DMS Veterinary

B BRAUN
SHARING EXPERTISE

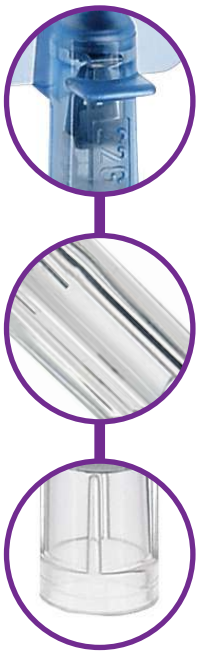
**Working in collaboration with DMS Veterinary.**

# B. Braun IV Consumables Range

# Solutions Overview

| Type | Balanced Electrolyte Solution | | Carbohydrate Solution |
|---|---|---|---|
| Product | 0.9% $NaCl^-$ Solution | Hartmann's Lactated Ringers | Glucose 5% |
| |   |   |   |
| Na+ (mmol/l) | 154 | 130.49 | - |
| $K^+$ (mmol/l) | - | 5.37 | - |
| $Ca^{++}$ (mmol/l) | - | 1.84 | - |
| $Mg^{++}$ (mmol/l) | - | - | - |
| $Cl^-$ (mmol/l) | 154 | 111.70 | - |
| Phosphate (mmol/l) | - | - | - |
| Buffer (mmol/l) | - | Lactate 27.84 | - |
| Glucose (g/l) (anhydrous) | - | - | 50.0 |
| kJ/l | - | - | 837 |
| kcal/l | - | - | 200 |
| Theor. Osmolarity (mOsm/l) | 308 | 277 | 278 |
| 500 ml | ✓ | ✓ | ✓ |
| 1000 ml | ✓ | ✓ | - |

# Introcan Safety® Closed IV Catheter



### Push Plate

- Facilitates one-handed catheter advancement
- Minimises incidence of catheter hub touch contamination
- Indicates needle bevel orientation

### Flashback Chamber

- Transparent flashback chamber allows quick visualisation of blood
- Rapid confirmation of vein access

### Removable Flash Plug

- Permits attachment of a syringe for aspiration or other specialised procedures

## Product Specifications Introcan Safety®

| Introcan Safety Cannula Size (G) | | Cannula | | Straight or Wing | Gravity Flow Rate ml/min | FEP | PUR | B. Braun Code |
|---|---|---|---|---|---|---|---|---|
| | | Length/inch | ø/mm | | | | | |
| | 24 | 3/4 | 0.7 x 19 | W | 22 | | ■ | 4253523-01 |
| | 24 | 3/4 | 0.7 x 19 | W | 22 | ■ | | 4254503-01 |
| | 24 | 3/4 | 0.7 x 19 | S | 22 | | ■ | 4251601-01 |
| | 24 | 3/4 | 0.7 x 19 | S | 22 | ■ | | 4252500-01 |
| | 22 | 1 | 0.9 x 25 | W | 35 | | ■ | 4253540-01 |
| | 22 | 1 | 0.9 x 25 | W | 35 | ■ | | 4254511-01 |
| | 22 | 1 | 0.9 x 25 | S | 35 | | ■ | 4251628-01 |
| | 20 | 1 1/4 | 1.1 x 32 | W | 60 | | ■ | 4253566-01 |
| | 20 | 1 1/4 | 1.1 x 32 | W | 60 | ■ | | 4254538-01 |
| | 20 | 1 1/4 | 1.1 x 32 | S | 60 | | ■ | 4251644-01 |
| | 18 | 1 3/4 | 1.3 x 45 | W | 100 | | ■ | 4253590-01 |
| | 18 | 1 3/4 | 1.3 x 45 | W | 100 | ■ | | 4254554-01 |
| | 18 | 1 3/4 | 1.3 x 45 | S | 100 | | ■ | 4251679-01 |
| | 16 | 2 | 1.7 x 50 | W | 210 | | ■ | 4253612-01 |
| | 16 | 2 | 1.7 x 50 | W | 210 | ■ | | 4254570-01 |
| | 16 | 2 | 1.7 x 50 | S | 210 | | ■ | 4251695-01 |
| | 14 | 2 | 2.2 x 50 | W | 345 | | ■ | 4253639-01 |
| | 14 | 2 | 2.2 x 50 | W | 345 | ■ | | 4254597-01 |
| | 14 | 2 | 2.2 x 50 | S | 345 | | ■ | 4251717-01 |

Please note: Medical devices supplied by B. Braun Medical Ltd are certified for use in humans.

