

# Aesculap Neurosurgery

## GAV<sup>®</sup>



Gravitational valve for the treatment of  
adult hydrocephalus





## *Alliance for innovations*

When two strong partners combine their expertise, innovative and ground-breaking solutions frequently arise that would scarcely have been possible working alone.

Aesculap and Miethke have followed this path and have been cooperating since 1999. The goal was and is to develop better solutions for the difficult treatment of hydrocephalus and to make them available all over the world.

This vision has inspired and motivated everyone involved. An intensive dialogue was initiated with customers, doctors and patients about the problems associated with this complex medical condition. New solutions were developed and discussed in small circles of experts and scientific symposia.

The eventual outcome of this fruitful process was the market introduction of a gravitational unit - which can effectively prevent the over-drainage of cerebrospinal fluid. A unique product worldwide, and a milestone in modern hydrocephalus therapy.

What has already been achieved is only the beginning. For us, it is a duty and a necessity to continue along the path we have begun. In the patients' interest we will carry on our extensive investment into research and development and will not tire of learning more, collecting new insights and remaining open for future developments.



*Aesculap, Tuttlingen*



*Miethke, Potsdam*

*We will continue to venture in new directions and cross frontiers in order to be able to help where no solutions have yet been found.*



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**GAV®**  
– *the valve*

The Miethke GAV® is a unique gravitational valve for the treatment of adult hydrocephalus.

The valve combines the tried and tested ball-in-cone technology with an innovative gravitational unit. This combination makes automatic adjustment of the opening pressure possible according to the position of the patient's body, thus effectively counteracting possible overdrainage.

Conventional differential pressure and programmable valves are passive systems. The opening pressure selected does not adjust to the different ICP situation which arises when the body position alters. As a result, many hydrocephalus patients suffer from side effects ranging from chronic headaches to slit ventricles.

It is precisely here that the strengths of the GAV® valve lie. By means of the gravitational mechanism, the GAV® actively varies its opening pressure as soon as this becomes necessary due to alterations in the patient's body position. As a result, CSF drainage is as physiological as possible.

This also makes the valve particularly well suited for the treatment of NPH patients, as well as for extreme forms of hydrocephalus, such as LOVA (long-standing overt ventriculomegaly in adults)\*.

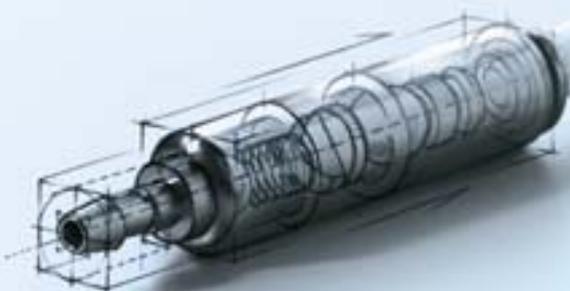


The GAV® valve is made from titanium, a material that guarantees outstanding precision, reliability and biocompatibility. It is MRI compatible and offers effective protection against subcutaneous pressure.

Last but not least, the very slim, streamlined valve design facilitates extremely easy implantation in the retroauricular area.

*“Unlike conventional differential pressure shunts, gravitational shunts can be used in the treatment of high-risk patients with longstanding overt ventriculomegaly in adults. Significant risk of overdrainage can be avoided.”\**

\*Source: Kiefer M., Eymann R., Strowitzki M., Steudel W.-I.,  
Gravitational Shunts in Longstanding Overt Ventriculomegaly in Adults.  
Neurosurgery, Volume 57, Number 1, July 2005

