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Flash*Smart* Elemental Analyzers

Organic Elemental Analyzers

Consumables and Spare Parts Catalog

31707002 Revision D November 2019

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Revision D released in November 2019.

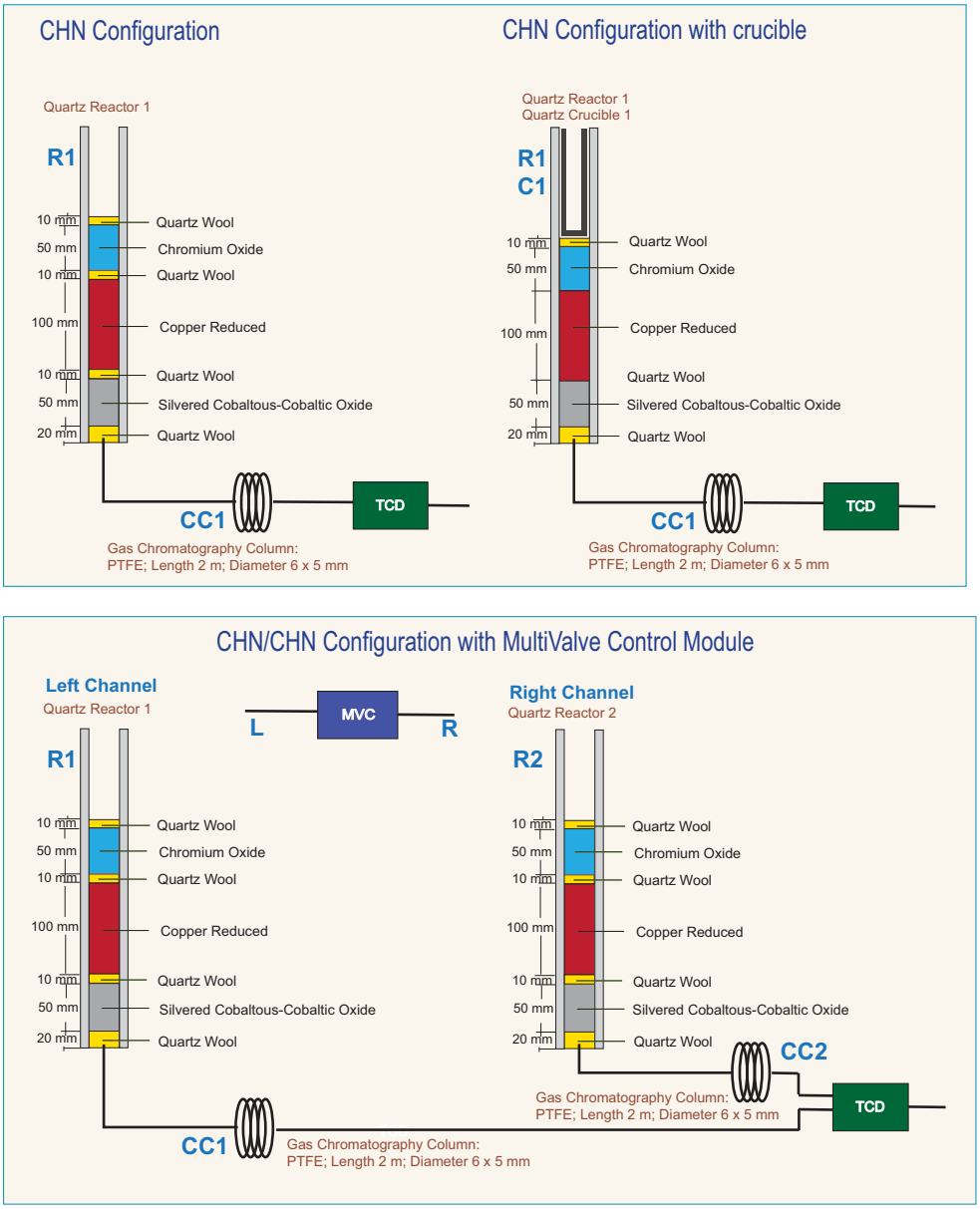
Contents

CHN Determination

Table 1-1. Consumables and Spare Parts for CHN Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Chromium Oxide	25 g	33822900
❍	High Quality Copper	50 g	33835312
❍	Silvered Cobaltous-Cobaltic Oxide	25 g	33824500
R1	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
C1	Quartz Crucible	1	25204510
--	Pre-Packed Quartz Reactor CHN/NC - Argon Sealed 	1	46802009
CC1	Multiseparation Column (PTFE; 2 m; 6x5 mm)	1	26008220
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	Cyclohexanone STD	1 g	33822400
--	Atropine STD	2 g	33824400
--	Imidazole STD	1 g	33835430
--	Acetanilide STD	2 g	33836700
--	Urea STD	2 g	33840001
--	Nicotinamide STD	2 g	33840019

Figure 1-1. Size of the Filling Material



Tip If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the oxidation/reduction reactor. In this case it is necessary to eliminate the **quartz wool** between **chromium oxide** and high quality **copper reduced**, and between high quality **copper reduced** and **silvered cobaltous/cobaltic oxide**.

Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)

CHN/O Determination

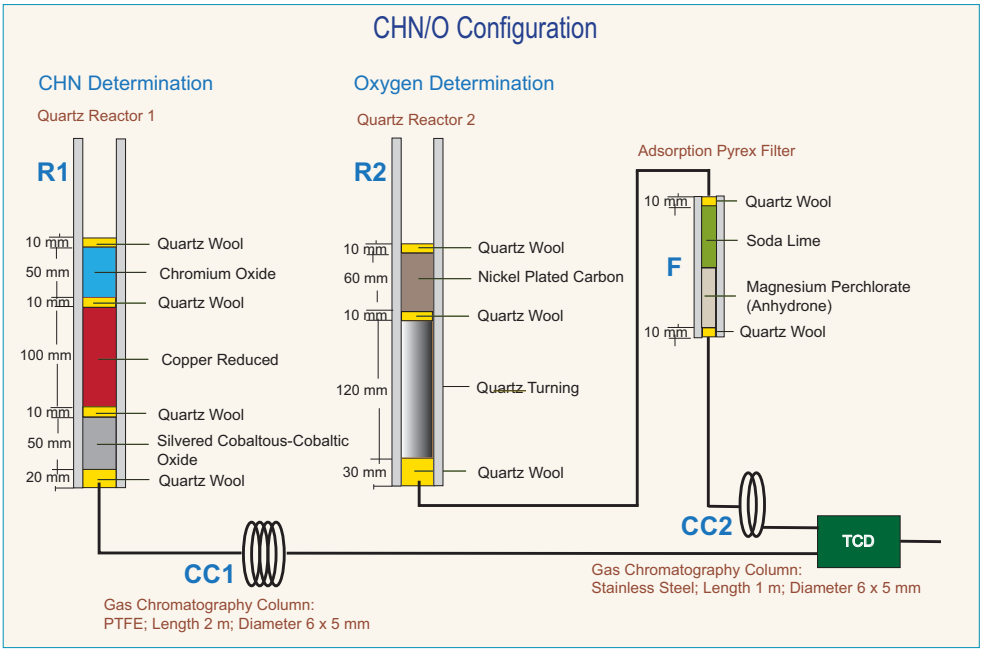
Table 2-1. Consumables and Spare Parts for CHN/O Determination (Sheet 1 of 2)

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Chromium Oxide	25 g	33822900
❍	High Quality Copper	50 g	33835312
❍	Silvered Cobaltous-Cobaltic Oxide	25 g	33824500
❍	Nickel Plated Carbon	5 g	33823800
❍	Quartz Turning	50 g	33822300
❍	Soda Lime	100 g	33835235
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
--	Nickel Wool	2 g	33825000
R1/R2	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
C1/C2	Quartz Crucible	1	25204510
--	Pre-Packed Quartz Reactor CHN/NC - Argon Sealed 	1	46802009
F	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	Multiseparation Column (PTFE; 2 m; 6x5 mm)	1	26008220
CC2	Oxygen Separation Column (SS; 1 m; 6x5 mm)	1	26007900
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Silver Containers Megabox for Oxygen Determination (Set of 1000)	1	24005410
--	Silver Containers for Oxygen Determination (Set of 100)	1	24005400
--	Forceps	1	20500500
--	Spatula	1	20500600
--	Cyclohexanone STD	1 g	33822400
--	Atropine STD	2 g	33824400

Table 2-1. Consumables and Spare Parts for CHN/O Determination (Sheet 2 of 2)

--	Benzoic Acid STD	2 g	33822500
--	Imidazole STD	1 g	33835430
--	Acetanilide STD	2 g	33836700
--	Urea STD	2 g	33840001
--	Nicotinamide STD	2 g	33840019

Figure 2-1. Size of the Filling Material (1)

