CLAIMS

1. A method for the production of a line guide for a clean room application, with electric lines and an elongate flexible enclosure (100; 500; 900) which is reciprocatingly displaceable in particular with the formation of a direction-changing arc (4) between two runs (1, 3), wherein the flexible enclosure (100; 500; 900) has a number of parallel receiving means (902; 1002; 1102) for at least one respective line, wherein each receiving means (902; 1002; 1102) extends passage-like in a longitudinal direction (L) from a first end to a second end; the method including at least the steps:

- providing at least one line bundle (30) of interrelated lines; and
- providing the flexible enclosure (100; 500; 900);

characterised in that

the enclosure (100; 500; 900) is prefabricated and the line bundle (30) is introduced into a receiving means (902; 1002; 1102) of the prefabricated enclosure (100; 500; 900), wherein the at least one line bundle (30) of interrelated lines includes a wire bundle comprising at least two twisted wires (20) each having ~~its~~ a wire's own insulation (22), wherein the at least one line bundle (30) does not have the line bundle's ~~its~~ own ~~respective~~ outer sheath, and wherein

- the prefabricated enclosure (100; 500) comprises at least one enclosure unit (101; 501) having two cooperating closure profiles (511, 512) of a closure (510) for dust-tightly closing an opened state and the line bundle (30) is introduced transversely to the longitudinal direction (L) into the opened enclosure (100; 500); or
- the prefabricated enclosure (900) includes at least one enclosure unit (901) which is produced peripherally closed and the line bundle (30) is drawn into the closed enclosure unit (901) in the longitudinal direction (L).

2. A method according to claim 1 characterised in that the line bundle (30) includes an outward separating layer (23) comprising a slidable

material, preferably a material which at ~~its~~ an outside includes a fluoropolymer.

3. A method according to claim 2 characterised in that the outward separating layer (23) is in the form of banding, in particular strips of a PTFE-bearing film (23) or a PTFE-bearing non-woven fabric.

4. A method according to claim 3 characterised in that the banding has at least one wrapping, in particular two wrappings in opposite directions.

5. A method according to one of claims 1 to 4 characterised in that

- the line bundle (30) includes at least two highly flexible stranded lines, in particular stranded lines with an individual wire diameter < 0.1 mm, in particular ≤ 0.08 mm and/or super-fine stranded lines; and/or
- that the line bundle (30) includes at least two stranded lines, each of the two stranded lines having an insulation (22) comprising a fluoropolymer like for example a PTFE, PFA, PVDF, ETFE, FEP or the like; and/or
- that the line bundle (30) includes a tension-resistant core element.

6. A method according to one of claims 1 to 5 characterised in that the line bundle (30) includes a wire bundle comprising at least six layer-stranded or bundle-stranded wires (20).

7. A method according to one of claims 1 to 6 characterised in that the opened enclosure (100; 500) is dust-tightly closed after introduction of the line bundles (30) by means of the two cooperating closure profiles (511, 512).

8. A method according to one of claims 1 to 7 characterised in that each enclosure unit (101; 501; 901) is prefabricated and has two fixing

strips (520, 521; 920, 921) which are in opposite relationship at both sides and which are in one piece with the enclosure unit (101; 501; 901),

the method further including ~~the~~ a step of connecting the prefabricated enclosure units (101; 501; 901) together in parallel to form ~~an~~ the enclosure (100; 500; 900).

9. A line guide for lines like for example cables, hoses or the like, in particular for a clean room application, comprising an elongate flexible enclosure (100; 500; 900) which is reciprocatingly displaceable in particular with the formation of a direction-changing arc (4) between two runs (1, 3), and has a plurality of receiving means (902; 1002; 1102) for at least one respective line, wherein each receiving means (902; 1002; 1102) extends passage-like in a longitudinal direction (L) from a first end to a second end,

characterised in that the enclosure (100; 500; 900) is separately prefabricated and a respective line bundle (30) is introduced into at least some receiving means (902; 1002; 1102), wherein the at least one line bundle (30) of interrelated lines includes a wire bundle comprising at least two twisted wires (20) each having a wire's ~~its~~ own insulation, wherein the at least one line bundle (30) does not have the line bundle's ~~its~~ own ~~respective~~ outer sheath, and wherein the enclosure (100; 500; 900) forms the outer sheath of the line bundle (30).