# Extension Lines

| Original Perfusor Extension Line with Integrated Slide Clamps | Length (cm) | Priming Volume (ml) | Inner ø | Material | Quantity per Box | B. Braun Code |
|---|---|---|---|---|---|---|
|  | 150 | 1.0 | 0.9 | PVC (DEHP-free) | 25 | 8722940 |
| | 200 | 1.3 | 0.9 | PVC (DEHP-free) | 25 | 8722941 |

Please note: Medical devices supplied by B. Braun Medical Ltd are certified for use in humans.

# Infusomat® Space SafeSet

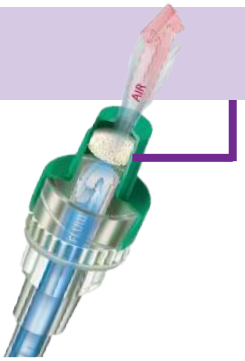
## The Smart Protection in Infusion Therapy

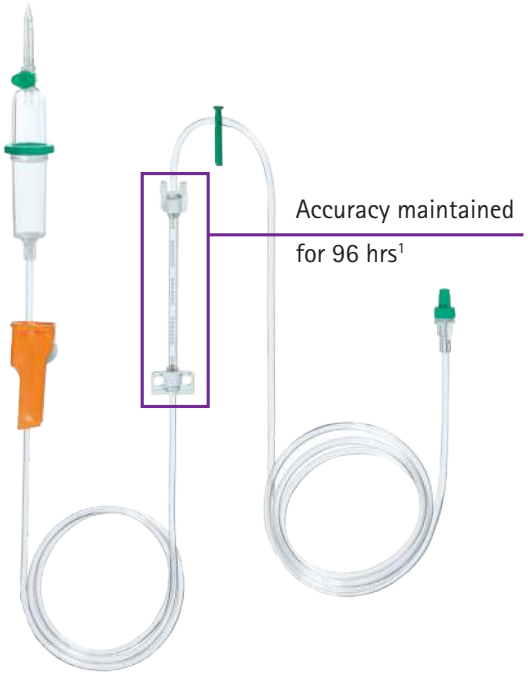
### AirStop

An airtight filter membrane acts as a barrier, helping to protect against air infusion while retaining particulate matter.

### PrimeStop

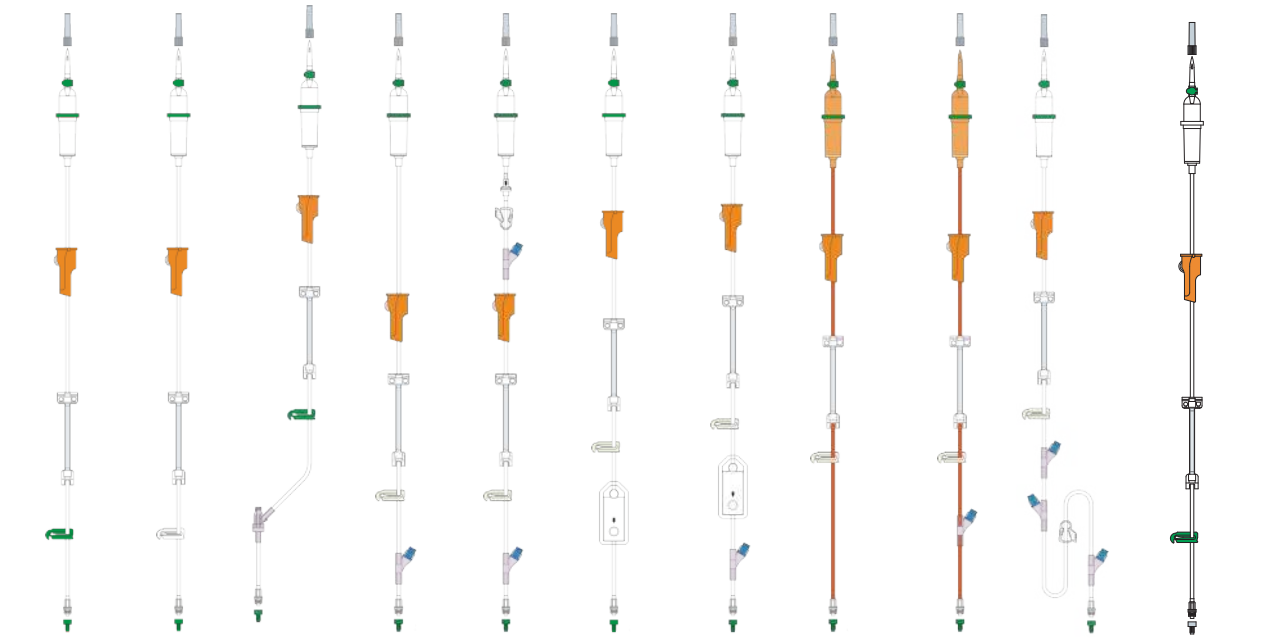
A protective cap lined with a hydrophobic membrane stops fluid leaking and helps to protect against contamination.





