PP PUSH-FIT DRAINAGE SOLUTIONS CATALOGUE

EXPORT EDITION

"SUPERIOR GERMAN QUALITY"

ABOUT

The Egyptian German Industrial Corporate - EGIC was founded in 1991 to market all types of sanitary products and related accessories. Joining Bänninger, our German partners, we introduced PP-R systems to the water supply in the Egyptian market, then expanded our entire production to produce and market all types of reliable plumbing and sanitary products.

EGIC has established top-class manufacturing facilities; including four facilities in Egypt and one in Germany, where we produce water supply and drainage solutions from numerous plastic materials and copper (polypropylene, PVC and polyethylene) under the best-known brands; Bänninger, Kessel, and Smart Home. One of those four factories is the largest copper foundry in the Middle East that manufactures the purest bronze bars, valves, and other related accessories.

By constantly adapting our products to the needs of the market, EGIC eventually became a trendsetter and a leading developer of benchmark quality in polymer and plastic products. We manufacture an economically innovative wide product range of PP-R pipes and fittings for drinkable cold & hot water as well as PP & PVC pipes and fittings for drainage, where we provide complete home solutions for different residential and industrial projects across the world.

Our applied raw material technologies optimize the material characteristics for the protection of the environment. The use of polypropylene raw materials for manufacturing ensures a socially compatible, hygienic and healthy packaging for the most precious commodity: clean drinking water

Our promise is to not only satisfy but to also exceed our customers' expectations by offering them the highest quality products as well as a wide range of support services. Our outstanding customer relations skills ensure efficient delivery, which in return results in customer loyalty.

At EGIC we believe in teamwork, progress, honesty, open communication and a better tomorrow.

Founded by
Omar Safey El Dine

EGIC company was established in early **1991** with the intent to market all types of plumbing-related products. Overtime, **EGIC is a pioneer and market leader** in manufacturing pipes and fittings for water supply and drainage, using numerous plastic materials: Polypropylene, PVC and Polyethylene. As a result, the company was positioned as a main sanitary solution supplier in the construction value chain, and was known for its superior, high-quality, German products.

EGIC's Timeline since 1991

1991	EGIC was founded as an importer of top-class plumbing products.
1995	EGIC was the first company to introduce PPR water supply solutions to the Egyptian Market.
1997	EGIC launched its integrated customer service loyalty program. EGIC introduced a new PP push-to-fit drainage solutions.
2000	EGIC started its first corporate social responsibility initiative via establishing Nahdet Beni Suief Foundation.
2001	EGIC established its first manufacturing facility to locally produce PPR water supply solutions.
2006	EGIC expanded to its second manufacturing facility to locally produce UPVC drainage solutions.
2013	EGIC implemented the SAP system. EGIC established the Egyptian Plumbers Foundation as part of EGIC's corporate social responsibility program.
2014	EGIC launched its PVC cleaning cement & adhesives as well as new pumping systems in order to provide an integrated and complete home solution strategy. EGIC acquired its third manufacturing facility.
2016	EGIC established one of the largest bronze and brass foundries in the Middle East.
2019	EGIC expanded its manufacturing process to produce the new Kessel shower drains and Smart Home accessories.

EGIC Facilities

- Cairo Head Office.
- Bani Suef Manufacturing Facility.
- Bani Suef Bronze/Brass Foundry.
- October | Manufacturing Facility.
- October II Manufacturing Facility.
- Customer Service Branches Across Egypt.

QUALITY ASSURANCE

Our promise is to be a dependable provider of comprehensive and integrated home solutions of superior German quality, with the support of our exemplary customer care service, comprehensive warranties, and outstanding distribution network.

EGIC's entire production line has been adjusted to fit European standards, which have been previously approved and certified by different accredited independent international institutes.

Those standards are being sustained by our Quality Assurance laboratories which test all raw materials, products and effectiveness.

All products undergo tests in abnormal conditions to guarantee optimum quality, through using the highest quality raw material BOREALIS, basell, implying the required standards of the following certifications: DVGW, SKZ, EOS, GL, NOPWASD, IGH and Certificates of quality process ISO 9001, ISO 14001, ISO 45001, ISO 17025.

COMPLETE HOME SOLUTIONS

Home is where most of our time is spent, and investing in high-quality water Plumbing solutions is of the upmost importance, in order to ensure a stable water supply for a peaceful and hassle-free life.

1 PP-R Water Supply Solutions
2 PPR-R Water Supply Solutions with UV Resistance
3 PVC Drainage Solutions
4 Floor Drains
5 Gully traps
6 Inspection Chamber for Outdoor Drainage Solutions
7 Backwater Valve for Outdoor Drainage Solutions
8 Underground Push to Fit Drainage Solutions
9 Lifting Station for Basements
10 Water channels for Garage and Swimming Pools

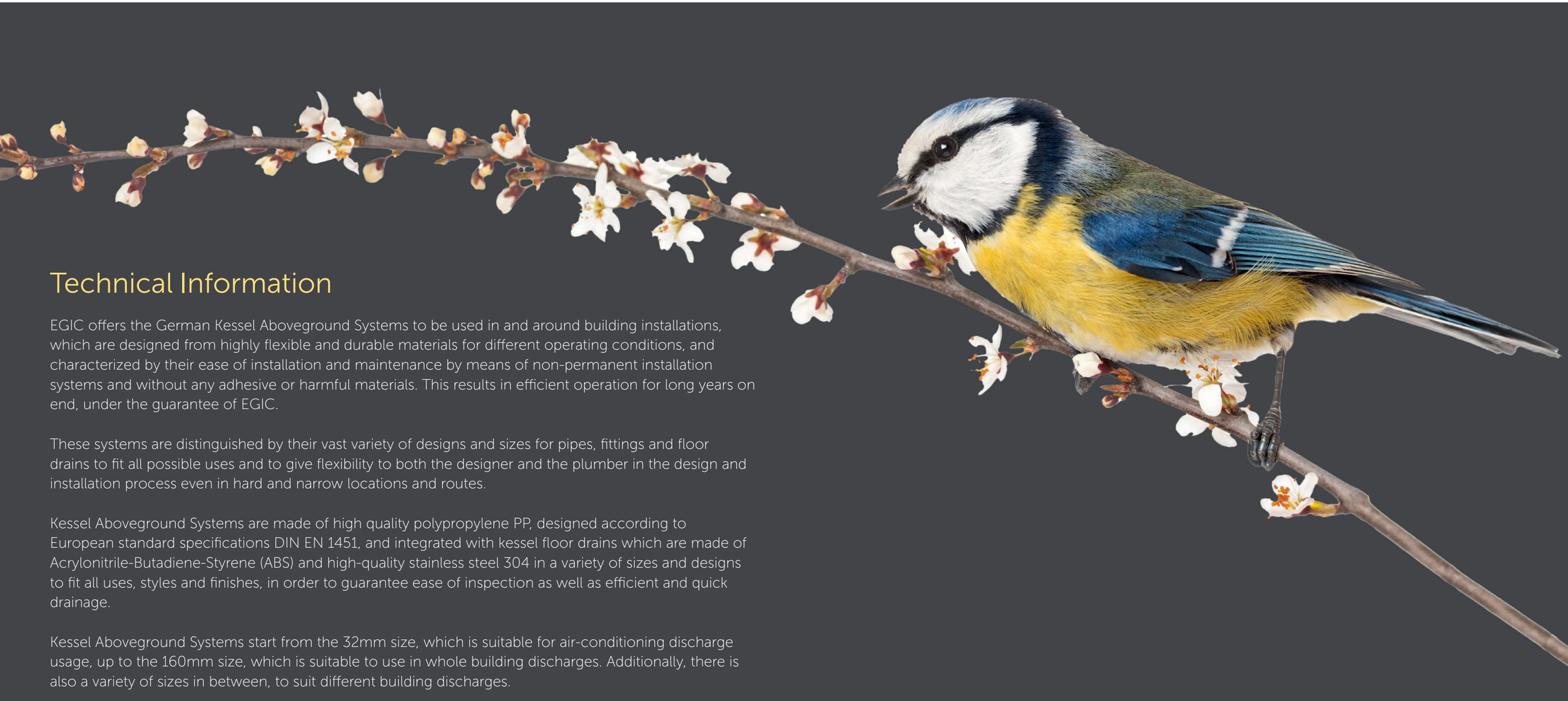
Related Plumbing Solutions: Valves, Flexible Hoses, Lubricant, Adhesives, Waterproof cementitious coating and water pumps.