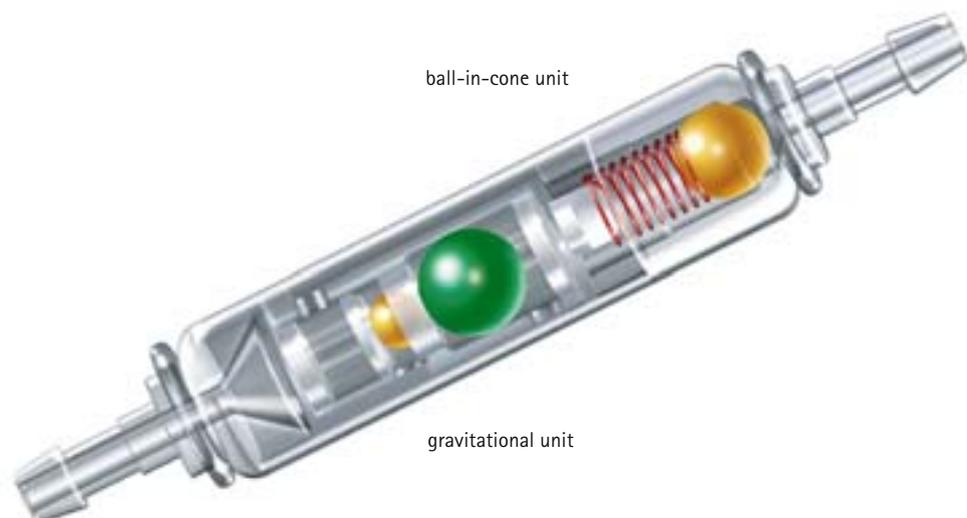


GAV®  
– the valve

*“The gravitational ball valves...showed the closest  
relation to physiological flow requirements.”\**

\*Oikonomou J., Aschoff A., Hashemi B., Kunze S., New valves – new dangers? 22 valves designed in the nineties in ultralong-term tests (365 days). Eur J Pediatr Surg 1999; 9 Suppl 1:23-6

- combined ball-in-cone and gravitational unit
- active adaptation of opening pressure to the body position maintains physiological drainage of CSF
- effective protection against overdrainage avoids chronic headache and hematomas
- timesaving and easy implantation of the streamlined valve lowers the infection risk
- the use of titanium as the housing material permits the maximum possible flow volume with the smallest possible valve dimensions, reducing the risk of obstruction





Our recommendation:\*\*

Height of patient	Standard valve
up to 160 cm	5 / 30 cmH <sub>2</sub> O
160 - 180 cm	5 / 35 cmH <sub>2</sub> O
over 180 cm	5 / 40 cmH <sub>2</sub> O

\*\* Recommended settings only; may vary according to patient and medical history.

**GAV®**

*- our recommendation  
- your choice*

Your choice:

GAV® is available in different pressure level settings. Each pressure level is specially coded, enabling the valve to be identified on post-operative x-rays.

Opening pressure horizontal/vertical (cmH <sub>2</sub> O)	coding GAV® on x-ray
5 / 30	
5 / 35	
5 / 40	
10 / 30	
10 / 40	
10 / 50	

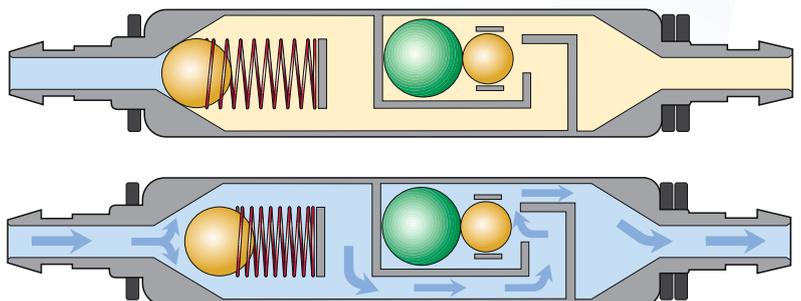
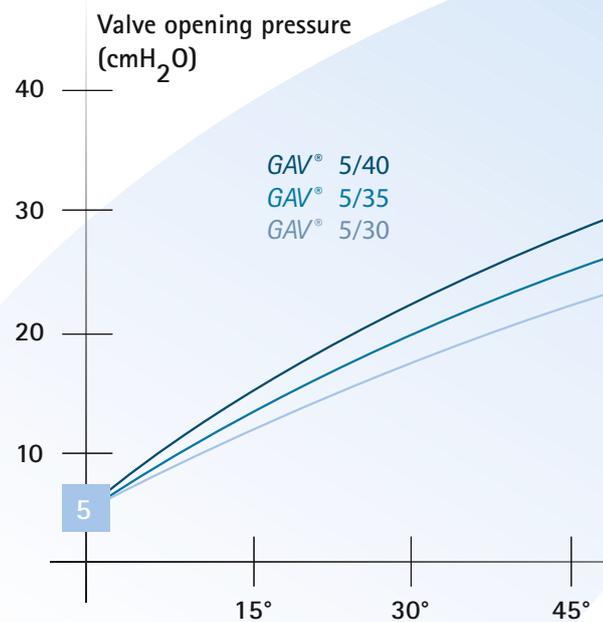
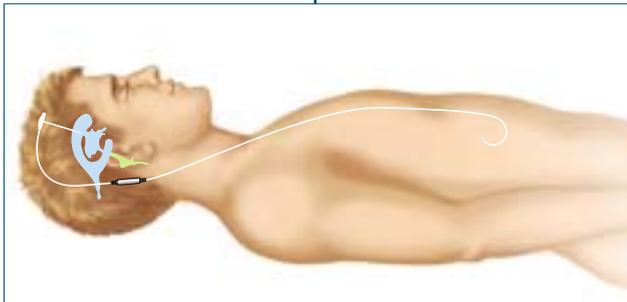
## GAV®

