

SUCTION SYSTEMS

Sizing/calculation guidelines



According to INTERNATIONAL STANDARD ISO 10637: Dental equipment – High- and medium volume suction systems

Suction system - active entity of dental equipment, including a suction machine, which enables an air flow to be induced which is designed to remove spray, liquids and solids from the mouth of the dental patient during dental treatment.

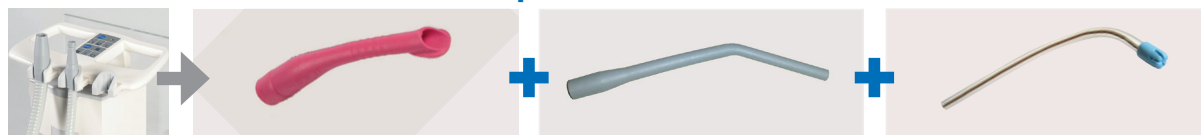
The high volume suction system shall ensure an air suction volume flow rate of at least 250 l/min into the cannula connector of the largest-bore operating hose, when operated at full power and in accordance with the manufacturer's instruction for use. The maximum vacuum at the cannula connector of any operating hose shall not exceed 25 kPa (250 mbar) under worst-case normal operating conditions, including a zero-suction volume by closed-cannula connector.

Sizing guide

HVE = High volume evacuators (large cannulas), SE = Saliva ejectors 1 HVE \triangleq 2 SE

| Type of suction machine | EXCOM hybrid 3 | | EXCOM hybrid 6 | | 2 x EXCOM hybrid 3 (central /clinic) | | 2 x EXCOM hybrid 6 (central /clinic) | | 3 x EXCOM hybrid 3 (central /clinic) | | 3 x EXCOM hybrid 6 (central /clinic) | | | | | | | |
|----------------------------------|----------------|----|----------------|----|--------------------------------------|----|--------------------------------------|----|--------------------------------------|----|--------------------------------------|----|---|---|----|----|----|----|
| | HVE | SE | HVE | SE | HVE | SE | HVE | SE | HVE | SE | HVE | SE | | | | | | |
| Type of user | | | | | | | | | | | | | | | | | | |
| No. of simultaneous HVE/SE users | 3 | + | 3 | 5 | + | 5 | 6 | + | 6 | 10 | + | 10 | 9 | + | 9 | 15 | + | 15 |
| | 2 | + | 5 | 4 | + | 7 | 4 | + | 10 | 8 | + | 14 | 7 | + | 13 | 13 | + | 19 |
| | 1 | + | 7 | 2 | + | 11 | 2 | + | 14 | 6 | + | 18 | 5 | + | 17 | 11 | + | 23 |
| | 0 | + | 9 | 0 | + | 15 | 0 | + | 16 | 4 | + | 22 | 2 | + | 21 | 9 | + | 27 |
| | | | | | | | | | | 2 | + | 26 | 0 | + | 25 | 7 | + | 31 |
| | | | | | | | | | 0 | + | 30 | | | | 5 | + | 35 | |
| | | | | | | | | | | | | | | | 0 | + | 45 | |

How to calculate suction volume requirements



| No. of dental chairs | HVE / large cannula (~300 l/min per pc) | surgical cannula (~150 l/min per pc) | SE / saliva ejector (~80 l/min per pc) | Suction volume requirement Σ |
|----------------------|---|--------------------------------------|--|-------------------------------------|
| # 1 | ___ pc. x 300 l/min = ___ l/min | ___ pc. x 150 l/min = ___ l/min | ___ pc. x 80 l/min = ___ l/min | = ___ l/min |

How to determine the appropriate pipe dimensions

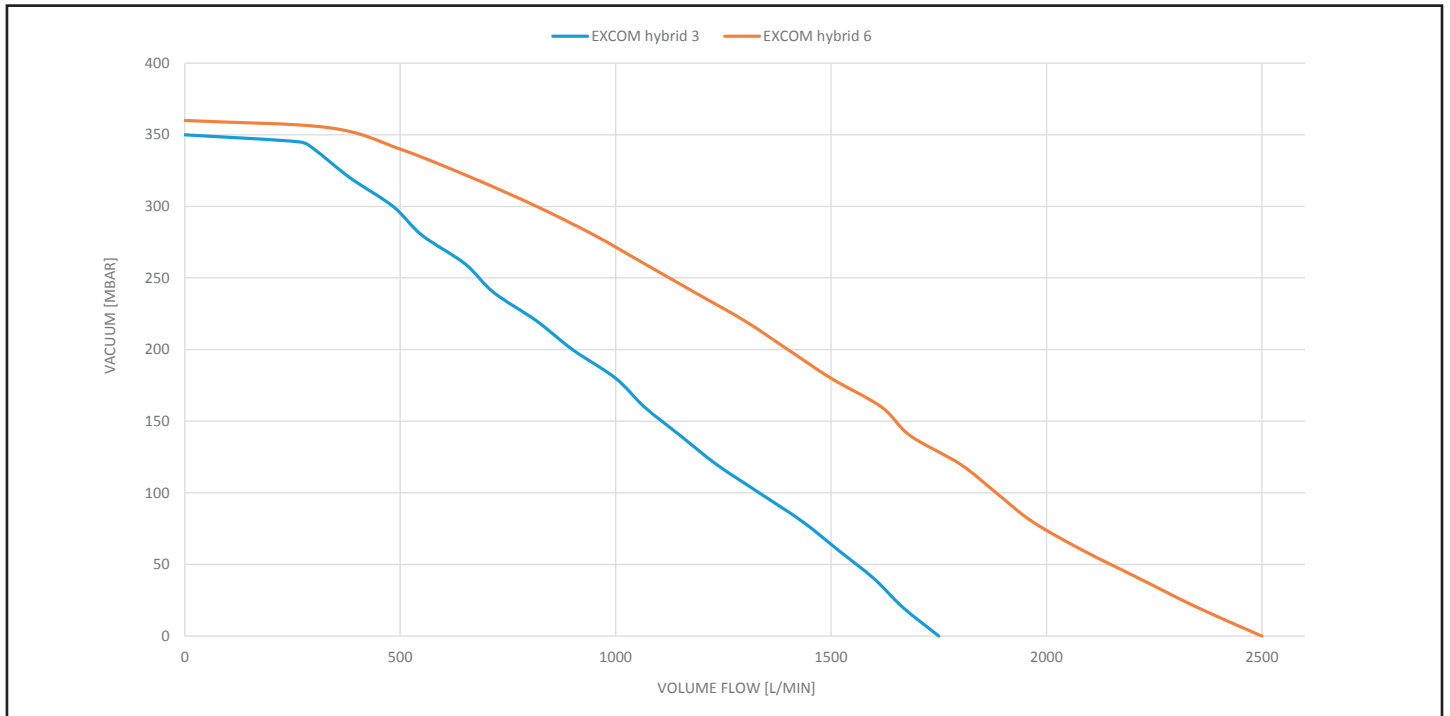
| Max. volume flow Q_{pmax} through pipe diameter \emptyset | | | |
|---|-------|---------------------|---------------------|
| Piping \emptyset | | Q_{pmax} [l/min] | |
| [inch] | [mm] | at $\vec{v}=15$ m/s | at $\vec{v}=20$ m/s |
| ½ | DN15 | 159 | 212 |
| ¾ | DN20 | 283 | 377 |
| 1 | DN25 | 442,00 | 589,00 |
| 1 ¼ | DN32 | 724,00 | 965,00 |
| 1 ½ | DN40 | 1.131,00 | 1.508,00 |
| 2 | DN50 | 1.767,00 | 2.356,00 |
| 2 ¾ | DN70 | 3.464,00 | 4.618,00 |
| 4 | DN100 | 7.069,00 | 9.425,00 |