KESSEL

INDEX

"Eco Friendly Connections"

ABOVE GROUND PRODUCTS



Technical Information

EGIC offers the German Kessel Aboveground Systems to be used in and around building installations, which are designed from highly flexible and durable materials for different operating conditions, and characterized by their ease of installation and maintenance by means of non-permanent installation systems and without any adhesive or harmful materials. This results in efficient operation for long years on end, under the guarantee of EGIC.

These systems are distinguished by their vast variety of designs and sizes for pipes, fittings and floor drains to fit all possible uses and to give flexibility to both the designer and the plumber in the design and installation process even in hard and narrow locations and routes.

Kessel Aboveground Systems are made of high quality polypropylene PP, designed according to European standard specifications DIN EN 1451, and integrated with kessel floor drains which are made of Acrylonitrile-Butadiene-Styrene (ABS) and high-quality stainless steel 304 in a variety of sizes and designs to fit all uses, styles and finishes, in order to guarantee ease of inspection as well as efficient and quick drainage.

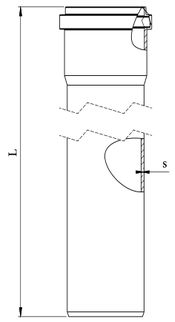
Kessel Aboveground Systems start from the 32mm size, which is suitable for air-conditioning discharge usage, up to the 160mm size, which is suitable to use in whole building discharges. Additionally, there is also a variety of sizes in between, to suit different building discharges.

These Aboveground Systems use two main designs for both body and socket gaskets, in order to suit the operating conditions, and to give pipes and fittings extra strength in loading, withstanding and sealing. Kessel Aboveground Systems are suitable for all water and sewage gravity discharging with operational temperatures that reach up to 95°C as well as an efficient solids slipping system and excellent resistance to most chemicals for several long years, in addition to the ability to withstand all building loads with the proper installation.

"Eco Friendly Connections"

Zero Leakage, Zero Contamination, Zero Corrosion, Zero Blockage

ABOVE GROUND PRODUCTS - PIPES



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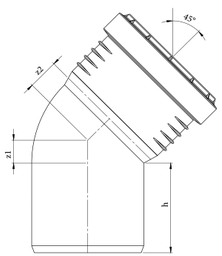
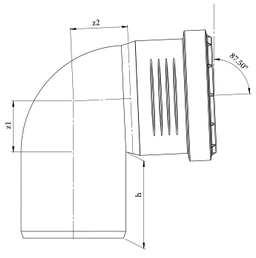
332020009	32	3000	2	0.565
342010002	50	750	1.8	0.221
342030001	50	1500	1.8	0.443
332020001	50	3000	1.8	0.859
332020014	63	3000	2.5	0.495
342020001	75	1000	1.9	0.471
332020002	75	3000	1.9	1.421
332020007	75	3000	2.9	1.956
342020002	110	1000	2.7	0.972
332020003	110	3000	2.7	3
332020008	110	3000	4.1	4.053
332020005	160	3000	3.9	6.018
332020004	160	6000	3.9	11.988

Pipes with Socket



Code	dn	z1	z2	h	kg
352010008	32	6	7	47	0.022
352010002	50	10	15	58	0.061
352010010	63	13	17	55	0.070
352010003	75	12	15	63	0.097
352010004	110	18	20	65	0.227
352010005	160	20	43	96	0.711

Bend 45°



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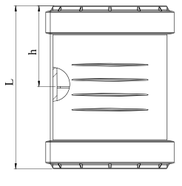
352020008	32	15	20	46	0.024
352020002	50	22	37	56	0.067
352020010	63	30	34	55	0.083
352020003	75	30	44	63	0.118
352020004	110	47	66	78	0.282
352020005	160	70	92	96	0.851

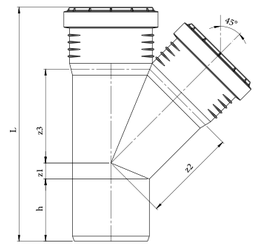
Bend 87.5°



Code	dn	l	h	kg
352080009	32	89	43	0.025
352080002	50	106	52	0.064
352080010	63	102	50	0.067
352080003	75	115.3	56.4	0.105
352080004	110	131.5	64.8	0.214
352080005	160	185.4	90	0.852

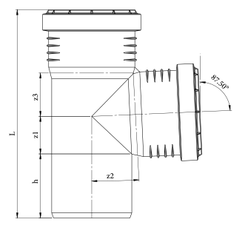
Double Socket

Code	dn	z1	z2	z3	h	l	kg
352040015	32/32	8	38	36	48	132	0.040
352040003	50/50	11	63.5	63.5	56.5	180	0.113
352040016	63/63	13	77	77	55.3	200	0.140
352040005	75/50	17	70	56	59.6	187	0.140
352040006	75/75	16	93	93	61	225	0.199
352040007	110/50	20	86	53	68	208	0.274
352040008	110/75	20	105	90	68	244	0.342
352040009	110/110	24	137	137	72	297	0.460
352040013	160/110	10	142	142	90	354	10.50
352040011	160/160	23.4	200	200	90	425	15.35



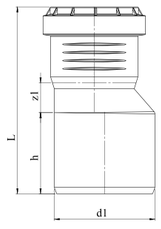
Branch 45°

Code	dn	z1	z2	z3	h	l	kg
352050016	32/32	13	20	21	46	120	0.036
352050003	50/50	24	30	30	56	185	0.101
352050017	63/63	30	34.5	34.5	55.3	176	0.122
352050005	75/50	25	29	30	60	167	0.140
352050020	75/63	31	44	39	59	185	0.15
352050006	75/75	35	44	44	63	196	0.168
352050007	110/50	20	64	35	68	183	0.236
352050019	110/63	32	63	43	115	240	0.27
352050008	110/75	35	59	42	71	214	0.292
352050009	110/110	54	62	60	63	237	0.356
352050012	160/110	50	92	62	90	309	0.920
352050010	160/160	70	92	92	90	360	12.48



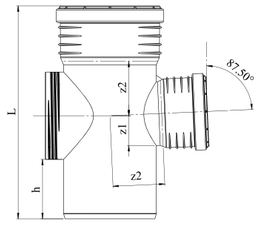
Branch 87.5°

Code	dn	d1	z1	h	l	kg
352092008	50/32	50	13	55	113	0.043
352092007	50/1"	50	13	55	113	0.041
352092001	50/40	50	20	60	123	0.047
352092012	63/50	63	19	55	121	0.061
352092002	75/50	75	31.5	60.5	140	0.077
352092013	75/63	75	19	60	132	0.077
352092003	110/50	110	37	70	155	0.132
352092004	110/75	110	26	70	150	0.140
352092005	160/110	160	47	90	215	0.460