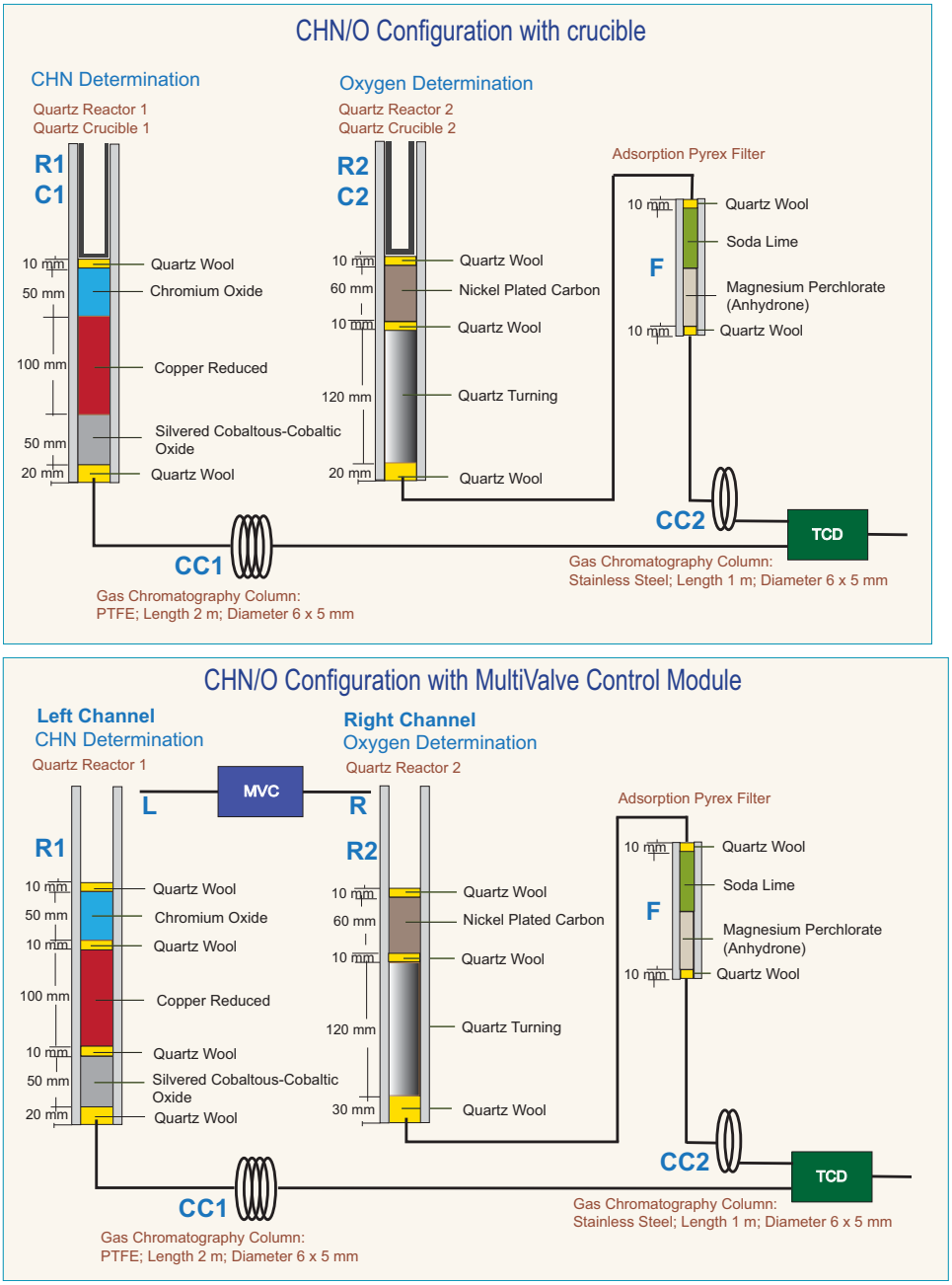


Tip In some cases, is suggested to use **nickel wool** in the top layer up the **nickel plated carbon** instead of **quartz wool**.

Tip CHN Determination: If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the oxidation/reduction reactor. In this case, it is necessary to eliminate the **quartz wool** between **chromium oxide** and the high quality **copper reduced** and between the high quality **copper reduced** and the **cobaltous/cobaltic oxide**.

Tip Oxygen Determination: If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the reactor of pyrolysis. In this case, it is necessary to reduce the **quartz wool** in the lower section of the reactor from **30 mm** to **20 mm**.

Figure 2-2. Size of the Filling Material (2)



Tip If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the oxidation/reduction reactor. In this case, it is necessary to eliminate the **quartz wool** between **chromium oxide** and high quality **copper reduced**, and between high quality **copper reduced** and **silvered cobaltous/cobaltic oxide**.

Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)
- **Doping vessel for Oxygen** determination P/N 25204400 (Set of 5)
  The doping solution is constituted by **Heptane/Carbon Tetrachloride 95:5.**

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A single CHNS/O, NC, N/Protein Analyzer handling all applications

The Thermo Scientific™ Flash*Smart*™ Elemental Analyzer (EA), based on the modified Dumas Method, is a flexible solution that expands your CHNS/O analysis with over 20 configurations in one system. Powerful software supports automated and precise reports, making everything easier for you and your team. With the Flash*Smart* EA your lab can easily handle varying sample types, obtain from 1 to 5 element determinations and achieve maximum sample throughput. With powerful yet easy operation, your team can process more samples every day. When you need to analyze more elements, you can adapt the Flash*Smart* EA on-site to your applications or add a second reactor to unlock more capabilities.

Find out more at **thermofisher.com/OEA**

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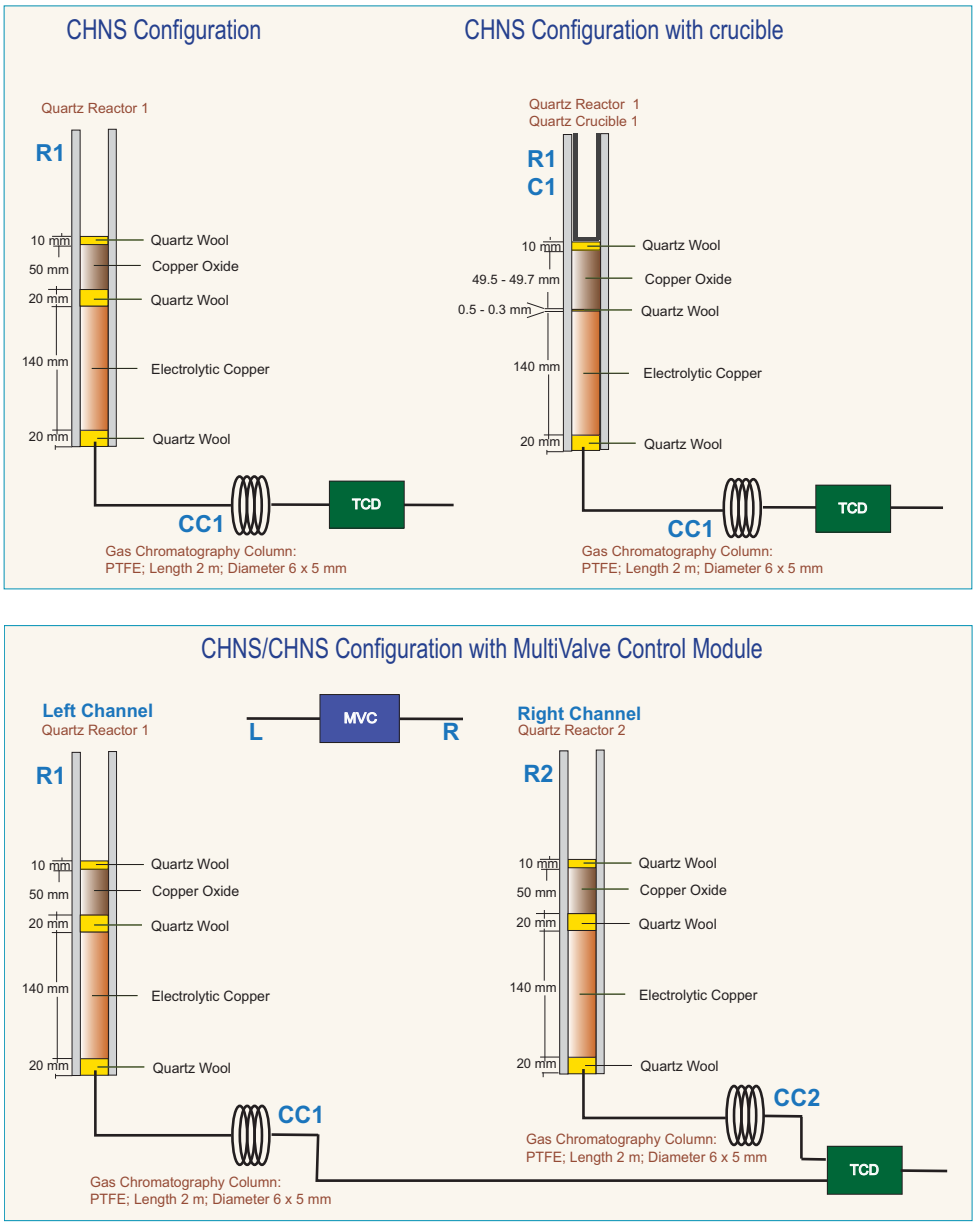
CHNS Determination