# Administration sets for Infusomat® Space

## SafeSet Administration sets for Infusomat Space

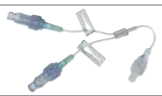
| B. Braun code (REF) | 8701148SP<br>8270358SP | 8701149SP | 8700130SP | 8700118SP | 8250718SP | 8700098SP | 8251284SP | 8700128SP | 8250438SP | 4183189SP | 8270066SP-01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Units per box (pcs) | 100 | 100 | 100 | 100 | 25 | 20 | 50 | 100 | 100 | 50 | 100 |
| PVC-free (Neutrapur) | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × |
| Spike with bacteria-tight air vent | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Filter in the drip chamber (µm) | 15 µm | 15 µm | 15 µm | 15 µm | 15 µm | 15 µm | 15 µm | 15 µm | 15 µm | 15 µm | 200 µm |
| AirStop | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × |
| Filter in-line (µm) | × | × | × | × | × | 0.20 µm | 0.20 µm | × | × | × | × |
| Length total/patient end (cm) | 250/145 cm<br>300/200 cm | 250/<br>145 cm | 300/<br>200 cm | 300/<br>200 cm | 300/<br>200 cm | 250/<br>150 cm | 270/<br>170 cm | 250/<br>145 cm | 250/<br>145 cm | 310/<br>210 cm | 250/<br>145 cm |
| Priming volume (ml) | 16 ml<br>20 ml | 16 ml | 20 ml | 20 ml | 20 ml | 20 ml | 22 ml | 16 ml | 16 ml | 21 ml | 16 ml |
| PrimeStop Cap | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| NF port(s) upstream | × | × | × | × | x 1 | × | × | × | × | × | × |
| NF port(s) downstream (EN=Enteral Port) | × | × | x 1 | x 1 | x 1 | × | x 1 | × | x 1 | x 2 + x 1 | × |
| Blood product administration | × | × | × | × | × | × | × | × | × | × | ✓ |
| Transparent light protection (520 nm) | × | × | × | × | × | × | × | ✓ | ✓ | × | × |

CODE: NF=Needle Free Port

Please note: Medical devices supplied by B. Braun Medical Ltd are certified for use in humans.

# CARESITE®: Clean, Clear Connection

## Designed To Improve Patient Outcomes And Clinician Efficiency

| Description | | Length (cm) | Priming volume (ml) | Tubing inner ø (mm) | Latex free | DEHP free | Quantity (per box) | B. Braun Code |
|---|---|---|---|---|---|---|---|---|
| CARESITE needlefree valve |  | - | 0.22 | - | ✓ | ✓ | 100 | 415122-01 |
| CARESITE needlefree single extension |  | 20 | 0.5 | 1.3 | ✓ | ✓ | 100 | 470100-01 |
| CARESITE needlefree single extension (wide bore) |  | 15 | 0.9 | 2.8 | ✓ | ✓ | 100 | 470108-01 |
| CARESITE needlefree double extension |  | 18 | 0.9 | 1.3 | ✓ | ✓ | 50 | 470106-01 |
| CARESITE needlefree double extension with 2 back check valves |  | 22 | 1.6 | 1.3 | ✓ | ✓ | 100 | 470182 |
| CARESITE needlefree triple extension |  | 20 | 1.3 | 1.3 | ✓ | ✓ | 50 | 470160 |
| CARESITE needlefree triple extension with 3 back check valves |  | 22 | 2.0 | 1.3 | ✓ | ✓ | 50 | 470161 |

