Synthene HPE system

Synthene®

What is the HPE system ?

A large range of hardnesses

4 components

HPE 40A Polyol
HPE 85A Polyol
HPE 40-85A Iso
HPE 55D Iso

2 or 3 component combinations to get a large range of hardnesses

40 Shore A

85 Shore A

55 Shore D

Chemistry for safety & performance

HPE system
Polyurea Polyurethane

Polyol
+
amine

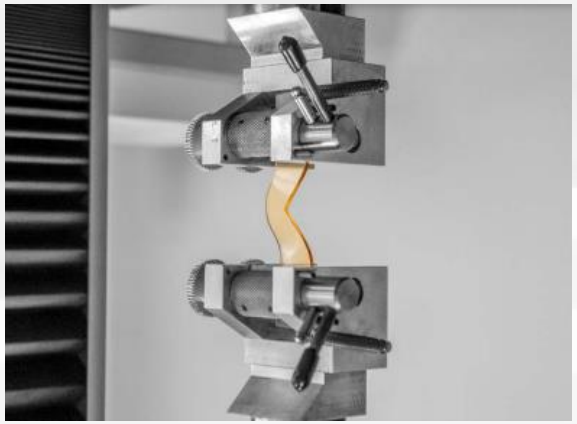
+

- **Aromatic polyisocyanate prepolymer** (MDI + polyol)
- **TDI prepomyler** (with low rate of monomer)

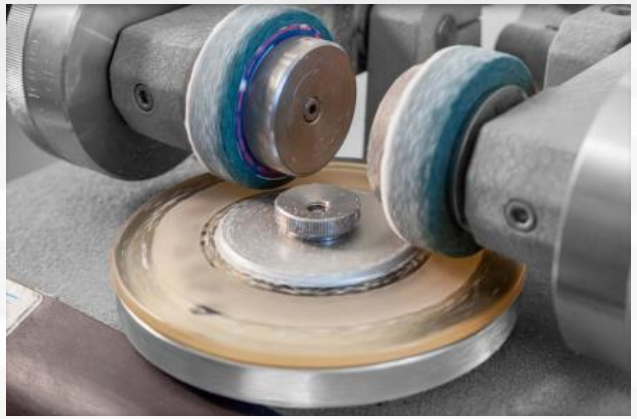
→ **More safety and user-friendliness combined to high performance**

Strong mechanical properties

Shore A hardness ISO 868	40	50	60	70	85	95	
Shore D hardness ISO 868						**40**	**50-55**
Working temperature	-40/+90	-40/+90	-40/+90	-40/+90	-40/+90	-40/+90	-40/+90
Maximum casting thickness (mm)	100	80	80	60	50	30	20
Elongation at break at 23°C (%) ISO 37	270	400	500	800	900	460	325
Tensile strength at break at 23°C (MPa) ISO 37	2.7	3.6	6	7.2	13	14	16
Tear resistance at 23°C ($kN.m^{-1}$) ISO 34	11.5	18	27	40	54	58	70
Abrasion resistance (TABER 1000 Tr/H22) ISO 5470 (mg/100U)					18		35



