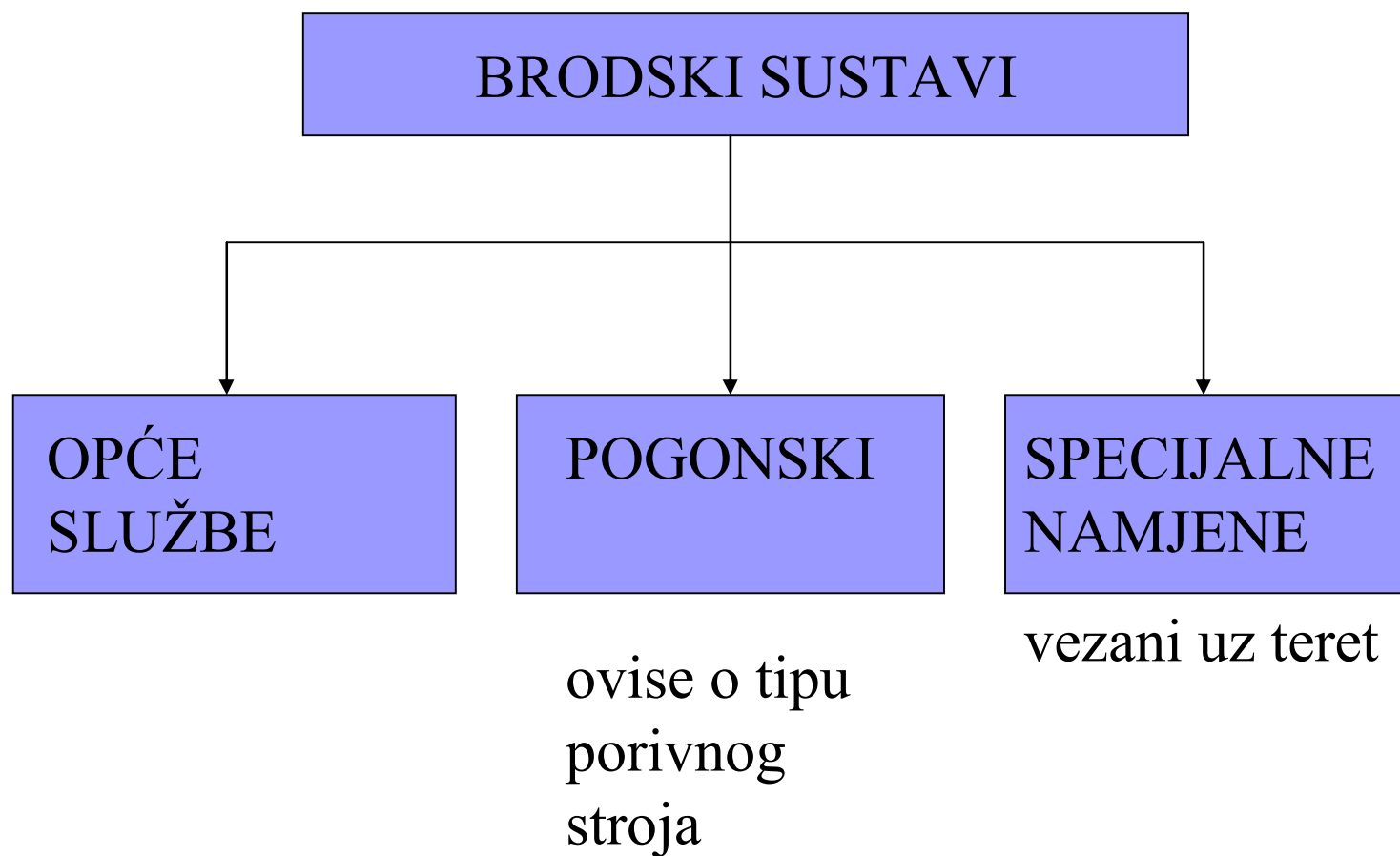




BRODSKI STROJNI SUSTAVI

Brodski cjevovodi: elementi

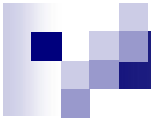
Podjela





Cjevovodi opće službe

- kaljužni i izljevni
- balastni
- odušivanja, otplinjavanja, preljevni, sondiranja
- ventilacije
- hidrauličkih pogona
- protupožarni...



Pogonski cjevovodi*

- goriva
- ulja za podmazivanje
- rashladne vode
- komprimiranog zraka
- pare, kondenzata i napojne vode
- ispušnih plinova
- ispirnog zraka



Cjevovodi specijalne namjene

- tekućeg tereta
- ukapljenih plinova
- čišćenja i pranja tankova
- posušivanja tankova tereta
- inertnog plina*



Označavanje

Morska voda

Slatka voda

Komprimirani zrak

Teško gorivo

Lako gorivo

Para

Ulje



Group colour	Substance	Group colour	Substance
Black	Waste Media	Orange	Oils other than fuel
Blue	Fresh Water	Silver	Steam
Brown	Fuel	Red	Fire Fighting
Green	Sea Water	Violet	Acids, Alkalis
Grey	Non-flammable gases	White	Air in ventilation systems
Copper	Masses (dry and wet)	Yellow	Flammable gases

Legend	Columns	Layout 5	Layout 6	Layout 7
		28 x 200 Order Ref.	28 x 200 Order Ref.	28 x 200 Order Ref.