– the functions

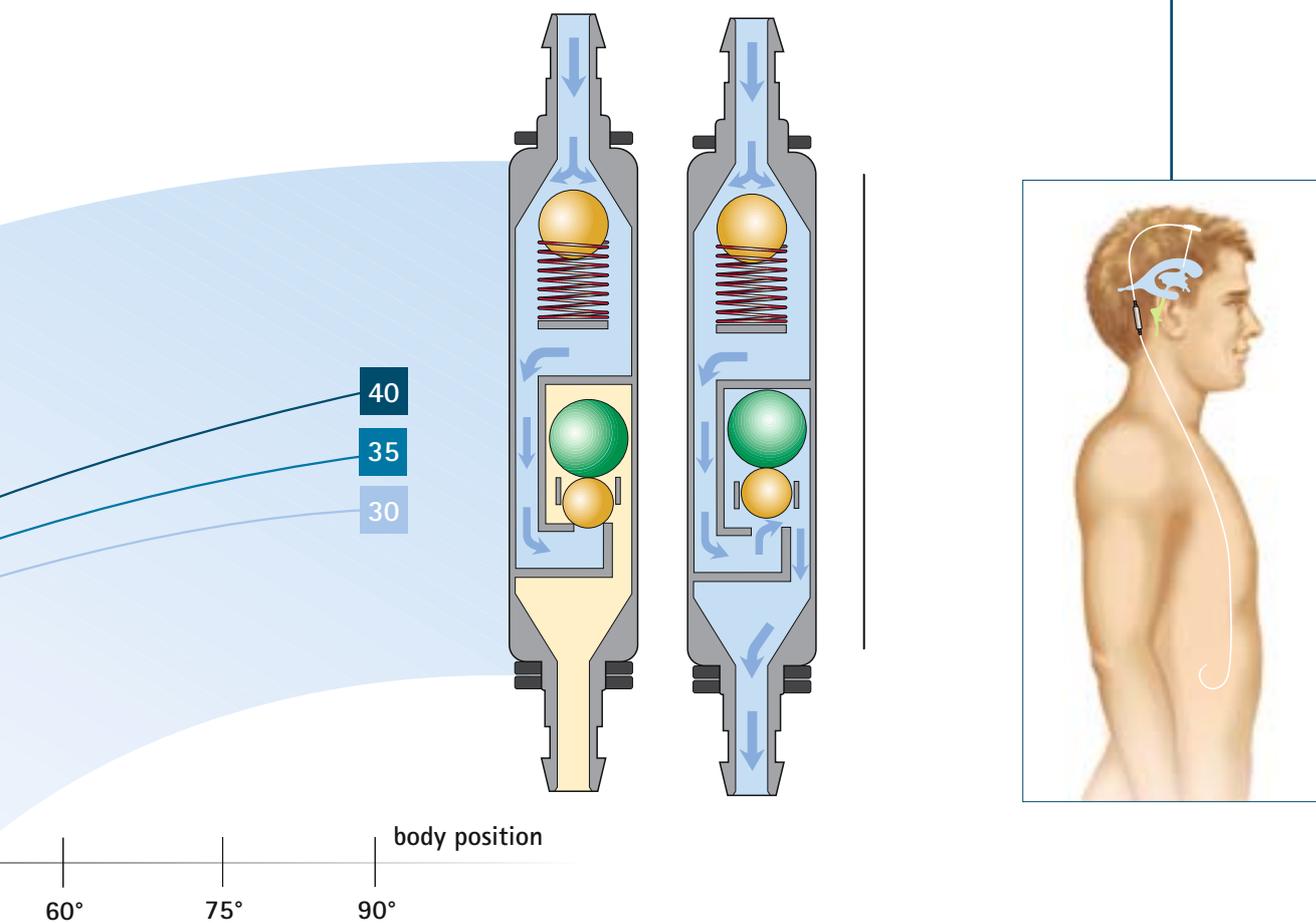
### Supine Function

Implantation parallel to the patient's body axis guarantees precise and reliable functionality of the GAV® valve.

- When the patient is supine, the GAV® is in a horizontal position.
- The low pressure setting of the ball-in-cone unit keeps the patient's intra-ventricular pressure within physiological limits
- The freely moving balls in the gravitational unit do not create any additional resistance when the patient is supine, and automatically keep the flow channel open in this position.



*GAV®*  
- the functions



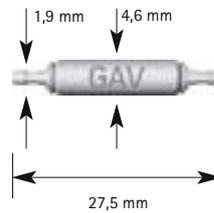
*Upright Function*

When the patient becomes upright, the gravitational unit is activated:

- A higher valve opening pressure is produced, since the opening pressures of both valve mechanisms (ball-in-cone and gravitational unit) must now be overcome.