Table 3-1. Consumables and Spare Parts for CHNS Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Electrolytic Copper	80 g	33835314
--	Vanadium Pentoxide	1 g	33837510
R1	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
R1	Pre-Packed Quartz Reactor for CHNS/NCS/S Determinations	1	46802015
C1	Quartz Crucible	1	25204510
CC1	Packed Column CHNS/NCS (PTFE; 2 m; 6x5 mm)	1	26008215
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	BBOT STD	2 g	33835210
--	Sulphanilamide STD	2 g	33825100
--	L-Cystine STD	2 g	33840018

Tip **Vanadium Pentoxide** (V_2O_5) is an oxygen donor. According to the sample nature, it is suggested to insert it into the tin container with the sample, for a proper oxidation of material and consequently a quantitative sulfur determination.

Figure 3-1. Size of the Filling Material



Tip If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the oxidation/reduction reactor. In this case it is necessary to reduce the **quartz wool** between **copper oxide** and **electrolytic copper** up to obtain a thin layer and to reduce the **copper oxide** proportionally.

Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)

CHNS/O Determination

Table 4-1. Consumables and Spare Parts for CHNS/O Determination (Sheet 1 of 2)

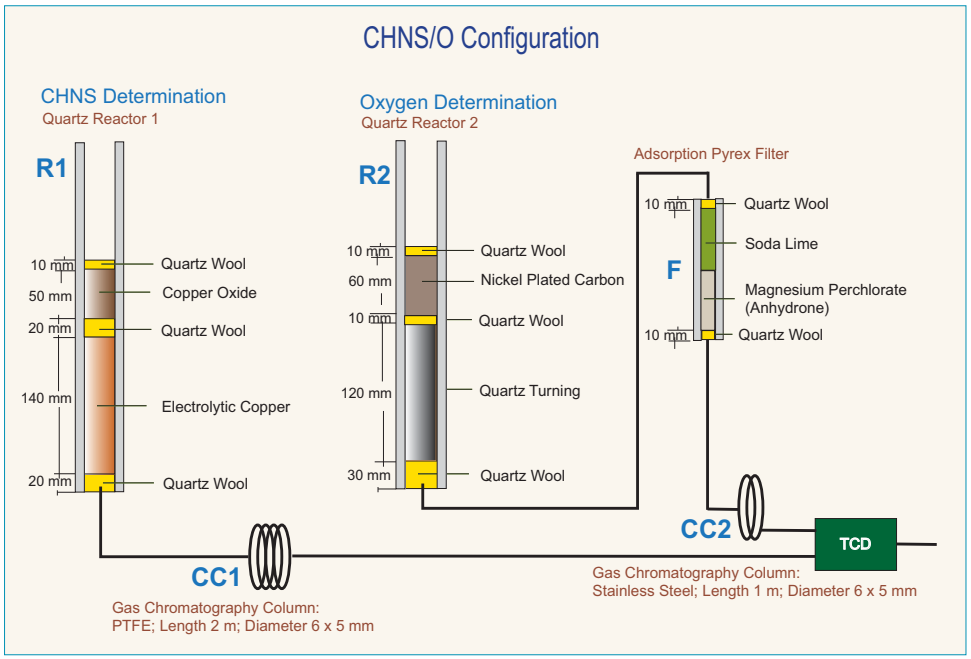
Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Electrolytic Copper	80 g	33835314
❍	Nickel Plated Carbon	5 g	33823800
❍	Quartz Turnings	50 g	33822300
❍	Soda Lime	100 g	33835235
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
--	Nickel Wool	2 g	33825000
--	Vanadium Pentoxide	1 g	33837510
R1/R2	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
R1	Pre-Packed Quartz Reactor for CHNS/NCS/S Determinations	1	46802015
C1/C2	Quartz Crucible	1	25204510
F	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	CHNS/NCS Separation Column (PTFE; 2 m; 6x5 mm)	1	26008215
CC2	Oxygen Separation Column (SS; 1m; 6x5 mm)	1	26007900
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Silver Containers Megabox for Oxygen Determination (Set of 1000)	1	24005410
--	Silver Containers for Oxygen Determination (Set of 100)	1	24005400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	Atropine STD	2 g	33824400
--	Benzoic Acid STD	2 g	33822500
--	Sulphanilamide STD	2 g	33825100
--	BBOT STD	2 g	33835210

