

## B.17.5 Hose Immersion Test Method

### 1. Chemical Resistance Test

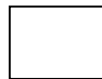
- 테스트할 호스 샘플을 준비한다.
- 호스 샘플의 경도 및 두께를 측정한다.
- 호스 샘플을 2 개로 자른다.
- 1 개는 이송액체 내에 담그고, 나머지 1 개는 테스트 후 비교를 위하여 별도 보관한다.
- 이송액체를 70 °C 상태로 유지한 상태에서 7 일간 보관한다.
- 7 일 경과 후 호스 샘플을 꺼내서 상온상태로 자연냉각시킨다.
- 담금 테스트한 호스 샘플의 경도 및 두께를 측정하여, 테스트전의 상태와 비교한다.

◆ 70 °C 상태에서 7 일간 담금효과는 상온에서 3 개월 담금효과와 동일함.

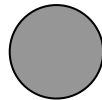
### 2.

- “A” : 테스트 전후의 호스 상태가 동일한 경우
- “B” : 경도가 5Shore A 미만 변화한 경우
- “B” : 두께가 5% 미만 변화한 경우
- “C” : 경도가 5Shore A 이상 변화한 경우
- “C” : 두께가 5%이상 변화한 경우

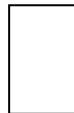
### 테스트용 호스 샘플의 종류(재질 / 형상)



Natural Rubber



NBR



EPDM

3.

1)

- **NR** : Natural Rubber, a highly dynamic, abrasion proof and wear resistant material that is a.o. resistant to diluted acids and alcohols.  
code : N, year, month  
sticker : white  
사용 액체 온도 : 최소 -20 °C                      최대 80 °C
  - **NBR** : Acryle Nitrile Butadiene Rubber (Nitrile or Buna), a highly abrasion proof and wear resistant material that is a.o. resistant to oils, fats, alkalines and detergents.  
code : P, year, month  
sticker : yellow  
사용 액체 온도 : 최소 -10 °C                      최대 80 °C
  - **EPDM** : Ethylene - Propylene Diene Monomer, a highly abrasion proof and wear resistant material that is a.o. resistant to more aggressive acids and alcohols.  
code : S, year, month  
sticker : red  
사용 액체 온도 : 최소 -10 °C                      최대 90 °C
  - **CSM** : Chlorosulfonated polyethylene, Excellent chemical resistance, recommended for strong oxidizing products like concentrated acids, alkaline liquids and oxygen generating substances such as hydrogen peroxide.  
Note : Pump speed may be limited with hypalon hose  
code : M, year, month  
sticker : blue  
사용 액체 온도 : 최소 -10 °C                      최대 80 °C
- ◆ 공통사항 :
- 대기온도 : - 40 °C 이상
  - 운활유 온도 : 80 °C 이하

2)

서늘하고 어두운 곳에 보관해야 함(호스의 노화방지 목적).  
호스의 제작 후 2년 이내에 사용하도록 하는 것이 추천됨(보관상태에 따라 차이)  
2년 경과 후 노화현상이 시작되어 호스 수명의 단축을 초래함.

#### 4. Chemical Resistance Charts

유첨자료는 브레델 호스펌프를 사용한 고객들의 경험을 바탕으로 제작되어진 자료입니다. 따라서 현장조건 등에 따라서 약간 차이가 있을 수 있으나, 양지하여 주시기 바랍니다. 이것은 호스 재질의 선택 가이드로서 제공되며, 귀하께서 호스 재질을 선정하시는데 도움을 주는 목적으로 제작되었습니다. 사용액체가 부식성이 강한 경우에는 호스 샘플을 통하여 담금 테스트를 시행하신 후 재질을 선정하는 것이 추천됩니다. 호스 샘플이 필요하신 경우는 한국스파이렉스사코(주) 왓슨말로우/브레델 펌프 사업부로 문의하시기 바랍니다.

#### ♣ 약어 설명 :

- A : Little or no action : 사용상 문제가 없는 경우임.
- B : Moderate action : 사용은 가능하나 호스 수명이 단축될 수 있음.
- C : Strong action : 사용 불가.
- S : Unknown : 경험 없음.

