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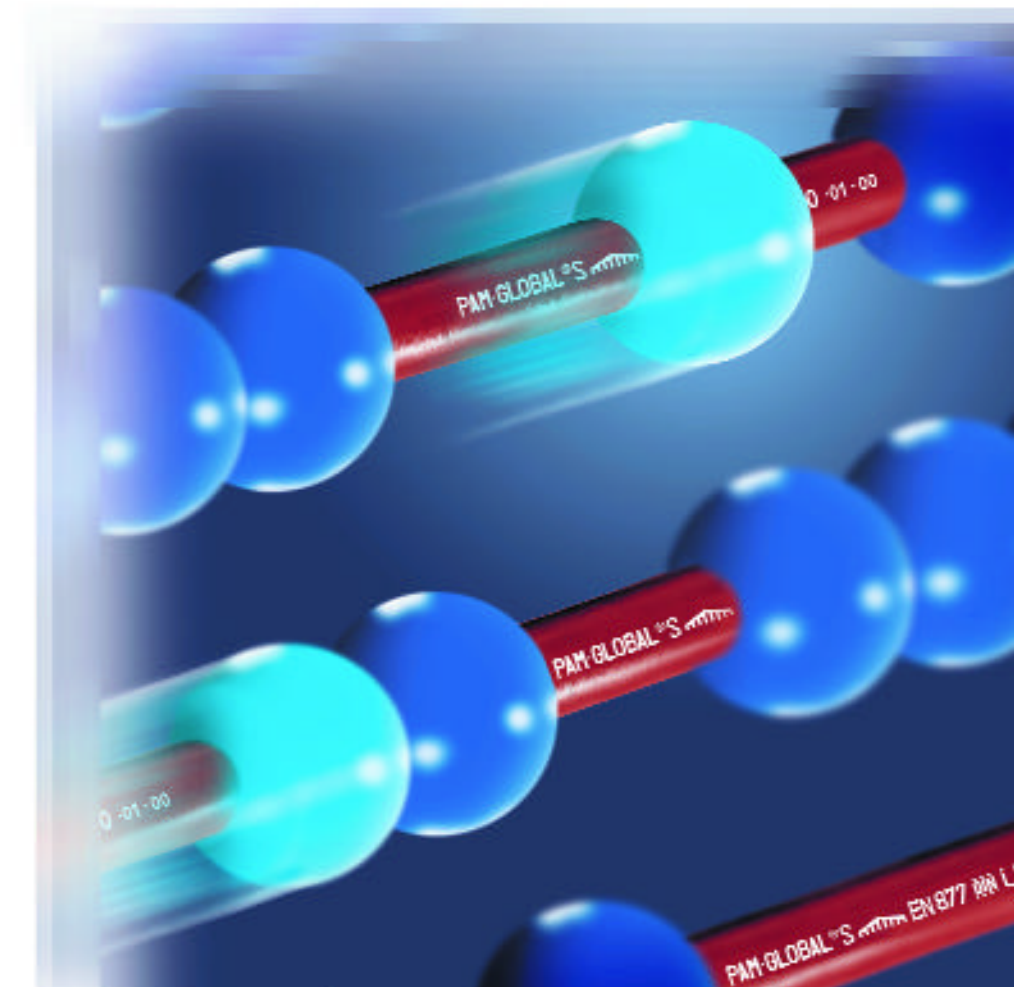


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PAM-GLOBAL®

**Socket-less cast iron
drainpipes and fittings**



**More than 25 decisive benefits
from the roof to sewer**

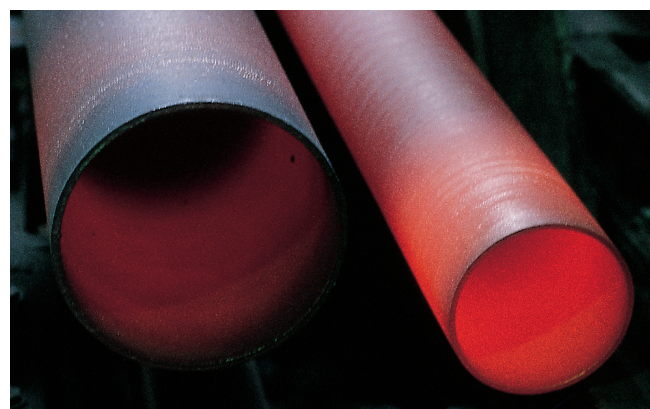
03/2001 Edition



THE DE LAVAUD CENTRIFUGAL CASTING METHOD

PAM-GLOBAL® pipes from SAINT-GOBAIN HES are made from lamellar-graphite cast iron corresponding to DIN EN 1561,

minimum grading EN-GJL-150, i.e. an iron-carbon alloy with a carbon content of over 2%.



They are manufactured by the De Lavaud centrifugal casting method. Because of the intensive cooling in the metallic, this produces a very fine microcrystalline structure. The structural constituents of the cast iron pipe are about 30 times smaller in the outer area and around 20 times smaller at the pipes interior surface, and therefore

more compactly arranged, than those in components manufactured by the usual sand casting method.

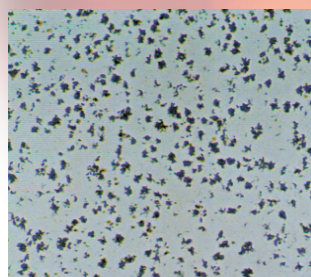


BENEFIT 1

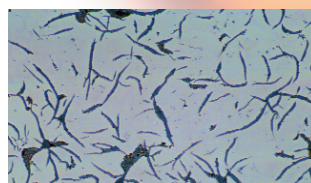
≥ 300 MPa for pipes

One of the decisive benefits of the De Lavaud method: After casting the pipes are heat-treated. The secondary heat treatment produces a rosette-like shaped graphite par-

ticles, which gives improved mechanical characteristics: e.g. reduction of internal stresses, increased tensile strength.