Table 4-1. Consumables and Spare Parts for CHNS/O Determination (Sheet 2 of 2)

--	Acetanilide STD	2 g	33836700
--	Urea STD	2 g	33840001
--	L-Cystine STD	2 g	33840018
--	Nicotinamide STD	2 g	33840019

Tip **Vanadium Pentoxide** (V_2O_5) is an oxygen donor. According to the sample nature, it is suggested to insert it into the tin container with the sample, for a proper oxidation of the material and consequently a quantitative sulfur determination.

Figure 4-1. Size of the Filling Material (1)

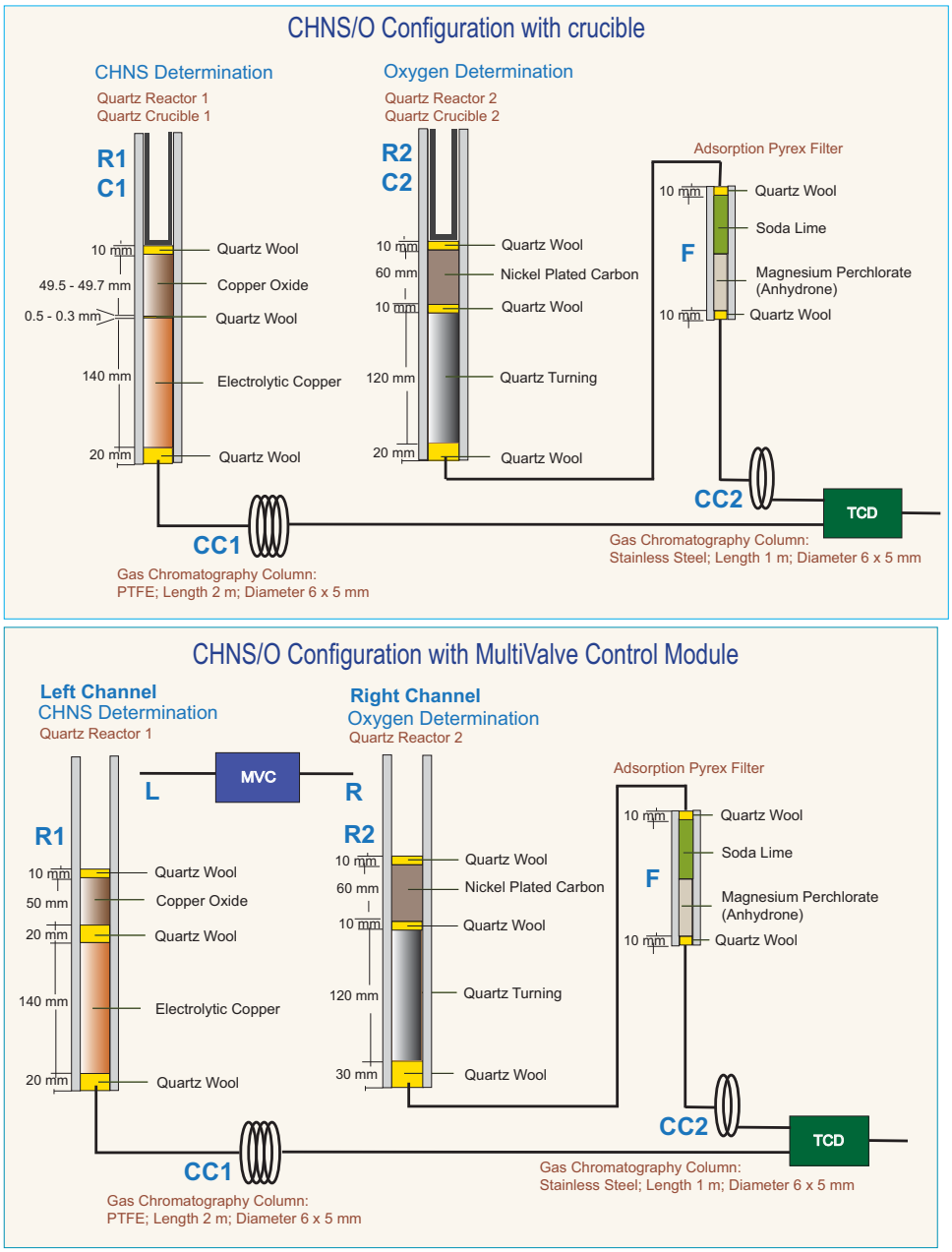


Tip In some cases, is suggested to use **nickel wool** in the top layer up the **nickel plated carbon** instead of quartz wool.

Tip **CHNS Determination:** If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the oxidation/reduction reactor. In this case, it is necessary to reduce the **quartz wool** between the **copper oxide** and the **electrolytic copper** up to obtain a thin layer and to reduce the **copper oxide** proportionally.