A=LITTLE OR NO ACTION, B=MODERATE ACTION, C=STRONG ACTION, S=UNKNOWN

ENGLISH	NR	NBR	EPDM
ACETAL	C	C	C
ACETIC ACID 10%	A	C	A
ACETIC ACID 20%	B	C	A
ACETIC ACID 30%	B	C	A
ACETIC ACID 50%	B	C	A
ACETIC ACID ANHYDRIDE	C	C	B
ACETIC ACID (ICE - COLD)	B	C	B
ACETOFENON	C	C	C
ACETONE	A	C	A
ACETONITRILE	C	C	C
ACETYLENE	C	B	C
ACRYL ARYL SULFONATE SLURRY	A	C	A
ACRYLIC ACID 323 K	C	C	C
ACRYLIC MONOMER	C	C	C
ACRYLONITRILE	C	C	C
AIR	A	A	A
ALCOHOL	A	A	A
ALKYLARYL BENZENE SULPHONATE	C	A	A
ALLYLALCOHOL	A	B	A
ALLYLCHLORIDE	C	C	C
ALUM	A	A	A
ALUMINIUM CHLORIDE	A	A	A
ALUMINIUM FLUORIDE	A	A	A
ALUMINIUM HYDROXIDE	A	A	A
ALUMINIUM SILICATE	A	A	A
ALUMINIUM SULFATE	A	A	A
AMMONIA ANHYDRIC	A	B	A
AMMONIA LIQUOR	A	A	A
AMMONIA (GAS)	A	A	A
AMMONIUM BICARBONATE	A	A	A
AMMONIUM BISULFATE 50%	A	C	A
AMMONIUM BROMIDE	B	C	A
AMMONIUM CARBONATE	A	A	A
AMMONIUM CHLORIDE	A	A	A
AMMONIUM FORMATE	A	A	A
AMMONIUM HYDROXIDE	A	A	A
AMMONIUM METAPHOSPHATE	A	A	A
AMMONIUM NITRATE	A	A	A
AMMONIUM NITRITE	A	A	A
AMMONIUM PERSULFATE	B	B	A
AMMONIUM PHOSPHATE	A	A	A
AMMONIUM PROPIONATE	A	C	A
AMMONIUM SULFATE	A	A	A
AMMONIUM THIOCYANATE	A	A	A
AMYL ACETATE	B	B	B
AMYL ALCOHOL	A	B	A
AMYL AMINE	C	C	C
AMYL BORATE	B	C	B
AMYL CHLORIDE	C	C	C
AMYL CHLORONAPHTALENE	C	C	C
AMYL ETHER	C	C	C
AMYL IODIDE	C	C	C
AMYL NAPHTALENE	C	C	C

ENGLISH	NR	NBR	EPDM
AMYL PHENOL	C	C	C
AMYLBROMIDE	B	C	B
AMYLENE	C	C	C
ANILINE PAINT	B	C	C
ANILINE (OIL)	C	C	C
ANIMAL FAT	C	B	C
ANIMAL GLUE	A	A	A
ANTI-FREEZE	A	A	A
ANTYMONYCHLORIDE 50%	B	C	A
AQUA REGIA	C	C	B
ARSENIC TRI OXIDE	A	A	A
ARSENIC ACID	C	C	B
ASCORBIC ACID	A	A	A
ASPHALT	C	B	C
ASTOR OIL 1-2-3	C	C	C
AVIATION GASOLINE	C	B	C
BARIUM CARBONATE	A	A	A
BARIUM CHLORIDE	A	A	A
BARIUM FERRITE	A	A	A
BARIUM HYDROXIDE	A	A	A
BARIUM SULFATE	A	A	A
BARIUM SULFIDE	A	A	A
BEER	A	A	A
BEETROOTSYRUP	A	A	A
BENZALDEHYDE	C	C	B
BENZENE SULPHONIC ACID	C	C	C
BENZENE (BENZOL)	C	C	C
BENZOYL CHLORIDE	C	C	C
BENZYLALCOHOL	C	C	C
BENZYLBENZOATE	C	C	C
BIRD LIME(GLUE)	A	A	A
BI CALCIUM PHOSPHATE	A	S	A
BISMUTH CARBONATE	A	A	A
BLACK SULFATE LIQUOR	A	A	A
BLAST FURNACE GAS	C	A	C
BORACIC ACID	A	A	A
BORAX	A	A	A
BROMINE	C	C	C
BUTADIENE	C	B	C
BUTANE	C	A	C
BUTANE FLUID	C	B	C
BUTTER	C	A	C
BUTTER ACID	B	B	C
BUTYL ACETATE	C	C	B
BUTYL ALCOHOL	B	B	C
BUTYL ALDEHYDE	C	C	C
BUTYL CELLOSOLVE	C	C	C
BUTYL CELLOSOLVE ADIPATE	C	C	C
BUTYL ETHER	C	C	C
BUTYL GLYCOL	A	A	A
BUTYL IODIDE	C	C	C
BUTYL STEARATE	C	B	C
BUTYRONITRILE	C	C	C
CALCIUM ACETATE	A	A	A
CALCIUM BISULFATE	A	A	A

