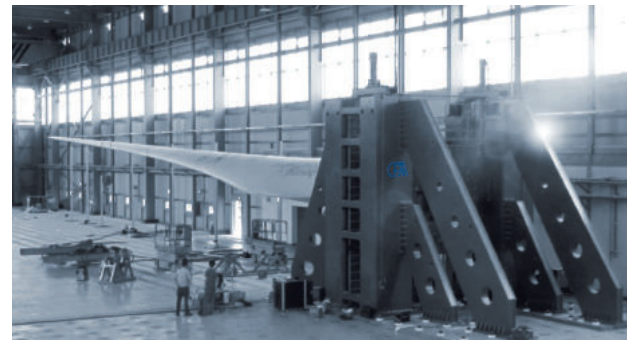




## ROTOR BLADE TEST SYSTEM

Reliability is one of the main factors in determining the success of the wind energy sector. The varying project scales, from small household units to the ever increasing size of large on and off shore plants, provides an extra challenge. The problem of access in difficult locations means life expectancy and long maintenance intervals are often critical for profitability.

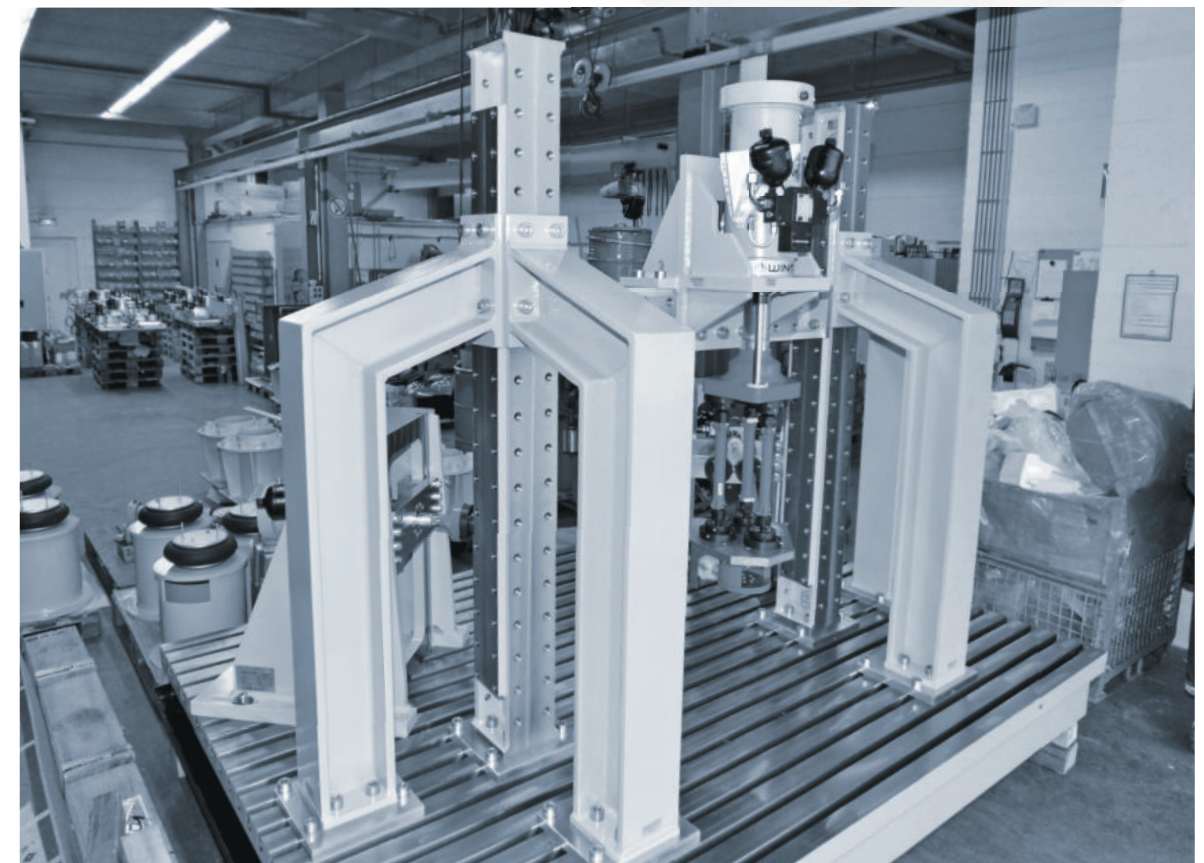
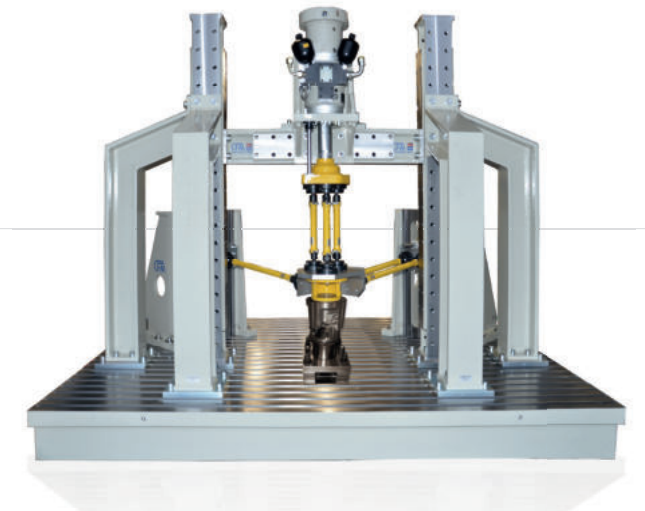
Extensive and comprehensive system tests are hence a fundamental part of the prospective development work of these systems. Detailed records of long-term operating loads form the basis of test definitions producing a better understanding of future requirements. **CFM Schiller** is the ideal partner for this task thanks to many years of varied experience in the fields of vibration isolation and overall manufacturing of test rigs - especially for large systems. Our experience extends from test systems for the automobile industry, railcar industry, power plants, on oil rigs, aeronautical industry, motor sports, agricultural and construction machinery industry to varied research equipment. They are completely designed, structured, manufactured and installed by us. The application of these complete solutions, along with our production quality, meant the field of wind energy technology was just the next logical step for us in our continuously expanding know-how.



