



**NEW-TEM**

**SGM THERMAL DEBURRING MACHINE**

**PROPOSAL NUMBER**

**XP F 450 (Dint 260 \* L 350 mm) / 21-192\_00**

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The data, the technical features and the components used, described in the present document are not binding; modifications can be made at any moment for improvement of the machine and/or the process that takes place inside it.

## SECTION 1

### *Introduction to thermal deburring process*

The “thermal deburring” treatment submit the parts to be treated to an actual “explosion” inside a deburring chamber where occurs a phenomenon very similar to that characteristic of internal combustion engines of vehicles. The combustion has the effect of oxidizing the burrs that may be present on the parts.

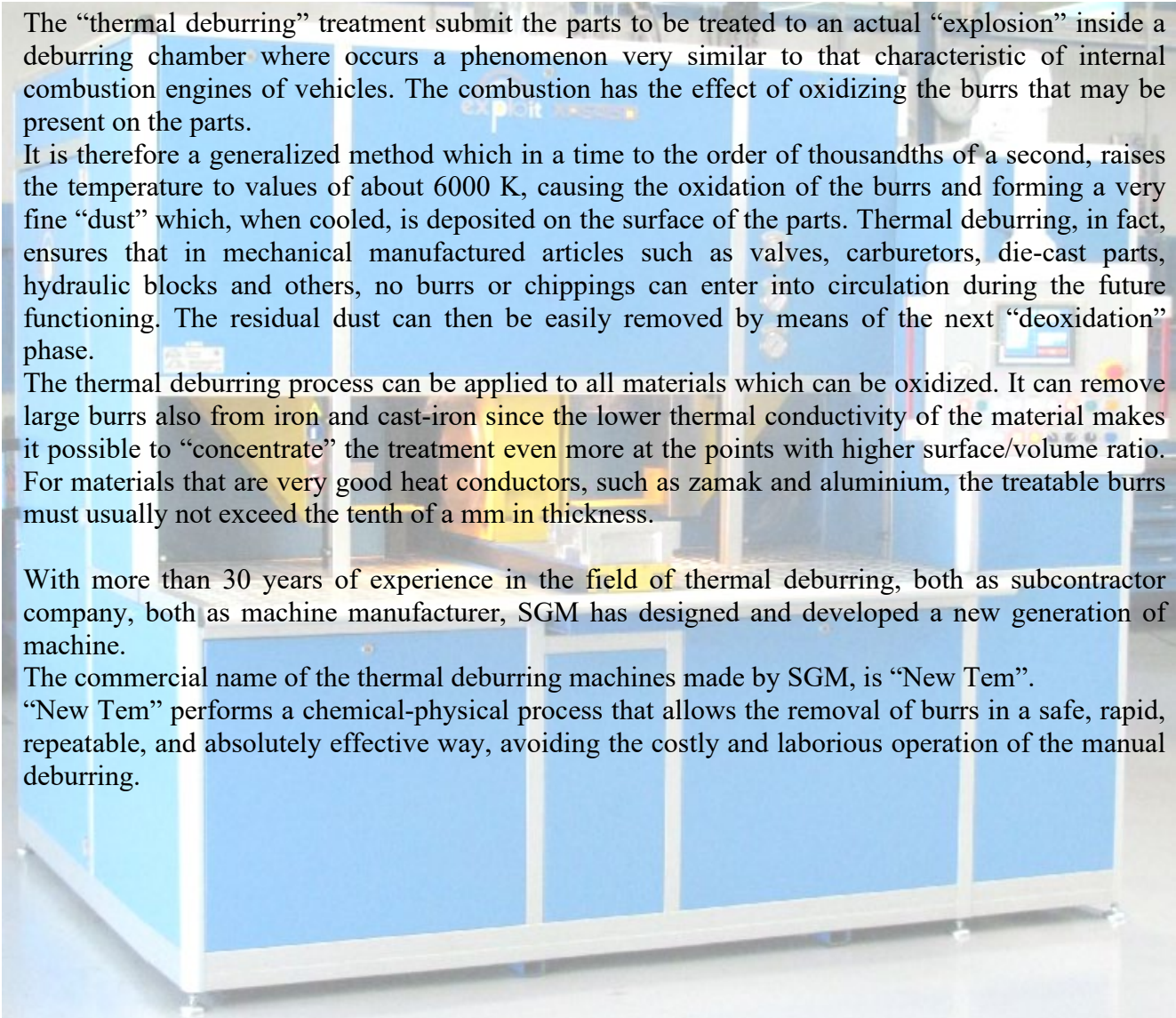
It is therefore a generalized method which in a time to the order of thousandths of a second, raises the temperature to values of about 6000 K, causing the oxidation of the burrs and forming a very fine “dust” which, when cooled, is deposited on the surface of the parts. Thermal deburring, in fact, ensures that in mechanical manufactured articles such as valves, carburetors, die-cast parts, hydraulic blocks and others, no burrs or chippings can enter into circulation during the future functioning. The residual dust can then be easily removed by means of the next “deoxidation” phase.