Scanning electron microscope image: rosette-like graphite shaping in PAM-GLOBAL® pipes.



Scanning electron microscope image: usual graphite shaping with grey iron casting.

BENEFIT 2

A soft Brinnell-hardness figure of around 210 is associated with the secondary heat treatment of the

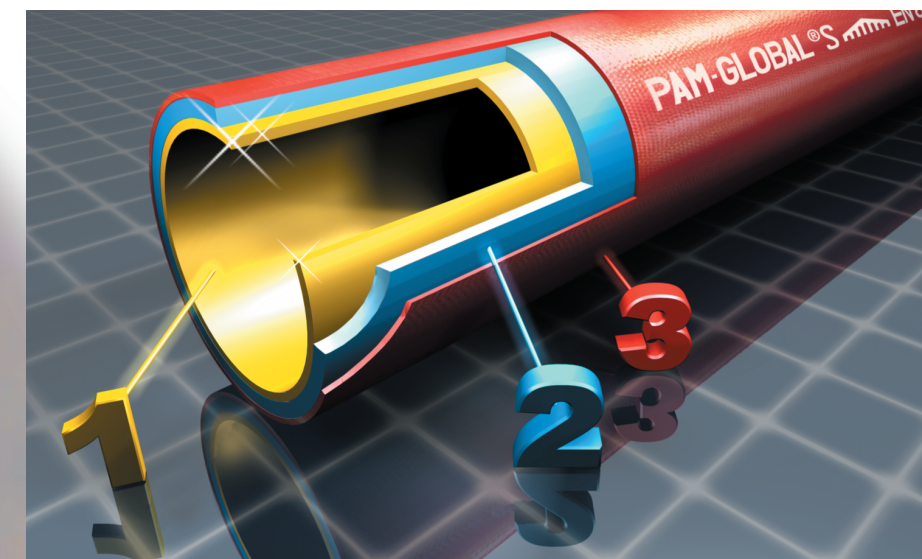
PAM-GLOBAL® pipes. PAM-GLOBAL® pipes are therefore easy to work.

THE NEW SURFACE FINISH FOR PIPE INTERIORS

BENEFIT 3

The interior surfaces of PAM-GLOBAL® pipes are given optimal protection against chemical and mechanical effects with an advanced 130 µm thick, environmentally friendly, modified epoxy resin coating.

- 1 New epoxy resin internal finish with optimised characteristics (130 µm) HPS 2000
- 2 Cast iron, De Lavaud process
- 3 Outer coating (base coat 40 µm acrylic enamel)



BENEFIT 4

Blockages are thus avoided and the functionality of the drainage system is ensured.

Externally the pipe lengths are protected with a red-brown, spray-applied primer.

Externally the pipe lengths are protected with a red-brown, spray-applied primer.



If required the pipe can be over-painted with the majority of paints suitable for structural steel work.

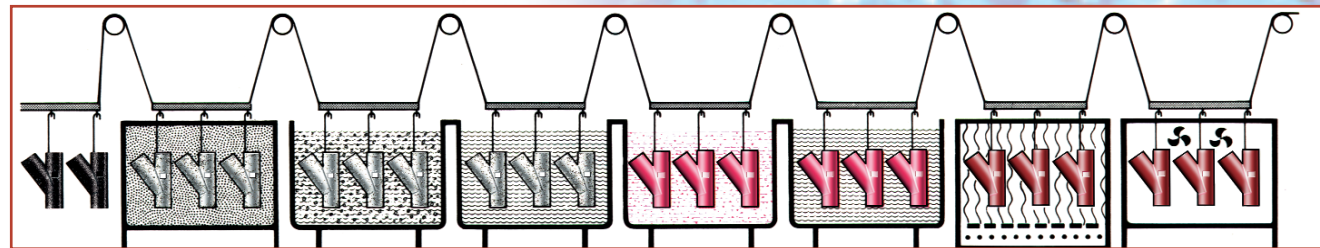


THE NEW SURFACE FINISH FOR FIXINGS

BENEFIT 5

All PAM-GLOBAL® fixings are interior and exterior surface-coated by cathaphoretic electro-dipping, parkerized and also protected internally and externally with a further epoxy coating applied by a dipping process.

Therefore electro-dipped surfaces offer excellent protection against mechanical effects. Cathaphoretic electro-dipping ranks among the highest quality surface coating methods.



BENEFIT 6

The new HPS 2000 coating on PAM-GLOBAL® component also stands out by virtue of its remarkable hardness, secure adhesion and even coating of edges and curves.

PAM-GLOBAL® components easily withstand a 2000-hour salt spray test; much more than required by DIN EN 877 (350 hours).



OPTIMALLY MATCHED SURFACE COATING FOR PIPES AND FIXINGS

BENEFIT 7

The interior coatings of SAINT GOBAIN HES cast iron pipes and cast iron fixings are perfectly matched to each other so that no differences can arise in resistance values within a PAM-GLOBAL® drainage pipe system.

	20 °C	< 60 °C	80 °C
pH0	ausgenommen organische Säuren		
pH1			
pH2	<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); border: 1px solid black; padding: 5px;">DIN EN 877</div> <div style="flex-grow: 1; background-color: #90EE90; border: 1px solid black; position: relative;"> <div style="position: absolute; top: 10px; right: 10px; background-color: white; padding: 5px;">Mittel ohne Anwendung</div> <div style="position: absolute; bottom: 10px; right: 10px; background-color: white; padding: 5px;">Mittel ohne Anwendung</div> </div> </div>		
Kalklösende Mittel			
Reinigungsmittel			
Waschmittel			
Desinfektionsmittel			
Fleckenwasser			
Oxidantien			
Wasser, Salze			
Abflußfrei			
Lösungsmittel			
pH12			
pH13			
pH14			

The most important PAM-GLOBAL® pipes and fixings interior coating resistance values at a glance:

BENEFIT 8

The coatings on PAM-GLOBAL® pipes and fixings far exceed the requirements of DIN EN 877.