TEAR RESISTANT

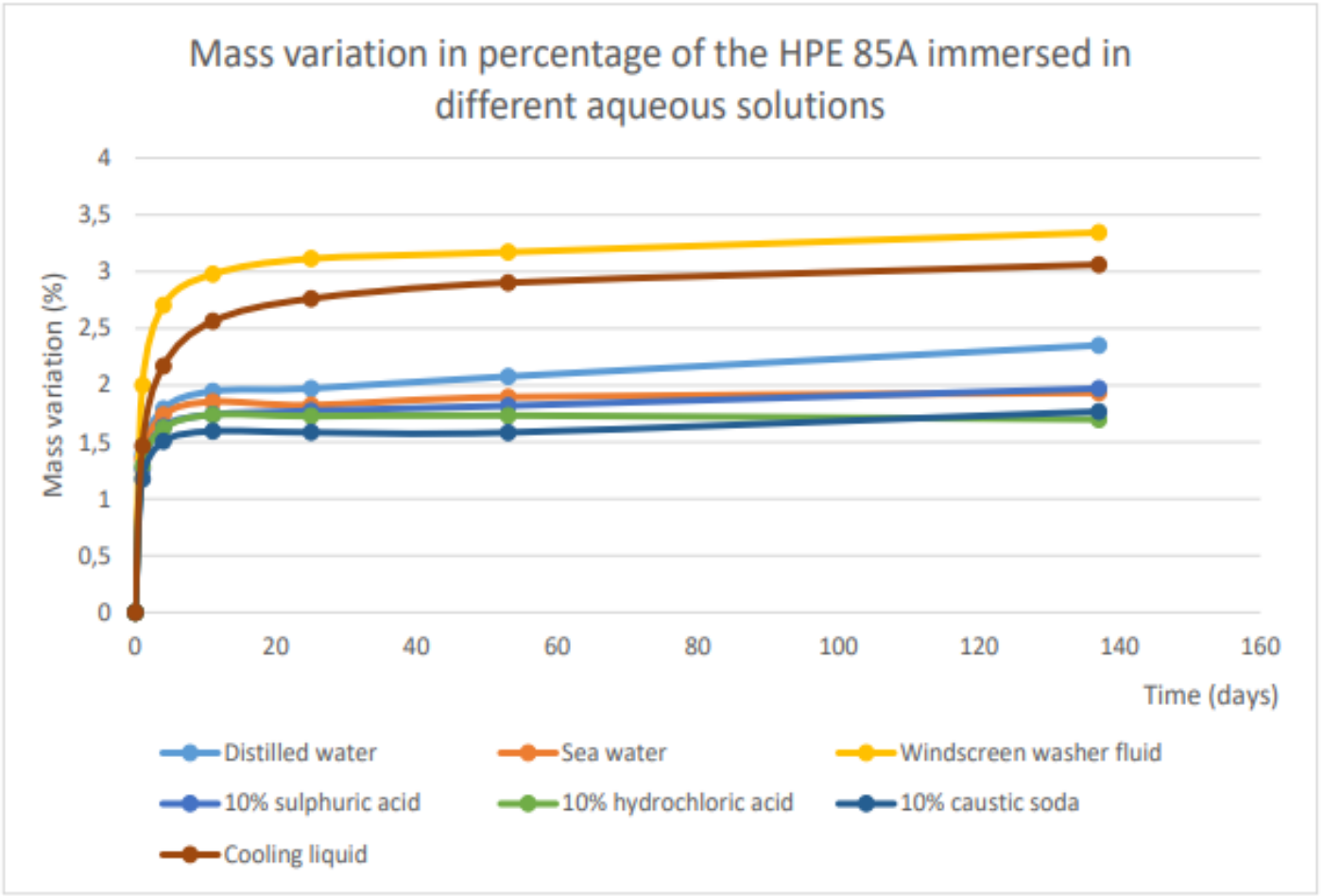


ABRASION RESISTANT

Strong chemical properties

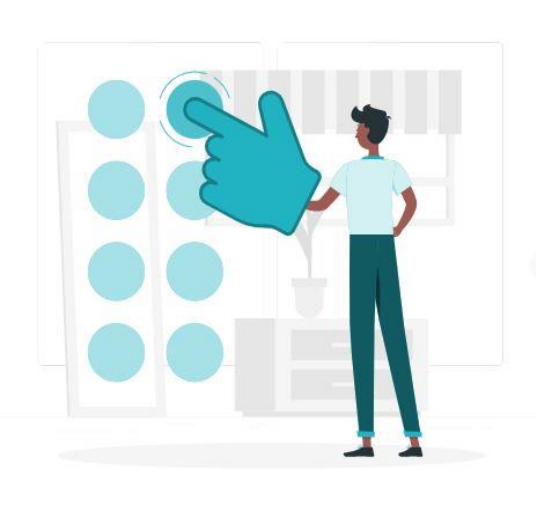
- High chemical resistance in aqueous solutions, suitable for submarine applications
- High resistance in engine environment: diesel, engine oil

CHEMICAL RESISTANT



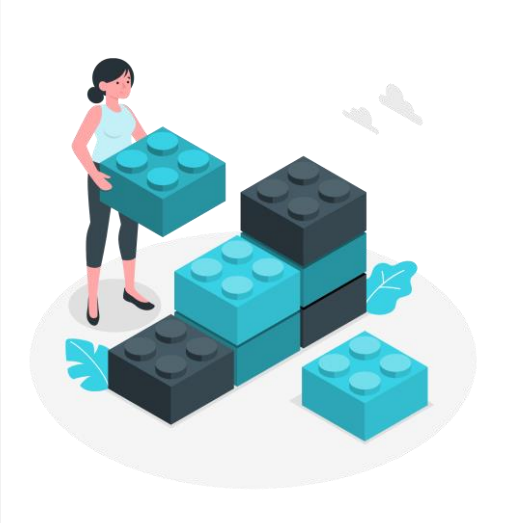
Why choose the HPE system ?