The thermal deburring process can be applied to all materials which can be oxidized. It can remove large burrs also from iron and cast-iron since the lower thermal conductivity of the material makes it possible to “concentrate” the treatment even more at the points with higher surface/volume ratio. For materials that are very good heat conductors, such as zamak and aluminium, the treatable burrs must usually not exceed the tenth of a mm in thickness.

With more than 30 years of experience in the field of thermal deburring, both as subcontractor company, both as machine manufacturer, SGM has designed and developed a new generation of machine.

The commercial name of the thermal deburring machines made by SGM, is “New Tem”.

“New Tem” performs a chemical-physical process that allows the removal of burrs in a safe, rapid, repeatable, and absolutely effective way, avoiding the costly and laborious operation of the manual deburring.



## SECTION 2

### *Description of the thermal deburring process*

#### **Operation before deburring**

- Removal of oil and dirt from the surfaces of the parts
- Removal of burrs and chips already detached and present on surfaces and in holes (for example using compressed air)

#### **Loading and unloading the baskets**

An operator will be responsible for manually positioning the parts into the working baskets, loading and unloading the baskets above the tray of the chamber's axle (See figures 2 and 3). Then the machine, thanks to two modern robots, will automatically load the baskets, from time to time, in the deburring chamber.

Unlike in the traditional machines with the turning table, the operator has enough time for positioning the parts in the basket; however, it is possible to make the process fully automatic also during the phase of filling and positioning the basket.

#### **Specifications**

Material	N° of cycles	Maximum thickness of treatable burrs [mm]
ALUMINIUM	1	0,1
BRASS	1	0,1
ZAMAK	1	0,1
STEEL	2	0,3
CAST IRON	2	0,3

#### **Operation after deburring**

- Deoxidation
- Treatment with protective oil on the deoxidized parts

For Deoxidation process SGM produce also Industrial Washing Machines WM800, that can easily be adapted for any industrial context; WM800 washer can use aqueous, environmentally-compatible products that do not require rinsing and also features an ultrasound and vacuum system that makes washing more efficient.

For these operations, SGM makes use of ERGON chemicals ([www.ergonsrl.biz](http://www.ergonsrl.biz)).

#### **Final results on suitable parts**

No burrs or chippings in the parts

No surface damages

No changes in the metallurgical properties

No changes in the shape of the particulars or machining tolerances

#### **Estimated Production**

Excluding the phase of positioning the parts in the baskets:

For aluminium, brass and zamak 70-80 cycles per hour;

For cast iron and steel 30-40 cycles per hour.

## SECTION 3

### *Machine Description*

#### **Advantages of New-Tem**

New-Tem machine has the peculiarity of having a cylindrical shaped deburring chamber, with both bases open, positioned and moved along the horizontal axis (international patents).

The cylindrical chamber is inserted inside a suitable support that allows horizontal movements perpendicular to the cylinder axis.

