

## Dual education system secures technical trainees for companies based in Brasov



Now the school has over 500 students studying in 20 classes for one of the 5 qualifications that are available

### SPGK - Scoala Profesionala Germana Kronstadt

The Kronstadt Vocational School is based on the German dual system for technical education. The school's purpose is to ensure qualified technicians as employees for the technical companies located around Brasov. Due to the lack of schools and institutions that are able to offer training and education in the technical field, there is a very high demand for qualified young workforce in this area. SPGK (Scoala Profesionala Germana Kronstadt) is a vocational school where students learn a profession and obtain their qualification, whilst emphasis is put on practice.

The target group of the SPGK vocational school are students aged 15-16; the programme duration is 3 years. The partnership involves a student-parent-school relationship, because after having passed all the examinations and interviews, the students have to sign a contract concluded between the college, the parents and the companies involved

in the project. The contract contains the terms and school guidelines, the terms for the scholarship granted during the studies (all students receive a 400 RON scholarship/month, which corresponds to approx. EUR 90.00/month) as well as the terms of employment that apply after graduation.



Scoala Profesionala  
Germana Kronstadt



Founders of the school project, teachers and representatives of the DWK- fit for the future association at the grand opening of SPGK's practical workshops

SPGK (Scoala Profesionala Germana Kronstadt) is the result of the partnership between the Brasov city hall that was in charge of finding and reconstructing the premises, the County School Inspectorate that dealt with the legal issues of establishing the school as a state institution and provided the required teachers and staff, and the German companies based in and near Brasov which founded the DWK-FIT FOR THE FUTURE association that was in charge of supplying the necessary equipment for the school, promoting its programmes and providing jobs for the SPGK graduates.

### Founding Year and Mission Statement

The SPGK project was started by the companies located around Brasov. When the vocational school started its activity in 2012, 129 students were enrolled in 5 classes, and 2 qualifications (CNC operator and electromechanical technician) were offered. SPGK strives to become a model of excellence in education and professional training, and the preferred partner of the economic environment in Brasov, which is due to the following facts:

- Qualification of the graduates who are adapted to the requirements of the labour market
- High-standard technical equipment and high-standard teaching methods
- Motivated and passionate master trainers

When the vocational school started its activity in 2012, 129 students were enrolled in 5 classes, and 2 qualifications (CNC operator and electromechanical technician) were offered. Now, in 2015, the school has over 500 students studying in 20 classes for one of the 5 qualifications that are now available. The selection process involves 2 stages: a written exam and an interview with the partner companies such as Ina Schaeffler, Hutchinson, Stabilus, Ramos, Continental, Aerotec etc. In order to pass, the student

must obtain a minimum grade of 6 (10 is the best grade in Romania), whilst the interview constitutes 60% of the grade. Now, students come from all over the country to enrol in SPGK, not only from Brasov and the cities nearby. There are currently 6 applicants per training position. After having graduated, 94% of the students start working at one of the partner companies in Brasov.



### Core competence / professions learnt by the students

The students are trained for one of the following professions: CNC operator, electromechanical technician, welder, moulding technician and mechatronics engineer.



Concept Turn 450 and Concept Mill 250 used in the practical workshops for mechatronics and conventional cutting

## Machinery / equipment of the school

The grand opening of SPGK's practical workshops was in September 2015. There are currently 8 workshop areas:

- Locksmith works
- Welding
- Conventional cutting
- CNC operations
- Pneumatics and hydraulics
- Logistics
- Mechatronics
- Manual operation

### The objective of these workshops is:

- to increase the level of student qualification
- to obtain a standard qualification level for the partner companies
- to use the same cutting-edge technology and equipment that is used in the factories, which will facilitate and accelerate the students' integration into the working environment at the respective company

The CNC operations workshop is equipped with 2 educational machines from EMCO: The CONCEPT TURN 450 TCM turning machine and the CONCEPT MILL 250 milling machine.

## Curriculum: share of theory and practice

The entire education system of SPGK is based on 40% theory and 60% practice. The students have the opportunity to practice at their future workplace along with the company's employees who are responsible for their training. By doing so, the students become more familiar with the technologies and the workflow they will use and follow at their future workplace. During the last semester at the vocational school, emphasis is put on teaching the students the skills, knowledge and abilities required in the production departments of the partner companies.

## The reasons why SPGK opted for EMCO

SPGK was looking for a complete educational solution to organise the training in the areas of operation and programming. EMCO was the only supplier of a complete solution including machines and software especially developed for training purposes.

Besides, EMCO was the only supplier offering an interchangeable system and thus the possibility to train various numerical control languages on the same machine.

EMCO provided support by means of sustainable training and two CNC machines – one Concept Turn 450 TCM and one Concept Mill 250 – including the control versions Siemens 840 D Solution Line, Fanuc 31i, Heidenhain TNC 426/430 and the accessories needed for advanced CNC education.

The support continued with equivalent classroom software, 3D simulation software and EMCO's e-learning solution called E[MCO] Campus.