PAM-GLOBAL® drainage pipe systems are suitable for all building and surface drainage applications.



Thus they offer a correspondingly better guarantee of long-term suitability – even with increasing aggressiveness of effluent from domestic and commercial premises.

A SUITABLE PAM-GLOBAL® SYSTEM FOR ANY APPLICATION

BENEFIT 9

SAINT-GOBAIN HES drainage systems guarantee the optimum solution for any application.

Regardless of whether for private or commercial building projects, the PAM-GLOBAL® programme is tailored to the particular application.

The PAM-GLOBAL® Plus programme for example, offers protection in commercial applications against aggressive effluents.

PAM-GLOBAL® S



...for building drainage

PAM-GLOBAL® Plus



...for commercial catering drainage

PAM-GLOBAL® C



...for surface water drainage

PAM-GLOBAL® B



...for bridge drainage

PAM-GLOBAL® V



...for condensation-proofed drainage pipes

PAM-GLOBAL® L



...for ventilation and air conditioning pipe work

BENEFIT 10

A SUITABLE CONNECTION FOR EACH PAM-GLOBAL® SYSTEM

Exactly matched connections not only guarantee absolute tightness, but also facilitate assembly and reduce assembly time.

Welding to ensure pipe-work integrity is unnecessary.



**PAM-GLOBAL®
RAPID**



HES CV



HES CE



**PAM-GLOBAL®
REKORD-KRALLE**



HES CV-KRALLE



**PAM-GLOBAL®
FLEX-INOX**



**PAM-GLOBAL®
GRIP-INOX**



**PAM-GLOBAL®
KONFIX**



**PAM-GLOBAL®
KONFIX-MULTI**



**PAM-GLOBAL®
MULTIQUICK**



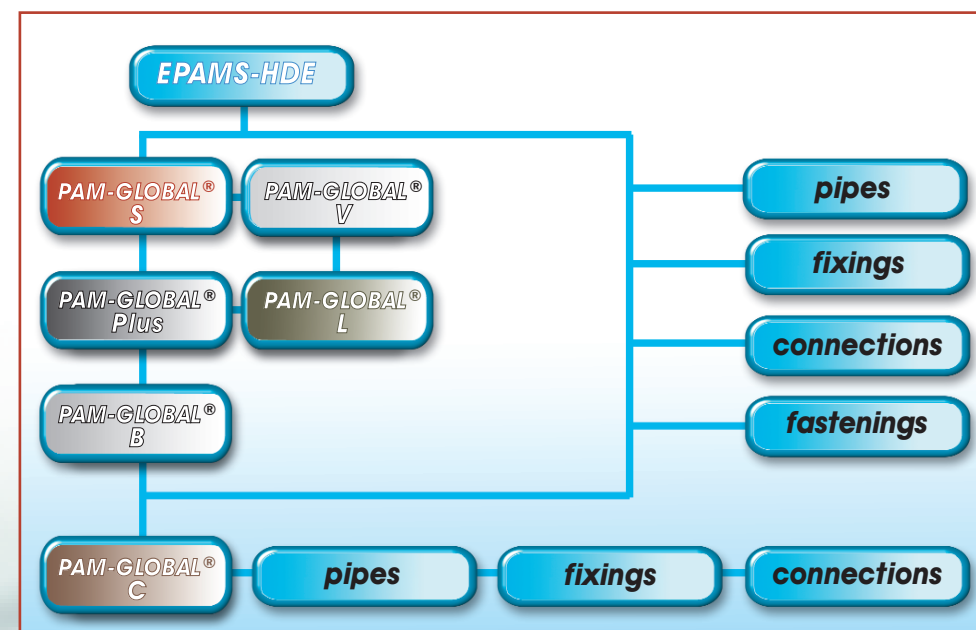
**PAM-GLOBAL®
CONZIS**



**PAM-GLOBAL®
SVE**

BENEFIT 11

FOR EACH PAM-GLOBAL® ASSEMBLY, A PERFECTLY MATCHED SAFETY SYSTEM



- cast drainage pipes
- cast fixings
- original connections
- original fastenings

Each PAM-GLOBAL® system comprises a complete range of pipes, fixings and accessories for drainage solutions from the roof to sewer. From refurbishment, through ultra-modern new commercial constructions, to private housing, PAM-GLOBAL® systems, with their exactly matched components – from a single source – offer a high level of operating safety.

**ALL PAM-GLOBAL® SYSTEMS ARE BACKED
BY SAFETY GUARANTEES**

BENEFIT 12

PAM-GLOBAL® systems are quality assured and are bound by the guarantee agreement of the

Central Association for Sanitation-Heating-Air Conditioning

**Guarantee agreement
with the ZVSHK and BHKS**

The installer is directly covered by a SAINT-GOBAIN HES guarantee. Liability for damages, including directly consequential damages, arising from non-fulfilment of these conditions, extend to a maximum of 2 million DM for material damage and personal injury per individual claim event.

**Guarantee agreement
with the
Z V S H K / B H K S**

BENEFIT 13

GUARANTEED SECURITY FOR PROTECTION OF THE TRADE



The SHK-ZERT (certificate) confirms ZVSHK's recommendation of SAINT-GOBAIN HES as a manufacturer of product in the product groups of cast pipes, pipe fastening systems, installation and roof drainage systems.