Waste Media	Columns	Layout 5	Layout 6	Layout 7
Waste Media		226 000	227 051	227 170
Black Water		226 001	227 052	227 171
Waste Oil		226 002	227 053	227 172
Black Water		226 003	227 054	227 173
Exhaust gas		226 004	227 055	227 174
Sewage		226 005	227 056	227 175

Fresh Water	Columns	Layout 5	Layout 6	Layout 7
Fresh Water		226 006	227 057	227 176
Condensate from heating system		226 007	227 058	227 177
Fresh water-sanitary		226 008	227 059	227 178
Cooling fresh water		226 009	227 060	227 179
Feed water		227 000	227 061	227 180
Distillate		227 001	227 062	227 181
Potable water		227 002	227 063	227 182
Chilled water		227 003	227 064	227 183
Condensate		227 004	227 065	227 184

Fuel	Columns	Layout 5	Layout 6	Layout 7
Fuel		227 005	227 066	227 185
Heavy Fuel		227 006	227 067	227 186
Liquid gas		227 007	227 068	227 187
Petrol		227 008	227 069	227 188
Diesel Fuel		227 009	227 070	227 189

Sea water	Columns	Layout 5	Layout 6	Layout 7
Sea water		227 010	227 071	227 190
Ballast water		227 011	227 072	227 191
Cooling sea water		227 012	227 073	227 192
Sanitary sea water		227 013	227 074	227 193

Non-flammable gases	Columns	Layout 5	Layout 6	Layout 7
Non-flammable gases		227 014	227 075	227 194
Oxygen		227 015	227 076	227 195
Breathing gas		227 016	227 077	227 196
Nitrogen		227 017	227 078	227 197
Refrigerant		227 018	227 079	227 198
Pressure air HP		227 019	227 080	227 199
Breathing air		227 020	227 081	227 200

Masses	Columns	Layout 5	Layout 6	Layout 7
Masses		227 167	227 188	227 189

Legend	Columns	Layout 5	Layout 6	Layout 7
		28 x 200 Order Ref.	28 x 200 Order Ref.	28 x 200 Order Ref.

Oil other than fuel	Columns	Layout 5	Layout 6	Layout 7
Oil other than fuel		227 021	227 062	227 201
Used oil		227 022	227 063	227 202
Thermal oil		227 023	227 064	227 203
Dirty oil		227 024	227 065	227 204
Lubricating oil		227 025	227 066	227 205
Hydraulic oil		227 026	227 067	227 206

Steam	Columns	Layout 5	Layout 6	Layout 7
Steam		227 027	227 068	227 207
Steam for heating		227 028	227 069	227 208
Boiler steam		227 029	227 070	227 209
LP Drains		227 030	227 071	227 210
Supply steam		227 031	227 072	227 211
Exhaust steam		227 032	227 073	227 212
HP Drains		227 033	227 074	227 213

Fire fighting	Columns	Layout 5	Layout 6	Layout 7
Fire fighting		227 034	227 075	227 214
Fire-fighting fresh water		227 035	227 076	227 215
Fire-fighting sea water		227 036	227 077	227 216
Fire-fighting CO2 gas		227 037	227 078	227 217
Sprinkler water		227 038	227 079	227 218
Fire-fighting powder		227 039	227 100	227 219
Fire-fighting foam		227 040	227 101	227 220

Acids & Alkalis	Columns	Layout 5	Layout 6	Layout 7
Acids & Alkalis		227 041	227 102	227 221

Air in ventilation systems	Columns	Layout 5	Layout 6	Layout 7
Air in ventilation systems		227 042	227 103	227 222
Natural exhaust air		227 043	227 104	227 223
Supply air, atmospheric		227 044	227 105	227 224
Natural supply air		227 045	227 106	227 225
Mechanical exhaust air		227 046	227 107	227 226

Flammable gases	Columns	Layout 5	Layout 6	Layout 7
Flammable gases		227 047	227 108	227 227
Hydrogen		227 048	227 109	227 228
Acetylene		227 049	227 110	227 229
Mixture of Propane/Butane		227 050	227 111	227 230

ISO 14726



Elementi sustava

- cijevi
- zaporni elementi
- cijevni spojevi
- filteri
- kompenzatori dilatacija
- regulacijska i kontrolna armatura
- (pomoćni uređaji)