## ELASTOMER TEST BENCH

Due to the ever increasing requirements of operating loads, durability specifications, system reliability and varied applications the testing requirements for elastomer bearings are subject to constant change. The importance of 3-axial tests, which recreate the operating conditions of complex elastomer bearings, is constantly increasing. This gives rise to the need to develop a future proof testing system.

The basic design of orthogonal load application is created by using **CFM Schiller** systems **MOCOKIT®**, which provides maximum flexibility and robustness in this application. Through the targeted application of the modular construction kit, additions, modifications or expansion stages can be implemented in shortest time in accordance with the customer's requirements. Parallel to this the testing system significantly increases the testing capacity and flexibility of component tests. The accessibility of test piece and the measuring technology for the observation of the test piece can be installed flexibly, quickly and without hindrance.







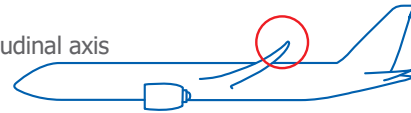
## AEROFOIL COMPONENT TEST BENCH

### FOR WIDE-BODY AIRCRAFT AIRBUS A350 XWB

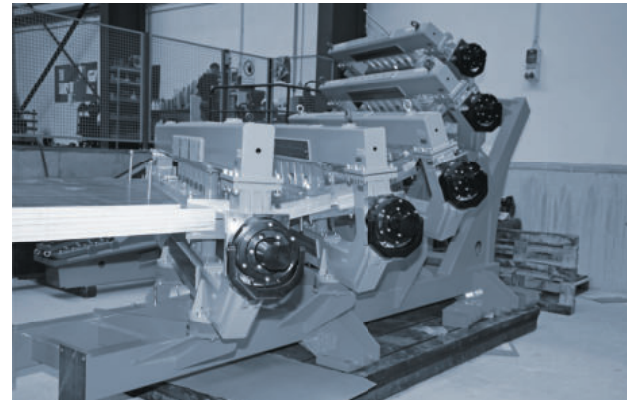
Performing static and dynamic tests was a developmental step for both the customer and qualifying the calculation methods including an aeronautic certification test for series parts in A350 XWB. CFM Schiller was responsible for the mechanical and hydraulic part including the hydraulic actuators. The main components of the test bench are the equipment and kinematic components for introducing forces and torques into the test piece; the bearing point of the test piece.

The implemented load configuration mainly comprises the follows:

- » Reverse alternating loads on the test piece around the airplane longitudinal axis
- » Torsion alternating torque on the test piece
- » Longitudinal forces on the test piece contra the flight direction



For this purpose a highly-precise complex spatial load application kinematics equipped with extreme rigidity values was designed. It features a servohydraulic drive and slide-conducted coupling rods which introduce the forces and torques into the test piece simultaneously depending on the flight operating loads. Special ridges were designed which transmit the mechanical test load of the load application kinematics to the contoured test piece surface.





# SEISMIC MASSES AND VIBRATION ISOLATION SYSTEMS

Since 1978 **CFM Schiller** has been the world's leading manufacturer of seismic masses and air spring based vibration isolation systems in the field of test bench systems. High reliability and long life of our vibration isolation systems and their components are based on sound engineering and high-quality in-house production which are further enhanced by our professional on-site installation teams. Confidence in our quality allows us to offer a guarantee to our customers which goes far beyond the usual scope. We not only understand the technology of vibration isolation, but also the complex test bench technology. Without this know-how it's not possible to optimally design your vibration isolation system.