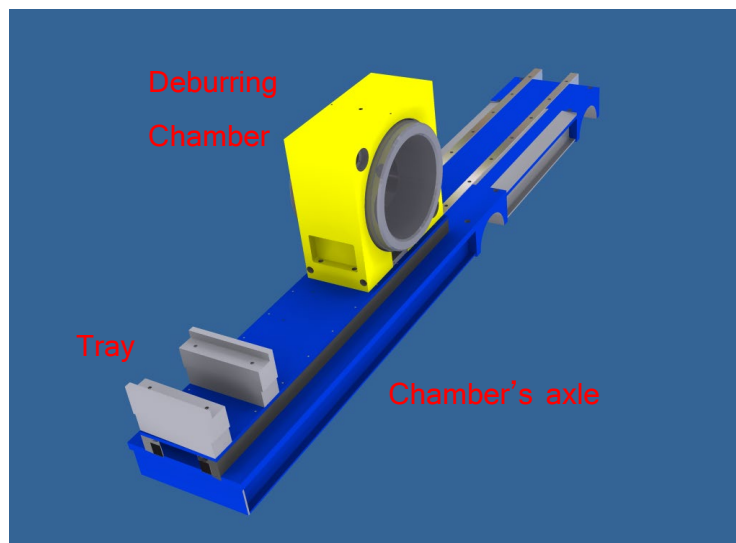


Figure 2

The horizontal axis of the deburring chamber is the main innovation that allowed the jump in quality compared to traditional machines. This patented solution leads several advantages to the main machine / process parameters:

- *Compactness and modularity of the machine:* reduction of the closing stroke of the mobile plate, which allows constructive simplification and use of deburring chambers with different lengths
- *Delicacy:* the decentralization of the flame provides greater delicacy of the process, as the pieces are not directly invested by the flame front.
- *Efficacy:* the chamber of cylindrical shape and the basket of rectangular shape guarantee an optimal distribution of the process gases around all the pieces, even from below.
- *Simplified positioning:* the delicacy of the process makes not necessary to fix or screw the pieces reducing the positioning time.

## Machine Specifications

OVERALL DIMENSIONS	
Width (cm)	270
Depth (cm)	210
Height (cm)	226 (+ 40 for fumes outlet)
Weight (kg)	10500 kg

The deburring chamber has cylindrical shape. The machine is extremely flexible, since it is possible to use on the same machine chambers of different lengths. Also a customer technician properly prepared is able to replace the chambers in less than four hours.

DEBURRING CHAMBER'S DIMENSIONS XPF 450	
Internal diameter	260 mm
Useful internal length (small chamber)	330 mm
Max operating pressure	20 bar

NOISE PRODUCED BY THE MACHINE	
Weighted equivalent continuous noise level A measured at one meter distance in front of the loading station of a similar machine XP 450 model (chamber L270)	73,54 dB(A)

REMOTE ACCESS	module of remote assistance <b>eWon</b>
With this device, the end user can control the production parameters stored, according to the needs of production and quality required by the company. Moreover SGM can act promptly in case of anomalies and / or failures (with customer authorization)	

<b>CONTROL PANEL (PLC)</b>	Siemens 1500
<b>BDE INTERFACE</b>	Siemens Confort 12 in color with internal memory 12 MB

The machine uses a mixture of Methane (CH<sub>4</sub>) and Oxygen (O<sub>2</sub>) for the thermal deburring process which takes place in the deburring chamber, and water for cooling the walls of the chamber, the mixing block and the oil control unit.

The compressed air is required for the cleaning of the chamber and the mixing block at every "chamber closure" phase.

For correct working it is necessary to provide the supply of gases (CH<sub>4</sub> and O<sub>2</sub>), power, water and compressed air having the features described in the "Pressure Supply" table.

ELECTRIC SUPPLY		
Rated voltage	400 V as required	
Number of phases	3P + N + PE	
Frequency	50 Hz	
Full load current	40A	
Auxiliary voltage	24 VDC	
Installed power	20 kW	
PRESSURE SUPPLY		
Oxygen (barg)	MIN 8	MAX 10
Methane (barg)	MIN 8	MAX 10
Compressed air - dry and oil free (barg)	MIN 6	MAX 12
WATER COOLING SUPPLY		
Flow pressure	MIN 2 bar g	
Flow temperature	MAX 14 °C	
Min. flow	0,6 m <sup>3</sup> /h	
HYDRAULIC SYSTEM		
Operating pressure	50 - 220 bar	
Control unit motor power	15 kW	
INSTALLATION		
Environment	protected from adverse weather and solar radiations	
Environmental temperature	From +10°C to +35°C	
Fumes outlet tube connection	□370 x 285 mm	


**ATTENTION!**

The user must provide adequate protection devices for the supply lines to the machine

Machine design:

- Is compatible either for Automation or for subsequent robot assembly;
- Is ergonomic and compact;
- Has been made for friendly-Maintenance;
- Is safe and compact no mechanical interference with operator, designed under CE directive;
- Allows crane loading;

The machine has to be connected with gas bundle (air pressure, Oxygen and Methane), as mentioned above.