Please note: Medical devices supplied by B. Braun Medical Ltd are certified for use in humans.

# Combi-Stoppers and SwapCap®

- Combi-Stoppers are universally used to close needlefree injection sites and seal pre-filled syringes.
- SwabCap® Valve Cap with 70 % IPA. Passive disinfection and physical barrier to cross contamination for needlefree access devices.
  - SwabCap® maintains a disinfected valve surface for up to 7 days if not removed
  - Non-particulate sponge prefilled with 70 % IPA
  - 70 % IPA bathes threads

| Product | | Product Description | Quantity per Box | B. Braun Code |
|---|---|---|---|---|
| Combi-Stopper |  | ■ Universal suitable to close female and male accesses | 100 | 4495101 |
| | | ■ Universal suitable to close female and male accesses | 100 | 4495152 |
| | | □ Universal suitable to close female and male accesses | 100 | 4495209 |
| SwabCap |  | SwabCap Valve Cap with 70% IPA | 200 | EM-SCXT3 |

Please note: Medical devices supplied by B. Braun Medical Ltd are certified for use in humans.

# Syringes

## Three-piece syringes for smooth, controlled, infusion delivery

### Luer Slip and Luer Lock Syringes

- Available in all sizes from 1 ml – 50 ml
- Fine dosage markings for 1 ml Syringes
- Smooth gliding and leakage prevention during infusion
- High transparency
- Luer Lock Syringes compatible for use in syringe driver
- Luer Slip Syringes have eccentric connections from 3 ml - 50 ml allowing for smoother infusions due to the low insertion angle

### 50 ml Luer Lock UV-Protect Syringe

- For use with light sensitive drugs
- Translucent device makes the drug visible
- Compatible for use in syringe driver
- Easy detection of air bubbles
- Reaches a spectrum of up to 520 nm wave lengths which is needed for Vitamins and Nifedipine

### Irrigation Syringes

- 50 ml and 100 ml versions available
- For tube feeding and irrigation
- Centric catheter fitting cone for direct connection
- 50 ml version also available with Luer Slip adapter

Latex free ☑ PVC free ☑ DEHP free ☑

# Omniflush® Syringes

## Designed for safety and convenience

- Sterile solution and fluid path (QC002, SAL $10^{-6}$)
- For flushing of compatible intravenous tubing and/or indwelling access devices
- Packed inside a single unit tubular bag


## Reduces blood reflux

Blood reflux is generated when all fluid is flushed from a three-part standard syringe, the syringe plunger is fully depressed in the bottom of the syringe barrel and then released. When the syringe plunger tip rebounds, a vacuum is created, thus pulling blood back into the catheter lumen. Catheter lumen occlusion, with blood reflux into the lumen, is the major clinical concern[3].

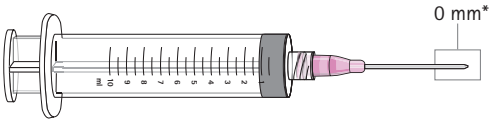
**The Omniflush® syringe is designed specifically to reduce unintended blood reflux into the catheter lumen thus decreases the risk of catheter blockage.**

*Average reflux as measured in G20 x 33 mm standard IV Catheter; data on file at B. Braun.

**Reflux of blood after flushing may occur because syringe components are not specifically designed for flushing procedures.