ENGLISH	NR	NBR	EPDM
CALCIUM BISULFITE	A	A	A
CALCIUM BROMIDE	S	S	A
CALCIUM CARBONATE	A	A	A
CALCIUM CHLORATE	A	B	A
CALCIUM CHLORIDE	A	A	A
CALCIUM FLUORIDE	A	A	A
CALCIUM HYDROXIDE	A	A	A
CALCIUM HYPOCHLORIDE	C	C	A
CALCIUM HYPOCHLORIDE 30%	B	B	A
CALCIUM NITRATE	A	A	A
CALCIUM SULFATE	A	A	A
CALCIUM SULFIDE	A	A	A
CALCIUM TETRA FLUORIDE	C	C	B
CALIC LIQUOR	A	A	A
CANE SUGAR LIQUOR	A	A	A
CARBIET KALKMELK	A	A	A
CARBITOL	C	C	C
CARBOLIC ACID, PHENOL	C	C	C
CARBON DIOXIDE DRY	A	A	A
CARBON DIOXIDE WET	A	A	A
CARBON DISULFIDE	C	A	C
CARBON MONOXIDE 338K	A	B	A
CARBONIC ACID	A	A	A
CARBOXYL METHYL CELLULOSE 12%	A	A	A
CASTOR OIL	C	B	C
CAUSTIC SODA (max. 50%)	A	B	A
CELLOSOLVE	C	C	C
CELLOSOLVE ACETATE	C	C	C
CELLULOSE ACETATE	S	B	C
CHINA WOOD OIL(TUNG OIL)	C	C	C
CHLORIC ACID	C	C	A
CHLORIC ACID SULFUROUS	C	C	B
CHLORINATED SOLVENTS	C	C	C
CHLORINE ACETON NITRILE	C	C	C
CHLORINE ACETONE	C	B	B
CHLORINE BENZENE	C	C	C
CHLORINE BENZOL	C	C	C
CHLORINE BROMINE METHANE	C	C	C
CHLORINE NAPHTENE	C	C	C
CHLORINE SULFONIC ACID	C	C	S
CHLORINE TOLUENE	C	C	C
CHLORINE WATER 3%	C	C	A
CHLORINE(DRY)	C	C	B
CHLORINE(SOLVENT)	C	C	S
CHLORINE(WET)	C	C	A
CHLORINE - ETHYL - ACETATE	C	C	C
CHLORINE - LYE	C	C	A
CHLORINE - METHYL	C	C	C
CHLORINE - NITRO - ETHANE	C	C	C
CHLOROFORM	C	C	C
CHROMIC ACID 10%	C	C	S
CHROMIC ACID 25%	C	C	S
CHROMIC ACID 50%	C	C	S
CHROMIUM SULFATE	C	C	A
CITRIC ACID	A	B	A

ENGLISH	NR	NBR	EPDM
CITRUS PULP	A	B	A
COCONUT OIL	C	B	C
COD LIVER OIL	C	B	C
COKE OVEN GAS	C	B	C
COMPRESSOR OIL	C	A	C
COPPER OXI CHORIDE	B	B	A
COPPERARSENATE	B	B	A
COPPERCHLORIDE	A	A	A
COPPERCYANIDE	B	A	A
COPPERNITRATE	A	B	A
COPPERSULFATE	A	B	A
COTTONSEED OIL	C	B	C
CREOSOTE OIL	C	C	C
CREOSOTE WOOD	C	C	C
CREOSOTE - COAL TAR	C	C	C
CRESOL 90%, XYLOL 5%, DDT 5%	C	C	C
CRESOL 95%, XYLOL 5%	C	C	C
CRESYLIC ACID	C	C	C
CRUDE OIL	C	B	C
CRYOLITE 10%	B	B	B
CYANIDE	A	A	A
CYCLOHEXANE	C	B	C
CYCLOHEXANOL	B	C	C
CYCLOHEXANONE	B	C	C
CYCLOPENTANE	C	C	C
CYMENE	C	C	C
DDT2 KEROSEN	C	B	C
DECALIN	C	C	C
DECANE	C	C	C
DECA - HYDRO - NAPHTENE	C	C	C
DIESELOIL	C	C	C
DIOXANE	C	C	C
DIVINYL BENZENE	C	C	C
DI - ACETONE - ALCOHOL	C	C	C
DI - AMYL - FTALATE	C	C	C
DI - AMYL - NAPHTENE	C	C	C
DI - BENZYL - ETHER	C	C	C
DI - BUTYL - ACETAT	S	C	C
DI - BUTYL - AMINE	C	C	C
DI - BUTYL - ETHER	C	C	C
DI - BUTYL - FTALATE	C	C	C
DI - BUTYL - SEBACATE	C	C	C
DI - CHLORINE - ACID	C	C	C
DI - CHLORINE - BENZENE	C	C	C
DI - CHLORINE - BUTENE	C	C	C
DI - CHLORINE - DI - FLUOR - METHANE	C	C	C
DI - CHLORINE - PROPENE	C	C	C
DI - CHLORINE - TETRA - FLUOR - ETHAAN	C	C	C
DI - CHLOROPHOXYL ACETIC ACID	S	S	S
DI - CYCLO - HEXYL - AMINE	C	C	C
DI - DOWTHERM(A+E)	C	C	C
DI - ETHYL - AMINE	S	C	C
DI - ETHYL - CARBONATE	C	C	C
DI - ETHYL - ETHER	C	C	C
DI - ETHYL - FATTY ACID	S	C	C