- This higher valve opening pressure in the upright position effectively prevents overdrainage and guarantees physiological intracranial pressure in this body position too.

GAV® – the valve

Single valve with two connections



Scale 1:1

Valve pressure level (cmH<sub>2</sub>O\*)

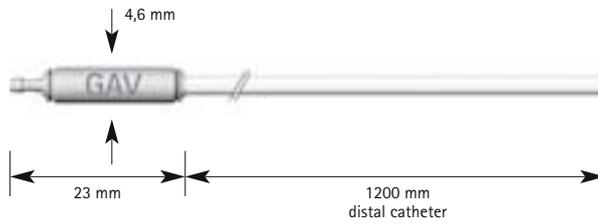
Cat. no.	Valve pressure level (cmH <sub>2</sub> O*)		
			
FV 310 T	up to 160 cm**	5	30
FV 311 T	160 – 180 cm**	5	35
FV 312 T	over 180 cm**	5	40
FV 313 T		10	30
FV 314 T		10	40
FV 315 T		10	50

\*\*Standard pressure levels – recommended levels only; may vary according to patient and medical history

\* 1 cmH<sub>2</sub>O = 0,74 mmHg



GAV® with distal catheter



Single valve with preattached distal catheter

All catheters:  $d_i = 1,2 \text{ mm}$ ,  $d_o = 2,5 \text{ mm}$

Scale 1:1

Cat. no.	Valve pressure level (cmH <sub>2</sub> O*)		
			
FV 316 T	up to 160 cm**	5	30
FV 317 T	160 - 180 cm**	5	35
FV 318 T	over 180 cm**	5	40
FV 319 T		10	30
FV 320 T		10	40
FV 321 T		10	50