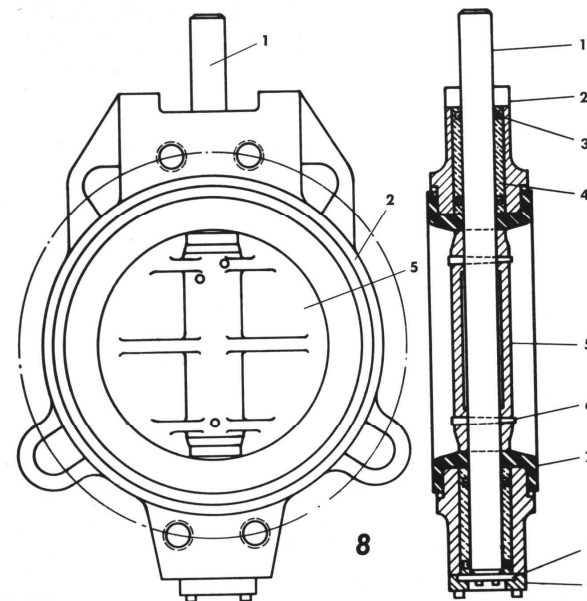
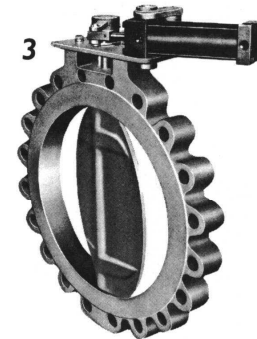
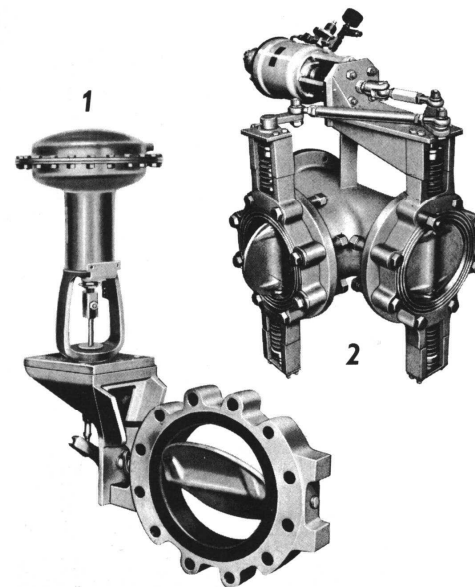
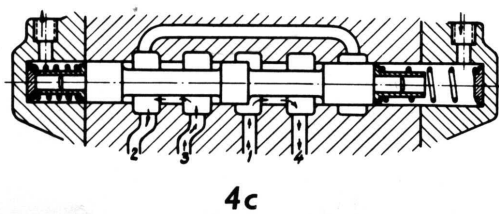
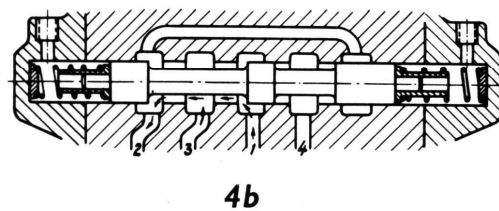
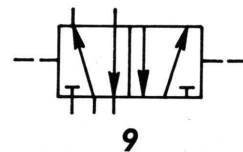
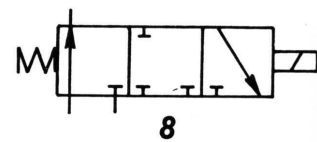
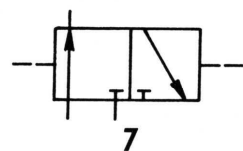
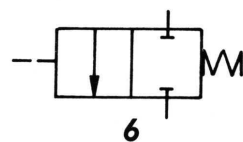
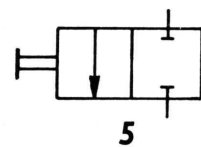
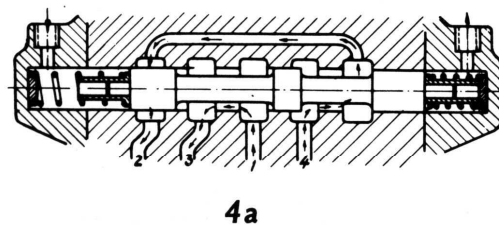
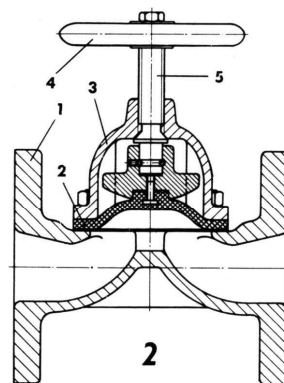
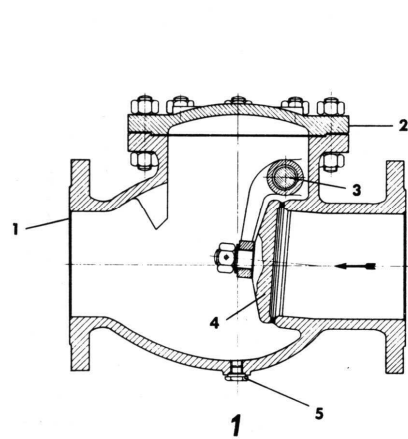
Cijevi

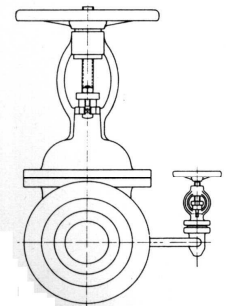
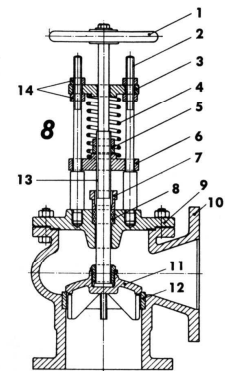