Versatility at all levels



Hardness

- 4 components
- Adjustable hardness from 40 shore A to 55 Shore D



Size & shape

- Low exothermic reaction
- For small to massive parts
- High level of details

Casting process

- Hand-casting
- Vacuum casting machine
- Two-component mixing maching

Curing process

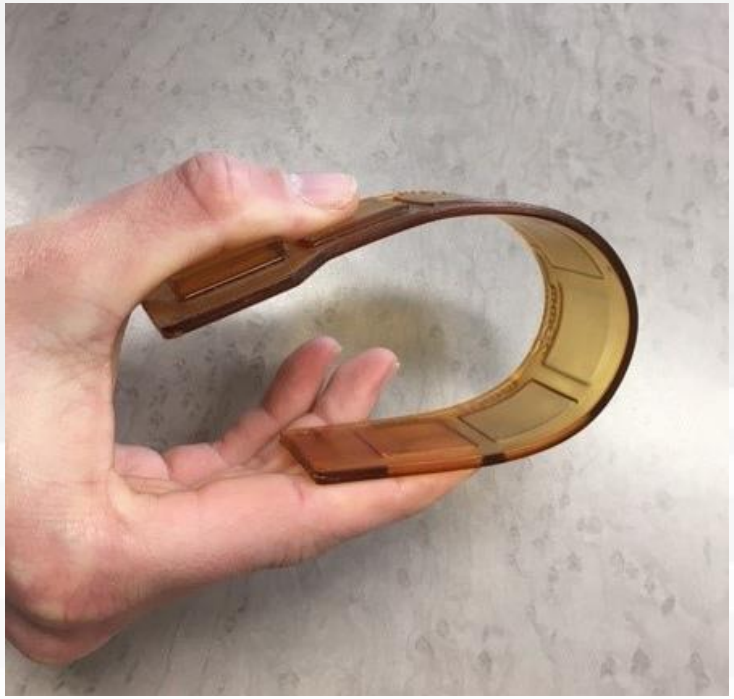
- Oven curing
- Room temperature curing

HPE in a few words

Ease of use & versatility combined to mechanical performance

1 single system to answer
a wide variety of projects

- Approaching hot-cast PU properties
- Can be used at room temperature
- Stronger than a regular TPU



How to use the HPE ?

Step by step guide

Decrystallisation & homogenization

Place the products in an oven or in a hot chamber :

- At 70°C for 40 min, on a 500g quantity
- Between 40°C to 60°C for few hours before using the product

On a 5 Kg Jerrican or a 1 Kg bottle :

- Heat the bottle for the decrystallisation
- After the product is warm and has a low viscosity, take the container out of the oven and shake it
- Put the container back in the oven until the product is ready to use

1

2

3

4

Product & casting preparation

Select your hardness

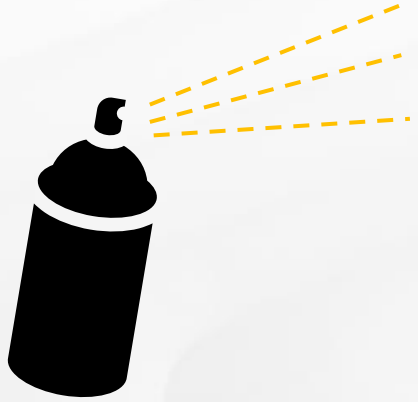
- Do you need 2 or 3 components for this casting?