ENGLISH	NR	NBR	EPDM
DI-ETHYL - FTALATE	C	C	C
DI-ETHYL - GLYCOL	A	A	A
DI-ETHYL - KETONE	B	C	B
DI-ETHYL - OXALATE	C	C	C
DI-ETHYL - SEBACATE	C	C	C
DI-ISOBUTENE	C	S	C
DI-ISOBUTYL - KETONE	B	C	C
DI-ISOPROPYL - ETHER	C	C	C
DI-ISOPROPYL - KETON	S	C	C
DI-METHYL - AMIN	C	C	C
DI-METHYL - ANILINE	C	C	C
DI-METHYL - ETHER	C	C	C
DI-METHYL - FORMAMIDE	A	B	A
DI-METHYL - FOSFITE	B	C	B
DI-METHYL - FTALATE	C	C	C
DI-METHYL - SULFIDE	C	C	C
DI-OCTYL - ADIPATE	C	C	C
DI-OCTYL - FTALATE	C	C	C
DI-OCTYL - SEBACATE	C	C	C
DODECYL BENZENE	C	C	C
DODECYL TOLUENE	C	C	C
EPI-CHLORO - HYDRINE	C	C	C
ETHANOLAMINE	C	C	C
ETHER	C	C	C
ETHYLENE OXYDE	C	C	C
ETHYL - ACETATE	B	C	B
ETHYL - ALOOHOL	A	A	A
ETHYL - AMINE	S	C	C
ETHYL - AMYL - KETON	S	C	C
ETHYL - BENZENE	C	C	C
ETHYL - BENZOATE	C	C	C
ETHYL - BROMIDE	C	C	C
ETHYL - BUTYRATE	C	C	C
ETHYL - CELLULOSE	A	B	A
ETHYL - CHLORIDE	C	C	C
ETHYL - CHLOROFOMATE	C	C	C
ETHYL - CYANO - ACETATE	S	C	S
ETHYL - ETHER	C	C	C
ETHYL - FORMATE	C	C	B
ETHYL - HEXANOL	S	C	C
ETHYL - HEXYL - DIPHENYL - PHOSPHATE	C	C	C
ETHYL - IODIDE	C	C	C
ETHYL - ISOBUTYL - ETHER	C	C	C
ETHYL - ISOBUTYRATE	C	C	C
ETHYL - MERCAPTAN	C	C	C
ETHYL - METHYL - KETON	B	C	B
ETHYL - OXALATE	S	C	C
ETHYL - PENTA - CHLOOR - BENZEEN	C	C	C
ETHYL - PROPIONATE	C	C	C
ETHYL - PROPYL - ETHER	C	C	C
ETHYL - SILICATE	A	A	A
ETHYL - DI - CHLORIDE	C	C	C
FAECES	A	A	A
FERRIC OXIDE	A	A	A
FERRIFEROUS CHLORIDE(338K)	A	A	A

ENGLISH	NR	NBR	EPDM
FERRO HYDROXIDE(Fe(OH) <sub>3</sub> )	C	C	A
FLEXOL 300	S	S	S
FLUOBORIC	A	B	A
FLUORIC ACID	C	C	B
FLUORINEBENZENE	C	C	C
FLUORINEBORICACID 65%	C	C	C
FLUORINESILICONACID	S	C	S
FLUORSILICON ACID 50%	S	C	S
FORMALDEHYDE 37%	A	B	A
FORMALDEHYDE 40% 343K	C	C	A
FORMAMIDE (FORMYLAMINE)	A	B	A
FORMIC ACID	C	C	B
FREON 11	C	C	C
FREON 112	C	C	C
FREON 114	C	C	C
FREON 115	C	C	C
FREON 12 LIQUID	C	C	C
FREON 13	C	C	C
FREON 14	C	C	C
FREON 21	C	C	C
FREON 22	C	C	C
FREON 31	C	C	C
FREON C 316	C	C	C
FREON C 318	C	C	C
FUEL OIL	C	B	C
FUMING SULPHURIC ACID (OLEUM)	C	C	B
FURAN	C	C	C
FURFURAL	C	C	C
GALLNUTOIL	B	C	B
GASOLINE 100 OCTANE	C	C	C
GASOLINE 65 OCTANE	C	C	C
GASOLINE OCTANE 100	C	C	C
GASOLINE OCTANE 65	C	C	C
GELATIN (GLUE)	A	A	A
GLUCOSE	A	A	A
GLUE	B	A	A
GLYCERINE	A	A	A
GLYCEROL	A	A	B
GLYCOL	A	A	A
GRAINSEED - OIL	C	B	C
GREEN SULFATE LIQUOR	A	B	A
HEPTANE	C	C	C
HEXALDEHYDE	A	B	A
HEXANE	C	C	C
HEXENE	C	B	C
HEXYL - ALCOHOL	A	A	B
HOG FAT	C	B	C
HYDRAULIC OIL ESTERBASE	B	C	C
HYDRAULIC OIL MINERALBASE	C	B	C
HYDRAULIC OIL PYDRAULBASE	C	C	C
HYDRAULIC OIL SKYDROLBASE	C	C	C
HYDRO CYANIC ACID	B	C	S
HYDROBROMIC ACID	B	B	A
HYDROBROMIC ACID 40%	C	C	B
HYDROCHLORIC ACID 15%	A	A	A

