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Tools for the D-4

The process defines the geometry.

Compare tool families by head geometry, rotor, indicative volume and dimensions. Select by medium, vessel, viscosity and process objective.

PICO

5 / 8 / 14 mm

6 complete tools

VARIO

18 / 20 / 30 mm

34 tool packages

VARIOFLEX

20 / 30 mm

4 tool packages

Contents

Tool family / section	Scope	Page
PICO	5 / 8 / 14 mm	2
VARIO 18	Six head variants	3
VARIO 20	SMIR / EMR / additional variants	4-6
VARIO 30	SMIR / EMR / additional variants	7-9
VARIOFLEX	Tool packages	10
RW	Modular high-speed mixing	11
Length versions	Standard / XL / XXL	12
Selection and operation	Guidance and operating limits	13

D-4: system limits and tool limits

Rotor-stator: 0.1-2,000 ml (H_2O) · Tool sizes: 5-30 mm.
A tool's indicative volume above 2,000 ml does not increase D-4 system capacity. Always observe the narrower limit of the drive and tool.

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PICO compared

Six variants. One comparison grid.

Tools with stator diameters up to 14 mm, organised by size and variant. Images show the geometry; the key selection values are listed alongside.

5 mm
Micro samples

8 mm
Small samples

14 mm
Multiple head geometries

Image / type	Tool	Stator Ø mm	Volume* ml	Length mm	Immersion depth min. / max. mm	Version
 Tool head	**DS-5/PE**	5	0.1-20	116.5	5 / 50	Standard
 Tool head	**DS-8/P**	8	1-100	155	20 / 90	Standard
 Tool head	**DS-14/P**	14	10-500	200	35 / 120	Standard
 Tool head	**DS-14/PG PMIR**	14	10-500	200	30 / 125	Standard
 Tool head	**DS-14/W PMIR**	14	10-500	200	30 / 125	Standard
 Tool head	**DS-14/ZKS PMIR**	14	10-500	200	30 / 125	Standard

*Indicative volumes for H_2O. Suitability depends on the medium, vessel and process conditions. All variants are complete tools; images show their tool heads and are not to scale.

Only Standard versions are included in this PICO comparison. Technical specifications do not replace the model-specific operating manual.

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VARIO compared

18 mm. Six tool variants.

Modular rotor-stator geometries in the same comparison grid. Rotor type and stator geometry accompany each model, with technical selection values alongside.

18 mm
This comparison page

20 mm
Next size class

30 mm
Larger size class

Image	Tool / rotor	Stator Ø mm	Volume* ml	Length mm	Immersion depth min. / max. mm	Version
 Tool head	**DS-18/PG PMIR** Stator: coarse	18	10-1,500	250	40 / 200	Standard
 Tool head	**DS-18/W PMIR** Stator: W	18	10-1,500	250	40 / 200	Standard
 Tool head	**DS-18/SAW PMIR** Stator: SAW	18	10-1,500	250	40 / 200	Standard
 Tool head	**DS-18/PF PMIR** Stator: fine	18	10-1,500	250	40 / 200	Standard
 Tool head	**DS-18/PF EMR** Stator: fine	18	10-1,500	250	40 / 200	Standard
 Tool head	**DS-18/ZKS PMIR** Stator: toothed	18	10-1,500	250	40 / 200	Standard

*Indicative volumes for H_2O. Suitability depends on the medium, vessel and process conditions. All variants are complete tools; images show their tool heads and are not to scale.

Parts in contact with the product: AISI 316L / PTFE. These additional 18 mm variants are available in Standard length only, not XL or XXL.

Rotor types: PMIR / EMR. Refer to the individual documents for model-specific operating limits and care instructions.

VARIO compared

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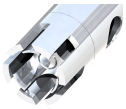
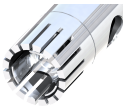
20 mm. Cutting and mixing rotors.

Head geometry, rotor and technical selection values at a glance. All listed variants are complete tools; images show the tool heads only.