Tip **Oxygen Determination:** If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the reactor of pyrolysis. In this case, it is necessary to reduce the **quartz wool** in the lower section of the reactor from **30 mm** to **20 mm**.

Figure 4-2. Size of the Filling Material (2)



Tip If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the oxidation/reduction reactor. In this case, it is necessary to reduce the **quartz wool** between the **copper oxide** and the **electrolytic copper** up to obtain a thin layer and to reduce the **copper oxide** proportionally.

Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)
- **Doping vessel** for **Oxygen** determination P/N 25204400 (Set of 5)
  The doping solution is constituted by **Heptane/Carbon Tetrachloride 95:5**.

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Find out more at **thermofisher.com/OEA**

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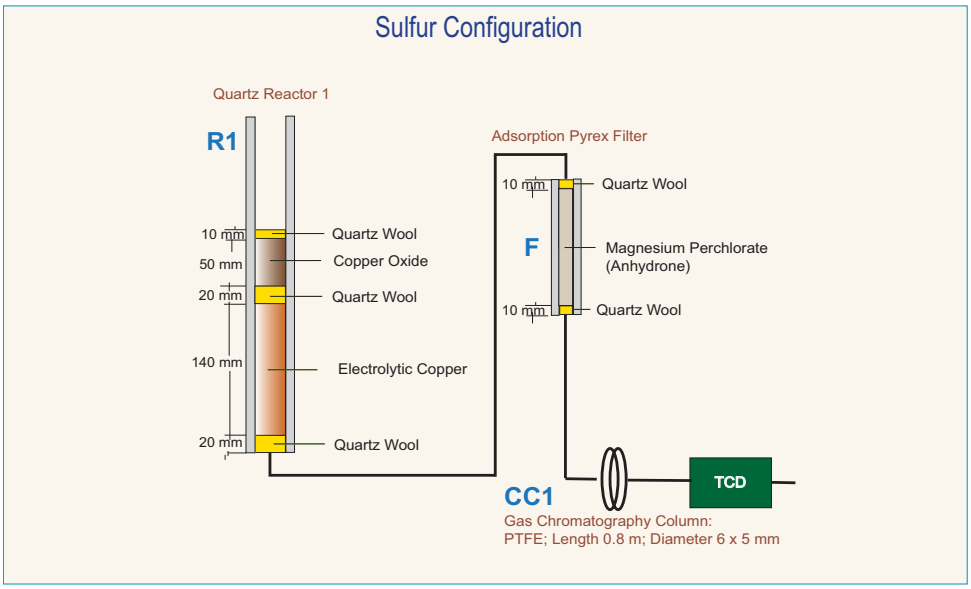
S Determination

Table 5-1. Consumables and Spare Parts for S Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Electrolytic Copper	80 g	33835314
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
--	Vanadium Pentoxide	1 g	33837510
R1	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
R1	Pre-Packed Quartz Reactor for CHNS/NCS/S Determinations	1	46802015
C1	Quartz Crucible	1	25204510
F	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	Sulfur Separation Column (PTFE; 0.8 m; 6x4 mm)	1	26007800
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	BBOT STD	2 g	33835210
--	Sulphanilamide STD	2 g	33825100
--	L-Cystine STD	2 g	33840018

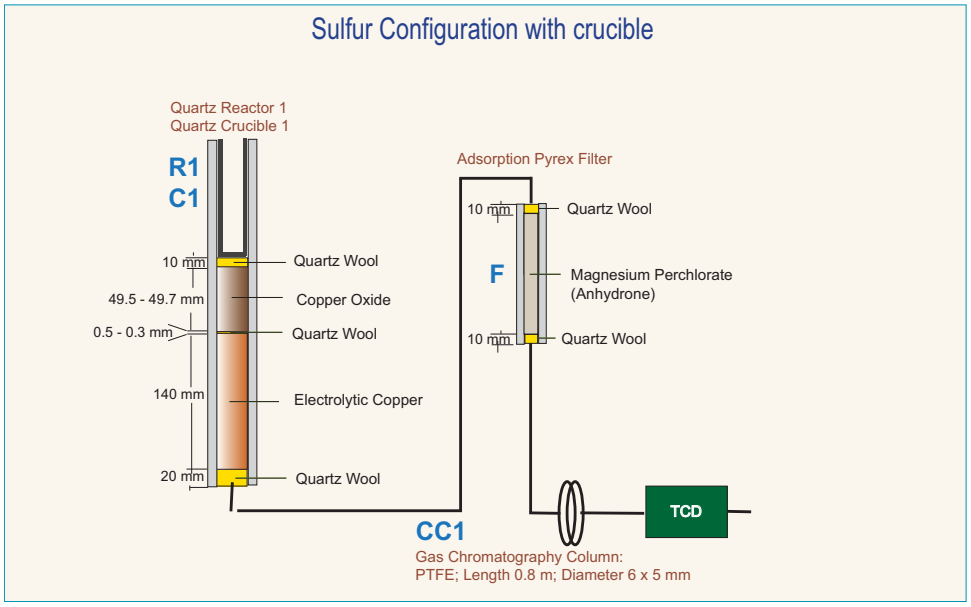
Tip **Vanadium Pentoxide** (V_2O_5) is an oxygen donor. According to the sample nature, it is suggested to insert it into the tin container with the sample, for a proper oxidation of material and consequently a quantitative sulfur determination.

Figure 5-1. Size of the Filling Material (1)



Tip If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the oxidation/reduction reactor. In this case it is necessary to reduce the **quartz wool** between **copper oxide** and **electrolytic copper** up to obtain a thin layer and to reduce the **copper oxide** proportionally.