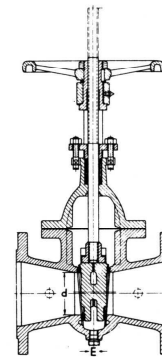
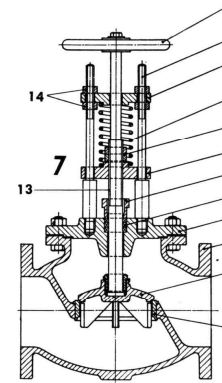
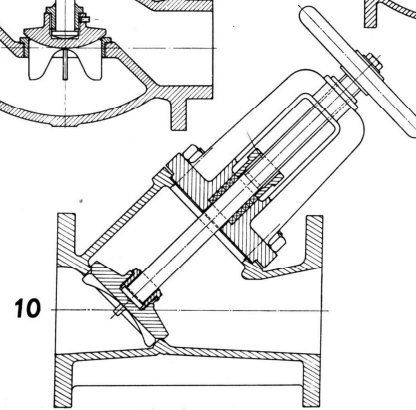
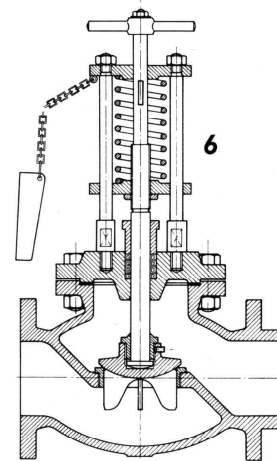
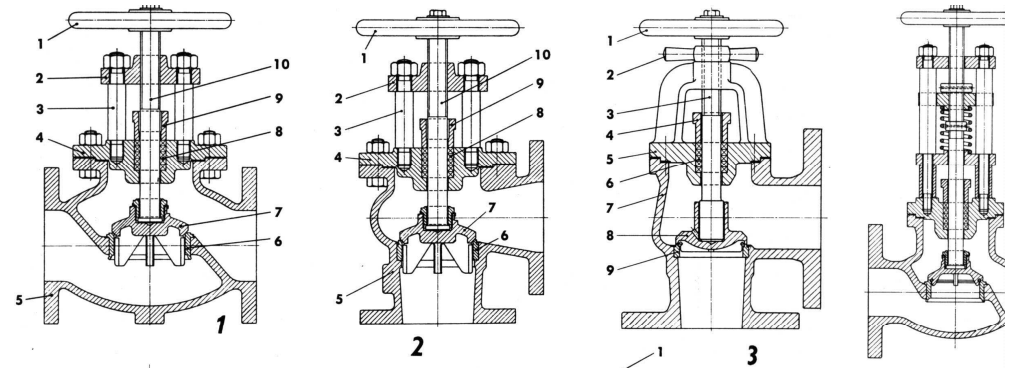
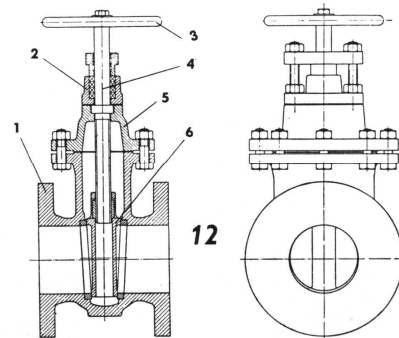
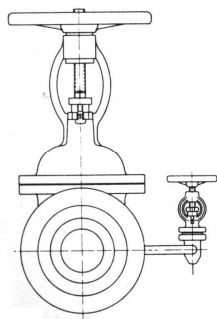
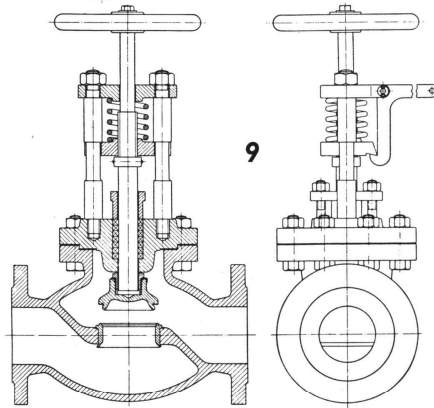
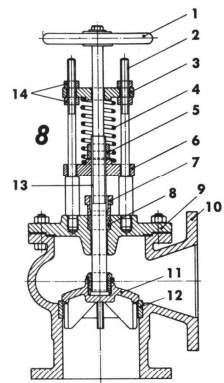
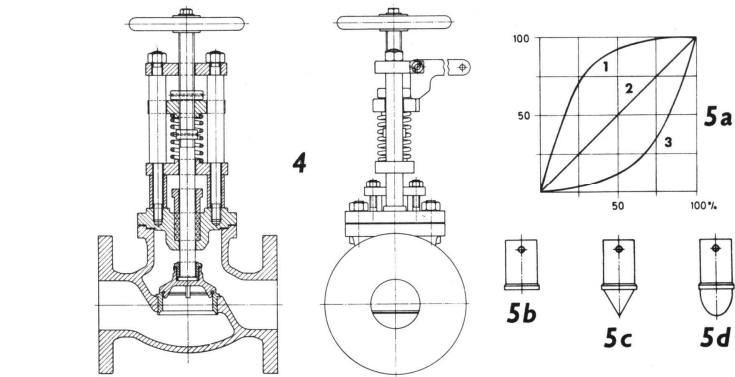
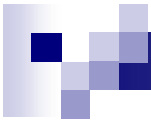
- označavanje cjevovoda: boje i natpisne pločice
- materijali i zaštita materijala
- debljina stjenke
- potreban promjer cjevovoda
- proračuni dilatacija, pada tlaka