i Optimal flow speed (\vec{v}) in suction pipes = between 15 to 20 m/s

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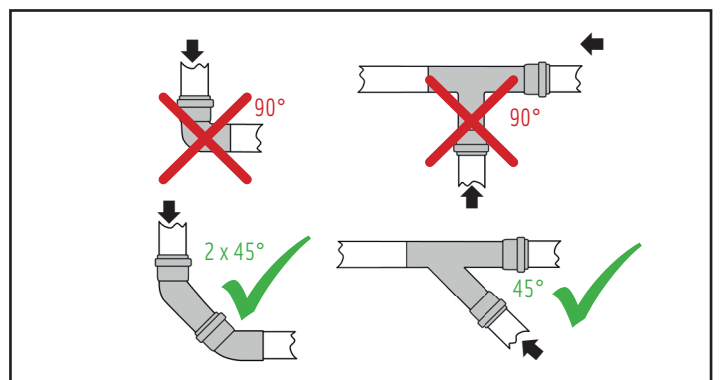
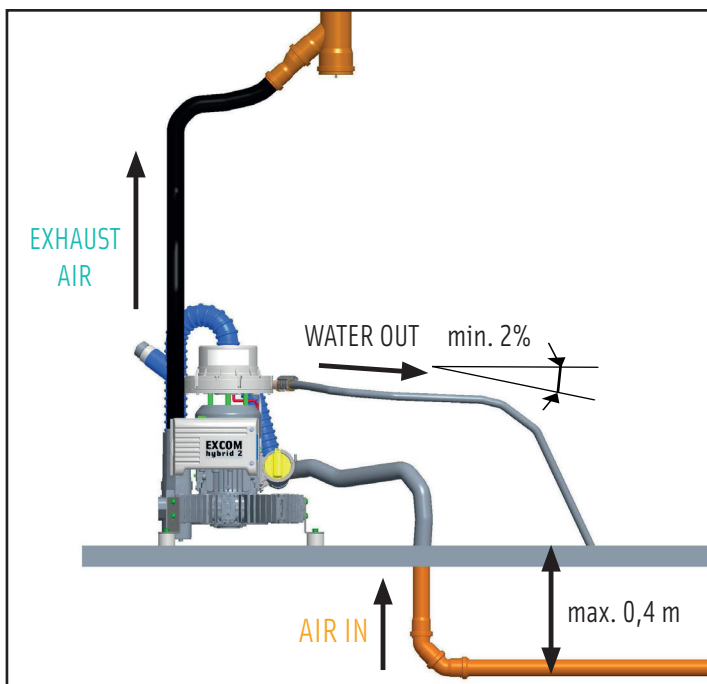
Performance graph of the EXCOM hybrid 3/6



Technical data

| | EXCOM hybrid 3 | EXCOM hybrid 6 |
|-----------------------------|----------------|----------------|
| Power supply | 220-240 V AC | 220-240 V AC |
| Frequency | 60 Hz | 60 Hz |
| Max. current consumption | 10,3 A | 10,0 A |
| Max. electrical shaft power | 1,3 kW | 1,8 kW |
| Air flow rate | 1750 l/min | 2400 l/min |
| Max. water suction | 8 l/min | 16 l/min |

How to correctly install a semi-wet suction system



PIPE Ø EXHAUST AIR ≥ PIPE Ø AIR IN

| | Ø AIR IN | Ø EXHAUST AIR | Ø pipes > 5m length |
|----------------|----------|---------------|---------------------|
| EXCOM hybrid 3 | 40 mm | ≥ 40 mm | ≥ 70 mm |
| EXCOM hybrid 6 | 40 mm | ≥ 50 mm | ≥ 70 - 100 mm |