Energy saving and environment


CERTIFICATO
ISO 14001:2004
DEKRA Certification
certifica che l'azienda
METAL WORK
METAL WORK S.p.A.
Settore:
Sede:
IAF

Metal Work SpA has always placed great emphasis on environmental issues, and now – following creation of the Environmental Management System and receipt of UNI EN ISO 14001 certification in 2000 – we wish to make our commitment public.

Metal Work is fully committed to:

A. complying with all the applicable laws and regulations
B. continuously seeking to reduce emissions and waste
C. continuously seeking to reduce the consumption of water, energy and raw materials
D. adopting technological processes having the lowest environmental impact
E. training all employees in order to encourage the adoption of measures to safeguard the environment.

Metal Work products are sold all over the world. Being pneumatic products, they intrinsically consume large amounts of energy. We are aware of this and we feel it our responsibility to provide our customers with information to help them reduce energy wastage.

At the end of their working life, our products have to be disposed of. Even at this final stage, it is important to note that most of their parts can be recycled, which is why we provide you with information to help you to dispose of them correctly.

Materials used in Metal Work products

Nearly all Metal Work **products** are designed so that at the end of their working life they can be taken apart to separate the constituents. Only certain small subassemblies are difficult to dismantle, so they have to be disposed of still assembled.
The materials of which our products are made are listed in detail on the first page of the catalogue for each family, under the heading "Component Parts". There is a full list and a cutaway drawing of a typical product in each family.
The choice of using selected materials and lubricants has contributed to position Metal Work products in the class of NON-HAZARDOUS SPECIAL WASTE at the end of their useful life, in accordance with Directive 91/689/CE. This condition only applies if the products have not been contaminated during operation by pollutants included in the list of hazardous substances.

Product **packaging** adopts the following criteria:
- Each product comes in a cardboard box. The cardboard is corrugated and made of recycled material. The printed words cover a small area to save as much ink as possible.
- When cardboard boxes cannot be used as they do not provide enough protection or the right shape is unavailable, some products are protected by sheets of polyethylene bubble wrap.
- Small products are contained in clear polyethylene bags.
- Gaskets are contained in black polyethylene bags as they are sensitive to light.
- Pneumatic cylinders are protected by polyethylene mesh.
- The single products are then placed in larger boxes, which are also made of recycled corrugated cardboard and have a white paper film on the outside.
- The boxes and loose products are held in position inside the larger box by means of crumbled sheets of paper which are fully recycled and can be reused.

As a result of this policy, 95% of the packaging material is comprised of cardboard, and 80% of this is obtained from recycled paper.

CONAI Metal Work is a member of CONAI, the Italian Packaging Consortium, set up to promote the recovery and recycling of packaging material. It must be highlighted that Metal Work is required by law to pay CONAI an environmental contribution of €30/tonne for paper and cardboard, and €72.30/tonne for plastic packaging (2008 figures). Clearly, it is in the interest of all of us to reduce the weight of packaging, recycle it and prefer paper to plastic.

Below is a list of materials and general indications on how to dispose of them.

METAL
- Aluminium
- Cast aluminium alloy
- Cast zamak
- Steel
- Brass
- Sintered bronze

These materials can be taken to a recycling plant as scrap.

PLASTIC
- POM – Acetal Polyoxymethylene Copolymer: Hostaform® and others
- PA – Polyamide polymer / Nylon: Grilamid, Durethaned, Zytel and others
- ABS - Acrylonitrile butadiene styrene polymer: Novodur and others
- PET – Polyester resin: Rynite and others
- PPS – Poly-Phenylene Sulphide: Fortron
- PTFE - Polytetrefluoroethene

These materials can be taken to a recycling plant.

