



# The Pressure Equipment Directive and Hydro-Pneumatic Accumulators

How new European legislation will affect Designers,  
Specifiers and End Users of Accumulators





## Note

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# *An introduction to the Pressure Equipment Directive*

*EC legislation which affects all designers,  
distributors and end users of accumulators*

Prepare for change ...

From 30th May 2002, most pressure equipment with a maximum operating pressure greater than 0.5 bar manufactured in EC member states must meet the requirements of the European Pressure Equipment Directive 97/23/EC.

Since November 1999, there has been a transition period during which pressure equipment can be manufactured either to the requirements of the Pressure Equipment Directive or to the national rules which were in place at that date. This transition period ends on 29th May 2002.

What's new?

Before the introduction of the Pressure Equipment Directive (PED), an accumulator manufactured in one European country could not be used in another European country unless it met that country's pressure vessel regulations. Now, an accumulator which meets the requirements of the PED can be used in any member state of the EC without restriction. Under the PED, the manufacturer will be entirely responsible for the compliance of its own products, where they fall within the scope of the PED. Compliance with the directive is shown by a CE label and by the 'Certificate of Conformity' (see example on page 8) supplied by the manufacturer.

Parker Hannifin has been actively involved in the development of the new Directive, with representation on the CEN TC 54 committee which has been responsible for development of the new Unfired Pressure Vessel standard. All of Parker's European sites which carry out design and manufacture of piston and bladder accumulators have been successfully audited for compliance with the PED.

## What is the PED?

The Pressure Equipment Directive is one of the series of technical harmonisation directives covering subjects such as machinery, simple pressure vessels, gas appliances etc., which were identified by the Community's programme for the elimination of technical barriers to trade. The purpose of the PED is to harmonise national laws of member states regarding the design, manufacture, testing and conformity assessment of pressure equipment and assemblies of pressure equipment.

The programme aims to ensure the free placing on the market and putting into service of relevant equipment within the European Union and the European Economic Area (see Appendix 1 on page 7). The Pressure Equipment Directive provides for a flexible regulatory environment which does not impose any technical solution. This approach allows European industry the freedom to develop new techniques, increasing its international competitiveness.

The Directive requires that all pressure equipment and assemblies within its scope must be safe when placed on the market and put into service. Safe pressure equipment and assemblies are defined as those which, when properly installed and maintained and used for their intended purpose, will not endanger the health and safety of persons and, where appropriate, domestic animals and property.

## What does it cover?

The Pressure Equipment Directive applies to the design, manufacture and conformity assessment of pressure equipment and assemblies of pressure equipment with maximum allowable pressure greater than 0.5 bar above atmospheric pressure (ie: 1.5 bar of absolute pressure), subject to certain exclusions – see 'What is excluded?' on page 5.

The PED Conformity Assessment Modules apply to all accumulators using fluids in Group 2 (ie: non-hazardous), with a volume greater than 1 litre and a product of service pressure (PS) and volume (V) which is greater than 50 bar/litre, or for any pressure vessel where PS exceeds 1000 bar – see 'What are its requirements?' on page 4.

The PED has two principal aspects – essential safety requirements and conformity assessment. It divides pressure equipment into four classifications based on their 'hazard category' – the hazard arising from equipment failure or the danger of fluid release. It applies to all non-transportable pressure parts, which are classified into the following categories:

- pressure accessories
- piping
- safety accessories
- pressure vessels

Their hazard category is dependent on:

- the type of fluid
- whether liquid or gas
- pressure
- volume
- whether unfired or fired (ie: subject to heating, eg: to raise steam)

## What are its requirements?

Under the Directive, pressure equipment and assemblies which exceed specified pressure and/or volume thresholds must:

- be safe;
- meet essential safety requirements covering design, manufacture and testing;
- satisfy appropriate conformity assessment procedures;
- bear specified markings including the CE mark and have adequate instructions for use.

Pressure equipment and assemblies below the specified pressure/volume thresholds must:

- be safe;
- be designed and manufactured according to sound engineering practice;
- bear specified markings (but not the CE mark) and have adequate instructions for use.

Marking, labelling and documentation of pressure equipment above the specified thresholds must comprise:

- CE marking on an appropriate nameplate
- A Declaration of Conformity
- Operating Instructions, detailing the design features and hazards of misuse.

The PED only applies to the design and first placing of a product in an EU market, not its subsequent service requirements. For the operation of the product, national laws are still applicable.

## What are the benefits of the PED?

For the OEM manufacturer:

- A level playing field. With free movement of goods throughout the European Economic Area (see Appendix 1 on page 7), national regulations can no longer be used as a barrier to trade.
- Simplicity. Existing national standards apply different methods of calculation to arrive at different maximum operating pressures. With CE approval, a single, standard approach applies throughout the European Economic Area (EEA), and documentation is rationalised.
- Safety. Both European and non-European manufacturers are legally required to comply with the requirements of the Directive, which cover not only design and construction but also aspects such as corrosion, erosion, wind loading etc.