- Practical support and
- comprehensive services for the SHK industry

**PAM-GLOBAL® DRAINAGE SYSTEMS.
NO.1 IN ENVIRONMENTAL PROTECTION**

BENEFIT 14

PAM-GLOBAL® cast pipes and fixings are 100 % recyclable, therefore no expensive disposal costs.



BENEFIT 15

**PAM-GLOBAL® CAST PIPES AND FIXINGS
DO NOT WASTE RESOURCES**

They are made from up to 95% scrap iron. And: Iron can always be melted down again – "endless" recycling.

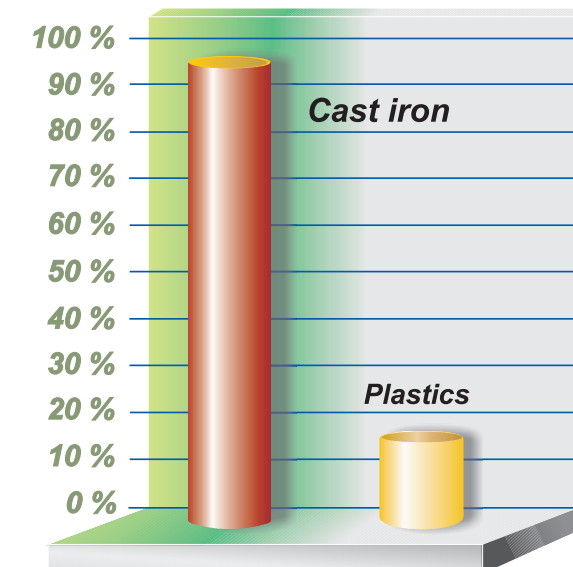
In the foreseeable future the world oil reserves will be exhausted (for plastics production among other things).

Conversely there will still be cast iron in a hundred thousand years.

Worldwide plastics recycling remains a dream, most waste being incinerated. Filler-reinforced plastic pipes can as a rule not be incinerated and remain for posterity in special waste sites.

*Source: APME '98 Study.
According to an APME study the recyclable proportion of plastics in Europe in 2001 will be around 15%.*

Recycling - Quote ø



GOOD AIRBORNE NOISE LEVEL ABSORPTION, HIGHLY EFFECTIVE INTERRUPTION OF STRUCTURE-BORNE NOISE TRANSMISSION

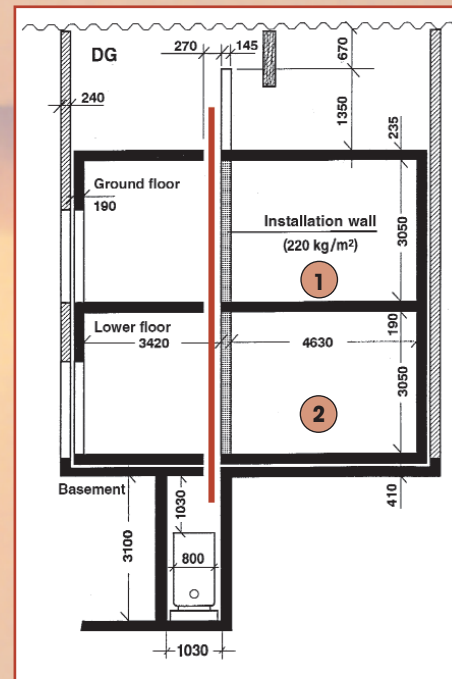
BENEFIT 16








Cast iron with lamella graphite: high area weight, better airborne noise absorption.

As a result of their area weight and good material properties, PAM-GLOBAL® cast iron pipes largely absorb structure-borne noise waves. Fewer structure-borne noise waves through the rubber profile of the connections and special fastenings.

When properly installed all noise protection requirements are met, even in rooms requiring protection. In future the permissible noise level for sounds from water and drainage installations will fall to max. 30 dB(A) in accordance with DIN 4109.



Installations	Noise level LAF, 10 (dB (A))	
Measuring room	Ground floor rear ①	Lower floor rear ②
1. Structure: with HES TYRODUR pipe clamps 5-E-128/8	25	29
2. Structure: with HES Rapid SE noise decoupling clamps	15	15

Aircraft noise	Music	Traffic	Clock	Snowfall
				
130 dB(A)	100 dB(A)	80 dB(A)	26 dB(A)	10 dB(A)

When properly installed:
15 dB (A)
QUIETER THAN
THE TICKING
OF A CLOCK

PAM-GLOBAL® DRAINAGE SYSTEMS. NO.1 IN NOISE PROTECTION. UNDER 15 DB(A) WITH RAPID SE

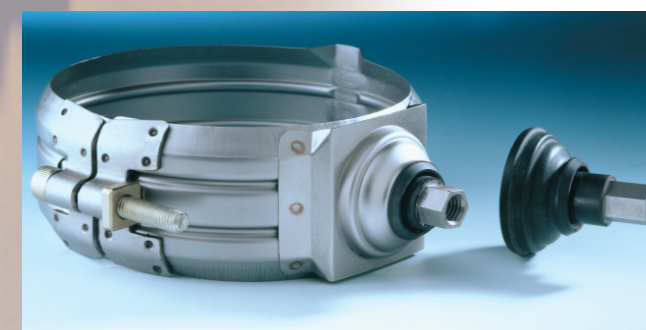
BENEFIT 17

Comparative tests on the installation test bed at the Fraunhofer Institute, Stuttgart have confirmed this. Differences of more than 10 dB(A) in comparison to a conventional pipe fastening could be measured. At a flow rate of 4 litres per second the noise value in the next room was approximately 15 dB(A) with the new PAM-GLOBAL® RAPID SE fastening.