ELASTOMERS
- NBR
- Polyurethane
- FKM/FPM

Since they are only used in our products in small quantities, are greasy and, after long use, are also covered in metal filings, these materials are not taken to a recycling plant but are classified as **non-hazardous special waste.**

OTHERS
- Magnets (neodymium, plastoferrite, plasto-neodymium)
- PC boards
- Magnetic sensors
- Coils (PA+steel+copper)
- Power cables (PA or PU + copper)

These materials, which are generally present in our products in small quantities, are classified as **non-hazardous special waste** and are normally accepted as **urban waste.**
Large amount of power cables and coils can be **sold** as **scrap** to companies specialised in recycling power cables.

PACKAGING
- Cardboard
- Polyethylene bubble wrap – LDPE
- Polyethylene mesh – LDPE
- Clear or black polyethylene bags

These materials can be **fully recycable** and can be **taken to disposal centres** for paper and plastic.

Symbols labelling of materials and packaging

Labelling to identify the packaging material is optional, and is a self-declared statement by the manufacturer.
The normative reference for handling used packaging is Directive 94/62/CE as revised by Directive 2004/12/CE.
Other interesting international standards are:

- EN ISO 1043:2002: Plastics – Symbols and abbreviations
- EN ISO 11469:2001: Plastics – Identification and marking of plastic products
- EN ISO 14021:2002: Environmental labels and declarations – Self-declared environmental claims.

Mobius cycle. This means the material can be recycled.

This means that the material, which can be recycled, contains X % by mass of recycled material.

The RESY symbol, together with the manufacturer's identification code, certifies that the cardboard packaging possesses the requirements to be recycled by the Paper Mills Association.

Marks indicating the material used for packaging and liquid containers.
NO LONGER USED.

Material identification abbreviation and number (Resolution 97/129/CE) + graphic symbol (CR 14311:2002)

MATERIAL	ABBREVIATION	NUMBER	SYMBOL
Polyethylene terephthalate	PET	1	
High-density polyethylene	HDPE	2	
Polyvinyl chloride	PVC	3	
Low-density polyethylene	LDPE	4	
Polypropylene	PP	5	
Polystyrene	PS	6	
Other technopolymers		7	
Corrugated cardboard	PAP	20	
Non-corrugated cardboard	PAP	21	
Paper	PAP	22	
Steel	FE	40	
Aluminium	ALU	41	
Other metals		42	
Wood	FOR	50	
Colourless glass	GL	70	
Green glass	GL	71	
Brown glass	GL	72	
Paper and cardboard/various metals	C/*	80	
Paper and cardboard/plastic	C/*	81	
Paper and cardboard/aluminium	C/*	82	
Paper and cardboard/tin	C/*	83	
Paper and cardboard/plastic/aluminium	C/*	84	
Paper and cardboard/plastic/aluminium/tin	C/*	85	
Plastic/aluminium	C/*	90	
Plastic/tin	C/*	91	
Plastic/various metals	C/*	92	
Glass/plastic	C/*	95	
Glass/aluminium	C/*	96	
Glass/tin	C/*	97	
Glass/various metals	C/*	98	

*: Abbreviation of predominant material. Examples:
C/PAP 84: material comprised of paper or cardboard, plastic and aluminium, with a predominance of paper or cardboard (brick).
C/LPDE 90: material comprised of plastic and aluminium, with a predominance of plastic (coffee pack)

Energy saving

Compressed air is clean energy but producing it requires electricity, which costs money and consumes environmental resources.
Below are some indicative averages of the energy ratio of compressed air to its sources.
The values vary as a function of the output of the compressor and other factors.

Specific power:	6.5	W/Nl/min	i.e. it takes 6.5 W to generate 1 normal litre per minute of compressed air.
Oil factor:	0.254	lit oil/kWh	i.e. 0.254 litres of oil are burnt to produce 1 kW/h.
	0.00165	lit oil/Nl/min/h	i.e. 0.00165 litres of oil are burnt to produce 1 Nl/min of compressed air.
CO_2 factor:	0.702	kg/kWh	i.e. 0.702 kg of carbon dioxide is dispersed into the environment to produce 1 kWh.
	0.00456	kg/Nl/min/h	i.e. 0.00456 kg of carbon dioxide is dispersed into the environment to produce 1 Nl/min. for 1 hour.
Cost of air	0.00065	€/Nl/min/h	i.e. it cost € 0.00065 to generate 1 normal litre/minute of compressed air for one hour.