For the customer:

- Ease of selection. Responsibility for specifying coding and notification is moved to the manufacturer. The customer need only specify the application, fluid type and requirement for compliance with the PED.
- Freedom of application. A CE-marked accumulator can be used in any European Economic Area market without additional inspection or documentation.
- Safety. A CE-approved accumulator has been manufactured to common safety standards which are universally recognised in EEA markets.
- Cost. In place of the many national standards which currently apply, only one design of accumulator need be obtained for use in EEA markets, reducing ordering and stocking requirements.

## What industries are affected?

The Pressure Equipment Directive concerns manufacturers and users of a wide range of pressure equipment in addition to the accumulators covered by this handbook. Such pressure equipment is widely used in the process industries, eg: oil and gas, chemical, pharmaceutical, plastics and rubber and the food and beverage industries; high temperature process industries such as glass, paper and board; in energy production and in the supply of utilities, heating, air conditioning and gas storage and transportation.

## Who is responsible for compliance?

The 'manufacturer' is the person or organisation which takes responsibility for the equipment, and may be a designer, subcontractor or main engineering contractor. The manufacturer who subcontracts some or all of his activities remains responsible in law, and has sole and ultimate responsibility for the conformity of the product to the PED.

## What is the timescale?

### 29th May 1997

The Directive 97/23/EC on the approximation of the laws of the member states concerning pressure equipment was signed by the European Parliament and the Council.

### 29th November 1999

The option of CE approval under the Pressure Equipment Directive (97/23/EC) became available in place of existing national approvals.

### 29th May 2002

Existing approvals (eg: TÜV in Germany, DRIRE in France or ISPESL in Italy) will not be accepted after this date.

## Will this affect accumulators already in use?

No. Pressure vessels which have been put into use before 29th May 2002 can continue to be used after this date.

## What is excluded?

In a number of cases, pressure equipment – although designed for a maximum allowable pressure above the threshold for approval – is excluded. Note, however, that some excluded items or applications are subject to other regulations. Examples of pressure equipment outside the scope of the PED include:

- equipment which is already regulated at EU level, eg: motor vehicles, forestry and agricultural tractors;
- equipment presenting a minor pressure hazard (category 1 of the PED), covered by directives on machinery, lifts, low voltage electrical devices, medical devices, gas appliances and on explosive atmospheres;
- equipment which does not present any significant pressure hazard, such as for distribution of water, radiators and piping for hot water heating systems and carbonated drink containers;
- pressure equipment for which neither the free circulation nor the safety aspects necessitated its inclusion, eg: high voltage switch gear;
- marine, aerospace and weapons systems;
- certain pipeline installations and oil/gas well-control equipment.

Equipment prototypes to be shown at trade fairs do not have to conform with the requirements of the Directive as long as appropriate safety measures are taken.

## What do I have to do?

### Designers

When designing accumulators into equipment within the scope of the PED which will be put into first use after 29th May 2002, the accumulator chosen must satisfy the requirements of the Pressure Equipment Directive.

### Distributors

Where a stock of pressure equipment is carried, it should be borne in mind that non-CE marked equipment falling within the scope of the Directive cannot be put into first use after the PED comes into force on 30th May 2002.

### OEMs

Machinery or equipment within the scope of the PED manufactured for first use after 29th May 2002 must use accumulators which satisfy the requirements of the Pressure Equipment Directive. The OEM manufacturer will be entirely responsible for the compliance of his own products, and will be responsible for determining the frequency of inspection.

## What should I look for?

When selecting a supplier of accumulators, look for the CE mark. This shows that conformity assessment has been completed, and that the equipment or assembly complies with the provisions of the Directive. The manufacturer of approved equipment is required to affix the CE mark to each item of pressure equipment or assembly within the scope of the PED, and to draw up a declaration of conformity (see example on page 8).

## Is re-certification required?

The manufacturer (see 'Who is responsible for compliance?' on page 5) is required to renew its CE approval design certificate after 10 years. Quality assessment is continual and inspection may be carried out at any time without prior notice. Pressure equipment is not subject to inspection in service under the PED, but may be subject to local rules governing operational checking, depending on where it is ultimately put into service.

## Are Parker accumulators fully approved?

Yes. Parker has obtained CE approval and is already applying the 'CE' mark to its standard ranges of A and AP Series piston accumulators and ABE Series bladder accumulators.

The conformity assessment (audit and certification) has been completed by the notified bodies, Lloyd's Register (LRQA) and Bureau Veritas, and these accumulators comply with the provisions of the Directive. As a manufacturer, Parker is responsible for its products meeting the PED and its products are marked with the CE logo and supplied with a declaration of conformity. To enable the user to achieve a safe installation of the accumulator, Parker supplies full operating instructions with the product.

## What about non-European countries?

Regulations governing the use of accumulators and other pressure equipment in non-European countries are unaffected by the introduction of the PED. The most widely recognized standard outside Europe is ASME, the American Society of Mechanical Engineers – visit [www.asme.org](http://www.asme.org) for further information. Accumulators approved to the ASME standard are available from Parker Hannifin.