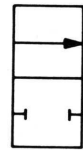
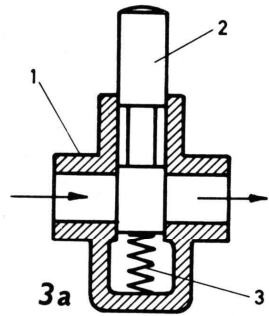


Zaporni elementi

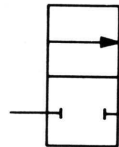
- ventili (ND > 50 mm)
- pipci (ND < 50 mm)
- zasuni
- ravni, kutni, troputni, prigušni, mješači, nepovratni, sigurnosni...
- upravljanje: ručno, hidraulički, pneumatski, elektromagnetsko
- automatsko djelovanje



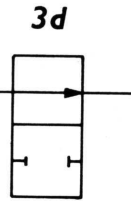




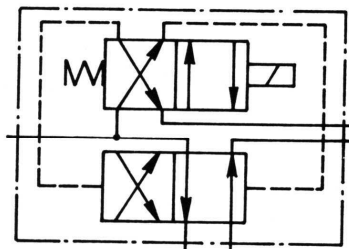
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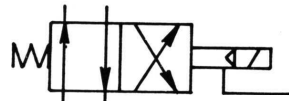
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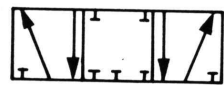
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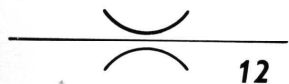
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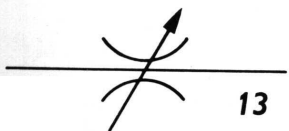
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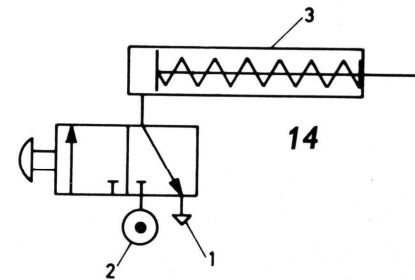
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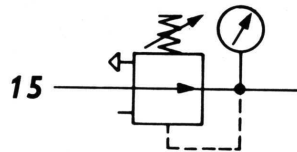
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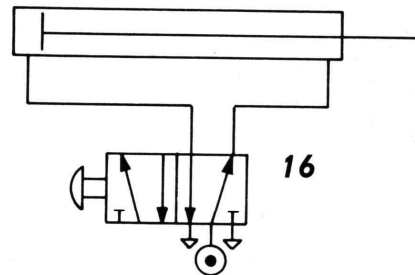
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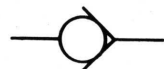
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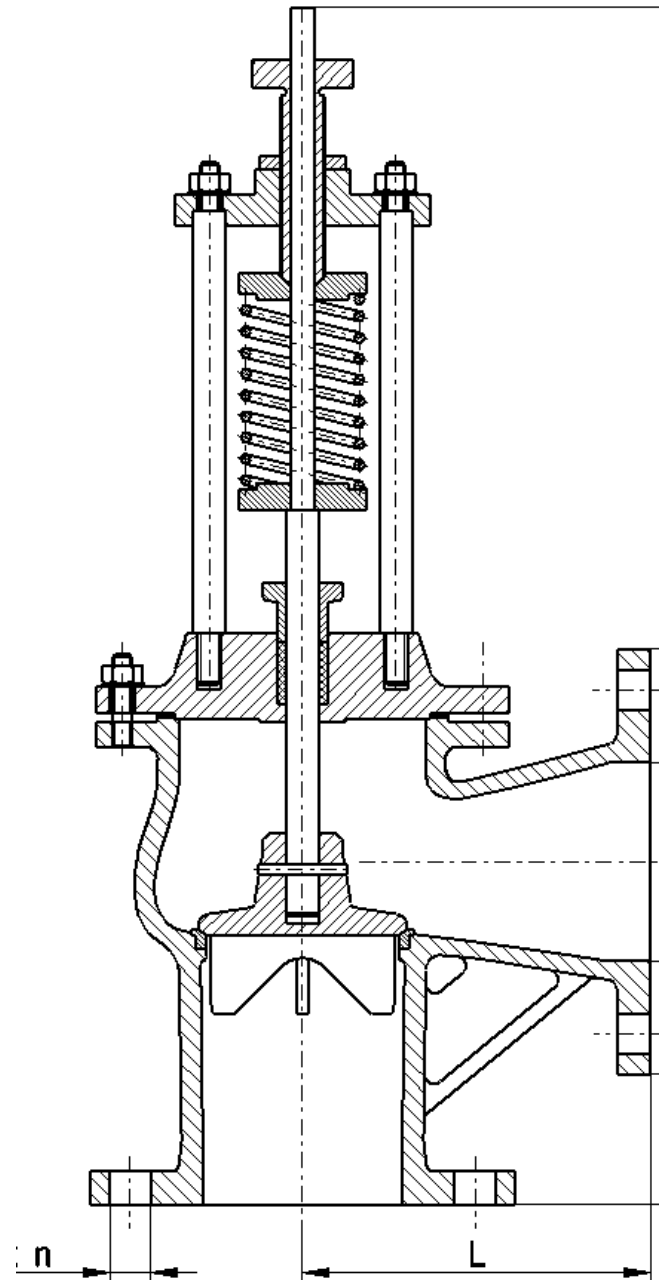
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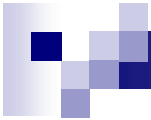


17



18





Cijevni spojevi

- rastavljivi (prirubnički i dr.)
 - brtvljenje, materijal odgovara vrsti fluida, tlaku i temperaturi
- nerastavljivi (zavareni, lemljenje – “spojka”)
 - prolaz kroz nepropusne pregrade, cjevovodi u tankovima goriva, tereta



Filtri

- prema veličini čestice:
 - grubi: čestice $> 2 \mu\text{m}$
 - fini: čestice od $0,2 \mu\text{m}$ do $2 \mu\text{m}$
 - ultrafini: čestice $< 0,2 \mu\text{m}$
- filtriranje po površini te po dubini
- filc, perforirani lim, lamelasti, magnetski
- samočistivi



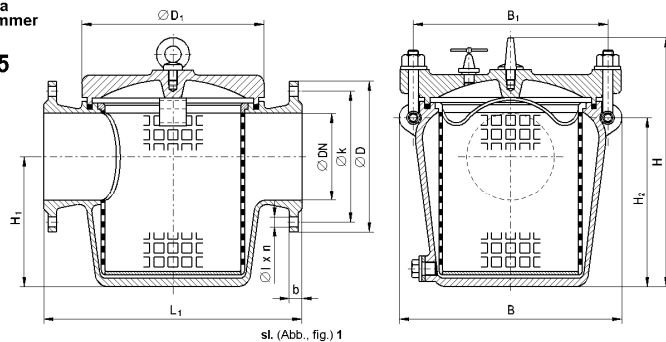
FILTER GRUBI RAVNI I KUTNI

GROBFILTER IN DURCHGANGSFORM UND ECKFORM

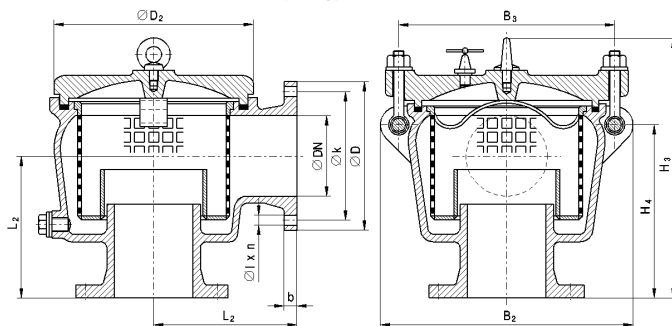
COARSE FILTER STRAIGHT AND ANGLE

Broj artikla
Artikelnummer
Model N°

V7 – 05



sl. (Abb., fig.) 1



sl. (Abb., fig.) 2

DN	D	k	l	n	b	D ₁	D ₂	B	B ₁	B ₂	B ₃	H	H ₁	H ₂	H ₃	H ₄	L ₁	L ₂	V		m, kg	
																			sl. Abb 1 fig.	sl. Abb 2 fig.	sl. Abb 1 fig.	sl. Abb 2 fig.
40	130	100	14	4	16	137	160	202	162	242	190	210	95	105	238	132	200	125	1.6	1:6.5	11.6	15.6
50	140	110	14	4	16	160	186	242	190	268	216	224	106	118	253	147	230	135	1.6	1:6.7	17.2	19.2
65	160	130	14	4	16	186	212	268	216	296	244	263	134	157	288	173	290	150	1.6	1:6	22.9	24.0
80	190	150	19	4	18	212	243	296	244	328	274	299	156	184	325	203	310	175	1:5.4	1:5.9	29.5	32.1
100	210	170	19	4	18	243	298	326	274	394	334	339	185	224	370	235	350	195	1:5	1:5.7	38.9	50.1
125	240	200	19	8	20	298	343	394	334	442	382	416	229	282	407	273	400	220	1:5	1:5.5	63.5	60.2
150	265	225	19	8	20	343	395	442	382	512	440	468	268	334	489	333	480	270	1:5	1:5.5	84.1	97.3
175	295	255	19	8	22	395	440	512	440	558	486	524	296	372	532	376	550	300	1:4.7	1:5.3	121	123.0
200	320	280	19	8	22	440	440	558	486	558	486	580	335	424	560	384	600	300	1:4.7	1:5.3	150	140.0