ENGLISH	NR	NBR	EPDM
HYDROCHLORIC ACID 30%	A	B	A
HYDROCHLORIC ACID 338K	C	C	A
HYDROCHLORIC ACID 33%, 323K	C	C	B
HYDROCHLORIC ACID CONC. 38%	B	C	A
HYDROCYANIC ACID	A	B	A
HYDROFLUORINE - ACID(COLD)	B	C	C
HYDROFLUORINE - ACID(HOT)	B	C	C
HYDROFLUOSILICIC ACID	A	B	A
HYDROGEN GAS 338K	A	A	A
HYDROGEN GAS COLD	A	A	A
HYDROGEN PEROXIDE 10%	C	C	A
HYDROGEN PEROXIDE 30%	C	C	C
HYDROGEN PEROXIDE 88%	C	C	C
HYDROGEN SULFIDE	A	B	A
HYDROGEN SULFIDE DRY COLD	A	S	A
HYDROGEN SULFIDE DRY WARM	A	B	A
HYDROGEN SULFIDE WET COLD	A	C	A
HYDROGEN SULFIDE WET WARM	A	A	A
HYDROGEN SULFIDE DRY	A	B	A
HYDROGEN SULFIDE MOIST	B	B	A
HYDROGEN SULFATE	S	S	A
INK - OIL	C	B	C
IODINE	C	C	B
IRON ACETAT SOLUTION	A	A	A
IRON CHLORIDE	A	A	A
IRON CHLORIDE SULFATE	B	S	A
IRON HYDROXIDE	C	C	A
IRON&ZINC PHOSPHATE SOLUTION	A	A	A
IRONNITRATE 338K	A	A	A
IRONSULFATE	A	A	A
ISOAMYL - ACETATE	C	C	C
ISOAMYL - ALCOHOL	C	C	C
ISOAMYL - FORMATE	C	C	C
ISOBUTENE	C	C	C
ISOBUTYL - ACETATE	C	C	C
ISOBUTYL - ALCOHOL	B	C	C
ISOBUTYL - ALDEHYDE	C	C	C
ISOBUTYL - FORMATE	C	C	C
ISOCYANATE	C	C	C
ISOPROPYL - ACETATE	B	C	B
ISOPROPYL - ALCOHOL	A	B	A
ISOPROPYL - CHLORIDE	C	C	C
ISOPROPYL - ETHER	C	C	C
ISO - DECANE	C	C	C
ISO - DODECANE	C	C	C
ISO - OCTANE	C	B	C
JET FUELS(JP1 TIL JP5)	C	B	C
KEROSINE	C	B	C
LACQUERS	C	S	C
LACQUER - SOLVENTS	C	S	C
LACTIC ACID	B	S	B
LACTOL	C	B	C
LARD	C	B	C
LAURYL ETHER SULPHATE	B	C	A
LEAD ACETATE	A	A	A

ENGLISH	NR	NBR	EPDM
LEAD NITRATE	A	A	A
LEADARSENATE	A	B	A
LEADSULPHAMATE	A	A	A
LIMESULFUR	A	A	A
LIMEWATER	A	A	A
LINSEED OIL	C	C	C
LIQUID MANURE	A	A	A
LITHIUMHYDROXIDE	A	A	A
LUBRICATING OIL	C	B	C
LYE(CAUSTIC)	A	A	A
MAGNESIUMCARBONATE	A	A	A
MAGNESIUMCHLORIDE	A	A	A
MAGNESIUMHYDROXIDE	A	A	A
MAGNESIUMNITRATE	A	A	A
MAGNESIUMSULFATE	A	A	A
MAGNESIUMSULPHIDE	S	S	A
MAGNESIUMSULFITE	S	S	A
MANGANESE SULFATE	A	A	A
MARGARINE OIL	C	A	C
MERCURY	A	A	A
MERCURYCHLORIDE	A	B	A
MERCURYCYANIDE	A	B	A
METHANOL(=METHYLALCOHOL)	A	A	A
METHYLENE - CHLORIDE	C	C	C
METHYL - ACETATE	B	C	B
METHYL - ACETONE	B	B	C
METHYL - ACETO - ACETATE	C	C	C
METHYL - AMINE	C	C	C
METHYL - AMYL - ACETATE	C	C	C
METHYL - AMYL - CARBINOL	C	C	C
METHYL - ANILINE	C	C	C
METHYL - BROMIDE	C	C	C
METHYL - BUTYL - KETONE	B	B	C
METHYL - BUTYRATE	C	C	C
METHYL - CELLOSOVE	C	C	C
METHYL - CHLORIDE	C	C	C
METHYL - ETHYL - KETONE	C	C	C
METHYL - FORMATE	C	C	C
METHYL - IODIDE	C	C	C
METHYL - ISOBUTYL - CARBINOL	C	C	C
METHYL - ISOBUTYRATE	C	C	C
METHYL - ISOPROPYL - KETONE	C	C	C
METHYL - METHACRYLATE	C	C	C
METHYL - OLEATE	C	C	C
METHYL - PROPIONATE	C	C	C
METHYL - SALICYLATE	C	C	C
METYL - ISOBUTYL - KETONE	B	B	C
MILK	B	A	B
MINERAL OIL	C	A	C
MOLASSES	A	A	A
MONO SODIUM GLUTAMATE	C	A	C
MONOBROMINEBENZOL	C	C	C
MONOCHLOROBENZENE	C	C	C
MONOCHLORO - ANILINE	C	C	C
MONOCHLORO - DIFLUORO - METHANE	C	C	C

