

DISSOLVING

MIXING

EMULSIFYING

HOMOGENIZING

SUSPENDING

DISPERSING

GASSING

**YTRON**  
PROCESS TECHNOLOGY

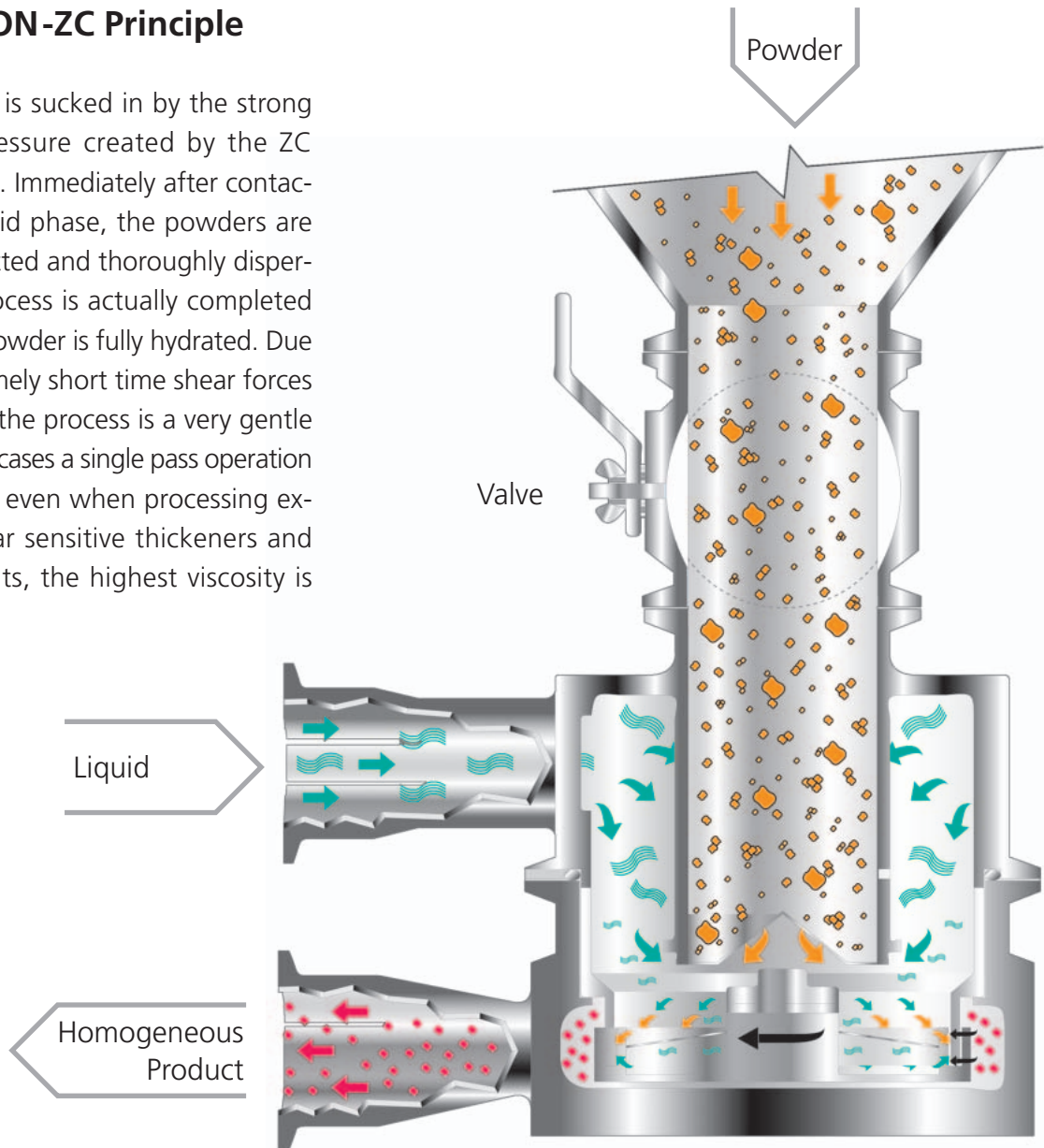


# YTRON-ZC



## The YTRON-ZC Principle

The powder is sucked in by the strong negative pressure created by the ZC reactor head. Immediately after contacting the liquid phase, the powders are instantly wetted and thoroughly dispersed. This process is actually completed before the powder is fully hydrated. Due to the extremely short time shear forces are applied, the process is a very gentle one. In most cases a single pass operation ensures that even when processing extremely shear sensitive thickeners and gelling agents, the highest viscosity is achieved.



## Important Advantages of YTRON-ZC

- Extremely difficult to wet out powders are processed in a single pass
- The defined application of shear forces results in a STRETCHING® effect of the molecular chain which therefore leads to an increase in viscosity
- Selection of rotor/stator slot width according to the application
- No air entrainment other than the occluded air in the powder phase
- Batch time reduced to the minimum
- High dispersion capabilities at low energy consumption
- Significantly higher yield due to an intensive wetting out of the powders
- Feeding from BigBag or silo is also possible
- Perfectly wetted-out products are achieved in the shortest time
- CIP and SIP available



Product example: Carbopol -  
Concentration approx. 12%



YTRON-ZC in the Dairy Industry  
Application: Dispersing of a Protein Hydrolysate



YTRON-ZC ViscoTron  
for high viscosities  
and/or high solids ratio

## Use of YTRON-ZC Example Carbopol

### The Problem

When in contact with water, individual particles of the hydrophilic polymer immediately begin to swell. The surfaces of these gradually swelling particles cross-link to form a tough outer skin which prevents the completion of the hydration process.