V – omjer presjeka cijevi prema ukupnom presjeku rupa na situ

– Verhältnis der Rohrquerschnittsfläche zur freien Filterfläche
– ratio of the pipe cross-sectional area to the effective screening area

n – broj rupa

– Anzahl der Löcher
– Number of holes

Narudžba ventila

Narudžba mora sadržavati sljedeće podatke:
- Broj artikla: V7 – 05
- Nazivni promjer, npr. DN 100
- Posebni zahtjevi

Bestellung

Bei Bestellung bitte angeben:
- Artikelnummer: V7 – 05
- Nennweite z.B. DN 100
- Besondere Wünsche

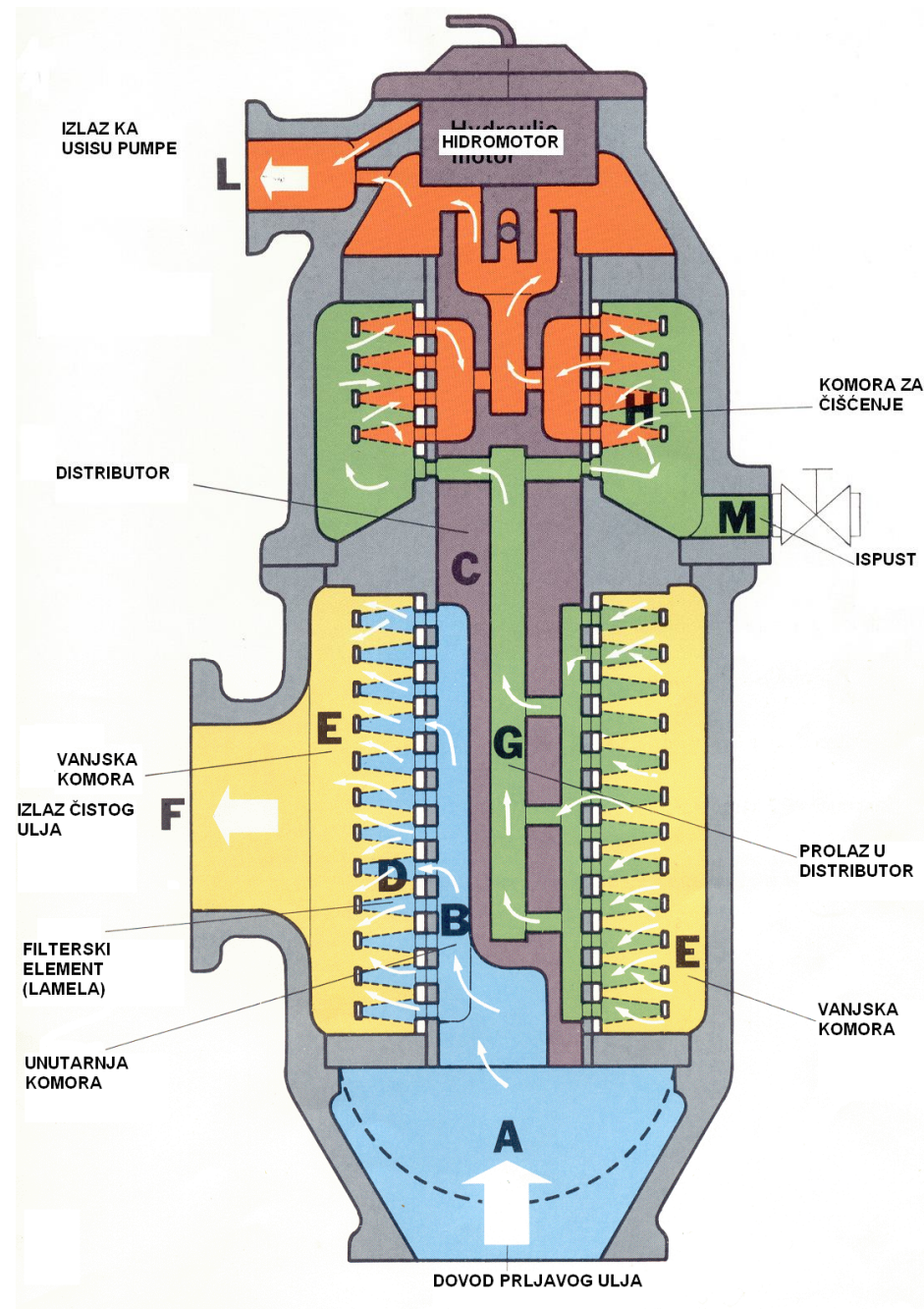
Ordering

When ordering please state:
- Model number: V7 – 05
- Nominal size e.g. DN 100
- Special requirements

METALSKA INDUSTRIJA VARAŽDIN d.d.