Figure 5-2. Size of the Filling Material (2)



Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)

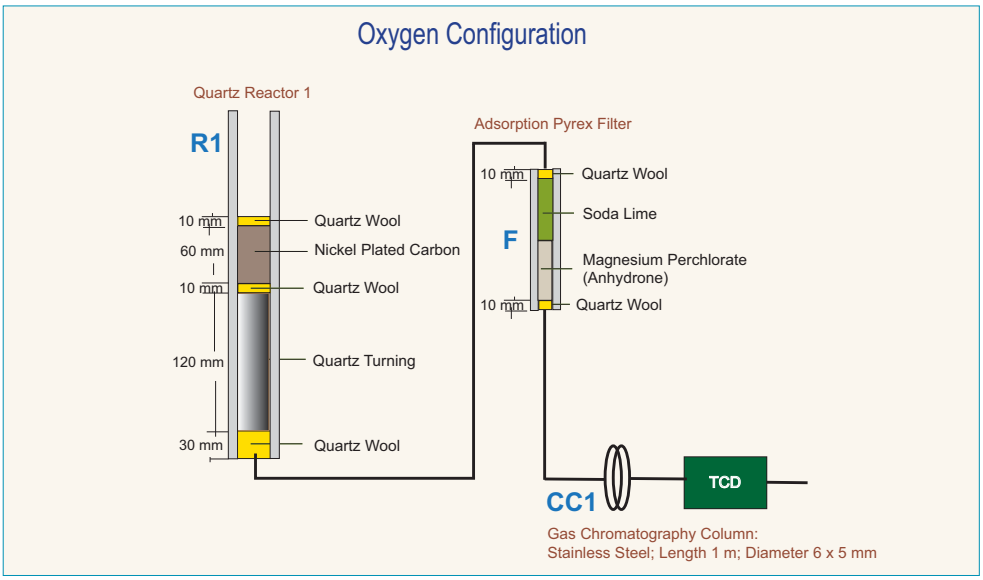
O Determination

Table 6-1. Consumables and Spare Parts for O Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Nickel Plated Carbon	5 g	33823800
❍	Quartz Turnings	50 g	33822300
❍	Soda Lime	100 g	33835235
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
--	Nickel Wool	2 g	33825000
R1	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
C1	Quartz Crucible	1	25204510
F	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	Oxygen Separation Column (SS; 1m; 6x5mm)	1	26007900
--	Silver Containers Megabox for Oxygen Determination (Set of 1000)	1	24005410
--	Silver Containers for Oxygen Determination (Set of 100)	1	24005400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	Cyclohexanone STD	1 g	33822400
--	Benzoic Acid STD	2 g	33822500
--	Sulphanilamide STD	2 g	33825100
--	BBOT STD	2 g	33835210
--	Acetanilide STD	2 g	33836700
--	Urea STD	2 g	33840001
--	L-Cystine STD	2 g	33840018
--	Nicotinamide STD	2 g	33840019

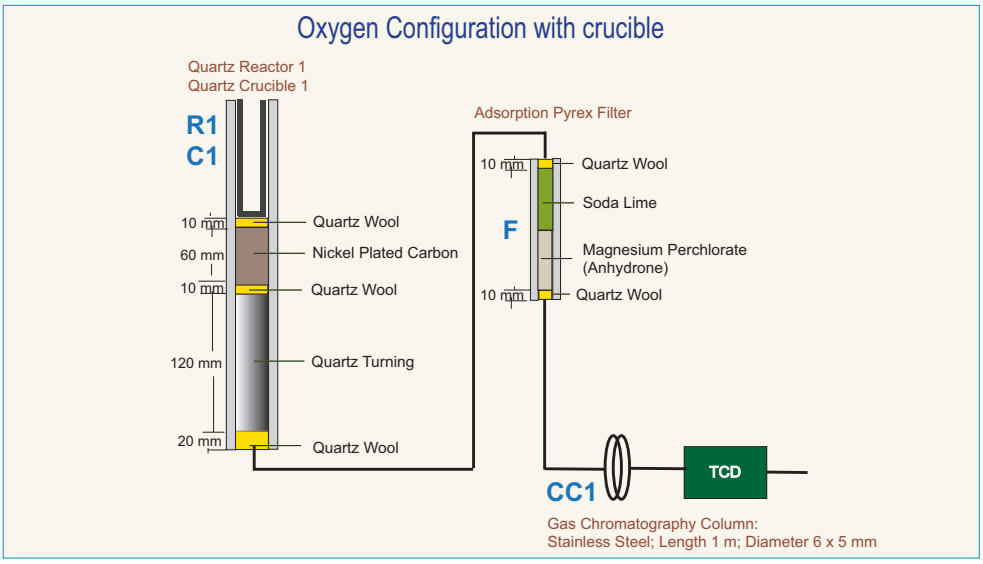
Tip Instead of **quartz wool** it is possible to use **nickel wool** in the top layer up the **nickel plated carbon**.

Figure 6-1. Size of the Filling Material (1)



Tip If the sample has a high presence of inorganic material, we suggest to insert the **quartz crucible** into the reactor of pyrolysis. In this case, it is necessary to reduce the **quartz wool** in the lower section of the reactor from **30 mm** to **20 mm**.