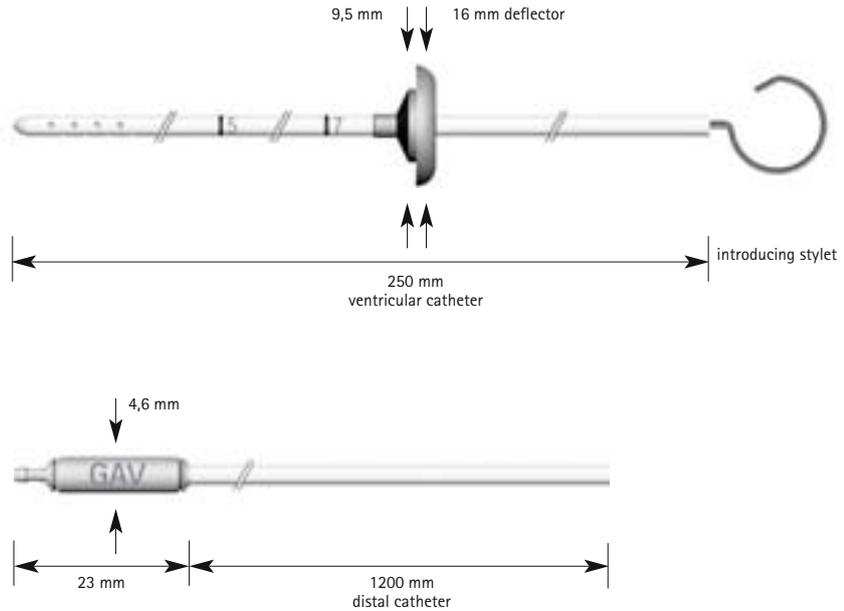
\*\*Standard pressure levels recommended levels only; may vary according to patient and medical history

\* 1 cmH<sub>2</sub>O = 0,74 mmHg

GAV®- system

Valve system with one connection

- Ventricular catheter with introducing stylet and deflector
- Valve with preattached distal catheter



All catheters:  $d_i = 1,2 \text{ mm}$ ,  $d_o = 2,5 \text{ mm}$

Scale 1:1

Valve pressure level (cmH<sub>2</sub>O\*)

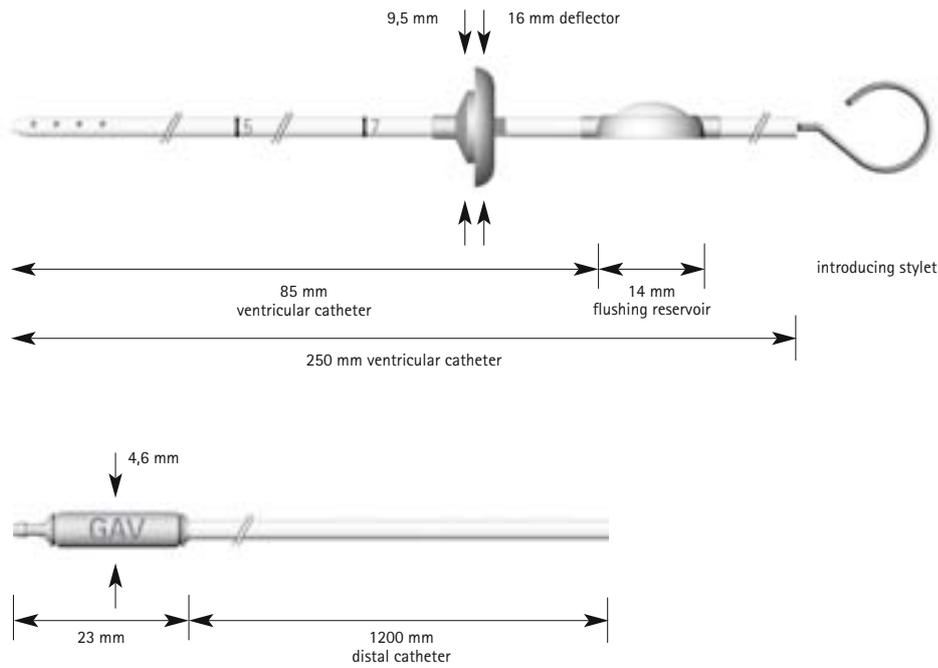
Cat. no.	Valve pressure level (cmH <sub>2</sub> O*)		
			
FV 322 T	up to 160 cm**	5	30
FV 323 T	160 – 180 cm**	5	35
FV 324 T	over 180 cm**	5	40
FV 325 T		10	30
FV 326 T		10	40
FV 327 T		10	50

\*\*Standard pressure levels recommended levels only; may vary according to patient and medical history

\* 1 cmH<sub>2</sub>O = 0,74 mmHg



## GAV®- system with flushing reservoir



Scale 1:1

### Valve system with one connection

- Ventricular catheter with introducing stylet, integrated flushing reservoir and deflector
- Valve with preattached distal catheter