HRVATSKA

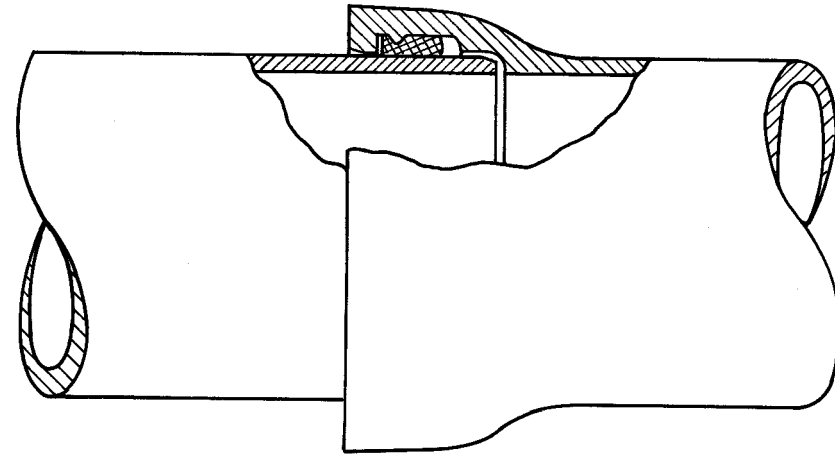
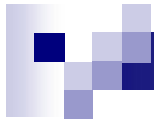
42000 VARAŽDIN, Fabijanska 33 • Telefon: +385 +42 404-100 • Fax: +42 242-004 • E-mail: prodaja-miv@vz.hinet.hr





Kompenzatori dilatacija

- dilatacija cjevovoda i opreme zbog promjene temperature
- deformacija dugih ravnih cijevi s deformacijom trupa, jer su cijevi na nekim mjestima čvrsto vezane za trup
- vođenjem cijevi s puno koljena
- cijevna lira, klizni, korugirani lim



KLIZNI

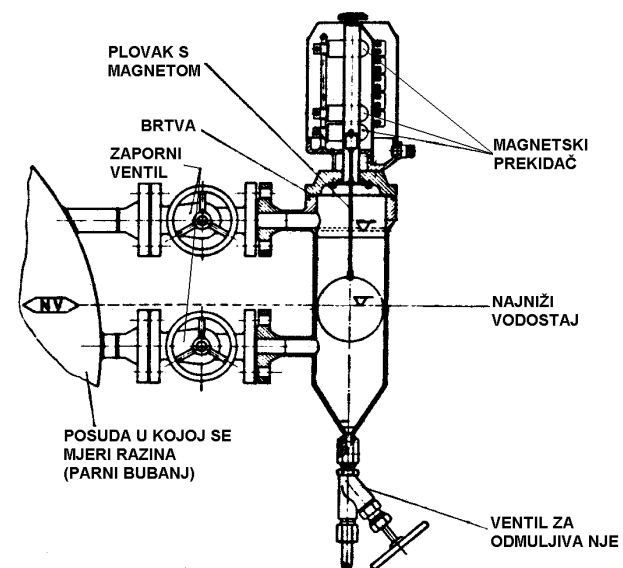
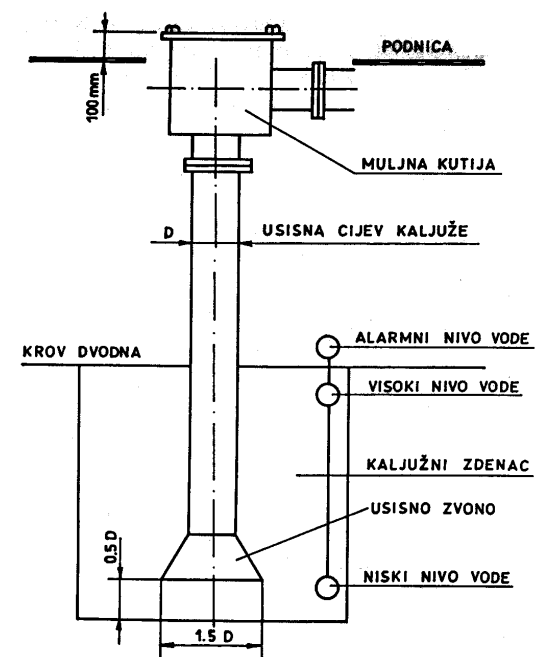
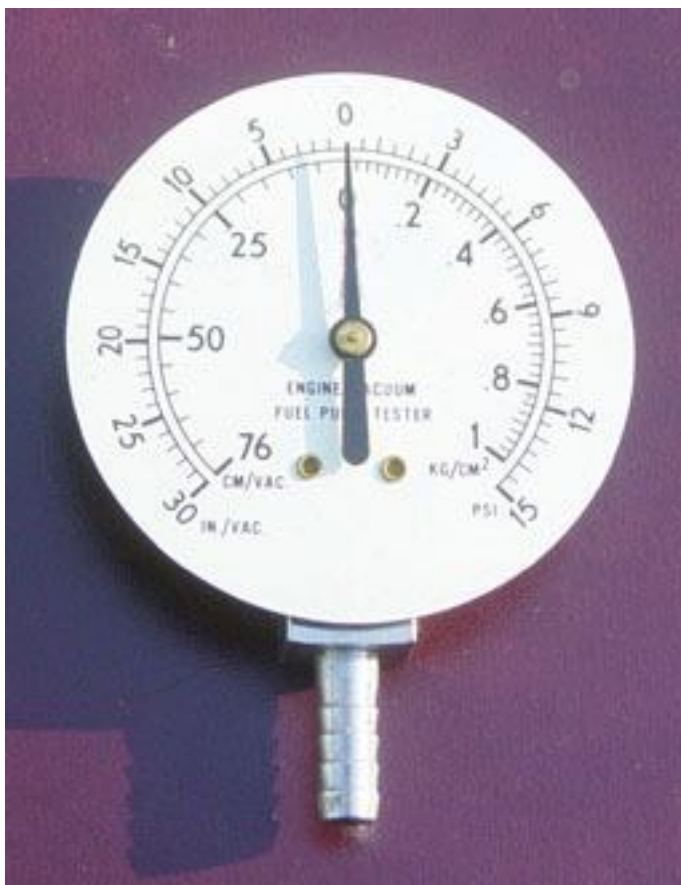