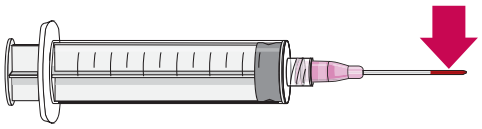
No reflux

10 ml B. Braun Omniflush®




Reflux**

Three-part 10 ml standard syringe, customary in the market



## Decreases the risk of catheter damage

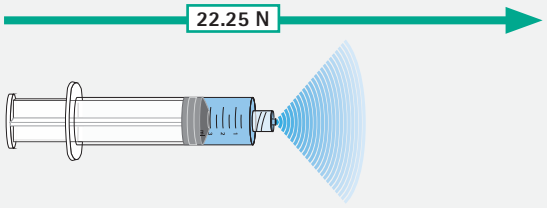
The syringe size has an impact on the risk of catheter damage. Smaller diameter syringes generate greater pressure exerted against the catheter wall on injection than larger diameter syringes.[2]

Omniflush® is available in the filling volumes 3 ml, 5 ml and 10 ml. The inside diameter of the syringe barrel for each filling volume is identical to the 10 ml B. Braun standard syringe.

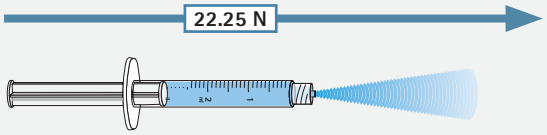
**The larger inside diameter of the Omniflush® syringe barrel results in lower flushing pressure compared to 3 ml or 5 ml standard syringes and decreases the risk of catheter rupture.**

*Pressure generation at 22.25 N force; data on file at B. Braun.

3 ml Omniflush® with the diameter of a 10 ml B. Braun standard syringe **creates 16.5 psi = 1.14 bar***




3 ml B. Braun standard syringe **creates 46 psi = 3.17** bar *



# Syringes

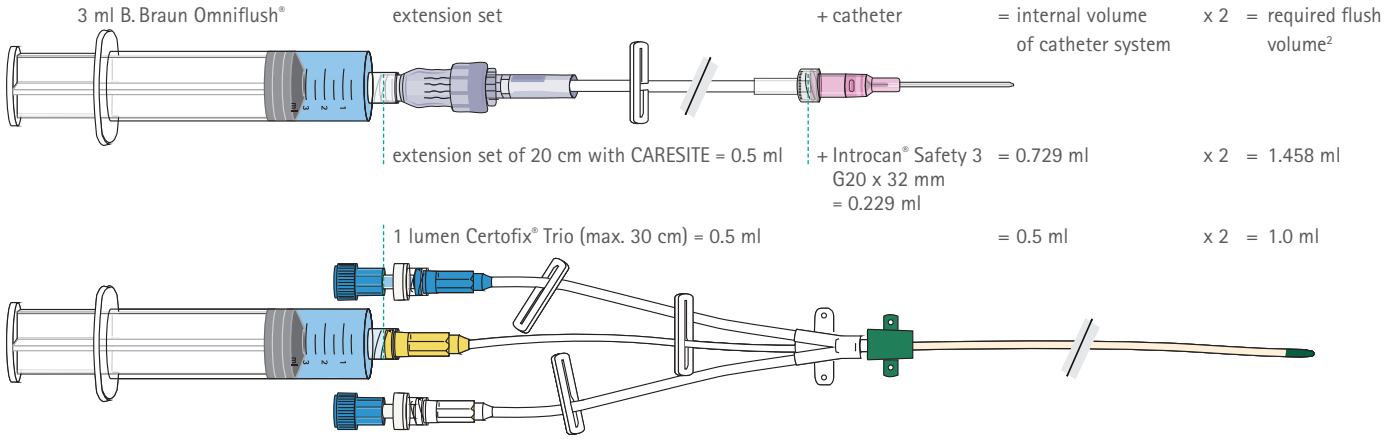
## Three-piece syringes for smooth, controlled, infusion delivery

### Gives the flexibility to reduce the flushing volume to a patient's individual minimum.

The Infusion Therapy Standards of Practice recommend a minimum flush volume equal to twice the internal volume of the catheter system, which includes the catheter, extension set, and/or needleless injection system added to the catheter hub[4].