For external automatization different option can be adapted (robot anthropic; robot 3-axys system; automated roller conveyor with air or electric pushers (brushless)) and can be connected with XP F PLC; SGM can offer also automatization for XP F.

Execution language is in Russian, and also all the devices into the control panel are in Russian.

During Thermal Deburring process, SGM machine allow operator to program even gas parameters



of deburring process, and on the display machine operator can monitor Gas parameters. In order to improve gas control XP F has a system called cut-injection of gases, which allows the gases to be discharged if the limit imposed on the machine for the automatically programmed activity is exceeded, so as to always safeguard the components to be deburred.

XP F has Indicator lights (red with sound noise if there is an anomaly of operation of the machine; orange if machine is ready to work but not working; green when machine is working normally). External Cooling units for hydraulics and process-related has to be connected to the XP F, if not available into the customer factory, it could be provided as extra optional.

XP F presents:

- its own connection for the discharge of chamber fumes;
- Siemens Confort touch screen display, where operator can observe deburring process and can program and command even manually the machine, all the commands are in Russian Language;
- predisposition for Industry 4.0 ready, that allow remote control and command from back office operator.

## SECTION 4

### *Baskets, fixing tools, spare parts, accessories*

In the loading/unloading phase, the operator or the robot will position the parts into the working baskets and then will load and unload the baskets above the tray of the chamber's axle. Then the machine is completely autonomous. These phases can be fully automated, using a mechanized roller, on customers request, increasing process efficiency.

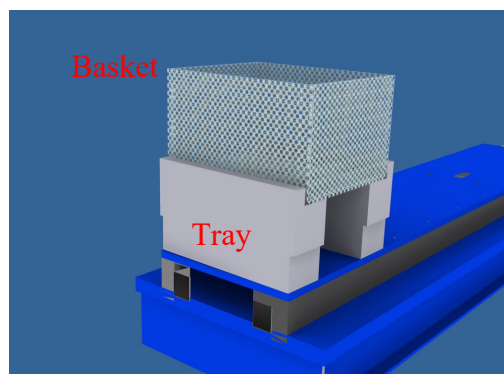


Figure 3

The baskets, in which the operator inserts the pieces to be treated, are universal.

One of the advantages of New-Tem, compared to the traditional machines, is the simplified positioning of the parts. A lot of items can be treated inside the basket positioned in random way; nevertheless, SGM's technicians develop special, but simple, tools in order to protect the delicate shapes of some customer's items.

The special tools developed and made to measure for the customer, can be also in aluminium. These tools are then inserted inside the baskets. They have the scope of preserving the external threads and / or the sealing seats from damages that may occur in the chamber where the pieces may hit each other.

Thanks to the delicacy of the process, the customer can use also perforated aluminium sheets for

laying the pieces on one or more floors, and avoid any kind of dent and / or damage on the same.

<p><b>RANDOM</b></p>			
<p>Minimum time required for the positioning</p>			
<p><b>ORDERED</b></p>			
<p>High productivity Increase of delicacy</p>			
<p><b>SPECIAL TOOLS</b></p>			
<p>Positioning speed and maximum delicacy</p>			

## SECTION 5

### *Safety devices*

The thermal deburring machine manufactured by SGM is equipped with systems for regulation and active and passive safety systems: these systems together allow the control of the operating parameters and help to prevent hazards for persons working on the machine or present in the vicinity.

- **Protection from combustible gas leaks**

Two gas detectors are provided for protecting the operators and the entire installation from the possibility of creating explosive atmospheres.

- **Protection from possible flash-backs**

The technical gases circuit is provided with special devices against flashbacks that could possibly come from injection circuits in the chamber (downline) and spread to gas supply circuits (upline)

- **Protections of the hydraulic system**

The hydraulic system is designed and constructed to guarantee all the conditions for operation in complete safety. All the components of the hydraulic system are designed for a maximum operating pressure greater than the maximum operating pressure of the machine; the pipes are however positioned inside fixed guards, adequately protected from accidental impact. Moreover, the system is protected by pressure relief valves which prevent the components from exceeding the permitted pressure.