Values for the permitted noise levels in rooms with requirements per DIN 4109 for protection from noise from domestic equipment and industrial processes

Noise source	Type of room requiring protection	
	Living rooms and bedrooms	Classrooms and workrooms
	Typical noise level dB (A)	
Water installations (water supply and drainage equipment combined)	≤ 30 ^{a, b}	≤ 35 ^a

a) Individual, brief peaks which arise on activation of valves and equipment (opening, closing, adjustment, disconnection etc.), are currently not taken in to account.
b) Contractual conditions for attainment of permissible noise levels during installation:
- the method statement must take into account the requirements for noise protection, this means, among other things, that in respect of the components, the necessary noise protection information must be available.
- in addition the person responsible for supervising the installation must be designated, and must be consulted prior to closing up / covering over the installed works. Further details are laid down in the ZVSHK Instruction Sheet. (Obtainable from: Central Association for Sanitation-Heating-Air Conditioning (ZVSHK), Rathausallee 6, D-53757 Sankt Augustin)



PAM-GLOBAL® RAPID-SE pipe fastening

PAM-GLOBAL® DRAINAGE SYSTEMS
NO.1 IN FIRE PROTECTION
BUILDING MATERIAL CLASS A1: NON-FLAMMABLE

BENEFIT 18

PAM-GLOBAL® cast iron systems exhibit the best flame protection and fire-retardant properties. This has been confirmed by studies in this country and abroad (C.T.I.C.M./IBMB).
Test certificate no.:
P-34 34/32 49-MPA BS.
PAM-GLOBAL® pipes and moulded components are made of cast iron with

lamella graphite in accordance with DIN EN 1561. This material is in accordance with building material class A1 according to DIN 4102 in Germany and is **not flammable!** For more stringent fire protection requirements in building construction HES pipe systems are indispensable.

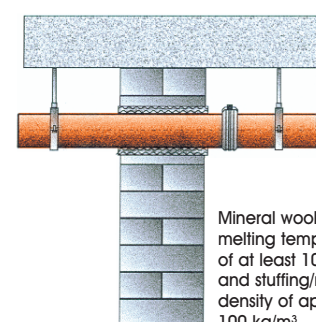
PAM-GLOBAL® cast pipes: optimum protection against fire



Ducting of PAM-GLOBAL® S pipes

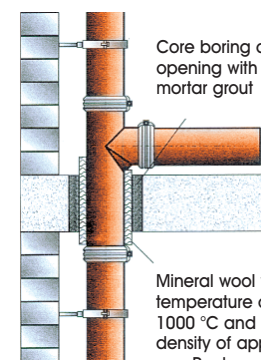
Wall or ceiling seal

Wall duct



Mineral wool with a melting temperature of at least 1000 °C and stuffing/relative density of approx. 100 kg/m³, e.g. Rockwool conilit shells

Ceiling duct



Core boring or opening with mortar grout

Mineral wool with a melting temperature of at least 1000 °C and stuffing/relative density of approx. 100 kg/m³, e.g. Rockwool conilit shells

BENEFIT 19

Cast iron PAM-GLOBAL® pipes and moulded components do not produce toxic gases in the event of fire. The production of hazardous fluids in combination with extinguishing water is also ruled out.

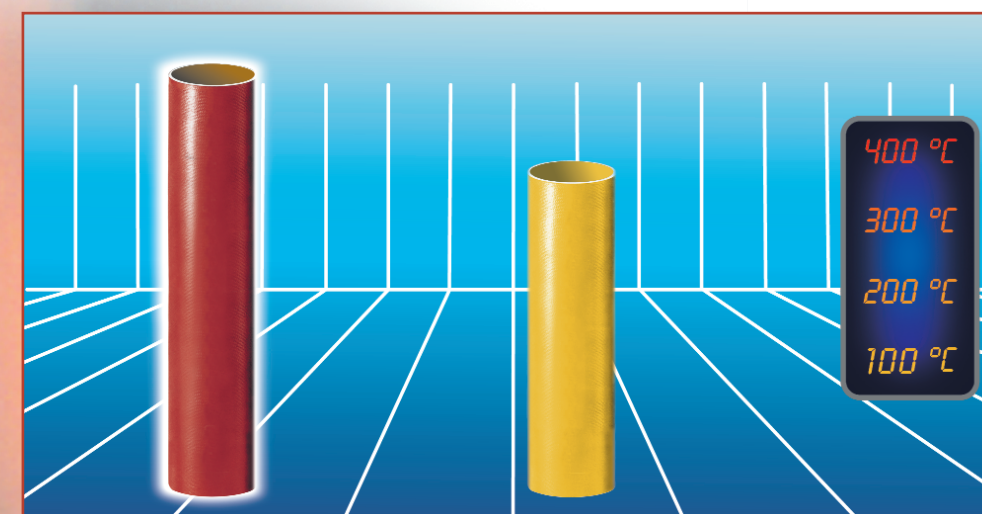
With cast iron pipes, fire is not spread by melting or dripping materials as is the case with many class B1 and B2 materials.

Safety comes first

FLAMMABLE - INFLAMMABLE ACCORDANCE WITH DIN 4102				
Pipe type	Highly flammable B1	Normally flammable B2	Not flammable A	Fire load thermal value kWh/kg
PAM-GLOBAL® S cast pipe			●	not measurable
PVC rigid	●			5
PE rigid		●		12.2
PPS	●			12.8
For comparison: heating oil		●		11.9

PRECAUTIONARY FIRE PROTECTION WITHOUT SPECIAL CONDITIONS

BENEFIT 20



Cast iron 400 °C

Plastic <100 °C

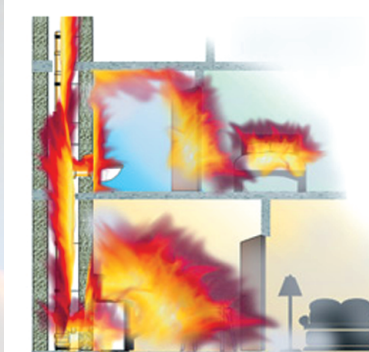
Temperature °C

PAM-GLOBAL® drainpipe systems offer the highest stability and safe positioning in the event of fire. Thanks to their temperature resistance to 400 °C they suffer no significant changes in mechanical properties. The melting point of a PAM-GLOBAL® pipe is approximately 1300 °C.