The result is an agglomeration of particles, which are wetted on the outside only. These appear at best as small transparent "fisheyes", but more normally as lumps of varying sizes.

The viscosity of the finished product is thereby reduced, and standardisation or consistent reproduction of results is difficult to achieve.

Should one attempt to achieve an homogeneous dispersion by smoothing out the lumps by means of high shear methods, the polymer molecular chain may be broken. This will effect the end result considerably by altering the desired characteristics of the finished product.

**Keeping the dispersing capabilities and efficient pumping separate makes the dispersing reproducible and efficient.**

- The power introduced via YTRON-ZC is used only to a limited degree to creating a pumping pressure. The main part of it is used to effectively disperse or wet out, the dry matter in the liquid phase.

- In combination with the appropriate pump selected for the relevant liquid phase, an extremely high pumping efficiency is achieved. For low viscosity, centrifugal pumps are used, for intermediate and high viscosity, positive displacement pumps are recommended.

- In the high viscosity range, 80 % or more of the energy can be saved in comparison to conventional processes. This means: No heating of the product due to mechanical energy input above the minimum during dispersion.

- Reproducible results are normally achieved in a single pass.

- The product is subject to a homogenous, uniform dispersing or shearing effect as it passes through the reactor head. There is no portion of the flow required to bypass the shear head for pumping the liquid in a loop.

### The Solution

YTRON-ZC facilitates a perfect dispersion of hydrophilic polymers, even providing an increase in the viscosity, by STRETCHING<sup>®</sup> of the molecular chains.

Each polymer particle is instantly wetted out after just one pass through the YTRON-ZC. The special rotor/stator dispersion reactor effects a STRETCHING<sup>®</sup> of molecular chains, which results in a considerable increase in viscosity. When compared to other traditional processing methods, the increase can amount up to 180 % of the normal value.

Due to the adjustable powder/liquid ratios, concentrations ranging from 0.5 - 10 % can be achieved.

YTRON -ZC  
Application: Dispersing of  
Acrylic Acid Polymers  
for Shampoo Production



YTRON-ZC 3 with switchboard and powder hopper  
for manual powder addition



YTRON-ZC with powder addition via silo  
Application: Suspending of Spices

# YTRON-ZC

Model	ZC-0	ZC 95.6V	ZC-1
Water/liquid flow rate (l/h)	700... 2,400	4,000... 6,000	4,000 ...10,000
Powder capacity (kg/h) max.	500	1,500	2,000
Rotation (1/min)	6,000	3,000	6,500
Drive power (kW)	2.20	2.20	5.50
Mechanical seal, single acting	Yes	Yes	Yes
Mechanical seal, double acting	Yes (Option)	No	Yes (Option)
Liquid inlet	DN 10	DN 25	DN 25
Liquid outlet	DN 25	DN 40	DN 40
Powder inlet	DN 25	DN 50	DN 50
Standard dimensions approx.*	410x255x470	830x450x870	925x455x660

Model	ZC-3	ZC-5
Water/liquid flow rate (l/h)	9,000...18,000	30,000... 90,000
Powder capacity (kg/h) max.	4,500	28,000
Rotation (1/min)	5,000	2,300
Drive power (kW)	15.00	55.00
Mechanical seal, single acting	Yes	No
Mechanical seal, double acting	Yes (Option)	Yes
Liquid inlet	DN 50	DN 80
Liquid outlet	DN 65	DN 100
Powder inlet	DN 65	DN 150
Standard dimensions approx.*	925x455x730	1.120 x 700 x 1.150

According to the application, special construction deviating from standard are available.

\* L x W x H (mm), without pump or powder hopper

## Typical application examples

Difficult to wet out thickeners and gums (binders), stabilizing and gelling agents, e.g. MC, CMC, HPMC, Guar Gum, Locust Bean Gum, Pectin, Agar-Agar, Alginate, Starches, Carrageenan, Xanthan Gum, Milk and Whey based Proteins as well as Polymers with a tendency to stick and form lumps (Poly-acrylic Acids, Carbopol etc.).

In a special configuration, YTRON-ZC is also suitable for very high solids contents in a single pass. Example: Silicates and binders in high viscosity liquids such as sugar syrup and chocolate mass.

Please note: In a single pass, the application is particularly gentle for shear sensitive products. Even on multiple passes, the shear rate is reproducible.



The YTRON® range is not mass produced

YTRON® equipment and systems are carefully selected for your individual application. We therefore kindly ask you to provide as detailed as possible a description of your application containing for example:

- Components to be processed
- Viscosity at the beginning and at the end of the process
- The specific gravity (bulk density when adding powders)
- Overall dimensions and shape of the mixing vessel
- Minimum and maximum filling levels of products to be processed
- Working temperature
- Other details that may be relevant

The capacities indicated in this brochure are related to certain applications under standardised conditions. They are not necessarily valid for all products or processes.

The standard materials for the product contact parts are:

- Material 1.4301 / AISI 304
- Material 1.4571 / AISI 316 Ti
- Material 1.4435 und 1.4404 / AISI316 L

Special materials such as 1.4539, Hastelloy etc. are available on request

Fittings can be delivered various types such as  
DIN 11851, DIN 11864, SMS, DS, RJT, Clamp, Flange etc.

We reserve the right to alter the design without previous notice in the interest of development.



## **YTRON Process Technology GmbH & Co. KG**

Am Anger 25  
D-83233 Bernau/Chiemsee

Tel. +49 (0)8051 / 9847 0  
Fax +49 (0)8051 / 9847 0

e-mail: [service@ytron.com](mailto:service@ytron.com)  
Internet: [www.ytron.com](http://www.ytron.com)