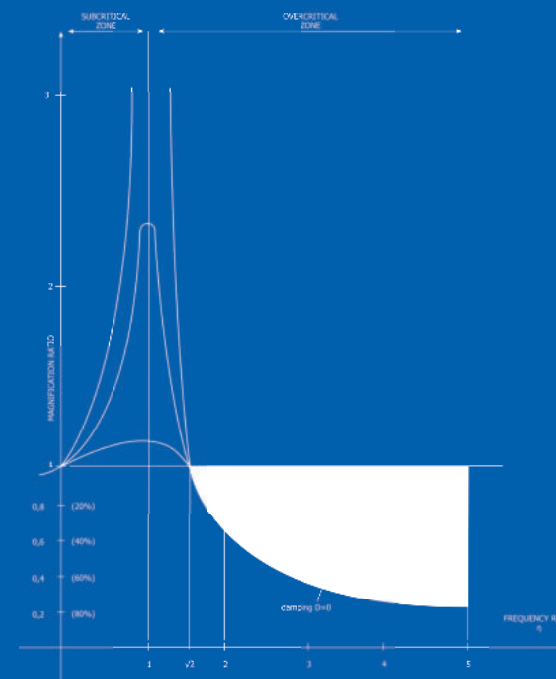
**The aim of every vibration isolation system is to reduce the transmission of vibrations generated by machines and systems to a minimum and to protect the vicinity or highly sensitive devices from vibrations and shocks.**

## Isolation from periodic vibrations

Damped and forced vibrations occur in machines and test benches. An important criterion for effectively isolating the vibrations is the frequency ratio ( $\eta$ ). The larger the value of  $\eta$  the better is the isolation effect. The transmission function given here shows that vibration isolation occurs only when the frequency ratio ( $\eta$ ) is greater than  $\sqrt{2}$ . Vibration isolation takes place effectively if the frequency ratio is greater than 3.

A distinction can be made between "active" and "passive" vibration isolation.

$$\eta = \frac{\text{excitation frequency}}{\text{natural frequency}} = \frac{f_{\text{err}}}{f_0}$$

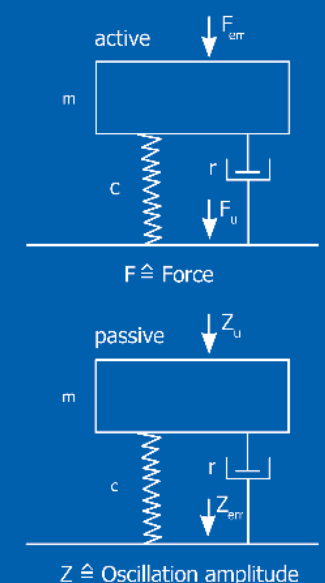


## Active vibration isolation

If the vibrations caused by machines or testing systems are reduced in such a way that the adjacent building structures or machines are not damaged and the people working there are not affected, it is called active vibration isolation.

## Passive vibration isolation

Passive vibration isolation is when sensitive machines or measuring devices, such as precision tool machines, scanning electron microscopes and laser measuring devices are protected from vibrations that occur from outside i.e. affect the building through the ground.



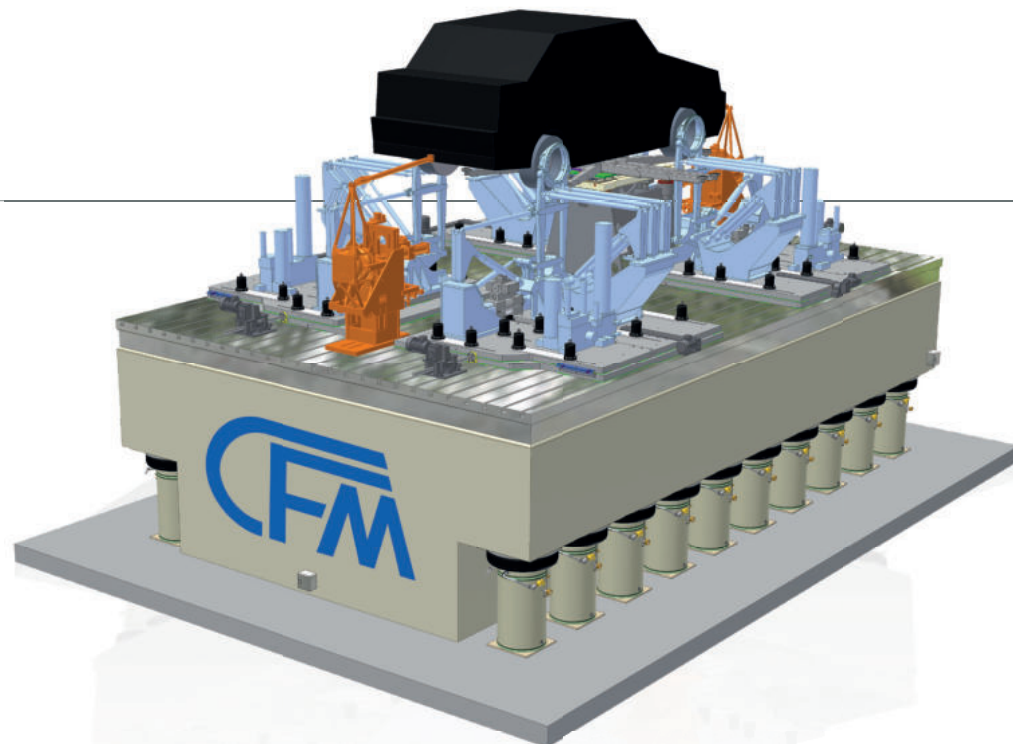


## SEISMIC MASSES

The base of most dynamic test benches or machines are seismic masses. Combined with air or steel spring isolators, these help prevent the inertial forces and vibrations that are generated in machines from being transmitted into buildings or machines that need to be protected.