- **Protection of high pressure's moving elements**

Access doors with closing monitored (through micro safety switch) allow to view and control, at standstill, the mechanical parts moved by the oil's high pressure system

- **Protection of load/unload robots moving elements**

The operator can never access the areas in which there are moving parts:

- panels to protect the robot loading-unloading area
- external shutter for the entry and the exit of the tray
- internal shutter for the access of the chamber inside the closure area

## SECTION 6

### *Reference regulatory standards and documentation*

The reference documentation for the design and construction of the machine by SGM is as shown below:

- ☞ DIRECTIVE 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment

- ☐ Standard UNI EN 12516-2:2014 concerning “Industrial Valves - Mechanical Resistance of valve shells - Part 2: Calculation method for steel valve shells”
- ☐ Standard UNI EN 12516-4:2014 concerning “Industrial Valves - Mechanical Resistance of valve shells - Part 4: Calculation method for valve shells made of metallic materials other than steel
- ☐ Standard UNI EN 14359:2011 concerning “Gas-loaded accumulators for fluid power applications”
- ☐ Machinery Directive 2006/42/EC
- ☐ CEI EN 60204-1 (2006): Safety of Machinery- Electrical Equipment of machines- Part 1: General requirements
- ☐ UNI EN 12100:2010: Safety of Machinery - General Principles for Design - Risk Assessment and risk reduction
- ☐ Directive 2014/35/EU of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
- ☐ Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility

In the machine design phase other technical standards, not included in the above list, were also applied, relative to specific safety aspects, such as, for example, standard UNI EN ISO 13857:2008 concerning the safety distances to prevent hazard zones being reached by upper limbs, standard UNI EN ISO 13849-1:2008 concerning the safety-related parts of control systems, as well as Standard UNI EN ISO 13850:2008 concerning emergency stop devices.

### **General machine documents in English language**

- CE Declaration of Conformity in compliance with Machinery Directive 2006/42/EC and the P.E.D. 2014/68/EU relating to pressurised equipment and machines.
- CE/PED Declaration for component, methane metering cylinder with the S.N. assembled on the machine.
- CE/PED Declaration for component, explosion chamber S.N. assembled on the machine.
- Service Manual, technical documentation and diagrams to allow operation, safety and routine maintenance of the equipment.

## **SECTION 7**

### ***Warranty, Installation and Training***

We are pleased to offer this program as follows:

#### **A. Warranty**

1. The warranty on the equipment quoted herein will be of 24 months (2 years) starting from the date of the final testing (but no more than 6 months from the delivery date). During this period, all defective or malfunctioning parts will be replaced; the parts

subject to wear are excluded from the guarantee.  
 The warranty is based on a use of the machine of maximum 90 000 cycles per year.

2. Travel, room and board costs of technician will be at the customer's charge.
3. The guarantee will expire in case of bad use of the machine or failure to observe what is specified in the manual.
4. Service assistance requested by the customer for warranty repairs (work hours and / or spare parts) will be at no charge with remote connection suitably performed.

**B. Installation and start up**

The customer, according to the specifications given by SGM, shall install machine in the final place with wiring connected, electrical power, process gases, compressed air and water available. Machine shall be also connected to an exhaust pipe (responsibility of the customer).

The machine final supervision and start-up will be provided by SGM from three (3) up to five (5) days for each machine.

Travel, room and board costs of technician will be charged in the final invoice.

**C. Training**

During the start up of the machine, SGM will provide training based on the following schedule:

- general functioning of the machine;
- assistance to the real production of the customer;
- explanation of the safety devices;
- explanation of the ordinary maintenance;
- deburring chamber change instructions in case of purchase of additional set

Training will be executed during regular first shift working hours by a qualified SGM service technician, eventually assisted by a professional translator (dispensed by the customer).

**Rates for our technical staff abroad**

- Technical Assistance .....
- Travel Tickets .....
- Transfers, Food and Accommodation .....

**SECTION 8**

***Pricing Summary***

Section 3 XP F 450 CE chamber Dint 260 \* L 350 mm .....

Section 4. Baskets and suggested spare parts set and accessories .....

Section 7    Installation & Training .....