With Omniflush® the fluid amount used for flushing can be reduced to the required minimum.

| Examples for required flush volumes | | Flush volume | | |
|---|---|---|---|---|
| Catheter/cannula/ other IV access devices | Extension set (length) | 3 ml | 5 ml | 10 ml |
| Introcan® Safety 3 | Caresite double needlefree extension (20 cm) | ■ | | |
| Vasofix® Safety | Caresite double needlefree extension (20 cm) | ■ | | |
| Certofix® Trio | | ■ | | |
| Port catheter | | | ■ | ■ |
| Arterial cannula | | ■ | ■ | |
| Intraosseous cannula | | ■ | ■ | |




## User Benefits

- **Helps to reduce manipulation:** Omniflush® is a ready-to-use flush system, which improves processes due to less preparation steps and helps to prevent contamination risks occurring while preparing the flush solution
- **Helps to reduce Sharps Injury:** Glass ampoules, bottles and cannulas are not required any more. Omniflush® circumvents the necessity of needles throughout the whole flushing process
- **Helps to reduce complex Catheter Care:** Flushing assesses catheter function, maintains vascular access and decreases the risk of catheter occlusion/thrombus formation[3]. Omniflush® simplifies catheter care and supports compliance with best practice IV maintenance procedures

## Product Codes

| Filling volume (ml) | Syringe volume (ml) | Units per box | B. Braun Code |
|---|---|---|---|
| 10 | 10 | 100 | EM-3513576 |
| 5 | 10 | 100 | EM-3513575 |
| 3 | 10 | 100 | EM-3513572 |

Please note: Medical devices supplied by B. Braun Medical Ltd are certified for use in humans.

Omniflush® is a medical device which is CE-certified according to the requirements of the European Council Directive 93/42/EEC. Omniflush® syringes are not manufactured with PVC, DEHP or natural rubber latex. Omniflush® syringes are produced in compliance with QSR-standards and meet highest quality standards.

## Prescribing Information

**Name of medicine**
Glucose 5 g/100 ml B. Braun Vet Care solution for infusion for cattle, horse, sheep, goat, pig, dog and cat

**Pharmaceutical form**
Solution for infusion.
Clear, colourless or almost colourless aqueous solution, free from visible particles

**POM Status**
To be supplied only on veterinary prescription

**List of active ingredients**
100ml contains glucose monohydrate 5.5 g (equivalent to anhydrous glucose 5.0 g)

**List of excipients**
Water for injections

**Indications for use**
This product is administered by intravenous infusion for the treatment of dehydration, (in the absence of shock), in cattle, sheep, goats, pigs, horses, dogs and cats. It is used to replace water when it cannot be taken or retained orally. It can also be used to correct hypernatraemia (by replacing lost water) and to aid the correction of hyperkalaemia (through the promotion of insulin production which in turn causes potassium to move from plasma into cells). A glucose 5 g/100 ml infusion is not a significant calorie source but can provide transient improvement of hypoglycaemia.

**Dosage, method of use and route of administration**
Intravenous use. Administer slowly via intravenous infusion. This product should not be administered at a rate in excess of 10 ml/kg bodyweight/hour, otherwise glycosuria and osmotic diuresis may result. Infusion rates should be calculated according to the presenting condition, bodyweight and degree of dehydration of the animal being treated. The total fluid volume to be administered should consider existing deficits, maintenance requirements and ongoing losses. IV fluids should be warmed up to body temperature prior to administration.Maintain aseptic precautions throughout administration. For single use only.

**Common adverse reactions, serious adverse reactions, precautions and contraindications**
Do not administer to hyperglycaemic animals.
This product is unsuitable for the correction of hypotonic dehydration. Do not use in animals with pre-existing peripheral oedema caused by a reduction in intravascular oncotic pressure.
This product is not suitable as a sole source of calorie requirements or as a substitute for oral or parenteral nutrition.

This product does not contain electrolytes. Closely monitor electrolyte and phosphate balance in patients undergoing infusion of this product and adjust treatment accordingly.

This product should be used with particular caution in patients with the
following conditions:
-Diabetes mellitus
-Intracranial or intraspinal bleeding
-Anuria
-Addisons disease
-Severe or long standing hypernatraemia should be corrected gradually.

In very rare cases administration of products by intravenous infusion may increase the risk of thrombosis.