**CFM Schiller** leads the entire planning of seismic masses including the engineering design; creates your completed foundation as required, and delivers the necessary CFM vibration isolation systems.

In order to ensure that the seismic mass is built according to your specifications we accompany you worldwide before and during the construction phase. You can be sure that everything is being implemented correctly for a building that is not within the normal scope of most construction companies. The foundation is generally made up of a concrete body, a special CFM anchorage system, integrated into the foundation, a T-slot mounting plate and high-strength anchor bolts. They combine to bind the plate with the foundation dynamically and durably. **More than 1 500 installations across the globe testify to our competence and experience.**



## PREFABRICATED FOUNDATIONS

**Small seismic masses made of concrete with mounting plate as finished component** **CFM Schiller** manufactures finished seismic masses up to a weight of 35 t and a width of up to 3 000 mm. Seismic masses as the finished element have the following advantages:

- » The foundations are manufactured with the necessary lifting eyes making it possible to transport them smoothly into your building
- » No onsite construction activity and concrete work
- » Short installation time onsite
- » No additional onsite curing time
- » Can be transported to another location anytime - a major advantage in terms of flexibility
- » Clean and smooth concrete surfaces thanks to system formwork
- » Good damping properties
- » Surface is concise and has high load-bearing capacity thanks to the cast iron or steel mounting plates





## VIBRATION-ISOLATED SUPPORT

An extensive spectrum of air and steel spring isolators is manufactured by CFM Schiller. Our products have been proved and tested for almost 4 decades and are constantly being further developed.

Our air springs cover a wide natural frequency range so that systems with individual levels of isolation can be implemented. Our air spring series include: Rolling lobe belt springs, single convolution air springs, rolling lobe air springs and membrane air springs.

You can find further information in our latest air spring catalogue.

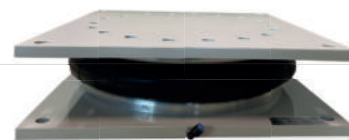
SERIES	LOAD-BEARING CAPACITY [kN]	NATURAL FREQUENCY [Hz]
MAS	2,8 - 200	2,1 - 2,3
BZ & DBZ	3,4 - 137,6	1,5 - 3,3
MBZ	0,65 - 100	3,0 - 5,0
RB-SH	22 - 40,5	1,2 - 1,5
GRB	78 - 248	0,84 - 1,6



Typ RB



Typ MAS



Typ BZ



Typ MAS M



Typ MBZ



TYP GRB

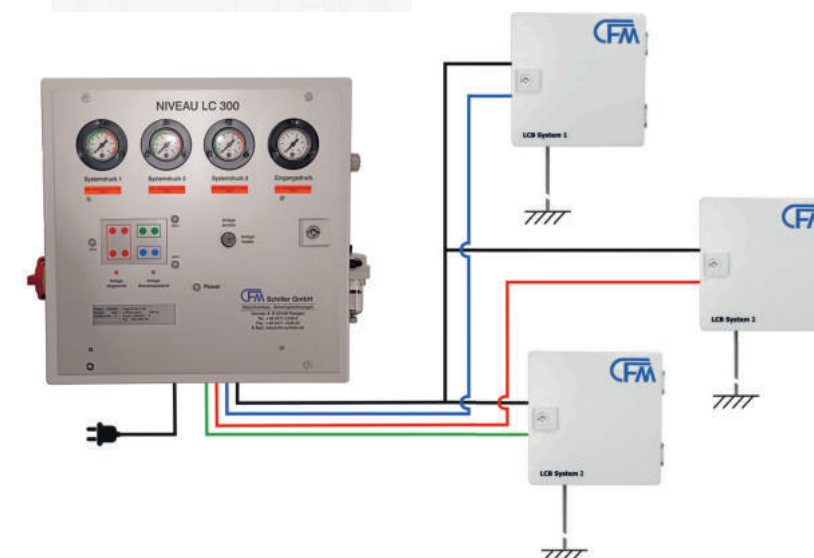
## LEVELLING SYSTEMS

ALL CFM air spring systems are delivered with automatic levelling systems. We offer you all options ranging from simple mechanical control to microcontroller-controlled regulation.

Depending on the application, levelling system EC 300/302 is delivered with the functions "Rapid Deflate" (RDS), "Rapid Inflate" (RIS) and automatic frequency change AFC.