Pre-mix

- If 3 components : Pre-mix the 2 polyols or the 2 isocyanates together before using

Mould or support

- Clean
- Dust free
- Moisture-free



Release agent

- Make sure that a **proper** release agent is used

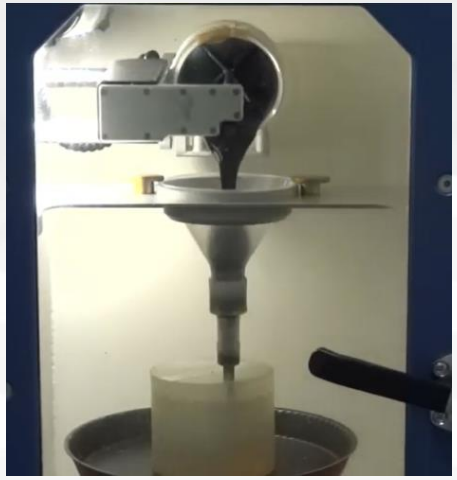
3 casting options

Two-component mixing machine

- Fill the tanks
- Check the mixing ratio at the entrance of the mixing head
- Cast in the mould
- Wait until gellation

Vacuum-casting machine

- Weigh the components, if necesary pre-mix the 2 similar components in the lower cup
- Pour the content of the upper cup into the lower cup and start the agitator
- Cast in the mould
- Wait until gellation



Hand casting

- Weigh the components in the same cup
- Mix with a spatula or a motorized mixer at low rotational speed
- Put under vacuum under casting
- Realise the casting
- Wait until gellation

Curing & demoulding

2 curing options

Wait at room temp until gellation (up to 1h*)

Curing at room temperature

Possible demoulding after 10 to 24h*

Full curing after 7 days at room temperature

Curing in a 70°C oven

Possible demoulding after 2 to 3h*

Full curing after 16h at 70°C + 48h at room temperature

** Gel time and demoulding time vary depending on the selected hardness*

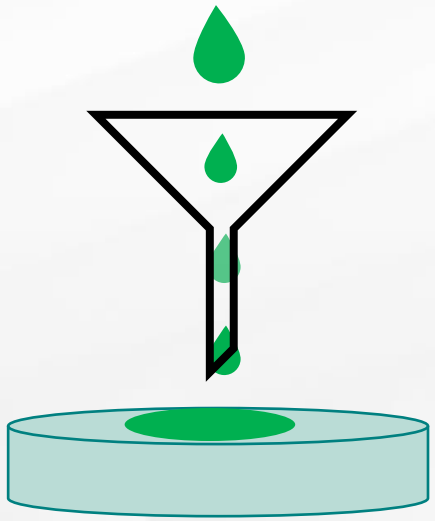
Tips for using

Frequently asked questions

How to add colour ?

Pre-mix the 2 **polyols** if necessary

Add 1 to 3% pigment
(ALWAYS in the polyol)
and mix



Mix with the Iso and realise the casting

The HPE is not UV stable and will darken over time
(without impact on the material's properties)

Using in combination with metal

1

Prepare your support

- Clean the metal
- Sand it slighlty
- Clean it with a proper solvent
- Make sure it is moisture-free

2

Use a **compatible primer**

3

Realise the casting

Dealing with viscosity

For vacuum casting applications	Hand casting or two-component mixing machine
Use a differential pressure system	Heat the products at 40°C (mind the potlife !)