18 mm
Small head geometries

20 mm
Modular tool variants

30 mm
Larger head geometries

Image	Tool / rotor	Stator Ø mm	Volume* ml	Standard length mm	Immersion depth min. / max. mm	Version
 Tool head	**DS-20/PG SMIR** Stator: coarse	20	20–5,000	250	40 / 200	Std. / XL / XXL
Image pending	**DS-20/PM SMIR** Stator: medium	20	20–3,500	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-20/ZKS SMIR** Stator: toothed ring	20	20–4,000	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-20/PF SMIR** Stator: fine	20	20–3,000	250	40 / 200	Std. / XL / XXL

*Indicative tool volumes for H_2O, not D-4 system capacity. D-4 maximum: 2,000 ml. Observe the narrower drive or tool limit, depending on the medium, vessel and process.

Parts in contact with the product: AISI 316L / PTFE. Std.: 250 / 200 mm; XL: 327 / 277 mm; XXL: 420 / 370 mm (length / max. immersion depth). PSF: Std. and XL only.

Table immersion depths refer to Standard versions. Images are not to scale. Operate the tool in liquid only.

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VARIO compared

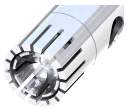
20 mm. Emulsifying rotors.

Head geometry, rotor and technical selection values at a glance. All listed variants are complete tools; images show the tool heads only.

18 mm
Small head geometries

20 mm
Modular tool variants

30 mm
Larger head geometries

Image	Tool / rotor	Stator Ø mm	Volume* ml	Standard length mm	Immersion depth min. / max. mm	Version
Image pending	**DS-20/PG EMR** Stator: coarse	20	20–5,000	250	40 / 200	Std. / XL / XXL
Image pending	**DS-20/PM EMR** Stator: medium	20	20–4,000	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-20/PF EMR** Stator: fine	20	20–3,000	250	40 / 200	Std. / XL / XXL
Image pending	**DS-20/PSF EMR** Stator: superfine	20	20–1,000	250	40 / 200	Std. / XL

*Indicative tool volumes for H_2O, not D-4 system capacity. D-4 maximum: 2,000 ml. Observe the narrower drive or tool limit, depending on the medium, vessel and process.

Parts in contact with the product: AISI 316L / PTFE. Std.: 250 / 200 mm; XL: 327 / 277 mm; XXL: 420 / 370 mm (length / max. immersion depth). PSF: Std. and XL only.

Table immersion depths refer to Standard versions. Images are not to scale. Operate the tool in liquid only.

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VARIO compared

20 mm. Additional tool variants.

Head geometry, rotor and technical selection values at a glance. All listed variants are complete tools; images show the tool heads only.

18 mm
Small head geometries

20 mm
Modular tool variants

30 mm
Larger head geometries

Image	Tool / rotor	Stator Ø mm	Volume* ml	Standard length mm	Immersion depth min. / max. mm	Version
 Tool head	**DS-20/PG PMIR** Stator: coarse	20	20–2,000	250	40 / 200	Standard
 Tool head	**DS-20/W PMIR** Stator: W	20	10–1,500	250	40 / 200	Standard
 Tool head	**DS-20/SAW PMIR** Stator: SAW	20	20–2,000	250	40 / 200	Standard
 Tool head	**DS-20/PF PMIR** Stator: fine	20	20–2,000	250	40 / 200	Standard
 Tool head	**DS-20/PF EMR** Stator: fine	20	20–2,000	250	40 / 200	Standard
 Tool head	**DS-20/ZKS PMIR** Stator: toothed ring	20	20–2,000	250	40 / 200	Standard

*Indicative tool volumes for H_2O, not D-4 system capacity. D-4 maximum: 2,000 ml. Observe the narrower drive or tool limit, depending on the medium, vessel and process.

Parts in contact with the product: AISI 316L / PTFE. Standard version only; no XL or XXL versions.

Table immersion depths refer to Standard versions. Images are not to scale. Operate the tool in liquid only.

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VARIO compared

30 mm. Cutting and mixing rotors.

Head geometry, rotor and technical selection values at a glance. All listed variants are complete tools; images show the tool heads only.

18 mm
Small head geometries

20 mm
Modular tool variants

30 mm
Larger head geometries

Image	Tool / rotor	Stator Ø mm	Volume* ml	Standard length mm	Immersion depth min. / max. mm	Version
Image pending	**DS-30/PR SMIR** Stator: very coarse	29	250–10,000	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-30/PG SMIR** Stator: coarse	29	250–10,000	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-30/PM SMIR** Stator: medium	29	100–6,000	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-30/ZKS SMIR** Stator: toothed ring	29	100–6,000	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-30/PF SMIR** Stator: fine	29	100–5,000	250	40 / 200	Std. / XL / XXL

*Indicative tool volumes for H_2O, not D-4 system capacity. D-4 maximum: 2,000 ml. Observe the narrower drive or tool limit, depending on the medium, vessel and process.