You can obtain detailed information from our brochure "Air springs and levelling systems"

LEVEL CONTROLL UNIT  
EC 303



LEVEL CONTROLL UNIT  
WITH SYSTEM LC 300



LEVEL CONTROLL UNIT  
MC 300-S

LEVEL CONTROLL UNIT  
WE 300



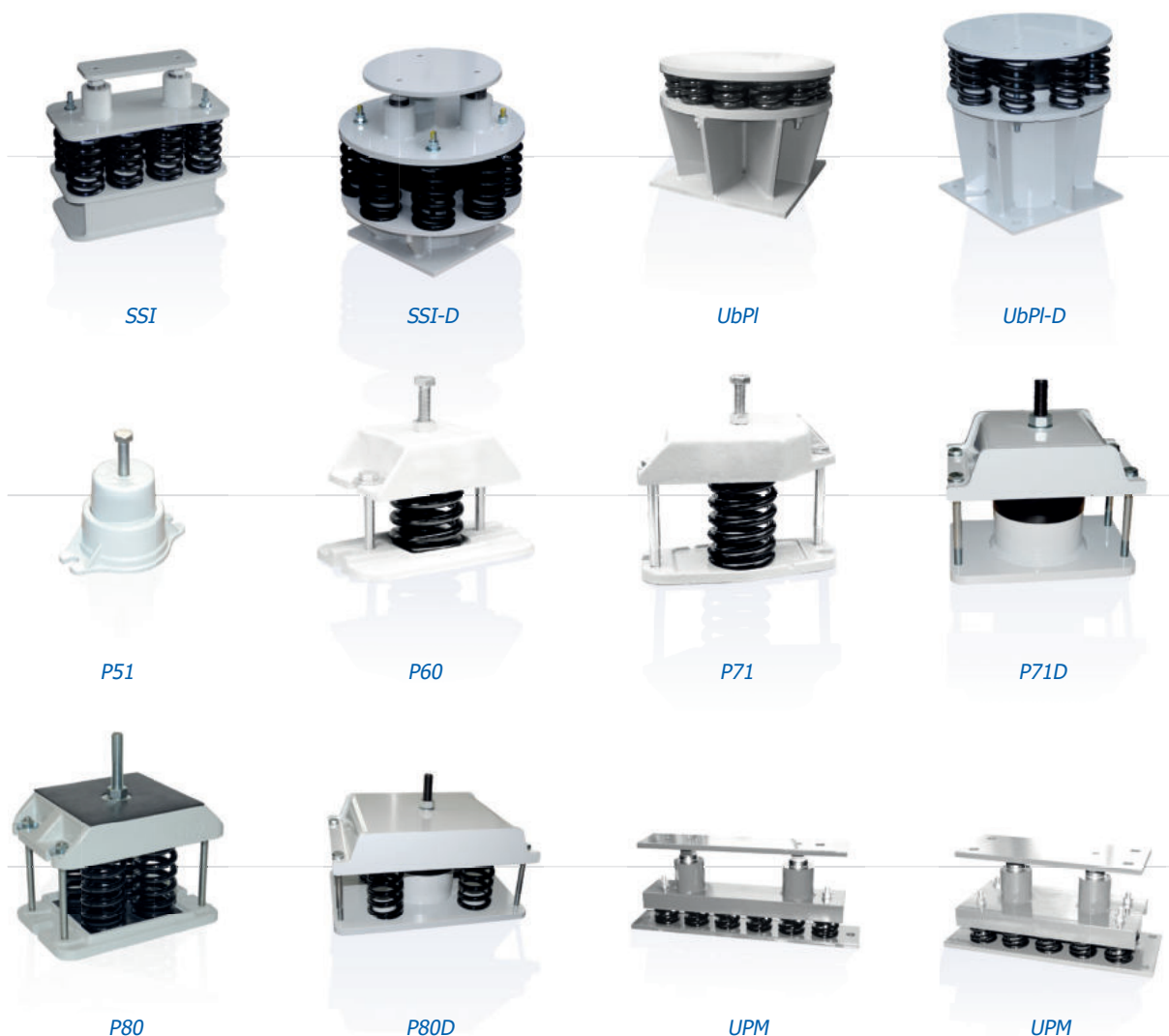
# STEEL SPRING ISOLATORS

In applications where the lowest excitation frequencies are more than 6 Hz and there are no requirements to change the test bench setup, it is possible to use CFM steel spring isolators.

CFM Schiller manufactures a complete product program - from small elements of a few kN to elements of several 100 kN and integrated dampers. Our spring elements are top-quality components which have a long life expectancy and can be easily installed and aligned thanks to their design. The CFM steel spring isolators cover various series with and without viscous dampers.

SERIES	LOAD-BEARING CAPACITY[kN]	NATURAL FREQUENCY [Hz]
P	0,07 - 29,06	1,5 - 4,7
UbPL	55 - 179	2,22 - 3,03
UPM	17 - 87	4,0 - 3,1
SSI	22 - 384	2,1 - 4,5

You can find further information in our latest steel spring catalogue.





A close-up, black and white photograph of a heavy-duty metal T-slot rail. The rail is shown in a perspective view, with its T-shaped cross-section clearly visible. The surface of the metal has a fine, cross-hatched texture, likely from a grinding process. The rail is mounted on a flat surface, and the lighting creates strong highlights and shadows, emphasizing its industrial nature.

# CLAMPING TECHNOLOGY

Base for almost any test rig is a concrete foundation equipped with clamping plates, T-slot rails, or heavy-duty anchor points. This technology belongs to our core competences since the establishment of CFM Schiller in 1978. For every application ranging from small component test rigs to wind turbine test rigs – we offer you the optimal solution.