Incompatibilities with certain antibiotics (e.g. beta-lactam antibiotics, tetracyclines, sulfadiazine sodium) and heparin are recognised.

Overperfusion can lead to overhydration, hypertension and extravascular fluid accumulation. Symptoms may include respiratory distress. The administration of excess glucose can lead to hyperglycaemia, glycosuria and polyuria.

**Special warnings**
None

Please consult the SmPC for further information.

**Basic / list price**
£2.68 per 500ml

**Marketing authorisation number**
Vm 03551/4002

**Name and address of MAH**
B. Braun Melsungen AG
Carl-Braun Strasse
34212 Melsungen
Germany

**Date PI was created / revised**
October 2019

## Prescribing Information

**Name of medicine**
B. Braun Vetcare Hartmann's Lactated Ringers Solution for infusion for cattle, horse, sheep, goat, pig, dog and cat.

**Pharmaceutical form**
Solution for infusion.
Clear, colourless, aqueous and free from bacterial endotoxins

**POM Status**
To be supplied only on veterinary prescription

**List of active ingredients**
100ml contains:
Sodium chloride 0.600 g
Potassium chloride 0.040 g
Calcium chloride dihydrate 0.027 g
Sodium (S)-lactate 0.312 g
(as sodium lactate solution (50% w/v) 0.624 g)

**List of excipients**
Water for injections

**Indications for use**
- Isotonic dehydration
- Metabolic acidosis
- Hypotonic dehydration
- Maintenance of normal extracellular fluid levels
- Electrolyte replacement in burns

**Dosage, method of use and route of administration**
Intravenous use. Do not inject intramuscularly.
The volume and rate of infusion will depend upon the clinical condition, existing deficits of the animal, maintenance needs and continuing losses. Generally aim to correct hypovolaemia by 50 % initially (ideally over 6 hours but faster if necessary) and reassess by clinical examination. Deficits are generally in the range of 50 ml/kg (mild) to 150 ml/kg (severe). An infusion rate of 15 ml/kg/bw/hour is recommended in the absence of shock (range 5-25 ml/kg/bw/hour). In shock, high initial infusion rates, up to 90 ml/kg/bw/hour, are needed. High infusion rates should not be continued for longer than 1 hour unless urine output is restored. The maximum infusion rate should be decreased in the presence of cardiac, renal and pulmonary disease. For single use only

**Common adverse reactions, serious adverse reactions, precautions and contraindications**
This veterinary medicinal product contains calcium, thus an effect on the heart cannot be ruled out. The safety of the veterinary medicinal product has not been established during pregnancy or lactation. Use only accordingly to the benefit/risk assessment by the responsible veterinarian. No interaction with other medicinal products and other forms of interaction are known. Before administering this solution the clinical and biological data of the animal have to be carefully examined.
Monitoring of serum electrolyte levels should be obliged in cases of electrolyte imbalances, such as hypertonic or hypotonic dehydration, or a single increase of one electrolyte (e.g. hyperchloraemia) as well. Furthermore monitoring of the acidbalance and the clinical condition of the animal should accompany the treatment with this veterinary medicinal product.
This veterinary medicinal product should be used with caution in congestive heart failure, severe renal insufficiency and in animals treated with corticoids and derivates. Due to the potassium content of this solution it should be used prudently in severe renal impairment
Do not use in animals with:
- Alkalosis of any origin
- Oedema (hepatic, renal, or cardiac)
- Overhydration
- Hyperkalaemia, hypernatraemia, hyperlactataemia
- Hepatic insufficiency
This veterinary medicinal product is incompatible with Chlortetracycline, Amphotericin B and Oxytetracycline. Mixtures with additives and other drugs (e.g. oxalate-, phosphate- and carbonate-/hydrogen carbonate- containing ones) may cause incompatibilities. In the absence of compatibility studies, this veterinary medicinal product must not be mixed with other veterinary medicinal products.
Overdose may result in cardiovascular overload and pulmonary oedema, which can lead to following symptoms such as restlessness, coughing and polyuria.
In case overdose has occurred the rate of infusion should be drastically reduced or the infusion should be stopped