All catheters:  $d_i = 1,2 \text{ mm}$ ,  $d_o = 2,5 \text{ mm}$

### Valve pressure level (cmH<sub>2</sub>O\*)

Cat. no.	Valve pressure level (cmH <sub>2</sub> O*)		
			
FV 328 T	up to 160 cm**	5	30
FV 329 T	160 - 180 cm**	5	35
FV 330 T	over 180 cm**	5	40
FV 331 T		10	30
FV 332 T		10	40
FV 333 T		10	50

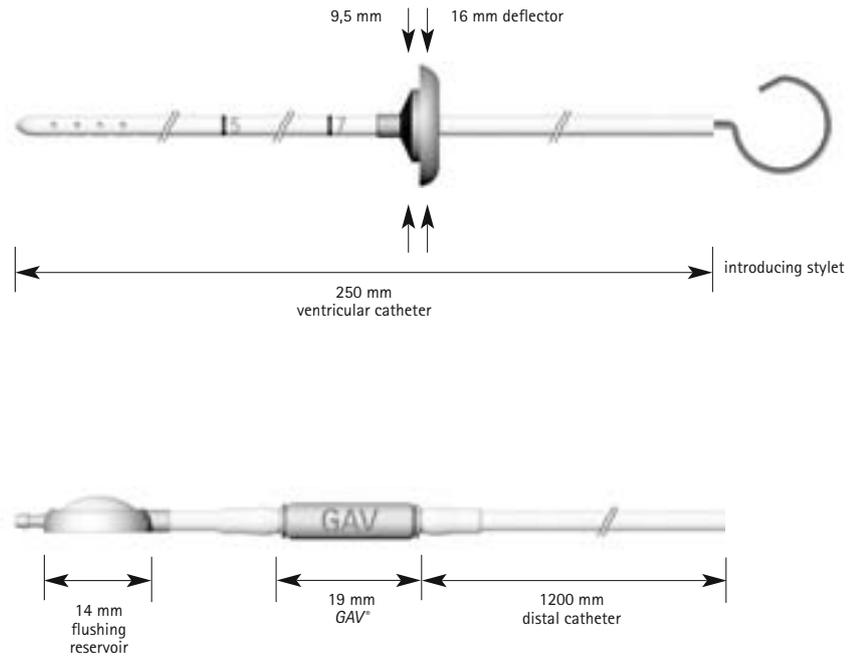
\*\*Standard pressure levels recommended levels only; may vary according to patient and medical history

\* 1 cmH<sub>2</sub>O = 0,74 mmHg

GAV®- system with flushing reservoir

Valve system with one connection

- Ventricular catheter with introducing stylet and deflector
- Valve with preattached distal catheter and flushing reservoir



All catheters:  $d_i = 1,2 \text{ mm}$ ,  $d_o = 2,5 \text{ mm}$

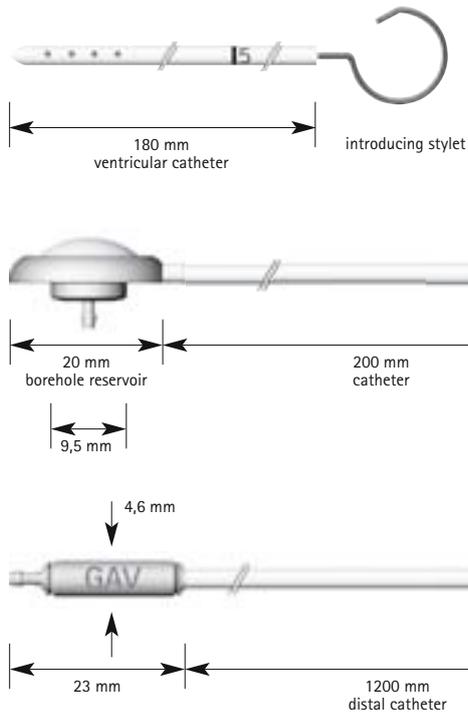
Scale 1:1

Valve pressure level (cmH<sub>2</sub>O\*)