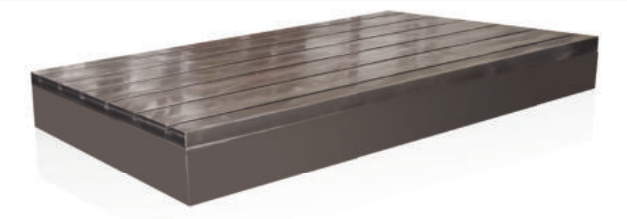
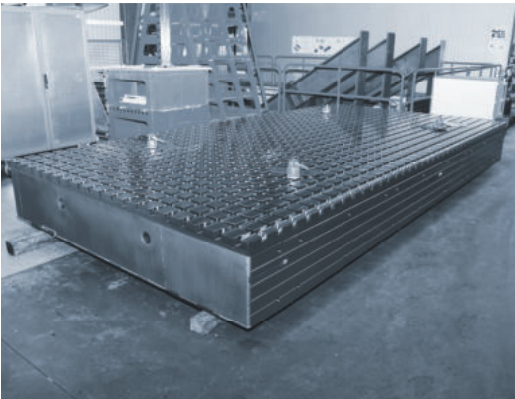


# MOUNTING PLATES

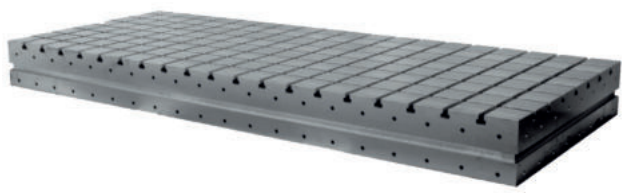
In most of the cases mounting plates are grey cast iron constructions which are designed to have high strength and thanks to their ribbed design can retain their rigidity. The surfaces of the mounting plates are machined in accordance with DIN 876 III and provided with T-slots as per DIN 650-H12. Mounting plates can be installed on CFM steel spring isolators, CFM air springs or CFM elastomer elements.

Mounting plates also are used as precise and resilient surfaces in seismic masses. They are connected to the concrete foundation of a unit using a dynamic-durable CFM anchorage design.

MOUNTING PLATE  
(HYBRID CONSTRUCTION)



T-LONGITUDINAL SLOT



T-LONGITUDINAL  
AND LATERAL SLOT

MOBILE MOUNTING PLATE



# WORK TABLES

CFM Schiller manufactures and delivers work tables for workshops, lab applications and small test benches. The work tables are made up of a stable base frame or floor unit, which is mounted on adjustable feet. The table plate can be delivered in cast iron and steel with T-slots or bore grid. Work tables can also be delivered with vibration isolation.

## TOLERANZTABELLEN:

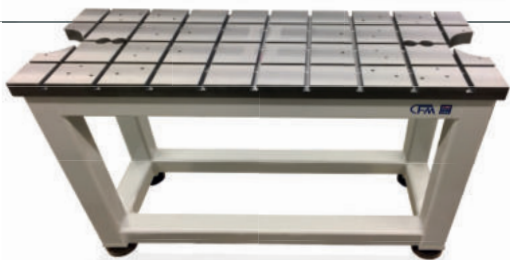
L [mm]	200	300	500	800	1 000	1 200	1 500	2 000	2 500
DIN 876/III	48	52	60	72	80	88	100	120	140

L [mm]	3 000	3 500	4 000	4 500	5 000	5 500	6 000	6 500	7 000
DIN 876/III	160	180	200	220	240	260	280	300	320

Data in  $\mu\text{m}$  DIN 876 / III =  $40 + L : 25 \mu\text{m}$  reference temperature 20 °C.

WORK TABLE WITH AIR SPRING ISOLATORS



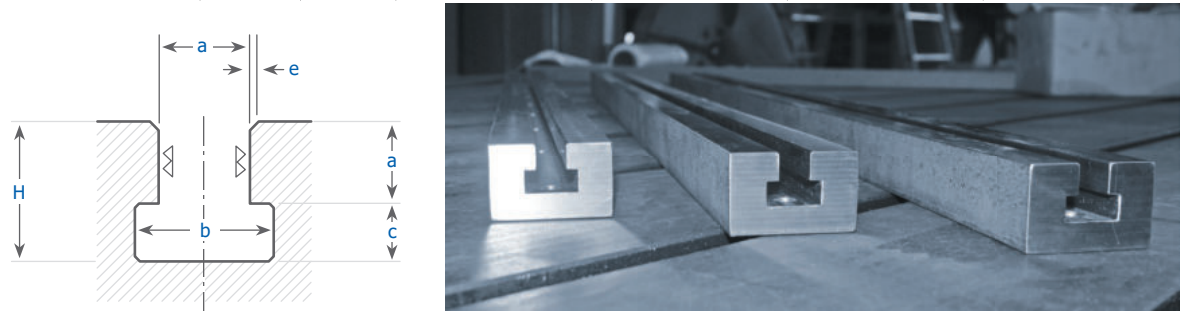


# CLAMPING RAILS WITH T-SLOTS

FOR ASSEMBLING ON FOUNDATIONS OR LABORATORY FLOORS

T-slots are by default manufactured in accordance with DIN 650-H12. Production with higher accuracy in tolerance field H7 or H8 is also possible. Special dimensions of T-slots can be produced on request.