ENGLISH	NR	NBR	EPDM
MONOCHLORO - TRIFLUORO - METHANE	C	C	C
MONO - ETHANOL - AMINEN	C	C	C
MOTOR OIL	C	B	C
NAPHTA	C	S	C
NAPHTALENE	C	C	C
NAPHTHENE	C	C	C
NATURAL GAS	B	A	B
NATURAL GAS(DRY)	B	A	B
NATURAL GAS(WET)	B	A	B
NICKEL CHLORIDE	A	A	A
NICKEL HYDROXIDE	B	S	A
NICKEL NITRATE	A	A	A
NICKEL SULFATE	A	A	A
NICOTINE BENTONITE	C	B	C
NICOTINE SULFATE	A	A	A
NITRIC ACID 10%	C	C	A
NITRIC ACID 2 %	C	C	A
NITRIC ACID 25%	C	C	B
NITRIC ACID 40%	C	C	B
NITRIC ACID 60%	C	C	C
NITRIC ACID 70%	C	C	C
NITRIC ACID (FUMING)	C	C	C
NITRO BENZEN	C	C	C
NITRO GLYCERINE	C	C	C
NITROSYL - CHLORIDE	C	C	C
NITROUS ACID	C	C	A
NITRO - ETHANE	C	C	C
NITRO - METHANE	C	C	C
NITRO - OCTANE	C	C	C
NITRO - PROPENE	C	C	C
OCTANE	C	B	C
OCTYL - ALCOHOL	A	A	A
OCTYL - ALDEHYDE	C	C	C
OLEIC ACID	C	C	C
OLEINIC ACID	C	B	C
OLIVE OIL	C	B	C
OXALIC ACID	A	B	A
OXYGEN	B	B	A
OZONE	C	C	A
PALMITIC ACID	C	B	C
PALMOIL	C	B	C
PARAFORMALDEHYDE	C	B	C
PARAFFINE OIL 50%	C	C	C
PELARBONICACID	C	C	C
PENTANE	C	B	C
PENTA - CHLORINE - PHENOL	C	C	C
PERCHLORINE - ACID	C	C	C
PERCHLORINE - ETHENE	C	C	C
PETROLEUM TILL 363K	C	C	C
PHENOL	C	C	C
PHENYL - ETHYL - ETHER	C	C	C
PHOSPHORIC ACID 8%(80°C)	C	C	A
PHOSPHORIC ACID 50%	A	B	A
PHOSPHORIC ACID 85%	A	B	A
PHOSPHOR - TRI - BUTYRATE	S	C	C

ENGLISH	NR	NBR	EPDM
PICKL.SOL.(20%NITR.ACID,4%HF)	C	C	B
PICRIC ACID	B	C	A
PINE OIL	C	B	C
PINETREE OIL	C	B	C
POLY ACRYL ACID	C	C	C
POLYALCYLENE - GLYCOL	C	B	C
POLYVINYLALCOHOL SOLVENT	A	C	A
POLYVINYLALCOHOL CONC.	C	C	C
POTASSIUMBICHROMATE	B	B	A
POTASSIUMBORATE	A	A	A
POTASSIUMBROMIDE	A	A	A
POTASSIUMCARBONATE	A	A	A
POTASSIUMCHLORATE	B	B	A
POTASSIUMCHLORIDE	A	A	A
POTASSIUMCYANIDE	A	A	A
POTASSIUMDICHROMATE	B	B	A
POTASSIUMHYDROXIDE	A	B	A
POTASSIUMNITRATE	A	A	A
POTASSIUMPERMANGANATE	A	A	A
POTASSIUMSULFATE	A	A	A
POTASSIUMSULFITE	A	A	A
PRODUCER GAS	B	A	B
PROPANE GAS	C	A	C
PROPANE LIQUID	C	A	C
PROPENE BROMIDE	C	C	C
PROPENE CARBONATE	A	C	A
PROPENE CHLORIC HYDRINE	C	C	C
PROPENE CHLORIDE	C	C	C
PROPENE GLYCOL	A	A	A
PROPENE GLYKOL	A	A	A
PROPENE OXIDE	C	C	S
PROPENE - DICHLORIDE	C	C	C
PROPENE - DI - AMINE	C	C	C
PROPENE - TRICHLORIDE	C	C	C
PROPIONACID	C	C	C
PROPIONITRILE	A	A	A
PROPYL - ACETATE	B	C	B
PROPYL - ALCOHOL	C	C	C
PROPYL - BENZENE	A	A	A
PROPYL - DI - CHLORIDE	C	C	C
PROPYL - FORMATE	C	C	C
PROPYL - PROPIONATE	C	C	C
PRUSSIC ACID 20%	A	B	A
PRUSSIC ACID 98% CONCENTRATED	B	B	A
PYRANOL 1467/76	C	C	C
PYRIDINE	C	C	C
QUICKSILVERNITRATE	A	A	A
RAPESEED OIL	C	B	C
RESIN(ROSIN)	C	B	C
ROTENONE IN WATER	A	A	A
SEAWATER	A	A	A
SEWAGE WATER(no hydro carbon)	A	A	A
SHELL DO	C	B	C
SILICIUM CARBIDE SLURRY	A	A	A
SILICONE - FLUORIDE	A	C	A