10. A line guide according to claim 9 characterised in that each line bundle of interrelated lines includes a wire bundle comprising at least two twisted wires each having the wire's ~~their~~ own insulation; and each line bundle (30) does not have the line bundle's ~~its~~ own outer sheath.

11. A line guide according to claim 9, characterised in that the line bundle (30) includes an outward separating layer (23) comprising a slidable material, preferably a material which at ~~its~~ an outside includes a fluoropolymer.

12. A line guide according to claim ~~10~~ 11 characterised in that the outward separating layer is in the form of banding, in particular strips of a PTFE-bearing film (23) or a PTFE-bearing non-woven fabric.

13. A line guide according to claim ~~11~~ 12 characterised in that the banding has at least one wrapping, in particular two wrappings in opposite directions.

14. A line guide according to one of claims 9 to ~~12~~ 13 characterised in that

- the line bundle (30) includes at least two highly flexible stranded lines, in particular stranded lines with an individual wire diameter < 0.1 mm, in particular ≤ 0.08 mm and/or super-fine stranded lines; and/or
- that the line bundle (30) includes at least two stranded lines, each of the two stranded lines having an insulation comprising a fluoropolymer like for example a PTFE, PFA, PVDF, ETFE, FEP or the like; and/or
- that the line bundle (30) includes a tension-resistant core element.

15. A line guide according to one of claims 9 to ~~13~~ 14 characterised in that the line bundle (30) includes a wire bundle comprising at least six layer-stranded or bundle-stranded wires (20).

16. A method according to one of claims 1 to 8 or a line guide according to one of claims 9 to ~~14~~ 15 characterised in that each line bundle (30) is replaceably introduced into a corresponding receiving means (902; 1002; 1102) of the prefabricated enclosure (100; 500; 900).

17. A method according to one of claims 1 to 8 or a line guide according to one of claims 9 to ~~14~~ 15 characterised in that the prefabricated enclosure (500; 900)

- has a plurality of enclosure units (501) respectively produced with cooperating closure profiles (511, 512), in particular enclosure units (501) which are extruded in one piece in the opened state; and/or

- has a plurality of enclosure units (901) which are produced peripherally closed, in particular enclosure units (901) extruded in the form of closed profiles, and/or

- each enclosure unit (501; 901) has two fixing strips (520, 521; 920, 921) which are opposite on both sides and which are in one piece with the enclosure units (501; 901) and by means of which adjacent enclosure units (501; 901) are connected together in parallel, and/or

- the enclosure (500; 900) comprises enclosure units (501; 901) of flexurally elastic plastic, wherein each enclosure unit (501; 901) is of a cross-section which remains the same in the longitudinal direction (L).

18. A line guide for a clean room application produced by the method according to one of claims 1 to 8.

19. An enclosure unit (101; 501; 901) of plastic for an elongate flexible enclosure (100; 500; 900) of a line guide, wherein the enclosure unit (101; 501; 901) forms at least one receiving means (902) for guiding at least one line and which extends passage-like in a longitudinal direction (L) from a first end to a second end and has an enclosure wall (503; 903) comprising a flexible plastic,

characterised in that

- the enclosure unit (101; 501; 901) includes a first fixing strip (520; 920) at one longitudinal side and a second fixing strip (521; 921) at the other longitudinal side, wherein the fixing strips (520, 521; 920, 921) are designed in mutually matching relationship for forming a releasable connection, and

- the fixing strips (520, 521; 920, 921) are flexurally stiffer in comparison with the enclosure wall (503; 903), wherein the fixing strips (520, 521; 920, 921) include in particular a plastic which is harder in

comparison with the enclosure wall (503; 903) and/or in particular of a flexurally stiffer design configuration.

20. An enclosure unit (501; 901) according to claim ~~18~~ 19 characterised in that the fixing strips (520, 521; 920, 921) are produced in one piece with the enclosure wall (503; 903), from a first plastic for the enclosure wall (503; 903) and a harder second plastic for the fixing strips (520, 521; 920, 921), in particular using a co-extrusion method or by subsequent material-bonded connection of the fixing strips (520, 521; 920, 921) to the enclosure wall (503; 903).