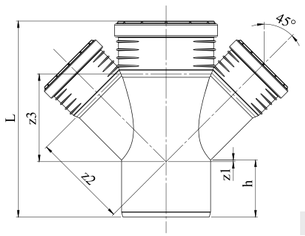


Eccentric Reducer

Code	dn	z1	z2	z3	h	l	kg
352060003	75/75	32	42	44	63	193	0.222
352060001	110/50	23	66	62	100	250	0.403
352060004	110/75	32	42	45	62	248	0.418
352060002	110/110	48	66	62	75	250	0.471
352060005	160/110	50	92	62	90	309	10.52
352060006	160/160	70	92	92	90	360	14.10

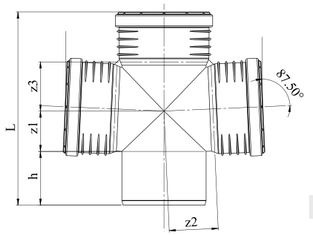


Branch with Inspection Access



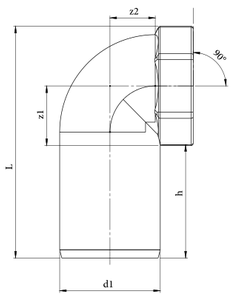
Double Branch 45°

Code	dn	z1	z2	z3	h	l	kg
352070002	75/75	2	107	107	63	225	0.256
352070006	110/75	2	116	105	71	243	0.429
352070004	110/110	2	151	155	77	298	0.624



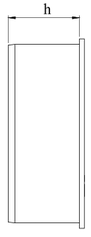
Double Branch 87.5°

Code	dn	z1	z2	z3	h	l	kg
352070007	75/75	33	44	44	62	193	0.235
352070005	110/75	33	63	46	71	215	0.355
352070008	110/110	48	65	63	76	252	0.508



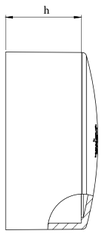
Bend with inner thread

Code	dn	h	l	kg
352020007	50	56	115	0.100



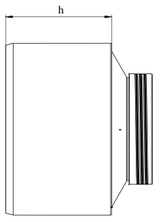
Plug

Code	dn	h	kg
352091006	32	43	0.009
352091002	50	30	0.012
352091007	63	40	0.025
352091003	75	30	0.023
352091004	110	35	0.054
352091005	160	70	0.140



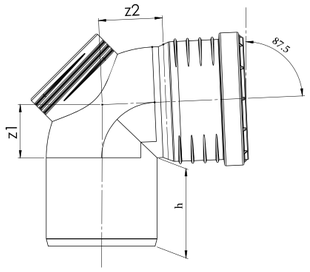
Pipe Cover

Code	dn	h	kg
352091012	32	24	0.006
352091008	50	25	0.015
352091013	63	35	0.023
352091009	75	34	0.034
352091010	110	35	0.048
352091011	160	50	0.106



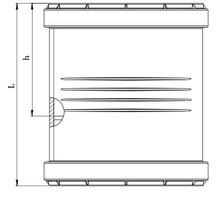
Cleaning Plug

Code	dn	h	kg
352094003	75	73	0.047
352094001	110	74	0.173
352094002	160	108	0.337



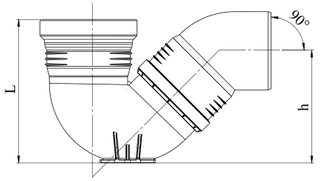
Bend with inspection access

Code	dn	z1	z2	h	kg
352030004	75	27	51	66	0.163
352030003	110	47	66	75	0.363
352030005	160	20	43	96	0.980



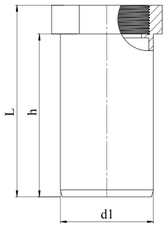
Repairing socket

Code	dn	h	l	kg
352080017	50	97	150	0.066
352080018	63	97	150	0.07
352080019	75	110	170	0.13
352080013	110	137	200	0.210
352080014	160	137	200	0.565



Siphon

Code	dn	h	l	kg
352099904	110/110	175	201	0.668



Socket with inner thread

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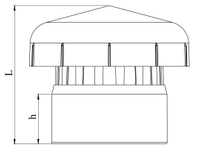
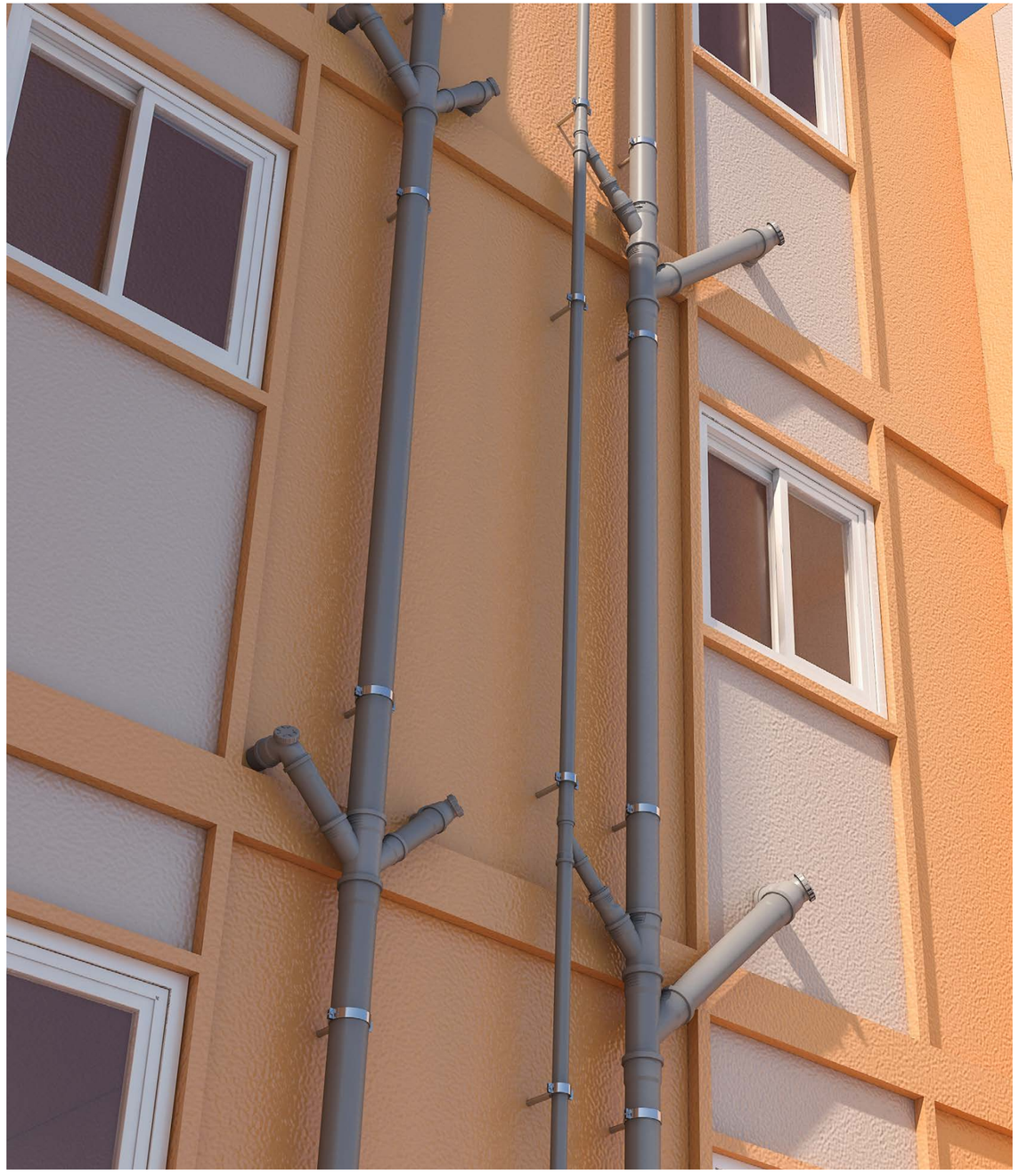
352080012	50/1.5"	50	83.5	100	0.039