Parts in contact with the product: AISI 316L / PTFE. Std.: 250 / 200 mm; XL: 327 / 277 mm; XXL: 420 / 370 mm (length / max. immersion depth). PSF: Std. and XL only.

Table immersion depths refer to Standard versions. Images are not to scale. Operate the tool in liquid only.

VARIO compared

MICCRA®

30 mm. Emulsifying rotors.

Head geometry, rotor and technical selection values at a glance. All listed variants are complete tools; images show the tool heads only.

18 mm
Small head geometries

20 mm
Modular tool variants

30 mm
Larger head geometries

Image	Tool / rotor	Stator Ø mm	Volume* ml	Standard length mm	Immersion depth min. / max. mm	Version
Image pending	**DS-30/PR EMR** Stator: very coarse	29	500–8,000	250	40 / 200	Std. / XL / XXL
Image pending	**DS-30/PG EMR** Stator: coarse	29	250–7,000	250	40 / 200	Std. / XL / XXL
Image pending	**DS-30/PM EMR** Stator: medium	29	250–6,000	250	40 / 200	Std. / XL / XXL
 Tool head	**DS-30/PF EMR** Stator: fine	29	100–5,000	250	40 / 200	Std. / XL / XXL
Image pending	**DS-30/PSF EMR** Stator: superfine	29	100–2,000	250	40 / 200	Std. / XL

*Indicative tool volumes for H_2O, not D-4 system capacity. D-4 maximum: 2,000 ml. Observe the narrower drive or tool limit, depending on the medium, vessel and process.

Parts in contact with the product: AISI 316L / PTFE. Std.: 250 / 200 mm; XL: 327 / 277 mm; XXL: 420 / 370 mm (length / max. immersion depth). PSF: Std. and XL only.

Table immersion depths refer to Standard versions. Images are not to scale. Operate the tool in liquid only.

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VARIO compared

30 mm. Additional tool variants.

Head geometry, rotor and technical selection values at a glance. All listed variants are complete tools; images show the tool heads only.

18 mm
Small head geometries

20 mm
Modular tool variants

30 mm
Larger head geometries

Image	Tool / rotor	Stator Ø mm	Volume* ml	Standard length mm	Immersion depth min. / max. mm	Version
 Tool head	**DS-30/PG PMIR** Stator: coarse	30	100–5,000	250	40 / 200	Standard
 Tool head	**DS-30/PGH PMIR** Stator: coarse	30	100–5,000	250	40 / 200	Standard
 Tool head	**DS-30/SAW PMIR** Stator: SAW	30	100–5,000	250	40 / 200	Standard
 Tool head	**DS-30/PF PMIR** Stator: fine	30	100–5,000	250	40 / 200	Standard

*Indicative tool volumes for H_2O, not D-4 system capacity. D-4 maximum: 2,000 ml. Observe the narrower drive or tool limit, depending on the medium, vessel and process.

Parts in contact with the product: AISI 316L / PTFE. Standard version only; no XL or XXL versions.

Table immersion depths refer to Standard versions. Images are not to scale. Operate the tool in liquid only.

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VARIOFLEX overview

Start coarse. Continue fine.

A tool package with interchangeable coarse and fine stator geometries for successive process steps.



Two geometries. One modular system.

Pre-process with a coarse stator, then continue with a suitable fine geometry. Select according to the sample, vessel and intended process step.

Image: DS-20/2P SMIR, tool head and additional stator. This image does not represent the other packages.

Packages and available lengths

Tool package	Size class	Rotor	Versions
DS-20P2-SMIR	20 mm	SMIR	Standard / XL / XXL
DS-20P2-EMR	20 mm	EMR	To be confirmed
DS-30P2-SMIR	30 mm	SMIR	Standard / XL / XXL
DS-30P2-EMR	30 mm	EMR	Standard / XL / XXL

Dimensions and working volume

Model-specific indicative volumes and detailed dimensions are still to be confirmed; they are not inferred from individual tools. The length overview on page 12 applies only to the model ranges explicitly listed there.