21. An enclosure unit (101; 501; 901) according to claim ~~18~~ 19 or claim ~~19~~ 20 characterised in that ~~it~~ the enclosure unit (101; 501; 901) has at least at ~~the~~ an outside on the enclosure wall (503; 903) and/or on a fixing strip (520, 521; 920, 921) at least one sliding friction-reducing layer (801; 802; 803), in particular a layer comprising a third plastic with a lower sliding coefficient in relation to the first and second plastics, wherein the enclosure unit (101; 501; 901) is preferably produced from three different plastics in a tri-extrusion method and/or the third plastic is preferably a polyethylene, in particular a PE-HMW or PE-UHMW.

22. An enclosure unit (101; 501; 901) according to claim ~~20~~ 21 characterised in that the fixing strips (520, 521; 920, 921) are designed in conjugate relationship with male and female cross-sections and the sliding friction-reducing layer (802; 803) is provided at least at ~~the~~ an outside of the female fixing strip (520; 920), and/or

the sliding friction-reducing layer (801) covers at least at one side a predominant surface proportion of the outer surface of the enclosure wall (803), and/or

the sliding friction-reducing layer (801; 802; 803) is of a layer thickness which is <20% of ~~the~~ a thickness of the enclosure wall (803).

23. An enclosure unit (101; 501; 901) according to claim ~~18~~ 19 characterised in that the enclosure unit (101; 501; 901) is produced in unitary material fashion from a thermoplastic elastomer (TPE), in particular a TPS, TPU or TPO, preferably from a TPE suitable for production in a hot extrusion method.

24. An enclosure unit (501; 901) according to one of claims ~~18~~ 19 to ~~21~~ 22 characterised in that the fixing strips (520, 521; 920, 921) are designed in mutually conjugate relationship in the form of extruded fixing profiles with a cross-section which is continuously the same in the longitudinal direction (L) and they cooperate in interengaging relationship, and/or

the fixing strips (520, 521; 920, 921) are of a symmetrical configuration relative to a central plane, in particular relative to the neutral fibre, wherein the first fixing strip (520; 920) and/or the second fixing strip (521; 921) has two symmetrically arranged inclined insertion portions.

25. An enclosure unit (501; 901) according to one of claims ~~18~~ 19 to ~~23~~ 24 characterised in that the fixing ~~profiles~~ strips are of such a configuration that in comparison with the connection of mutually matching fixing strips (520, 521; 920, 921) in the connecting direction they are releasable only with a markedly higher application of force in opposite relationship to the connecting direction or are releasable only in the longitudinal direction (L), wherein the fixing strips (520, 521; 920, 921) are preferably of a cross-section with a barb function.

26. An enclosure unit (501; 1001; 1101) according to one of claims ~~18~~ 19 to ~~24~~ 25 characterised in that each receiving means (1002; 1102) has two cooperating closure strips (511, 512; 1011; 1012) of a closure (510; 1010; 1110), that extend in the longitudinal direction (L), for dust-tight closure of an opened state in which a line can be introduced into or

removed from one of the receiving means (1002; 1102) transversely relative to the longitudinal direction (L).

27. An enclosure unit (501; 901) according to one of claims ~~18~~ 19 to ~~25~~ 26 characterised in that the fixing strips (520, 521; 920, 921) are adapted to be connected together in a connecting direction transversely relative to the longitudinal direction (L) in order to releasably fix together a plurality of enclosure units (501; 901) with mutually matching fixing strips (520, 521; 920, 921) by connection of the fixing strips (520, 521; 920, 921) in the connecting direction transversely relative to the longitudinal direction (L).

28. An enclosure unit (501) according to claim ~~25~~ 26 and ~~26~~ 27 characterised in that the closure strips (511, 512) are closable and openable respectively by a force substantially perpendicular to the connecting direction of the fixing strips (520, 521).

29. An enclosure unit (501; 1201) according to one of claims ~~18~~ 19 to ~~27~~ 28 characterised in that enclosure unit (501; 1201) ~~it~~ forms precisely one tubular receiving means for separate guidance of at least one respective line.