Vent

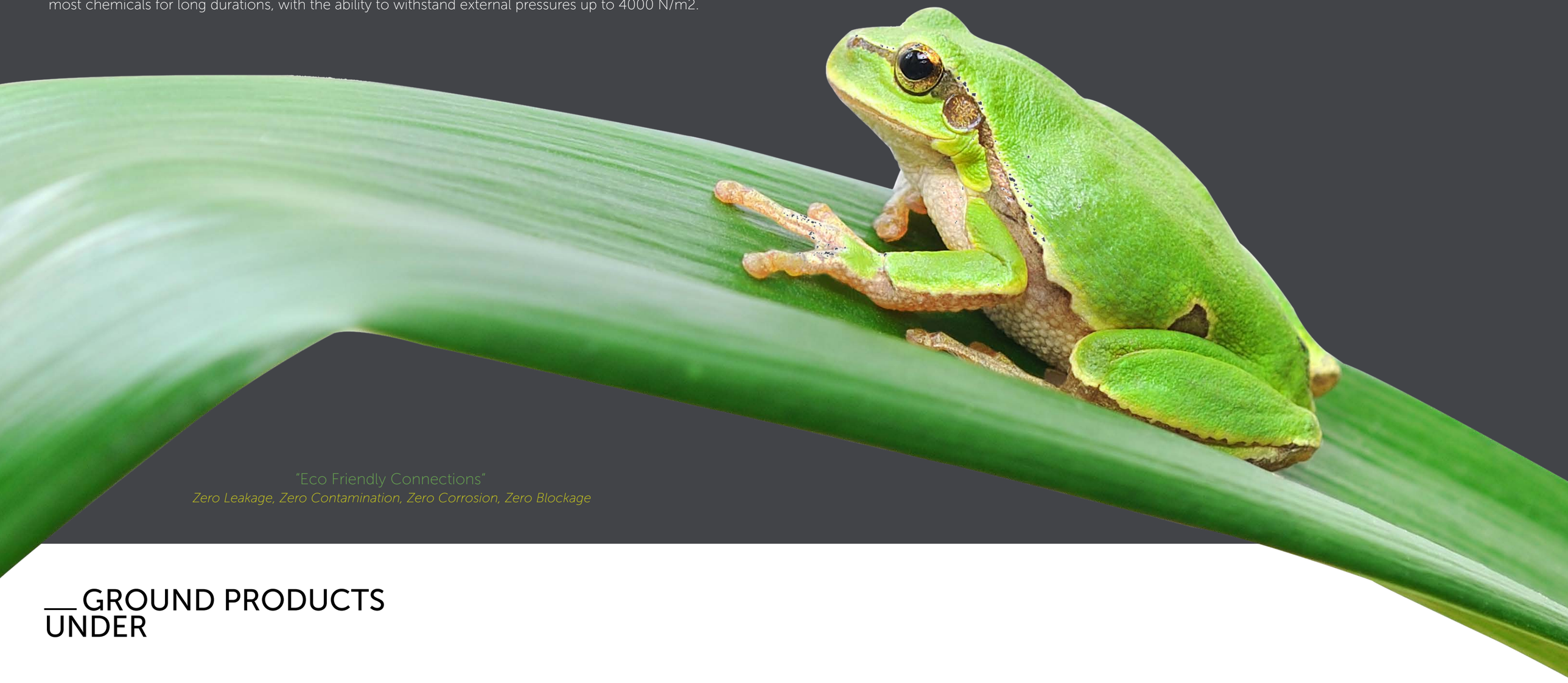
Code	dn	h	l	kg
352093001	50	31.4	75	0.032
352093002	75	40	102	0.067
352093003	110	49.7	145	0.151



Technical Information

EGIC also offers the German Kessel Underground Systems that are used in roadway installations, which are designed using highly flexible and durable materials for different operating conditions, and characterized by their ease of installation and maintenance by means of non-permanent installation systems and without any adhesive or harmful materials. This results in efficient operation for several years under the guarantee of EGIC.

Kessel Underground Systems are made of high-quality Polypropylene PP, and designed according to European standard specifications BS EN 1852-1. Kessel Underground Systems come in different sizes: 160mm and 200mm, which are suitable for all water and sewage gravity discharging with operational temperatures that reach up to 95°C with an efficient solids slipping system and excellent resistance to most chemicals for long durations, with the ability to withstand external pressures up to 4000 N/m2.