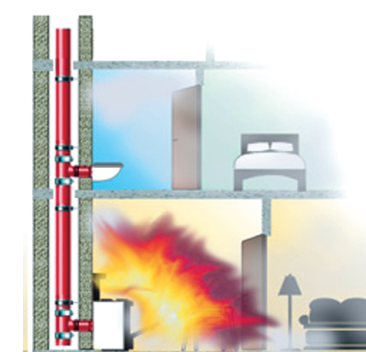
BENEFIT 21

Indispensable protection, no flashover, no spreading of fire. PAM-GLOBAL® pipe systems prevent flashover via expert assembly and sealing of gaps at wall and ceiling breakthrough points.

Through this, important minutes can be gained for escape. The likelihood of the fire service having only one seat of the fire to deal with, and the saving of the building substance.



With the wrong materials present, a "flashover" cannot be ruled out



PAM-GLOBAL® cast iron pipes do not spread the disaster

**PAM-GLOBAL® CAST IRON PIPES: BETWEEN 0 AND 100 °C
THE LINEAR EXPANSION COEFFICIENT IS ONLY 0.0105 MM/MK,
SIMILAR TO CONCRETE**

BENEFIT 22

This means that when comparing materials: for a 10 m pipe length, the linear expansion for plastic pipes – depending on the type of thermo-plastic and compound (HD, PE, PP, PVC, reinforcing filler etc) – is up to 20 times greater. To compensate for the differences plastic drainage pipes must be secured with expansion sockets, flexion joints or additional support brackets.

Cast iron ■ 5,2

Pipeline length: 10 m, $\Delta t=50K$

Expansion in mm

Plastic

Peh	■	20 x more
PE	■	14 x more
PVC	■	8 x more

This means: **no expansion sleeves, no expensive flexion joints when using PAM-GLOBAL® pipes.**



Problem-free setting in concrete



The minimal expansion with temperature variation makes possible problem-free embedding in concrete, as in this respect it behaves like concrete. Assembly is not dependent on the ambient temperature.

In time scheduling building projects there are therefore no technological problems in respect of drainage.

**PAM-GLOBAL® DRAINAGE SYSTEMS:
FIRST CLASS FUNCTIONAL SAFETY**

BENEFIT 23



Since the connection system ensures optimal longitudinal strength PAM-GLOBAL® pipes remain tight even with over-pressure.

Higher pressures can occur especially in these pipes:

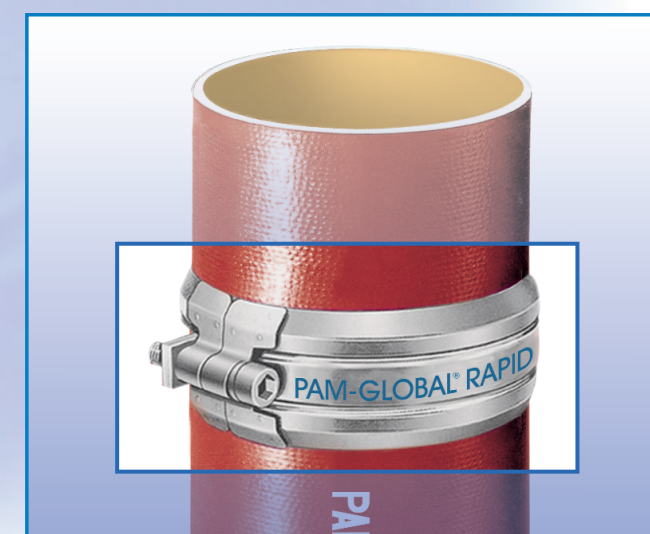
- backed-up sections of pipe
- rain water pipes
- waste pipes passing through several underground levels without run-off points
- pressurised pipes in pumping installations

DIY enthusiasts can buy plastic pipes in any DIY supermarket – and also install them themselves if desired. PAM-GLOBAL® systems however are professionally assembled by sanitation tradesmen. Thus from long practical experience it is also the tradesmen who best knows the additional installation advantages of the PAM-GLOBAL® safety system:

- no welding, no material property changes.
- no special tools required.
- the alignment of oblique pipe cuts is also easy because of the simple connection method.
- modification or adjustment of the pipe-work is not costly in time.
- when clearing blockages by machine a further benefit of the material comes into play: even with motor-driven moles, there is no serious material abrasion, even at bends and curves. Leaks do not occur.



For easy cutting a simple hand-operated pipe-cutter suffices.



PAM-GLOBAL® socket-less pipes and fixings are mounted with screw connections and special fastenings that can be disassembled in an emergency.

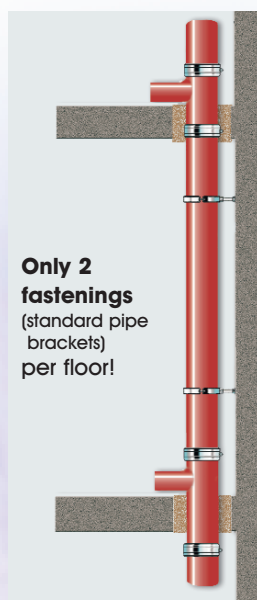
PAM-GLOBAL® CAST IRON PIPES: NO SAGGING OR DEFORMING WHEN INSTALLED HORIZONTALLY

BENEFIT 24

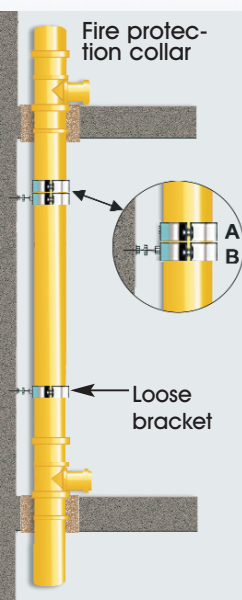
For laying under floors there are different fastening parameters for the various pipe materials. Thus plastic waste pipes must be fastened at intervals equal to 10 x the pipe diameter. For a DN 100 (100 mm nom. diam.) plastic pipe at max. 1 m interval, for a 3 m pipe length that means three pipe brackets. In addition, to take up linear expansion slide-pieces or double sockets are specified.