Example:

Flow rate 100 Nl/min, for **10 hours a day** for **230 days** a year:

Power: 6.5 x 100 Nl/min = **650 W**
Electricity consumption: 650 W x 10 hours/day x 230 days/year = 1495,000 Wh = **1495 KWh/year**
Oil burnt equivalent: 0.254 l/kWh x 1495 kWh = **380 litres/year**
Carbon dioxide emissions: 0.702 kg/kWh x 1495 kWh = **1050 kg/year**

1 Choose the correct cylinder size

Pneumatic actuators, especially cylinders, consume at each stroke an amount of air that depends on the pressure and the bore. Using the right cylinder at the right pressure allows considerable saving. A cylinder that requires a smaller flow enables you to associate valves, fittings and pipes of a smaller size, thereby saving on the cost of the products.

Example

Cylinder Ø 80mm, stroke 200mm, 6 bar, 12 cycles/min, 16 hours a day, 230 days a year.
Consumption: 144 Nl/min => 940 W => 3460 kWh/year =>880 litres of oil => 2428 kg of CO_2
If you pay € 0.10/kWh: => € 346/year.
If the cylinder has been oversized by mistake and a 63-mm cylinder could be used in its place, the figure would be:
Consumption: 90 Nl/min=>584W =>2140 kWh/year => 546 litres of oil => 1502 kg of CO_2
If you pay € 0.10/kWh: => € 214/year.
SAVE: € 132 a year.

2 Use economizers

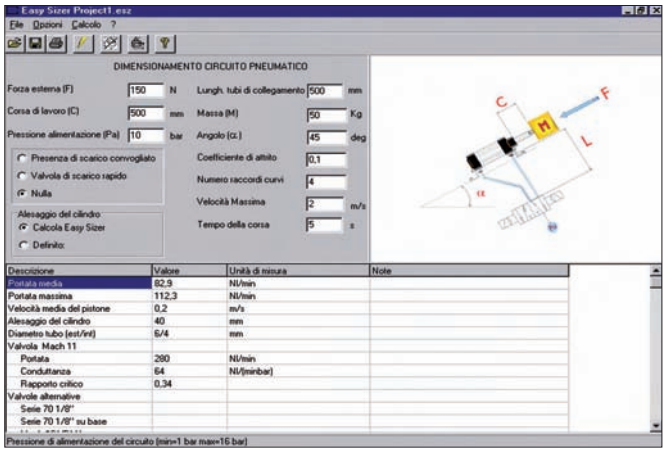
If in a cylinder you require a thrust in one direction only, e.g. piston rod extension, and a lower thrust and pressure is sufficient in the other direction, you can save a lot of energy by mounting an economizer valve. It reduces feed pressure to the cylinder chamber and allows air to flow freely during discharge.

Example

If, in the previous example, you install on one of the ports of the Ø 80 cylinder an econimizer that reduces the pressure from 6 to 12 bar, you **SAVE € 115 a year.**

METAL WORK PNEUMATIC

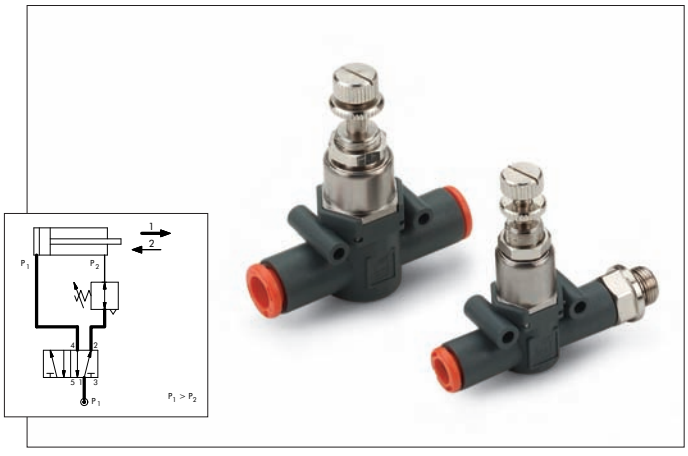
provides easy-to-use software called **EASY SIZER...**



...for sizing pneumatic cylinders, valves, pipes and units. You can download it from www.metalwork.it

METAL WORK PNEUMATIC

proposes a series of **miniature economizers...**



...to mount straight onto the cylinder port or in line on the pipe. See the line-on-line catalogue, series RML-RMS-RMC.