Cat. no.	Valve pressure level (cmH <sub>2</sub> O*)		
			
FV 340 T	up to 160 cm**	5	30
FV 341 T	160 - 180 cm**	5	35
FV 342 T	over 180 cm**	5	40
FV 343 T		10	30
FV 344 T		10	40
FV 345 T		10	50

\*\*Standard pressure levels recommended levels only; may vary according to patient and medical history

\* 1 cmH<sub>2</sub>O = 0,74 mmHg



Scale 1:1

Valve system with two connections

- Ventricular catheter with introducing stylet
- Borehole reservoir with integrated catheter
- Valve with preattached distal catheter

All catheters:  $d_i = 1,2 \text{ mm}$ ,  $d_o = 2,5 \text{ mm}$

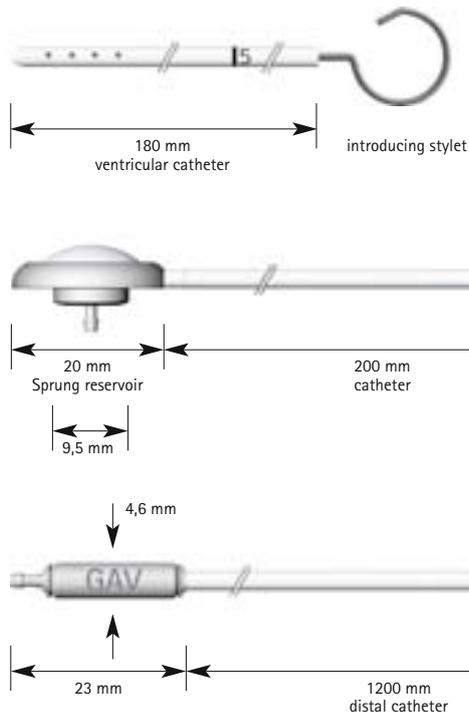
Cat. no.	Valve pressure level (cmH <sub>2</sub> O*)		
			
FV 334 T	up to 160 cm**	5	30
FV 335 T	160 - 180 cm**	5	35
FV 336 T	over 180 cm**	5	40
FV 337 T		10	30
FV 338 T		10	40
FV 339 T		10	50

\*\*Standard pressure levels recommended levels only; may vary according to patient and medical history

\* 1 cmH<sub>2</sub>O = 0,74 mmHg



GAV®- system with Sprung reservoir\*



Scale 1:1

Valve system with two connections

- Ventricular catheter with introducing stylet
- Sprung reservoir\* with integrated catheter
- Valve with preattached distal catheter and flushing reservoir

\* flushable reservoir, prevents reflux of CSF into the ventricular system during pumping.

All catheters:  $d_i = 1,2 \text{ mm}$ ,  $d_o = 2,5 \text{ mm}$

Valve pressure level (cmH<sub>2</sub>O\*)

Cat. no.	Valve pressure level (cmH <sub>2</sub> O*)		
			
FV 346 T	smaller than 160 cm**	5	30
FV 347 T	160 - 180 cm**	5	35
FV 348 T	over 180 cm**	5	40
FV 349 T		10	30
FV 350 T		10	40
FV 351 T		10	50

\*\*Standard pressure levels recommended levels only; may vary according to patient and medical history

\* 1 cmH<sub>2</sub>O = 0,74 mmHg

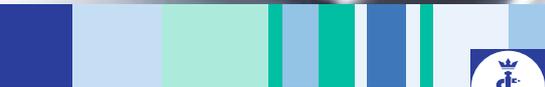


**proGAV<sup>®</sup> –**

the programmable MIETHKE gravitational valve



**3 Tesla  
MRI safe**



## Aesculap Neurosurgery

- Programmable ball-in-cone valve with opening pressure range 0–200 mmH<sub>2</sub>O
- Integral "ShuntAssistant" for effective protection against overdrainage
- "Active Lock" mechanism prevents accidental readjustment during MRI at 3 Tesla
- No x-rays necessary to identify the pressure level set
- Handy instruments for easy reading and programming of the pressure level
- High precision titanium valve technology



AESCULAP®

Manufacturer acc. 93/42/EWG

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