For all PAM-GLOBAL® S pipes (standard length 3 m), whether vertically or horizontally mounted and regardless of nominal diameter, require only two pipe brackets. Special support or loose brackets are not required.

Fastening of cast iron drain pipes



Fastening of plastic drain pipes



A) support ring
B) support bracket (at extremely high cost level)

Fastening of PAM-GLOBAL® pipelines

Basic rules:

The distances between the fastenings should be as equal as possible and should not exceed a length of 2 m. 2 to 3 m long pipes must fastened twice, shorter pipes, depending on the nominal width (or pipe weight) once or twice. Fastening must take place at equal distances between the connections, whereby the distance before and after each connection must be no greater than 0.75 m.

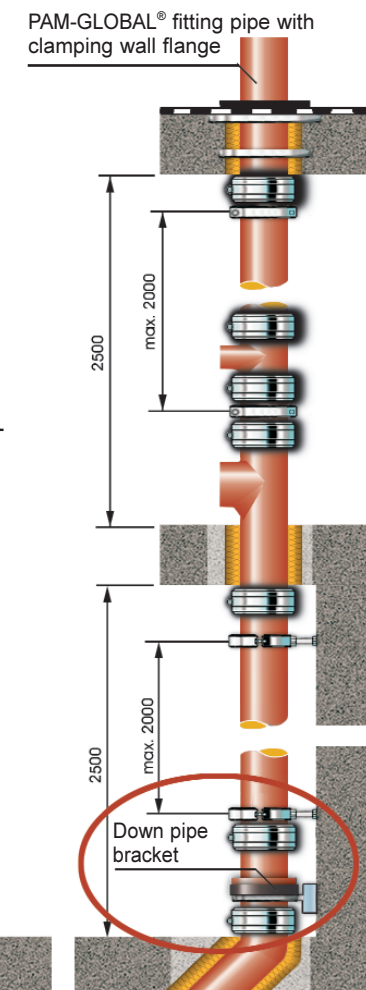
Horizontal pipelines

must be adequately fastened at all changes of direction and branches. Pipelines fastened to pendulums must be secured against any displacement by special fixing brackets at a distance of 10 to 15 m. This results in perfect lateral stability and prevents the pipeline being pushed out of the intended direction by other assembly groups.

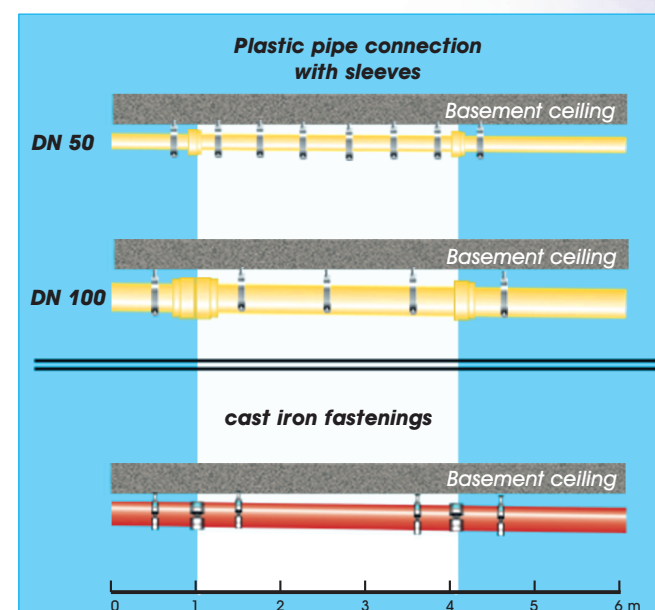
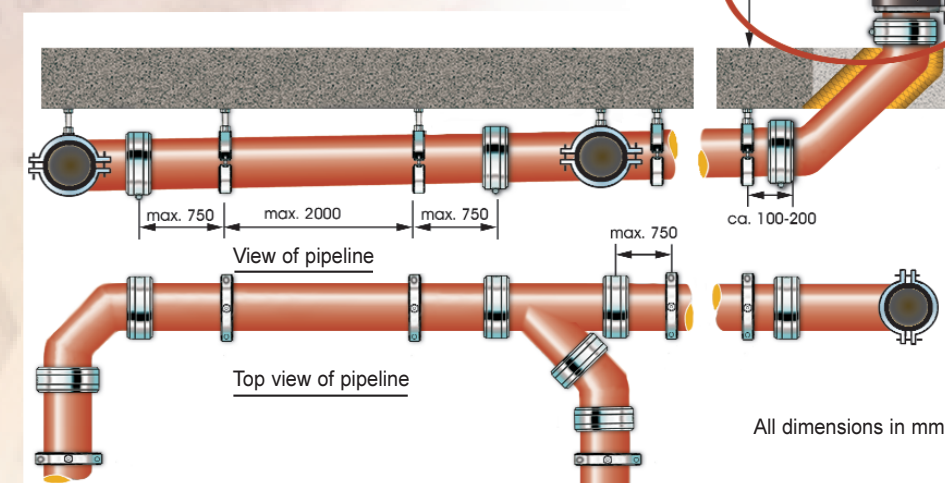
Down pipelines

must also be fastened at a maximum distance of 2 m with a floor height of 2.50 m, i.e. twice per floor, and underneath in the immediate vicinity of any incorporated branches.