ENGLISH	NR	NBR	EPDM
SILICONE - OIL	A	A	A
SILVER CYANIDE(74GR/LTR)	A	B	A
SILVERNITRATE	A	A	A
SOAP OIL	C	B	C
SOAP SOLUTIONS	A	B	A
SODA	A	A	A
SODA LYE 50%(338K)	C	C	A
SODIUM ACETATE	A	A	A
SODIUM ALUMINIUM SILICATE	A	A	A
SODIUM BICARBONATE	A	A	A
SODIUM BISULFATE	A	A	A
SODIUM BROMIDE	A	C	A
SODIUM CARBONATE	A	A	A
SODIUM CHLORATE	C	C	A
SODIUM CHLORIDE	A	A	A
SODIUM CHLORIDE(NaClO2)25%	A	A	A
SODIUM CYANIDE	A	A	A
SODIUM DICHROMATE	B	B	A
SODIUM FLUOR ALUMINATE	A	A	A
SODIUM FLUORIDE	A	A	A
SODIUM HYDROSULPHIDE	A	A	A
SODIUM HYDROXIDE 50%	A	B	A
SODIUM HYPOCHLORIDE 20%	C	C	A
SODIUM META PHOSPHATE	A	A	A
SODIUM METABORATE 18%, 333K	A	A	A
SODIUM NITRATE	A	A	A
SODIUM NITRITE	A	A	A
SODIUM PERBORATE	B	C	A
SODIUM PEROXIDE	C	C	A
SODIUM PHOSPHATE	A	A	A
SODIUM PHOSPHATE DI BASIC	A	A	A
SODIUM PHOSPHATE MONO BASIC	A	A	A
SODIUM PHOSPHATE TRI BASIC	A	A	A
SODIUM SALT	A	A	A
SODIUM SILICATE	A	A	A
SODIUM SILICO ALUMINATE	A	A	A
SODIUM SULFATE	A	A	A
SODIUM SULFIDE	A	A	A
SODIUM SULFITE	A	A	A
SODIUM THIOSULFATE	A	A	A
SOYA OIL	C	A	C
SPIRIT(ETHYL ALCOHOL)	A	B	A
STANNIC CHLORIDE	A	A	A
STEARIC ACID	C	B	C
STYRENE(MONOMER)	C	C	C
SULFAMINE ACID 2%	A	B	A
SULFUR 363K	C	C	C
SULFUR CHLORIDE	B	C	A
SULFUR DIOXIDE GAS	C	C	A
SULFURIC ACID 10% COLD	A	A	A
SULFURIC ACID 30%	A	B	A
SULFURIC ACID 338K	S	S	S
SULFURIC ACID 50%	B	B	A
SULFURIC ACID 75% COLD	C	C	A
SULFURIC ACID 95% COLD	C	C	B

ENGLISH	NR	NBR	EPDM
SULFUROUS ACID 10%	A	B	A
SULFUROUS ACID 75%	B	C	A
SULFURSMOKE	A	B	A
SULFURTRIOXIDE	C	C	B
SULPHUR DIOXIDE 5% IN WATER	A	B	A
SULPHONIC ACID	C	C	C
TALLOW	C	A	C
TANNIC ACID	A	A	A
TAR	C	C	C
TARTARIC ACID	A	A	A
TARTARIC OIL	A	B	A
TETRA -BROMO -ETHANE	C	C	C
TETRA -BUTYL -TITANATE	C	C	C
TETRA -CHLORO - CARBON	C	C	C
TETRA -CHLORO - DIFLUOR -ETHANE	C	C	C
TETRA -CHLORO -ETHANE	C	C	C
TETRA -CHLORO -NAFTALINE	C	C	C
TETRA -FLUOR -CARBON	C	C	C
TETRA -HYDRO -FURAN	C	C	C
THORIUM SLURRY	A	B	A
TOLUENE	C	C	C
TRIBUTOXY - PHOSPHATE	C	C	C
TRIBUTYL - PHOSPHATE	C	C	C
TRICHLORO - BENZENE	C	C	C
TRICHLORO -ETHENE	C	C	C
TRICHLORO -FLUORINE - METHANE	C	C	C
TRICHLORO -TRIFLUOR -ETHANE	C	C	C
TRICRESYL - PHOSPHATE	C	C	C
TRIETHANOL - AMINE	C	C	C
TRIFENYL - PHOSPHATE	A	A	A
TRISODIUM - PHOSPHATE	C	C	C
TUNG OIL(CHINA WOOD OIL)	C	C	C
TURPENTINE	C	C	C
URANIUM	A	A	A
UREA	A	A	A
URINE	A	B	A
VEGETABLE OIL	C	B	C
VINEGAR	B	C	A
VINEGAR ANHYDRIDE 50%	C	C	B
VINYLCHLORIDE	C	C	C
WATER	A	A	A
WATER, CONDENSATION	A	A	A
WATER, DISTILLED	A	A	A
WATER, DRINK	A	A	A
WATER, MIN.WITH OXYD.SALTS	B	C	A
WATER, MIN.WITHOUT OXYD.SALTS	A	A	A
WHISKY AND WHINE	A	A	A
WHITE OIL 10%	C	A	C
WHITE SPIRIT	C	B	C
WOOD OIL	C	C	C
XYLENE	C	C	C
YZER HYDROXIDE(Fe(OH)3)	A	A	A
ZEOLITE	B	B	A
ZINC BORAT	A	A	A
ZINC CHLORIDE	A	A	A