A training series for the teachers took place on site, whilst they will also have the opportunity to visit Austria to participate in a training session at the EMCO headquarters.

EMCO Industrial Training provides industrial standard and training close to the industrial requirements. EMCO Concept Range, for instance, provides the unique possibility of an interchangeable control unit. The students train with the latest CNC controls, e.g. Siemens 840 D SI or Fanuc 31i, and learn to work efficiently with practice-orientated programming.

The machines have been used for training purposes since 2015 and will help qualify the students for their jobs in the regional automotive companies that supported the investment.

# [Technical Data]

**EMCO** industrial training

Designed for your profit

## CONCEPT TURN 450

Work area	
Swing over bed	Ø 430 mm
Swing over cross slides	Ø 210 mm
Distance between centres (Spindle nose – tailstock centre tip)	687 mm
Maximum turning diameter	Ø 220 mm
Maximum turning length	310 mm
Maximum bar diameter	Ø 45 mm
Travel	
Travel in X	160 mm
Travel in Z	310 mm
Main spindle	
Speed range	0 – 6300 rpm
Spindle torque	78 Nm (57.5 ft/lbs)
Spindle connection DIN 55026	KK 5 (A2-5)
Spindle bearing (inside diameter)	Ø 80 mm
Spindle bore	Ø 45 / Ø 53 mm
C axis	
Resolution of the round axis	0,01°
Rapid motion speed	1000 rpm
Speed	78 Nm (57.5 ft/lbs)
Main motor	
Drive power (100% / 40% ED)	9 / 13 kW (12/17.4 hp)
Tool turret	
Number of tool positions	12
Tool holding shaft according the VDI (DIN 69880)	30
Tool cross-section for square tools	20 x 20 mm
Shank diameter for boring bars	Ø 32 mm
Turret indexing time	0.14 Secs
Driven tools DIN 5480	
Number of stations	6
Power	4.0 kW (5.4 hp)
Torque	16 Nm (11.8 ft/lbs)
Speed range	0 – 5000 rpm
Feed drives	
Rapid speed X / Z	20 / 24 m/min
Feed drives	
Feed force in the X / Z axis	4000 / 6000 N
Acceleration time	0.1 Secs
Position variation Ps (according to VDI 3441) X / Z	0.003 / 0.005 mm
Standard tailstock	
Quill stroke	120 mm
Quill diameter	Ø 60 mm
Quill thrust	5000 N (1124 lbs)
Cooling agent equipment	
Tank volume	230 liter (60.8 Gal)
Pump performance at 3.5 (optional 10 bar)	0.57 (2.2) kW (0.77 hp)
Dimensions	
Rotary axis height above the floor	1152 mm
Machine height	1940 mm
Machine setting up area (B X T)	2250 x 1650 mm
Total weight	3300 kg (7260 lb)

## CONCEPT MILL 250

Work area	
Travel along X axis	350 mm
Travel across Y axis	250 mm
Travel vertical Z axis	300 mm
Min. distance spindle nose - table surface	120 mm
Max. distance spindle nose - table surface	420 mm
Table	
Table dimensions (L x W)	520 x 300 mm
T-slots: Quantity, width, spacing:	5 x 12 x 45
Max. table load	100 kg (220 lb)
Milling spindle	
Max. speed	10000 rpm
Power asynchronous AC motor	7 kW (12 hp)
Maximum torque	41 Nm
Drive	infinitely variable
Axes	
Rapid motion speed in X / Y / Z axes	15 m/min (59"/min)
Work feed	0 – 10 m/min (0 – 39.3"/min)
Max. feed force	2400 N
Positioning variation acc. to VDI 3441 (X / Y axis)	0.004 mm
Positioning variation acc. to VDI 3441 (Z axis)	0.004 mm
Tool system	
Number of tool stations	20
Tool taper according	DIN 69871 SK 30
Tool management	chaotic*
Max. tool diameter (*free adjacent pockets)	63 (*80) mm
Max. tool length	200 mm
Max. permissible tool weight	5 kg (11 lb)
Tool changing time	2.5 s
General data	
Connected load	9 kVA
Machine diameters (L x W x H)	1600 x 1700 x 2200 mm
Weight	1970 kg (4334 lb)
Compressed air required	6 bar

## EMCO WinNC controls

Sinumerik 810D/840D	Heidenhain TNC 426/430
Sinumerik 820	Sinumerik 810
Sinumerik Operate	FANUC Series 0
FANUC Series 21	EMCOTRONIC TM02
FANUC Series 31i	Fagor 8055 MC

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Smart industrial solutions

EMCO GmbH  
Salzburger Str. 80 · 5400 Hallein-Taxach · Austria  
Telefon +43 6245 891-0 · Fax +43 6245 86965 · [info@emco.at](mailto:info@emco.at)

SC ALLMETECH TOOLS & MACHINES SRL Adresa: Strada  
Morilor, nr 36, cod 700011 Iasi, Romania Nr.reg.com/an:  
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