In buildings with up to 5 floors a downpipe as of DN 100 must be secured against sagging by a downpipe bracket attached above the basement ceiling. Also, in higher buildings a downpipe support must be built in at every further 5th floor.



The pipeline plan shown here illustrates the basic fastening rules



With a 30 m length of PAM-GLOBAL® S collection main **you save:**

- 10 fastening points
- 10 drill-holes with wall plugs
- 10 pipe brackets

For PAM-GLOBAL® pipes we recommend TYRODUR pipe brackets. Downpipe supports must be fastened with the accompanying bearings and TYRODUR consoles. The required longitudinal frictional force is achieved with the PAM-GLOBAL® claw.

PAM-GLOBAL® DRAINAGE SYSTEMS – EXTREMELY RESILIENT

BENEFIT 25

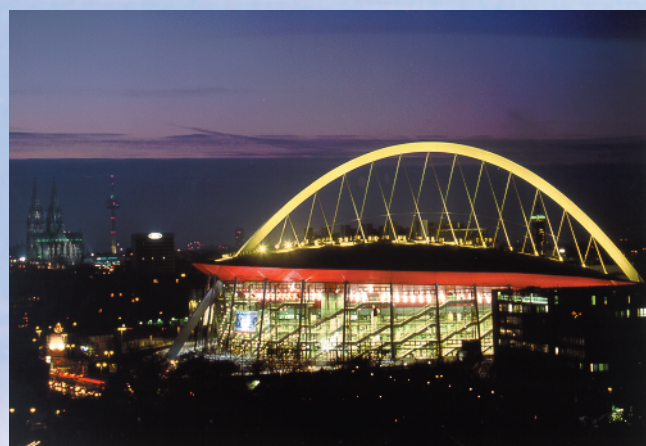
The PAM-GLOBAL® pipes withstand pressure loadings of up to 60 tonnes. No pipe damage on building sites through being run over by delivery or construction vehicles.



BENEFIT 26

ROBUST AND PRACTICALLY INDESTRUCTIBLE

For decades cast pipe and moulding materials, laying technology, connections and fastenings have proven their worth. Experience and know-how that has been gathered in buildings of all kinds with hundreds of thousands of kilometres of PAM-GLOBAL® drainage pipes.



Ideal for multi-storey car parks, schools, shopping centres, sports stadiums etc.

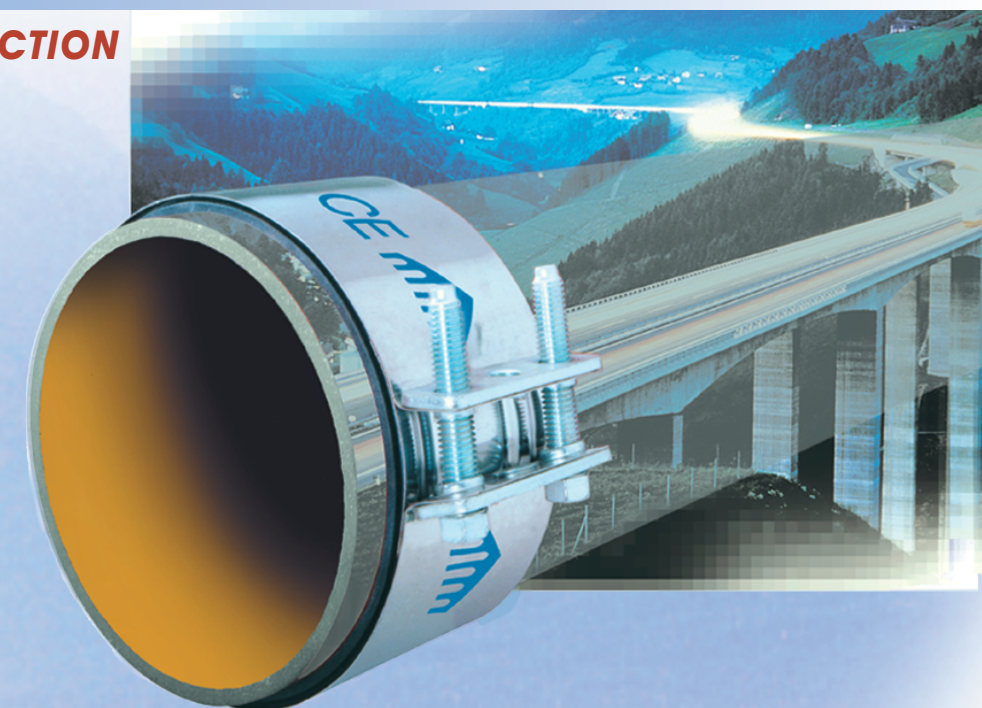
In Europe's most modern sports and concert hall, the **KÖLNARENA**, the choice of drainage material naturally fell to PAM-GLOBAL® pipes.



BENEFIT 27

OPTIMUM PROTECTION

Optimum protection when open to the elements – particularly when exposed to UV radiation. Whereas constant solar UV radiation attacks the material in PVC pipes, PAM-GLOBAL® drainage systems offer the best possible protection against the influences of the weather.



Because of the corrosion protection system applied to the exterior, cast iron pipes that are designed so be exposed to the elements withstand the attacks of environmental factors.

They must be dimensionally stable, non-flammable, easy to assemble, robust and have a long service life. Many years of experience have shown that cast iron drainage pipes fully meet these requirements.

BENEFIT 28

MORE SECURITY FOR THE FUTURE

- Quality assurance in accordance with DIN ISO 9001
- All national and international standards, regulations and conditions met
- Usable in all areas of building and land drainage