### Material Specification Sheet of Bredel Hose Pumps

No	Part	Material
1	Pump Housing	Cast-iron
2	Cover	Cast-iron, commercial grade mild steel 37
3	Pump rotor	Cast-iron
4	Pressing shoe	Aluminium, Epoxy
5	Pump support	Mild steel, galvanised
6	Flange bracket	Mild steel, galvanised
7	Mounting material of pump cover	Mild steel, galvanised
8	Mounting material of drive system	Mild steel, galvanised
9	Mounting material of pump support	Mild steel, galvanised
10	Seals	Neoprene or Nitrile
11	Pump hose NR	Natural Rubber, a highly dynamic, abrasion proof and wear resistant material that is a.o. resistant to diluted acids and alcohols.
12	Pump hose NBR	Acryle Nitrile Butadiene Rubber (Nitrile or Buna), a highly abrasion proof and wear resistant material that is a.o. resistant to oils, fats, alkalines and detergents.
13	Pump hose EPDM	Ethylene-Propylene Diene Monomer, a highly abrasion proof and wear resistant material that is a.o. resistant to more aggressive acids and alcohols.
14	Pump hose CSM	Chlorosulfonated polyethylene, Excellent chemical resistance, recommended for strong oxidizing products like concentrated acids, alkaline liquids and oxygen generating substances such as hydrogen peroxide. Note : Pump speed may be limited with hypalon hose
15	Lubricant	Specially compounded glycerine
16	Cleaning sponge	Sponge rubber
17	Inserts	Stainless steel

No	Part	Material
1	Pump hose NR	Natural Rubber
2	Pump hose NBR	Acryle Nitrile Butadiene Rubber (Nitrile or Buna)
3	Pump hose EPDM	Ethylene - Propylene Diene Monomer
4	Pump hose CSM	Chlorosulfonated polyethylene
5	Lubricant	Specially compounded glycerine

	펌프호스를 통하여 제품을 자연스럽게 이송	압축공기를 주동력원으로 하여 다이어프램을 좌우로 움직여서 이송
	저렴	고가 (압축공기 필요)
	작다	크다
	가능	불가
	작다	크다
	펌프호스만 주기적으로 교체	Ball valve 및 다이어프램 교체
	1 분 - 25 분(기종에 따라)	4 시간
<b>Downtime</b> ( )	Zero 化 (정비시간이 짧아서 생산정지시간이 거의 없다. 따라서 생산성 증대)	길다 (정비시간이 길어서 생산정지시간이 소요되어 생산성 감소)
	우수 (압축된 펌프호스가 복원되면서 마모성 제품을 흡입하여 이송하는 형태이므로 마모성 제품을 이송함에 적합. 마모성 제품에 의한 펌프의 손상이 없고, 주기적으로 펌프호스만 교체)	취약 (마모성 제품의 이송이 가능하나 Ball valve, 다이어프램의 마모 및 막힘문제 발생)
	펌핑제품은 펌프호스내에만 존재하므로, 펌프와 이송제품 상호간 오염이 없다.	펌핑제품이 펌프의 기계적부분과 접촉하여, 상호간 오염발생. (따라서 펌프 세척시간이 김)
	다양 (펌프호스만 교체하면, 펌핑제품을 다양하게 가능 : 펌프호스만 여러개 준비하면, 여러대의 펌프를 사용하는 효과)	없음 (펌핑제품을 교체시, 펌프를 세밀히 세척하거나 펌프를 여러대 준비해야 함)

	펌프호스를 통하여 제품을 자연스럽게 이송	스테이터내에 장착된 로터가 회전함에 따라 제품이송
	저렴(펌프호스만 주기적으로 교체)	고가(로터, 스테이터, 씌일 교체)
	1 분 - 25 분(기종에 따라)	4 시간 - 8 시간
<b>Downtime</b> ( )	Zero 化 (정비시간이 짧아서 생산정지시간이 거의 없다. 따라서 생산성 증대)	길다 (정비시간이 길어서 생산정지시간이 소요 되어 생산성 감소)
	가능	불가
	우수 (압축된 펌프호스가 복원되면서 마모성 제품을 흡입하여 이송하는 형태이므로 마모성 제품을 이송함에 적합. 마모성 제품에 의한 펌프의 손상이 없고, 주기적으로 펌프호스만 교체)	취약 (마모성 제품이 로터/스테이터 등의 금속 부분과 접촉함에 따라, 고가의 로터/스테이터의 마모가 심하다.)
	펌프 자체가 체크밸브 역할 (펌프 전, 후단에 별도의 밸브 불필요)	필요
	펌핑제품은 펌프호스 내에만 존재하므로, 펌프와 이송제품 상호간 오염이 없다.	펌핑제품이 펌프의 기계적부분과 접촉하여, 상호간 오염발생. (따라서 펌프 세척시간이 길다.)
	다양 (펌프호스만 교체하면, 펌핑제품을 다양하게 가능 : 펌프호스만 여러개 준비하면, 여러대의 펌프를 사용하는 효과)	없음 (펌핑제품을 교체시, 펌프를 세밀히 세척하거나 펌프를 여러대 준비해야 함.)
	자흡식	자흡식
	최대 16 Bar	제조업체에 따라 차이 (참고, 최대 24 Bar)
	고점도 이송 가능 (최대 20,000 cP 까지)	고점도 이송가능 (호스펌프보다 우수)
	가능	불가