NOMINAL DIMENSION: a [mm]	FOR SCREWS	b [mm]	c [mm]	H [mm]	e [mm]
10	M8	17,5 - 18	8	18	1,0
12	M10	20,5 - 21	9	21	1,0
14	M12 1/2"	23,5 - 24	10	24	1,0
16	M14	26,5 - 27	11	27	1,0
18	M16 5/8"	29,5 - 30	12	30	1,5
20	M18	33,5 - 34	14	34	1,5
22	M20 3/4"	37,5 - 38	16	38	1,5
24	M22 7/8"	41,0 - 42	18	42	1,5
28	M24 1"	47,0 - 48	20	48	1,5
32	M27 1 1/8"	54	22	54	1,5
36	M30 1 1/4"	60	25	61	2,0
42	M36 1 1/2"	70	29	74	2,0

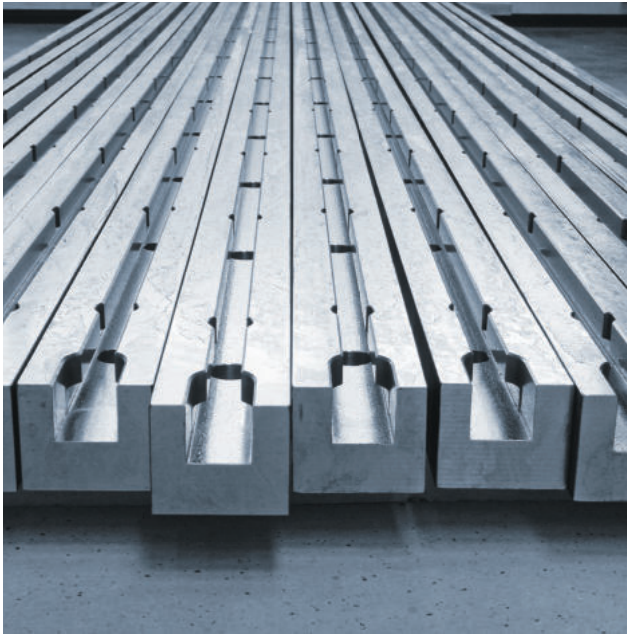


T-SLOT RAILS IN WELDED STEEL DESIGN

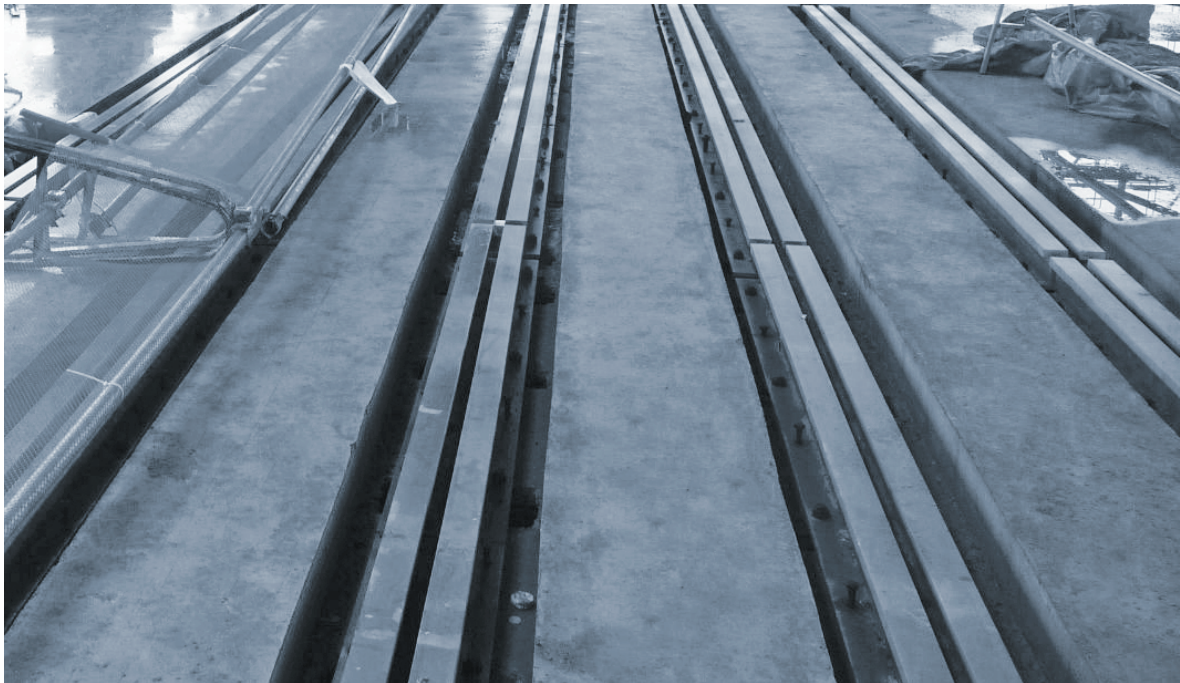
## INDIVIDUAL SPECIAL SOLUTION FOR LARGE PORTAL FRAMES

Clamping rails with T-slots form an alternative fastening element in association with a concrete foundation when only few T-slots are necessary in distances > 500 mm. CFM Schiller supplies mechanically processed T-slot rails in grey cast iron, steel; or stainless steel if there is a high requirement in terms of evenness, parallelism and dimensional accuracy.