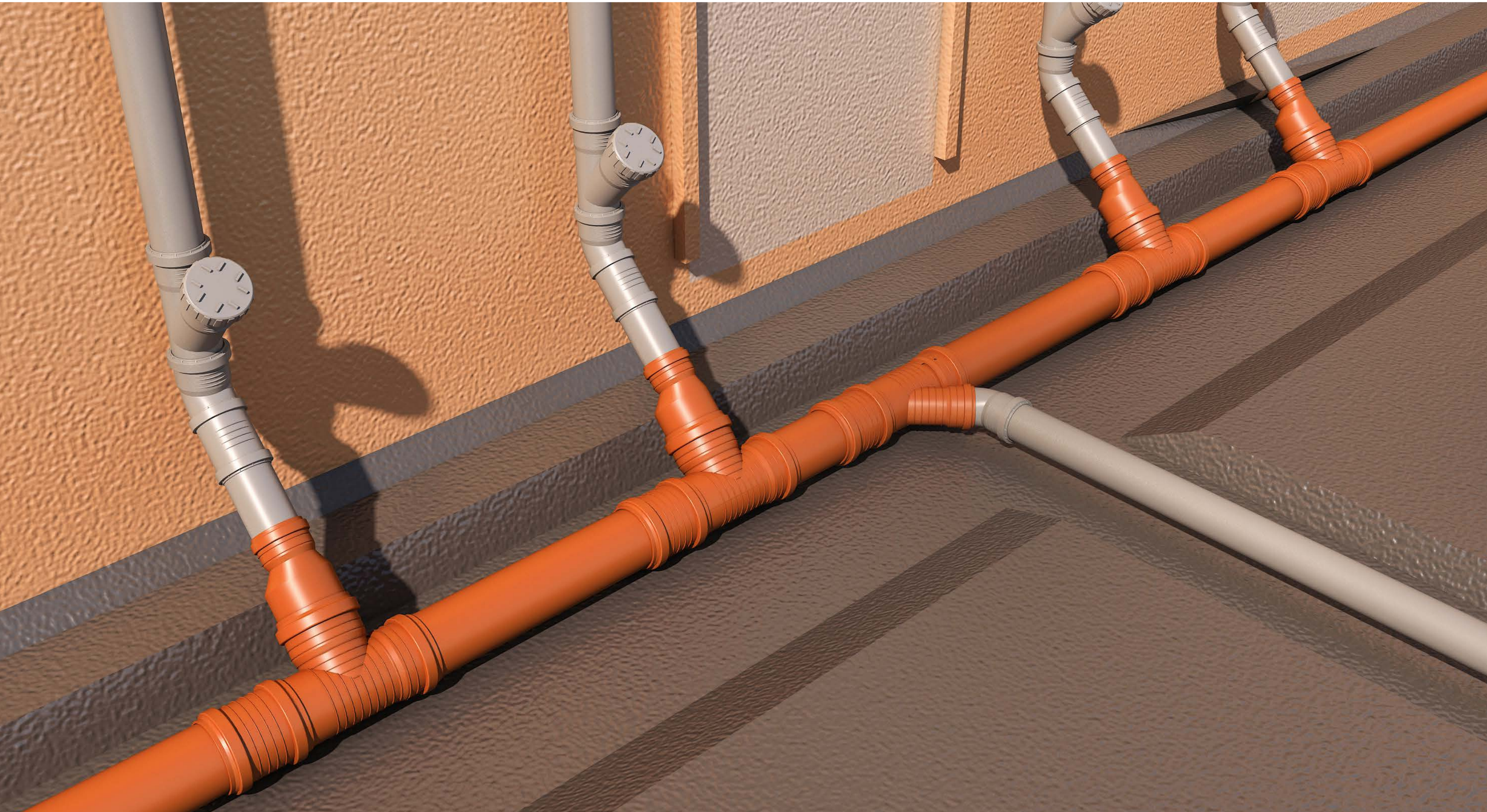


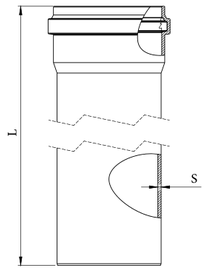
"Eco Friendly Connections"

Zero Leakage, Zero Contamination, Zero Corrosion, Zero Blockage

__GROUND PRODUCTS UNDER

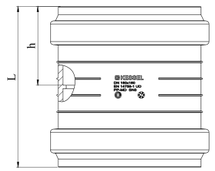
UNDER GROUND PRODUCTS - PIPES





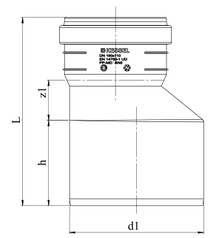
Code	dn	l	s	kg
332020017	110	3000	5	5.19
332020006	160	3000	5.5	8.326
332020010	200	3000	6.7	12.752

Pipes with Socket



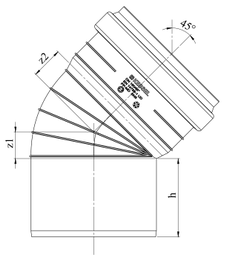
Code	dn	h	l	kg
352080011	110	75	152	0.29
352080007	160	100	194	0.98
352080008	200	107	220	1.196

Double Socket



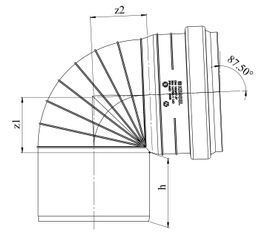
Code	dn	d1	z1	h	l	kg
352092006	160/110	160	47	150	225	0.550
352092011	200/110	200	39	164	240	0.830
352092009	200/160	200	37	159	260	0.958

Eccentric Reducer



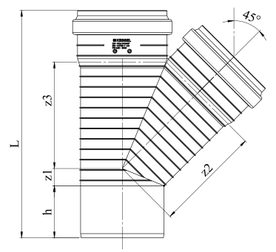
Code	dn	z1	z2	h	kg
352010011	110	24	30	83	0.37
352010006	160	28	47	100	0.844
352010009	200	35	50	120	1.420

Bend 45°



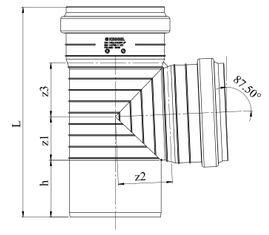
Code	dn	z1	z2	h	kg
352020011	110	56	57	83	0.44
352020006	160	76	92	100	0.963
352020009	200	97	110	120	1.727

Bend 87.5°



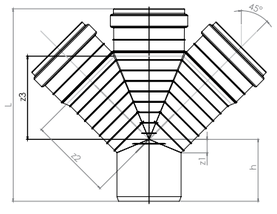
Code	dn	z1	z2	z3	h	l	kg
352040010	110/110	23	142	142	83	331	0.788
352040014	160/110	20	146	146	100	366	1.264
352040012	160/160	20	200	200	100	437	1.718
352040017	200/160	71	151	151	122	480	2.25
352040018	200/200	43	257	257	122	540	2.8

Branch 45°



Code	dn	z1	z2	z3	h	l	kg
352050018	110/110	54	66	66	83	285	0.63
352050013	160/110	47	70	70	100	320	1.075
352050011	160/160	70	90	90	100	370	1.440
352050015	200/160	76	117	117	121	410	2.041
352050014	200/200	76	120	92	121	450	2.455

Branch 87.5°



Code	dn	z1	z2	z3	h	l	kg
352070009	110/110	0.5	143	143	83	331	1.01

Double Branch 45°

SBR GASKET

Made of special rubber types used for push and fit drainage solutions where users can easily reassemble the joints on-site.

Kessel gaskets are known for their flexibility and durability in preventing dust and eliminating leakage.

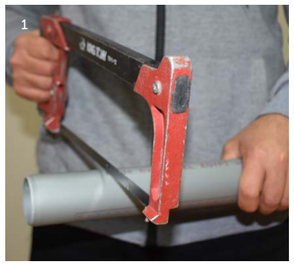
Kessel underground drainage systems have the ability to withstand external pressures up to 4000 N/m2.

Kessel SBR Gasket
Composed of 4 ribs to prevent dust, tighten the installation and eliminating leakage.

INSTALLATION INSTRUCTIONS

Kessel system installation guide
I. Pipe and fitting preparation and joining

1. Ensure the quality of the gasket installation in the part.
2. Specify the suitable overlap length.
3. Cut the pipe normally.
4. Chamfer the sharp end in angle between 15° and 45°
   in which the remaining wall thickness shall be at least 1/3 of the original thickness.
5. Clean the socket and spigot end.
6. Use smart home grease.
7. Remove the excess produced from cutting process.
8. Jointing (push the spigot end into the socket until it's fully in place).



Cutting

Chamferring

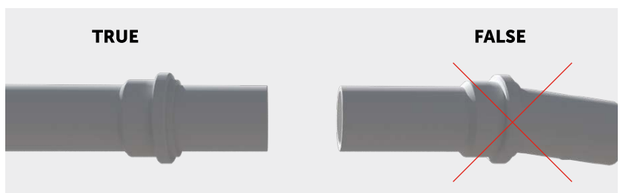
Cleaning

Lubricating

Jointing (push the spigot end into the socket until it's fully in place)

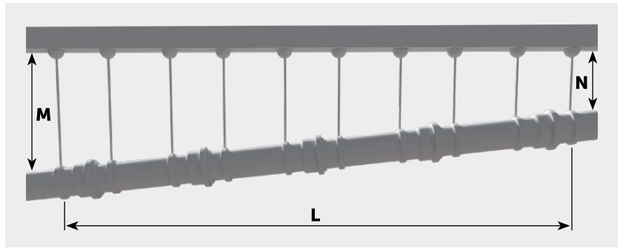
II. Pipe line installation instructions:

1. All Kessel systems are designed to drain wastes in atmospheric pressure only with temperatures up to 95°c.
2. The horizontal lines shall be inclined as shown:



The inclination will be according to the following equations:

Pipe diameter	Equation
From 32mm to 75mm	(M-N)/L*100 ≥ 2%
From 90mm to 200mm	(M-N)/L*100 ≥ 1%



M: The larger height from the pipe surface to the reference horizontal plane.