D-4 rotor-stator: maximum 2,000 ml (H_2O). Observe the narrower tool or drive limit. Operate the tool in a suitable liquid only; avoid dry running.

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Modular high-speed mixing

Mixing with reduced shear

A compatible smaller rotor is fitted inside the larger stator head. The wider clearance between rotor and stator reduces shear compared with the corresponding dispersing combination. The system still generates shear; it is not a shear-free stirrer.

RW combinations for the D-4 platform

Tool	Stator	Compatible rotor from	Version
RW-20/PR-PMIR	20 mm	18 mm tool / PMIR	Standard
RW-20/PR-EMR	20 mm	18 mm tool / EMR	Standard
RW-30/PR-SMIR	30 mm	20 mm tool / SMIR (Ø 15 mm)	Standard / XL / XXL
RW-30/PR-EMR	30 mm	20 mm tool / EMR (Ø 15 mm)	Standard / XL / XXL

RW-20 is a new addition and is available in Standard length only. RW-30 overall lengths are 250 / 327 / 420 mm, with maximum insertion depths of 200 / 277 / 370 mm. Minimum insertion depth: 40 mm.

Typical applications

- Wet and incorporate powders into a liquid phase.
- Rapidly mix liquid batches.
- Prepare mixtures with lower shear than dispersing.

Select the tool and drive together

Working volume and operating speed must be selected for the specific tool-drive combination and medium. Tool volumes specified for larger drives are not D-4 system capacities. RW-40 combinations with 23 mm rotors are reserved for more powerful drives and are not part of the D-4 selection.

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Available tool lengths

Standard, XL and XXL

Longer shafts allow greater insertion depth. Tool geometry and model-specific working volumes remain unchanged across the length versions listed below.

Version	Overall length	Insertion depth min. / max.
Standard	250 mm	40 / 200 mm
XL	327 mm	40 / 277 mm
XXL	420 mm	40 / 370 mm

Availability by tool model

These dimensions apply only to the existing models listed here. PSF: Standard and XL only, not XXL. The additional DS variants (14, 18, 20 and 30 mm) and RW-20 are available in Standard versions only.

Tool series / rotor	Model / stator variant	Versions
VARIO 20 mm / SMIR	PG, PM, ZKS, PF	Standard / XL / XXL
VARIO 30 mm / SMIR	PR, PG, PM, ZKS, PF	Standard / XL / XXL
VARIO 20 mm / EMR	PG, PM, PF	Standard / XL / XXL
VARIO 30 mm / EMR	PR, PG, PM, PF	Standard / XL / XXL
VARIOFLEX / SMIR	DS-20/2P, DS-30/2P	Standard / XL / XXL
VARIOFLEX / EMR	DS-30/2P	Standard / XL / XXL
VARIO / PSF-EMR	DS-20/PSF, DS-30/PSF	Standard / XL

Tool length and system capacity

A longer version does not automatically mean a larger working volume or a higher D-4 system capacity. The D-4 rotor-stator upper limit remains 2,000 ml (H_2O). Always observe the narrower drive or tool limit, subject to medium, vessel and process conditions.

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Selection and operation

From process to tool family.

Process descriptions provide guidance, not exclusive classifications. A tool may serve more than one process objective.

Sample / process	Guidance	Indicative volume*
Micro samples, cell lysates	PICO DS-5/PE	0.1-20 ml
Cell and tissue samples	PICO DS-8/P	1-100 ml
Small samples / analysis	PICO DS-14/P	10-500 ml
Hard / brittle constituents	VARIO PG + SMIR	Process-dependent
Pre-comminuted sample	VARIO PF + SMIR	Process-dependent
Fine suspension / emulsion	VARIO PF + EMR	Process-dependent
Multi-stage processing	VARIOFLEX	Process-dependent
Wetting and high-speed mixing	RW combination	Combination-dependent

Selection and operating limits

Operate rotor-stator tools in a suitable liquid only. Avoid dry running. Volumes are indicative values for H_2O; suitability depends on the medium, viscosity, solids content, vessel and process objective.

Select tool length and immersion depth independently of the permitted working volume. A longer version does not automatically increase either the tool volume or D-4 system capacity.

> This overview supports tool selection. For the specific combination, observe the model-specific operating, cleaning and sterilisation instructions in the individual documents and operating manuals.