40°C

Case studies

Typical applications

Disclaimer

The HPE is a very versatile material that can be adapted to many applications

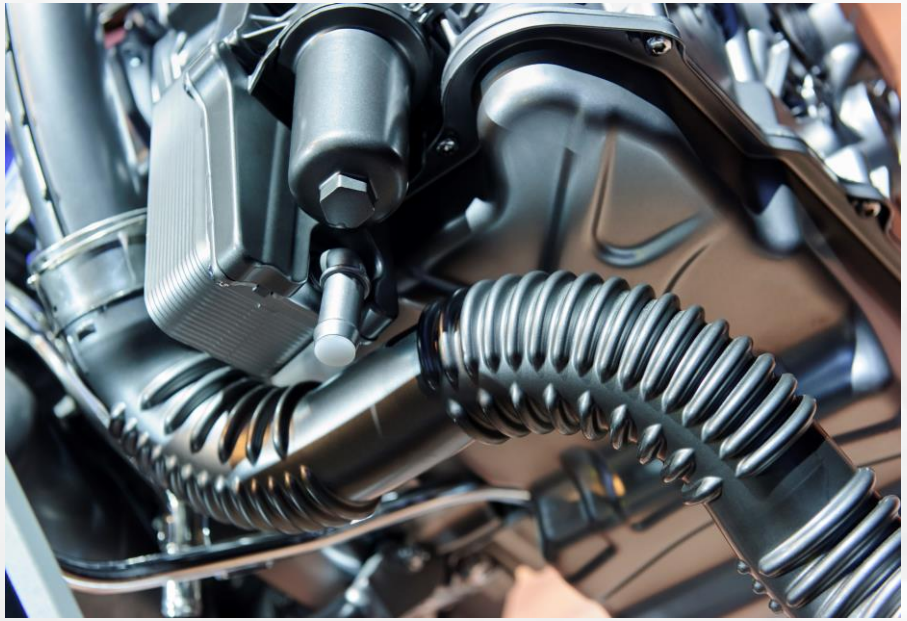
The below list is for information only

Seals, gaskets & silent blocks

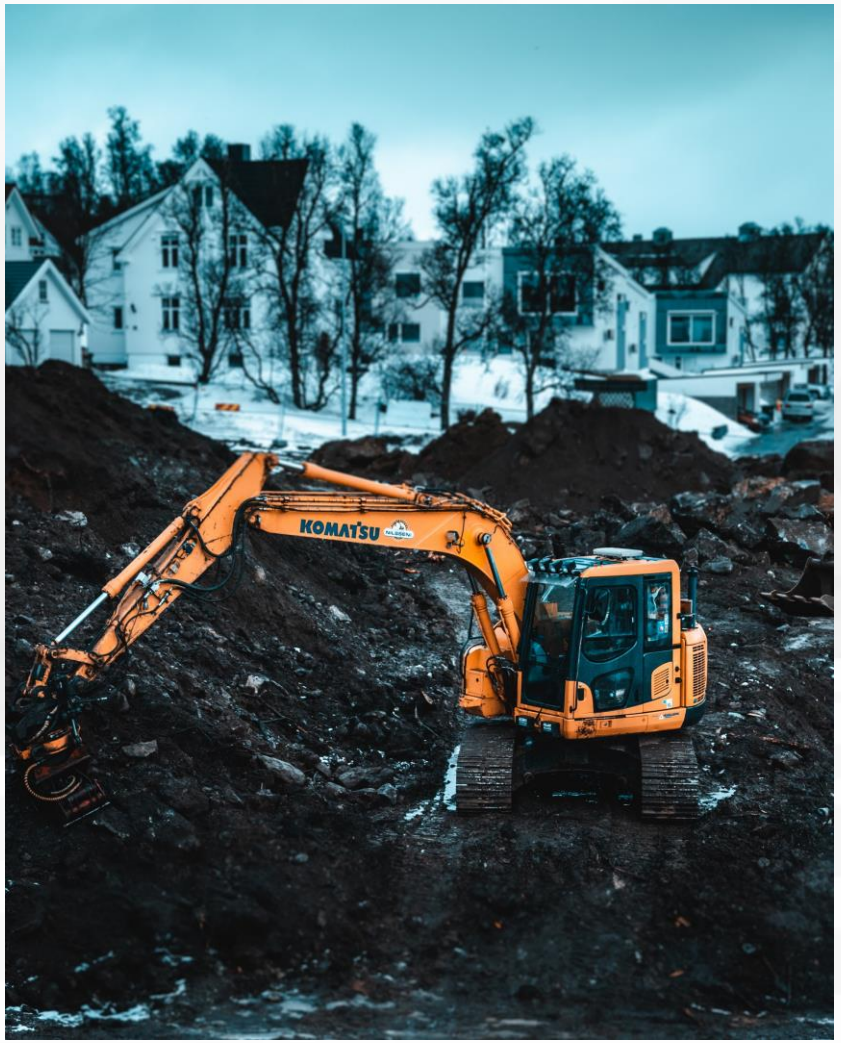
- Dishwasher machines gaskets (prototyping)
- Specific seals for intricate machines
- Silent blocs, anti-vibration parts
- Plumbing gaskets
- Fitting protective part to set manufactured parts

Hoses & bellows

- Car parts
- Charge air hoses
- Dentist chair parts
- Lift tables
- Protection bellows