The 4 pillars of saving

Considerable energy savings can be achieved by following four simple rules

3 Eliminate air leaks

Compressed air leaks in the system waste a large amount of money. The problem is that, besides electricity consumption, the compressor undergoes more stress than necessary, even when the machine is not in operation.
Two things can be done to reduce this wastage.
• Periodically check for air leaks. This should be done when the machinery is not running, so that the leaks can be heard. So-called sniffers can be bought from the trade to help you detect even small leaks.
• Fit solenoid valves on each machine. These cutout devices seal off the flow of air when the machine is off. This prevents accidental leaks and wastage for production requirements when cleaning using compressed air.

Example
In a system operating at 6 bar, there is a leak equivalent to that of a 2 mm hole.
The air flow, in this case, is 220 Nl/min. The leak is 24 hours a day all year round.
Consumption: 220 Nl/min => 1430 W => 12526 kWh/year => 3180 litres of oil => 8.8 tonnes CO_2
If electricity costs € 0.10/kWh =>
you **WASTE € 1252 a year**

METAL WORK PNEUMATIC

offers shut-off **solenoid valves...**

...of the V3V type, with instant opening, or the APR type, with progressive start up.
Refer to the catalogue of Skillair, New Deal and One units.

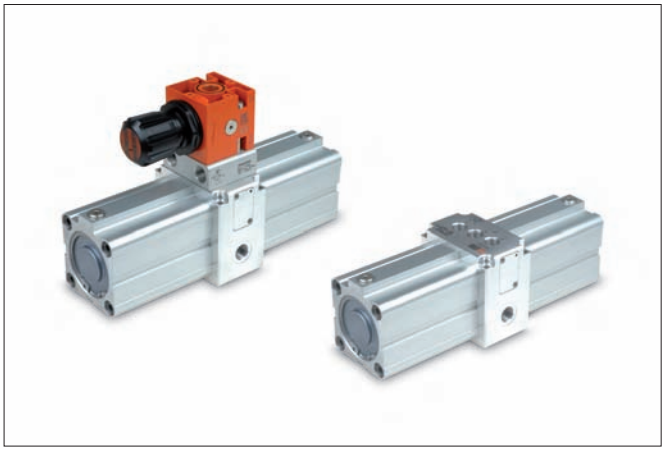
4 Design and operate the air distribution system correctly

The rules of good practice must be followed when designing, developing and operating a pneumatic system. The followings aspects should be taken into consideration.
• Size pipes so as not to have excessive load losses.
See Table 8 – RECOMMENDED FLOW RATE on page 6.1/07 in the catalogue.
• Size the compressor and the system for the minimum required pressure – pressure that is too high requires additional energy, which is then lost. If a system contains a few components requiring a higher pressure, you can use a pressure multiplier, or booster, for them only.
• Deactivate compressors when not used. Even when not in use, they consume 30-40% of the full power.

Example
A system operates at 7 bar. The average air consumption is 10 Nm3/min for 16 hours a day for 230 days a year.
But it would be enough to use air at 6 bar. Reducing the pressure from 7 to 6 bar gives the following:
Air saving of 142 Nm^3/min. => 929 kWh => 34100 kWh/year => 8680 litres of oil => 24 tonnes CO_2
If electricity costs 0.10 €/kWh: =>
you **SAVE € 3410 a year**

METAL WORK PNEUMATIC

proposes high-efficiency pressure multipliers **boosters...**



...that can be used to increase the air pressure only for components that effectively require it.