Consult the SPC for further information

**Basic / list price**
£2.50 per 500ml
£3.03 per 1000ml

**Marketing authorisation number**
Vm: 03551/4004

**Name and address of MAH**
B. Braun Melsungen AG
Carl-Braun-Strasse
34212 Melsungen
Germany

**Date PI was created / revised**
October 2019

## Prescribing Information

**Name of medicine**
Sodium Chloride 0.9 g/100 ml B. Braun Vet Care solution for infusion for cattle, horse, sheep, goat, pig, dog and cat

**Pharmaceutical form**
Solution for infusion.
Clear, colourless aqueous solution, free of particles in suspension

**POM Status**
To be supplied only on veterinary prescription

**List of active ingredients**
Sodium chloride 0.9 g

**List of excipients**
Water for injections

**Indications for use**
-States of dehydration and hypovolaemia
-Deficiency of sodium (hyponatraemia) and chloride (hypochloraemia)
-Hypochloraemic alkalosis management
-Vehicle solution for compatible drugs
-External use for wound irrigation and moistening of compresses

**Dosage, method of use and route of administration**
Administration by intravenous route. Topical use for wound irrigation and moistening
of compresses.
The dosage and duration of treatment must be adjusted according to the specific fluid and electrolyte requirements under control of a veterinarian to prevent any possible side effects due to overdose. High infusion rates should be avoided in cases of chronic hyponatraemia.

Maximum daily dosage:
The dosage should be adjusted individually by the veterinary upon the clinical condition of the animal

Maximum infusion rate:
Generally, it is recommended that the infusion rate should be adapted to the existing fluid deficit. Higher infusion rates are required in case of hypovolaemic shock (dog: up to 100 ml/kg b.w./h; cat: up to 60 ml/kg b.w./h; horse, cattle, neonate calf: 50 to 80 ml/kg b.w./h). In case of long-term intravenous infusion therapy 5 to 10 ml/kg.w./h should normally not be exceeded

**Common adverse reactions, serious adverse reactions, precautions and contraindications**

Intravenous infusion carries a risk of thrombosis. (Please see SPC section 4.10 for symptoms of overdose)

Do not use in animals with:
- Hypertonic dehydration
- Hypernatraemia
- Hyperchloraemia
- Hyperhydration
- Acidosis
- Syndrome of oedema and ascites
- In cases when sodium restriction are indicated

Use with caution in animals with cardiac or renal impairment as sodium overload may occur. The maximum infusion rate should be decreased in the presence of cardiac, renal and pulmonary disease.
Use with caution post surgery/trauma as sodium excretion may be impaired.
Use with caution in animals with hypokalaemia.
Serum electrolyte levels, water and acid-base balance and the clinical condition of the animal should be closely monitored during the treatment in order to prevent overdose, particularly in cases of renal or metabolic changes.
This product should not be used for longer than is necessary to correct and sustain circulating volume. Inappropriate/excessive use may worsen or create a metabolic acidosis. The solution should be warmed to approximately 37 degrees C prior to the administration of large volumes, or if the administration rate is high, in order to avoid hypothermia

Overdose may lead to hypernatraemia, hyperchloraemia, hypokalaemia, cardiac decompensation, hyperhydration and metabolic acidosis. In these cases, the rate of infusion should be drastically reduced or even discontinued.

Please consult the SmPC for further information.

**Special warnings**
None

**Marketing authorisation number**
Vm 03551/4005

**Name and address of marketing authorisation holder**
B. Braun Melsungen AG
Carl- Braun Strasse
34212 Melsungen
Germany

**Basic / list price**
£2.50 per 500ml
£3.33 per 1000ml

**Date of revision**
October 2019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XX-VCCR-08-20

References:

1. Data on file
2. Anna Casey et al., 2015, An In Vitro Comparison of Microbial Ingress Into 8 Different Needleless IV Access Devices, The Art and Science of Infusion Nursing, Volume 38, Issue 1
3. Flushing vascular access catheters: Risks for infection transmission by Lynn Hadaway, RN, C, MEd, CRNI. Infection Control Resource 2007, Vol. 4 No. 2
4. Infusion Therapy Standards of Practice, Journal of Infusion Nursing, Supplement to January/February 2016, Vol. 39, No. 1S