N: The smaller height from the pipe surface to the reference horizontal plane.

L: The horizontal distance between the first and last clamps.

3. The two parts should be well aligned.
4. Kessel Fittings should always be laid out as fixed points, e.g. installing two clamps right before and after the socket.
5. The clamp should be installed carefully near the socket area to prevent ovality in the socket, which may affect sealing quality.
6. The distance between the clamps for horizontal and vertical installations should not be greater than the values in the next table.

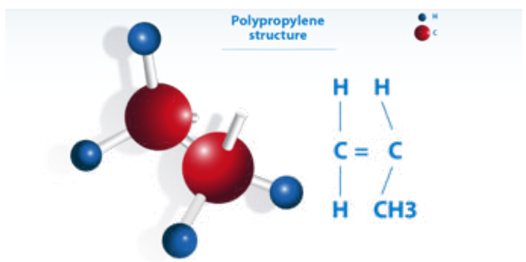
DN	Horizontal Distance (cm)	Vertical Distance (cm)
32	50	120
40	50	120
50	50	150
75	80	200
90	90	200
110	110	200
160	160	200
200	200	200

7. When installing heavy duty lines like the horizontal headers that receive high flow rates from one or more water columns, a steel structure member such as beams and angles must be used to hold the pipes, in order to maintain alignment and withstand these heavy loads.
8. Additionally, it is recommended to use a pipe between every two fittings to hold structure members or clamps, in order to eliminate slipping or misalignment due to the heavy loads.
9. When Kessel pipes are laid in concrete, the socket gaps should be sealed with an adhesive tape in order to prevent penetration of the cement grout.

Material Characteristics

Polypropylene (PP), also known as polypropene, is a thermoplastic polymer used in a wide variety of applications. It is produced via chain-growth polymerization from the monomer propylene.

Polypropylene belongs to the group of polyolefins and is partially crystalline and non-polar. Its properties are similar to polyethylene, but it is slightly harder and more heat resistant. It is a white, mechanically rugged material and has a high chemical resistance. Polypropylene is the second-most widely produced commodity plastic (after polyethylene) and it is often used in packaging and labeling. In 2013, the global market for polypropylene was about 55 million tons.



PHYSICAL PROPERTIES

Density	905 Kg/m3
Yield strength	30-32 MPa
Flexural Modulus	1300-1500 Mpa
Charpy Impact Strength, notched (23 °C)	60 kJ/m²
Charpy Impact Strength, notched (-20 °C)	6 kJ/m²

**These values may subjected to minor changes*

CHEMICAL CHARACTERISTICS

Selected chemical-resistance classification data for PP according to ISO/TR 10358

Concentration and/or purity of the fluid

Dil Sol.	Dilute aqueous solution at a concentration equal to or less than 10%
Sol.	Aqueous solution at a concentration higher than 10% but not saturated
Sat Sol.	Saturated aqueous solution, prepared at 20°C
tg	At least technical grade purity
tg-s	Technical grade, solid
tg-l	Technical grade, liquid
tg-g	Technical grade, gas
Work Sol.	Working solution of the concentration usually used in the industry concerned.
Susp.	Suspension of solid in a saturated solution at 20°C

Chemical resistance

S	Satisfactory resistance The pipes can be used for applications in which they are not subjected to pressure or other stresses; for applications in which they are exposed to pressure, the final assessment shall be on the basis of subsequent test under pressure.
L	Limited resistance The pipes can be used for applications in which they are not subjected to pressure or other stresses, but in which a certain amount of corrosion can be accepted; for applications in which they are exposed to pressure, the final assessment shall be on the basis of subsequent test under pressure.
NS	Resistance not satisfactory The pipes are seriously attacked: they shall not be used for either pressure or non-pressure applications. There is no point in conducting tests under pressure as the pipes would be certain to fail these tests.