Wheels & caterpillars



- Wheels
- Rollers
- Caterpillars
- Conveyor belts

Concrete moulds

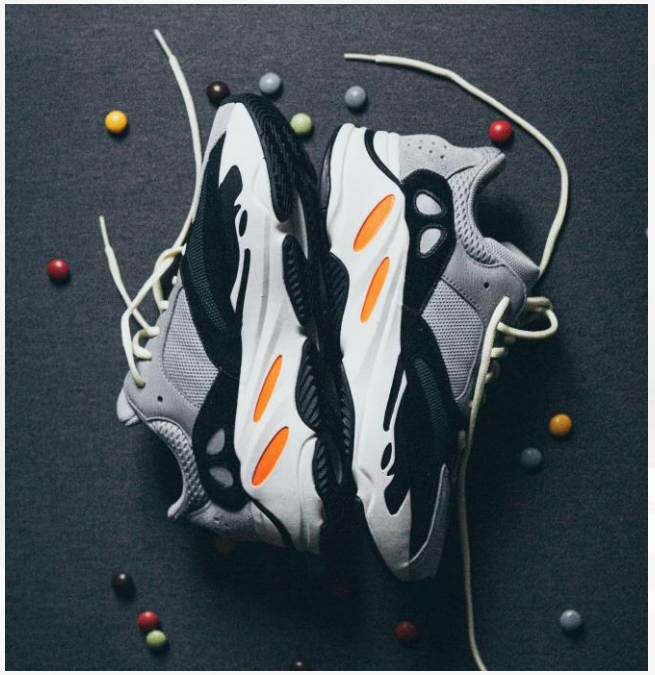
- Wear-proof, long lasting PU moulds for concrete casting (VS silicone)

Composites : encapsulation & coating

- Protective layer for electronics
  in submarine environment
  or for transport

- Walkie talkie protection

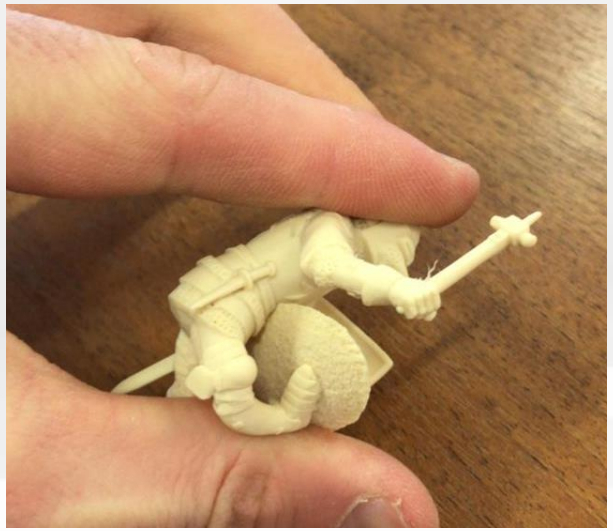
- Sport shoe soles



Pipes & cables

- Diabolo-shaped parts to guide pipes
- Bend restrictors
- Pipe brake
- Clamps
- Pipe coating to reduce vibration

Parts



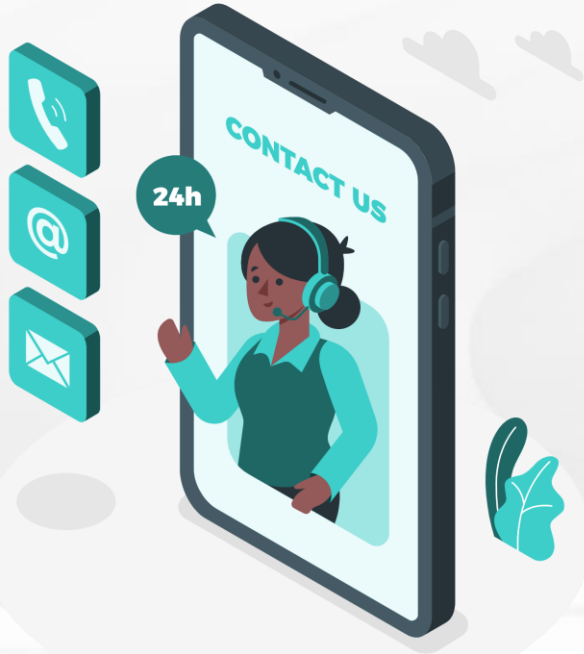
Synthene presentation – HPE System

Any question on our HPE system ?

Contact us:

- By email: comm@synthene.com
- By phone: +33 3 44 31 72 00

Find your local distributor on : http://www.synthene.com/en/distributors.html



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