All functional surfaces are processed with accuracy. The T-slots are produced in accordance with DIN 650. If the customer accuracy specification is lower, and is only concerned with the possibility of mounting components, we produce T-slot rails with high load carrying capacity in a pure welded steel design. These are primarily used in the field of rotor blade testing when large quantities are required.



T-SLOT



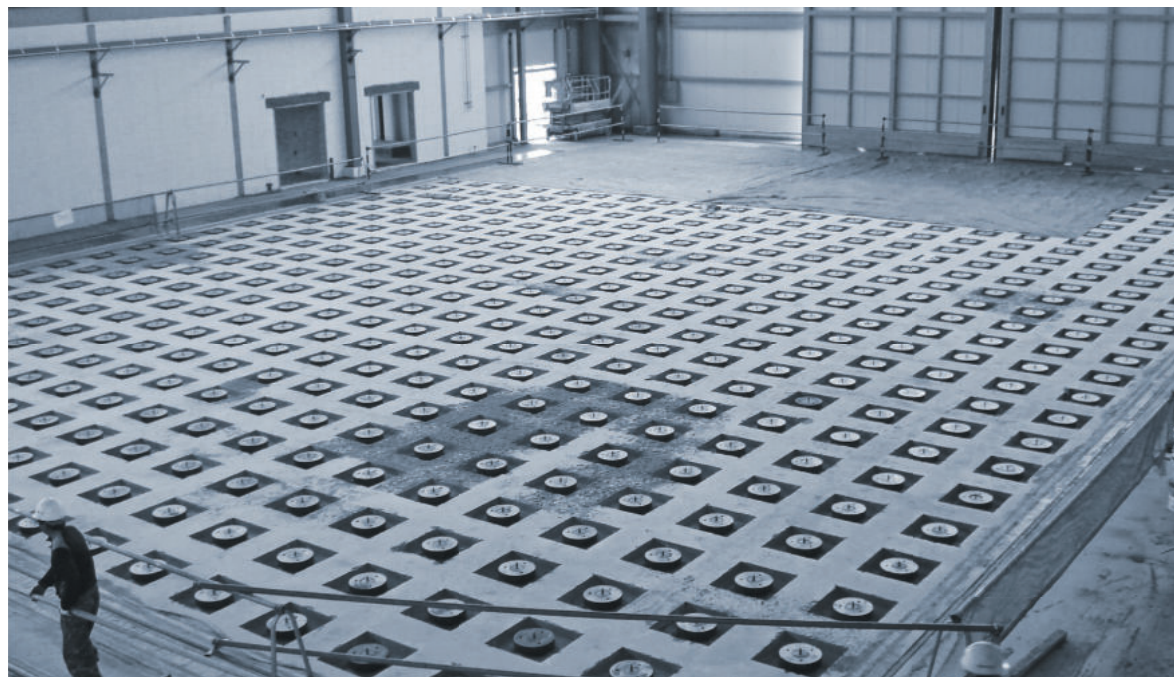
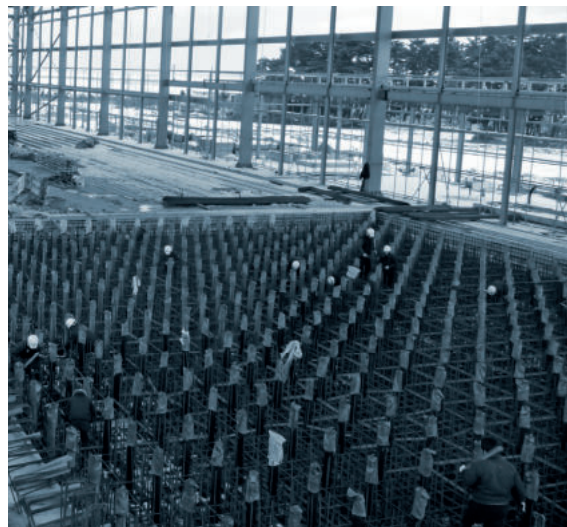
T-SLOT RECESSED AND MOUNTED IN THE FLOOR



## STRONG FLOORS

**There are many applications in which a system seismic mass with mounting plate is no longer sufficient due to the high forces to be withstood. In these cases, CFM Schiller strong floors come into use.**

Strong floors generally have a grid for pre-stressed anchor points of 1 000 x 1 000 mm with pressure plates at the stress points. Typical applications of this technology are span sections for large structure tests and wind turbine component test benches. Stressed surfaces can obviously also be reinforced strong walls that are correspondingly constructed. The transmissible forces for every stress point are between 1 MN and 3 MN. This corresponds to the pre-stressed anchor sizes of M56 and M80.





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Special machine construction, specialized in vibration isolation and test bench systems  
Managing director Dipl.-Ing. Wolfgang Peters

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