• Keys for chemical resistance table

Chemical-resistance data for PP

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
5	Acetone	-95	56	5	100	
				10	50	
		-95	56	tg-l	20	S
				tg-l	50	
				tg-l	60	S
11	Air			tg-g	20	S
				tg-g	50	
				tg-g	60	S
				tg-g	100	S
16	Aluminum Chloride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	80	
				Sat Sol.	100	
17	Aluminum Fluoride	250		Susp.	20	S
				Susp.	50	
				Susp.	60	S
				Susp.	100	
18	Aluminum Hydroxide			Susp.	20	S
				Susp.	50	
				Susp.	60	S
				Susp.	100	
19	Aluminum Nitrate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
20	Aluminum Oxychloride			Susp.	20	S
				Susp.	50	
				Susp.	60	S
21	Aluminum Potassium Sulphate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	80	
				Sat Sol.	100	
22	Aluminum Sulphate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
23	Ammonia, aqueous			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
24	Ammonia, Dry Gas	-78	-34	tg-g	20	S
				tg-g	50	
				tg-g	60	
25	Ammonia, Liquid	-78	-34	tg-g	20	S
				tg-g	50	
				tg-g	60	
26	Ammonium, Acetate			Sat Sol.	20	S
				Sat Sol.	60	S
				Sat Sol.	100	
28	Ammonium Carbonate (Dec. at 58°C)			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
				Sat Sol.	120	
29	Ammonium Chloride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
34	Ammonium Nitrate	170		Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
36	Ammonium Phosphate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	
				Sat Sol.	120	
37	Ammonium Sulphate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
41	Amyl Alcohol	-79	137	tg-1	20	S
				tg-1	50	
				tg-1	60	S
				tg-1	100	S
43	Aniline	-6	184	Sat Sol.	20	
				Sat Sol.	50	
				Sat Sol.	60	
				tg-1	20	S
				tg-1	50	
				tg-1	60	S
47	Apple Juice			Work Sol.	20	S
				Work Sol.	50	
				Work Sol.	60	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
50	Barium Bromide			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
51	Barium Carbonate			Susp.	20	S
				Susp.	50	
				Susp.	60	S
				Susp.	100	S
52	Barium Chloride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
53	Barium Hydroxide	78		Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
54	Barium Sulphate			Susp.	20	S
				Susp.	50	
				Susp.	60	S
				Susp.	100	S
55	Barium Sulphide			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
				Sat Sol.	120	
58	Benzene	6	80	tg-1	20	L
				tg-1	50	
				tg-1	60	NS
				tg-1	100	NS
59	Benzonic Acid	122	250	Sat. Sol.	20	S
				Sat. Sol.	50	
				Sat. Sol.	60	S
				tg-s	120	
61	Benzoyl Alcohol	-15	205	tg-1	20	S
				tg-1	50	
				tg-1	60	L
62	Benzyl Chloride	-39	179	tg-1	20	
				tg-1	50	
				tg-1	60	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
65	Boric Acid			Dil Sol.	20	S
				Dil Sol.	50	
				Dil Sol.	60	
				Dil Sol.	100	
				Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	
				Sat Sol.	100	
66	Boron Trifluoride	-129	-101	Sat Sol.	20	S
				Sat Sol.	60	
68	Bromine Gas	-7	58	tg-g	20	NS
				tg-g	50	
				tg-g	60	NS
				tg-g	100	NS
69	Bromine Liquid	-7	58	tg-1	20	NS
				tg-1	50	
				tg-1	60	NS
				tg-1	100	NS
73	Butane Gas	-135	-0.5	tg-g	20	S
				tg-g	50	
				tg-g	60	
74	n-Butanol	-80	117	tg-1	20	S
				tg-1	50	
				tg-1	60	L
				tg-1	80	
				tg-1	100	
83	Calcium Carbonate			Susp.	20	S
				Susp.	50	
				Susp.	60	S
				Susp.	100	S
84	Calcium Chlorate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	120	
85	Calcium Chloride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	80	
				Sat Sol.	100	S
88	Calcium Nitrate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	80	
				50	100	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
101	Chlorine Dry Gas			tg-g	20	NS
				tg-g	50	
				tg-g	60	NS
				tg-g	100	NS
102	Chlorine Water			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	L
				Sat Sol.	80	
				Sat Sol.	100	
103	Chlorine Wet Gas			tg-g	20	
				tg-g	50	
				tg-g	60	
				tg-g	80	
105	Chlorobenzene	-45	132	tg-1	20	
				tg-1	50	
				tg-1	60	
				tg-1	80	
				tg-1	100	
107	Chloroform	-64	62	tg-1	20	L
				tg-1	50	
				tg-1	60	NS
				tg-1	100	NS
110	Chlorosulphonic Acid	68	147	50	20	
			in	50	20	NS
			vac.	tg-s	50	
				tg-s	60	NS
				tg-s	100	NS
141	Diesel Fuel			Work Sol.	20	
				Work Sol.	60	
				Work Sol.	100	
155	Ethanol	-114	78	40	20	
				40	50	
				40	60	
				95	20	S
				95	50	
				95	60	S
				tg-1	20	
				tg-1	50	
				tg-1	60	
				tg-1	100	
176	Formaldehyde	-92	-19	Dil Sol.	20	
				Dil Sol.	60	
				Dil Sol.	80	
				30 to 40	20	S
				30 to 40	50	
				30 to 40	60	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
185	Gasoline (Fuel)			Work Sol.	20	NS
				Work Sol.	50	
				Work Sol.	60	NS
				Work Sol.	100	NS
186	Gelatine			Sol.	20	S
				Sol.	50	
				Sol.	60	S
187	Ginger Ale			Work Sol.	20	
188	Glucose	146		Sol.	20	S
		(Dec. at >200 °C)			Sol.	50
				Sol.	60	S
				Sol.	100	S
				Sol.	120	
189	Glycerine	20	290	tg-1	20	S
					tg-1	50
				tg-1	60	S
				tg-1	100	S
				tg-1	120	
190	Glycolic acid	80		Sol.	20	
					Sol.	60
				Sol.	100	
				30	20	S
				30	60	
				65	100	
192	Heptane	-90	98	tg-1	20	L
				tg-1	60	NS
				tg-1	80	
				tg-1	100	NS
194	Hexane	-94	69	tg-1	20	S
				tg-1	50	
				tg-1	60	L
				tg-1	80	
195	1- Hexanol	-52	158	tg-1	20	
				tg-1	60	
196	Honey			Work Sol.	20	S
					50	
					60	S

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
199	Hydrochloric acid	-112	-85	Up to 10	20	S
				Up to 10	50	
				Up to 10	60	S
				Up to 10	80	
				Up to 10	100	S
				20	20	S
				20	50	
				20	60	S
				20	80	
				20	100	S
				10 to 20	20	S
				10 to 20	50	
				10 to 20	60	S
				10 to 20	80	
				10 to 20	100	S
				Up to 25	20	S
				Up to 25	60	
				Up to 25	80	
				Up to 25	100	
				30	20	S
				30	60	L
				30	100	L
				>30	20	S
				>30	60	
				>30	80	
				>30	100	
				36	20	S
				36	50	
				36	60	
				36	80	
				38	100	
		-112	-85	Conc.	20	S
				Conc.	50	
				Conc.	60	
				Conc.	80	
200	Hydrochloric Acid, Dry Gas			tg-g	20	S
				tg-g	50	
				tg-g	60	S
201	Hydrochloric Acid, Wet Gas			tg-g	20	S
				tg-g	50	
				tg-g	60	S
204	Hydrofluoric Acid, Gas			tg-g	20	
				tg-g	40	
				tg-g	60	
205	Hydrogen			tg-g	20	S
				tg-g	60	
				tg-g	120	
213	Iodine, in Alcohol	114	183	Work Sol.	20	S
				Work Sol.	60	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
216	Isooctane		99	tg-1	20	L
					60	NS
					100	NS
220	Kerosene		150	Work Sol.	20	
			to 250	Work Sol.	100	
239	Mercurous Nitrate			Sol.	20	S
				Sol.	50	
				Sol.	60	S
				Sol.	100	
				Sat Sol.	20	S
				Sat Sol.	60	S
				Sat Sol.	100	
240	Mercury			tg-1	20	S
					60	S
					120	
244	Methyl Acetate	-98	57	tg-1	20	S
				tg-1	50	
				tg-1	60	S
245	Methyl Alcohol	-97	65	5	20	S
				5	50	
				5	60	L
				5	100	L
		-97	65	tg-1	20	S
				tg-1	50	
				tg-1	60	
				tg-1	80	
254	Milk			Work Sol.	20	S
				Work Sol.	50	
				Work Sol.	60	S
				Work Sol.	100	S
260	Nickel Acetate			Sat Sol.	20	
				Sat Sol.	40	
				Sat Sol.	60	
261	Nickel Chloride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
262	Nickel Nitrate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	120	
263	Nickel Sulphate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
265	Nitric acid			5	20	S
				5	50	
				5	60	
				5	80	
				10	20	S
				10	50	
				10	60	NS
				10	80	
				10	100	NS
				20	20	S
				20	50	
				20	60	NS
				20	80	
				20	100	NS
				25	20	S
				25	50	
				25	60	NS
				25	80	
				25	100	NS
				30	20	S
				30	50	
				30	60	NS
				30	80	
				30	100	NS
				30	120	
				35	20	
				35	50	
				35	60	NS
				35	80	
				35	100	NS
				40	20	
				40	50	
				40	60	
				40	80	
				40	120	
				up to 45	20	
				up to 45	50	
				up to 45	60	
				up to 45	80	
				50	20	L
				50	50	
				50	60	NS
				50	80	
				50	100	NS
				>50	20	NS
				>50	50	
				>50	60	NS
				>50	100	NS
				65	120	
				85	20	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
266	Nitrobenzene	6	210	tg-1	20	S
				tg-1	50	
				tg-1	60	L
272	Oxalic Acid (Subl.)	102		Dil Sol.	20	
				Dil Sol.	60	
				Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	L
				Sat Sol.	10	NS
				50	100	
273	Oxygen, Gas			tg-g	20	S
				tg-g	50	
				tg-g	60	
				tg-g	100	
283	Petroleum Ether (Ligroin)			Work Sol.	20	L
				Work Sol.	60	L
				Work Sol.	100	
284	Phenol	41	182	Sol.	20	
				Sol.	60	
				Sol.	80	
				5	20	S
				5	60	S
				5	120	
				50	80	
				90	20	S
				90	40	
				90	60	
		41	182	tg-s	20	
				tg-s	50	
				tg-s	60	
287	Phosphine	-134	-88	tg-g	20	S
				tg-g	40	
				tg-g	60	S
288	Phosphoric Acid	42		Up to 50	20	S
				Up to 50	50	
				Up to 50	60	S
				Up to 50	80	
				Up to 50	100	S
				50 to 75	20	S
				50 to 75	50	
				50 to 75	60	S
				50 to 75	80	
				50 to 75	100	
				25 to 85	20	S
				25 to 85	50	
				25 to 85	60	S
				25 to 85	80	
				25 to 85	100	S
				98	100	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
328	Propane, Gas	-190	-45	tg-g	20	S
				tg-g	120	
329	Propionic Acid	-20	141	50	20	
				50	60	
				>50	20	S
				tg-1	20	
				tg-1	60	
335	Silicone Oil			tg-1	20	S
				tg-1	60	S
				tg-1	100	S
340	Sodium Acetate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
				tg-s	80	
341	Sodium Acid Sulphate (See346)					
342	Sodium Antimonate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
343	Sodium Arsenite			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
344	Sodium Benzoate			Sat Sol.	20	
				Sat Sol.	40	
				Sat Sol.	60	
				35	20	S
				35	60	L
				50	100	
345	Sodium Bicarbonate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S
346	Sodium Bisulphate			Sat Sol.	20	S
				Sat Sol.	40	
				Sat Sol.	50	
				Sat Sol.	60	S
				50	100	
347	Sodium Bromide			Sat Sol.	20	S
				Sat Sol.	40	
				Sat Sol.	50	
				Sat Sol.	60	S
				50	120	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
348	Sodium Carbonate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	80	
				Sat Sol.	100	
				25	20	S
				25	50	
				25	60	S
				25	80	
				25	100	
				Up to 50	20	S
				Up to 50	50	
				Up to 50	60	S
				Up to 50	80	
				Up to 50	100	L
349	Sodium Chlorate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	80	
				Sat Sol.	100	
350	Sodium Chloride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	80	
				Sat Sol.	100	
				10	20	S
				10	50	
				10	60	S
				10	80	
				10	100	S
351	Sodium Chlorite			Dil Sol.	80	
				2	20	S
				2	60	L
				2	100	NS
				20	20	S
				20	40	
				20	60	L
				20	100	NS
352	Sodium Chromate			Dil Sol.	20	S
				Dil Sol.	50	
				Dil Sol.	60	S
				Dil Sol.	80	
357	Sodium Fluoride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
362	Sodium Hydrogen Sulphite			Sat Sol.	20	S
				Sat Sol.	60	
				50	100	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
363	Sodium Hydroxide			Sol.	20	S
				Sol.	50	
				Sol.	60	S
				Sol.	80	
				Sat Sol.	20	
				Sat Sol.	60	
				1	20	S
				1	50	
				1	60	S
				1	100	S
				5	20	
				10 to 35	20	S
				10 to 35	50	
				10 to 35	60	
				10 to 35	80	
				30	80	
				40	20	S
				40	50	
				40	60	
				40	80	
				10 to 60	20	S
				10 to 60	50	
				10 to 60	60	S
				10 to 60	100	S
364	Sodium Hypochlorite			2	100	
				5	20	S
				5	50	
				5	60	S
				10 to 15	20	S
				10 to 15	50	
				10 to 15	60	
366	Sodium Nitrate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
367	Sodium Nitrite			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
371	Sodium Phosphate, Acid			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
372	Sodium Phosphate, Neutral			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	S