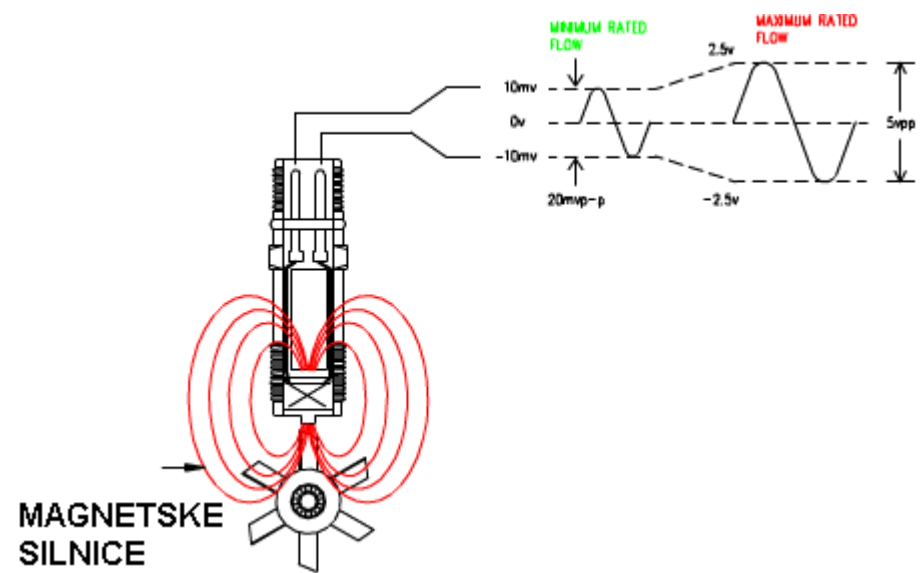
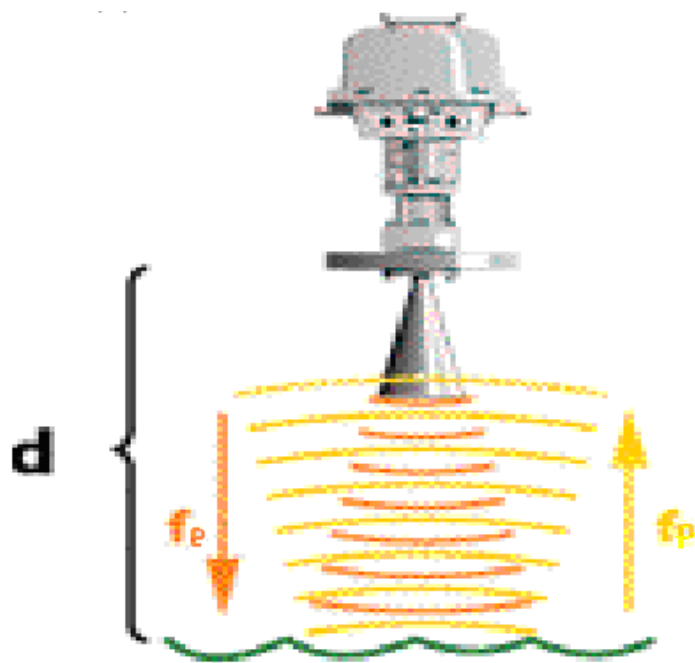
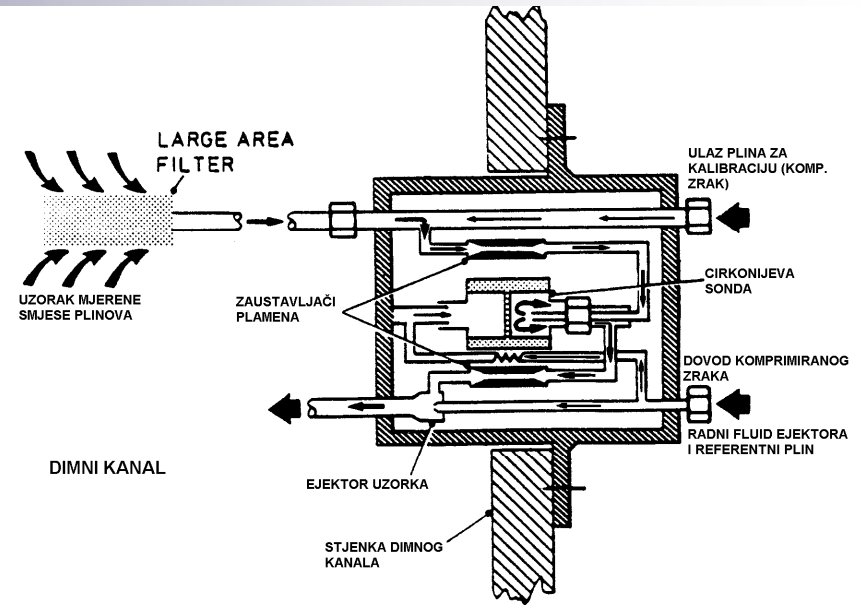
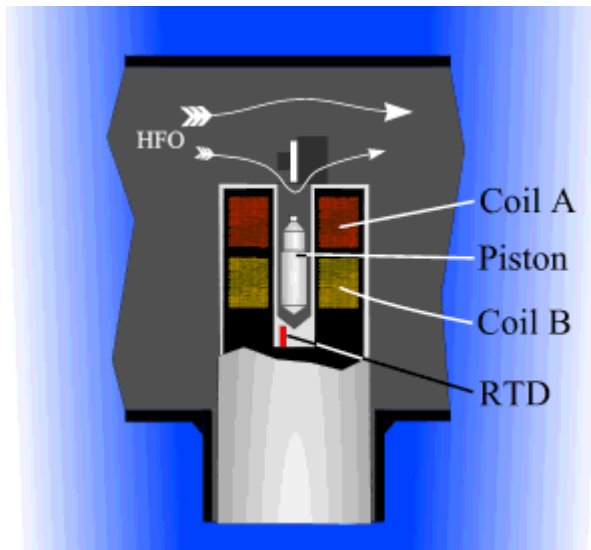
CIJEVNA LIRA



Regulacijska i kontrolna oprema

- termometri: termopar, otporni...
- manometri (mjere **pretlak**)
- mjerачи protoka su rijetki
- mjerenje razine, danas gotovo svaki tank
- ostalo: viskozitet, usio kisika ili sastav plinske smjese, slanost...
- pokazivači, prekidači...





Simboli