## Appendix 1

### Free movement of goods – the law

Member States of the EU may not, on the grounds of hazards due to pressure, prohibit, restrict or impede the placing on the market and putting into service of pressure equipment and assemblies which comply with the provisions of the PED. Member States are to presume that pressure equipment and assemblies bearing the CE marking and accompanied by the EC declaration of conformity satisfy the provisions of the PED.

### Where does the pressure equipment directive apply?

The PED applies in the member states of the European Union (EU) and the European Economic Area (EEA). Similar requirements to the PED have been adopted by many of the other countries which have applied to join the European Union.

The EU member states are:

- Austria
- Belgium
- Denmark
- Finland
- France
- Germany
- Greece
- Ireland
- Italy
- Luxembourg
- Netherlands
- Portugal
- Spain
- Sweden
- United Kingdom

The European Economic Area (EEA) includes the 15 EU countries listed above, plus Iceland, Liechtenstein and Norway.

## Appendix 2

### Definitions

**Pressure equipment** includes vessels, piping, safety accessories and pressure accessories. Where applicable, pressure equipment includes elements attached to pressurised parts, such as flanges, nozzles, couplings, supports, lifting lugs etc.

**Vessels** are defined as a housing designed and built to contain fluids under pressure.

**Piping** means piping components intended for the transport of fluids, when connected together for integration into a pressure system.

**Safety accessories** means devices designed to protect pressure equipment against the allowable limits being exceeded.

**Pressure accessories** means devices with an operational function and having pressure bearing housings.

**Assemblies** mean several pieces of pressure equipment assembled by a manufacturer to constitute an integrated and functional whole.

# EC DECLARATION OF CONFORMITY



Issued in accordance with the  
PRESSURE EQUIPMENT DIRECTIVE (PED) 97/23/EC

Parker Hannifin S.p.A  
Via Carducci 11  
21010 Arsago Seprio  
Varese  
Italy

We hereby declare that the Products listed below have been manufactured in accordance with the above mentioned Directive for use with non-hazardous fluids of Group 2.

Product Description:	Piston Accumulators
Model No:	Serial No:
GA Drawing No: (if applicable):	
Month and Year of Manufacture:	
Internal Volume of Gas Chamber:	Litres
Maximum Working Pressure:	bar
Design Temperature Range (min/max):	°C
Applicable Standards:	

Conformity Assessment Modules used: B, D

Technical Documentation File and Quality system (ISO 9001) have been approved by:

Certificate No:	Lloyd's Register Hiramford Middlemarch Office Village
Identification No: 0038	Siskin Drive Coventry CV3 4FJ UK

Authorized Signature for the manufacturer:

Name: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_

## Piston accumulator range

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### Piston accumulators

#### A series

Working pressures  
Standard volumes  
Bore diameters  
Standard Approval

Catalogue HY07-1240 (industrial)  
Catalogue HY07-1245 (mobile)  
250 and 350 bar  
0.1 – 38 litres  
50 – 150mm  
CE (Pressure Equipment Directive 97/23/EC)

#### AP series

Working pressures  
Standard volumes  
Bore diameters  
Standard Approval

Catalogue HY07-1240  
250 and 350 bar  
6 – 300 litres  
180 – 360mm  
CE (Pressure Equipment Directive 97/23/EC)

### Bladder accumulators

#### ABE series

Working pressures  
Standard volumes  
Standard Approval

Catalogue HY07-1235  
350 bar  
1.0 – 48.5 litres  
CE (Pressure Equipment Directive 97/23/EC)

### Accumulator safety blocks

#### ASB series

Working pressure (max)  
Max flow rate

Catalogue HY07-1241  
350 bar  
150 l/min  
(300 l/min with twin discharge valves)

## Applications

- Die casting
- Emergency shut down systems
- Injection moulding
- Steering & braking systems
- Presses
- Power units
- Machine tools
- Refuelling rigs
- Paper making machinery
- Ride control systems
- Aerial access platforms
- Shock absorption



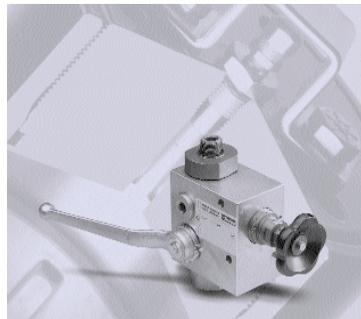
## Applications

- Machine tools
- Shock absorption
- Hydraulic power units
- Fast response applications
- Emergency shut down systems
- Low amplitude, high frequency applications
- Test rigs
- Wood working equipment



## Functions

- To protect, isolate and discharge a hydraulic accumulator



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## Need a Parker product?

Call Parker's European Product  
Information Centre  
on 00800 27 27 5374

Parker Hannifin plc  
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Watford, UK  
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Fax: (01923) 248557

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HY07-1237/1-UK 2M PD 0801