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
373	Sodium silicate			Sol.	20	S
				Sol.	50	
				Sol.	60	S
				Sat Sol.	20	
				Sat Sol.	50	
				Sat Sol.	60	
				50	100	
374	Sodium sulphate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
				0,1	20	S
				0,1	50	
				0,1	60	S
375	Sodium sulphide			Sat Sol.	20	S
				Sat Sol.	60	
376	Sodium sulphite			Sat Sol.	20	S
				Sat Sol.	60	S
				Sat Sol.	100	
				40	20	S
				40	60	S
				40	100	S
380	Sulphar dioxide, dry gas	-73	-10		20	S
					60	
381	Sulphar dioxide, wet gas	-73	-10		20	S
					40	
					60	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
383	Sulphuric acid			up to 10	20	S
				up to 10	50	
				up to 10	60	S
				up to 10	80	
				up to 10	100	S
				15	20	S
				15	50	
				15	60	
				15	80	
				15	100	
				10 to 30	20	S
				10 to 30	60	S
				10 to 30	80	
				10 to 50	20	S
				10 to 50	60	
				10 to 50	80	
				10 to 50	120	
				50	20	S
				50	50	
				50	60	L
				50	80	
				50	100	L
				60	120	
				50 to 75	20	
				50 to 75	60	
				50 to 75	80	
				80	120	
				50 to 90	20	
				50 to 90	60	
				50 to 90	80	
				90	100	
				75 to 90	20	
				75 to 90	50	
				75 to 90	60	
				75 to 90	80	
				95	20	
				95	50	
				95	60	
				95	80	
				95	100	
				96	20	S
				96	50	
				96	60	L
				96	80	
				96	100	NS
				98	20	L
				98	40	
				98	50	
				98	60	NS
				98	80	
				98	100	NS
				fuming	20	L
				fuming	50	
				fuming	60	NS
				fuming	100	NS

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
393	Toluene	-95	111	tg-1	20	L
				tg-1	50	
				tg-1	60	NS
				tg-1	100	NS
394	Trichloroacetic Acid	58	197	Up to 50	20	S
				Up to 50	40	
				Up to 50	60	S
				tg-s	40	
396	Trichloroethylene	-85	87	tg-1	20	NS
				tg-1	50	
				tg-1	60	NS
				tg-1	80	
				tg-1	100	NS
401	Turpentine			tg-1	20	NS
				tg-1	50	
				tg-1	60	NS
				tg-1	100	NS
402	Urea	133		Sol.	20	
				Sol.	50	
				Sol.	60	
				Sol.	80	
				Sol.	100	
				Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	
				Sat Sol.	80	
		133		10	20	
				10	50	
				10	60	
				10	80	
				10	100	
404	Urine			10	20	S
				10	50	
				10	60	S
406	Vinegar			Work Sol.	20	S
				Work Sol.	60	S
408	Water				20	S
					50	
					60	S
					80	
					100	S
					120	
414	Water, Sea				20	S
					50	
					60	S
					80	
					100	S
					120	

No.	Chemical	m.p. °c	b.p °c	Concentration %	T °c	Resistance
420	Zinc Carbonate			Susp.	20	S
				Susp.	50	
				Susp.	60	S
				Susp.	100	
421	Zinc Chloride			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
				58	20	S
				58	50	
				58	60	S
422	Zinc Chromate			Sat Sol.	20	
				Sat Sol.	60	
423	Zinc Cyanide			Sat Sol.	20	
				Sat Sol.	60	
424	Zinc Nitrate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	
425	Zinc Oxide			Susp.	20	S
				Susp.	50	
				Susp.	60	S
				Susp.	100	
426	Zinc Stearate	125		Susp.	20	
				Susp.	50	
				tg-s	100	
427	Zinc Sulphate			Sat Sol.	20	S
				Sat Sol.	50	
				Sat Sol.	60	S
				Sat Sol.	100	

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