Figure 6-2. Size of the Filling Material (2)



Tip The following consumables are also available:

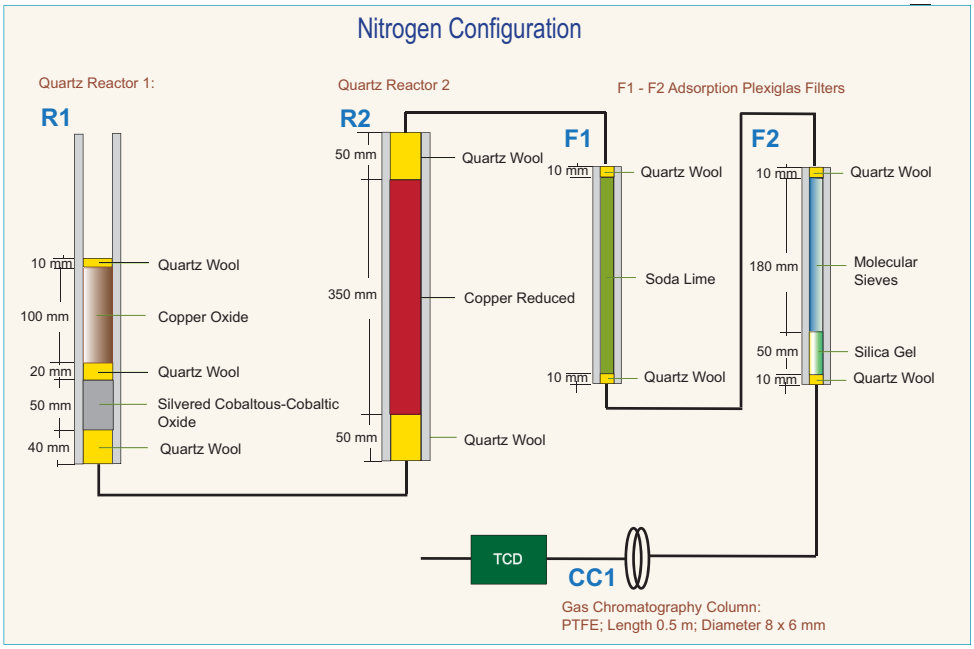
- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)
- **Doping vessel for Oxygen** determination P/N 25204400 (Set of 5).
  The doping solution is constituted by **Heptane/Carbon Tetrachloride 95:5**.
  The doping treatment can help the sample pyrolysis.

N Determination

Table 7-1. Consumables and Spare Parts for N Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Silvered Cobaltous-Cobaltic Oxide	25 g	33824500
❍	High Quality Copper	50 g	33835312
❍	Soda Lime	100 g	33835235
❍	Molecular Sieve 3 Å	100 g	33801801
❍	Silica Gel plus indicator	100 g	33840035
--	Chromosorb™ WAW 30/60 mesh	25 g	33837530
R1/R2	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
F1/F2	Empty Adsorption Filter (Large Size) without Fast Connectors	2	28113064
CC1	Nitrogen Separation Column (PTFE; 0.5m; 8x6 mm)	1	26007820
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	Nicotinamide STD	2 g	33840019
--	Aspartic Acid STD	2 g	33840022
--	Atropine STD	2 g	33824400

Figure 7-1. Size of the Filling Material



Tip the following consumables are also available:

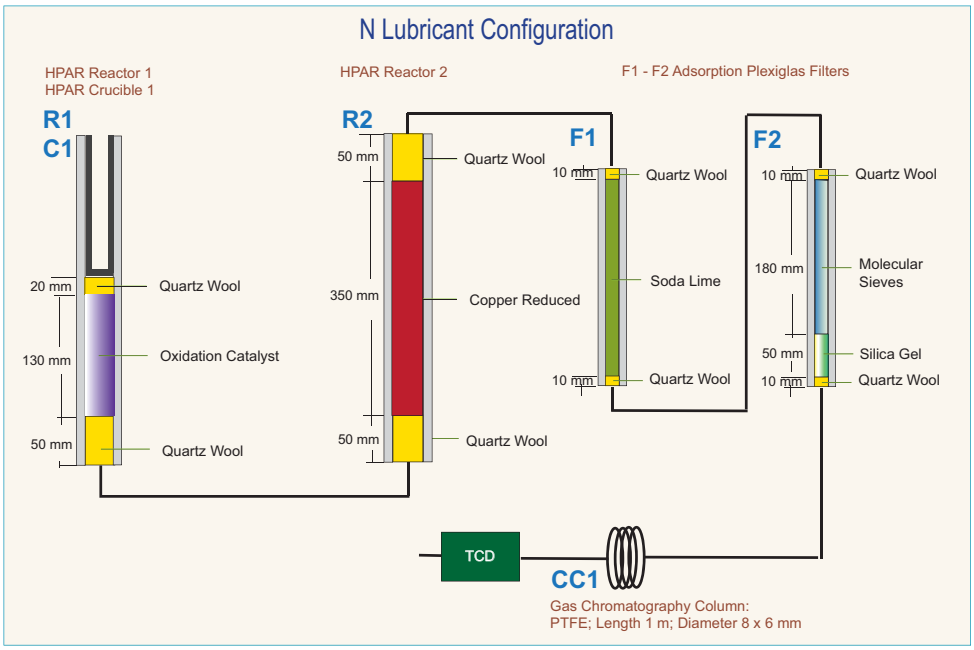
- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)

N Lubricant Determination

Table 8-1. Consumables and Spare Parts for N Lubricant Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
--	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
❍	Quartz Wool	5 g	33822200
❍	Oxidation Catalyst	40 g	33840000
❍	High Quality Copper	50 g	33835312
❍	Soda Lime	100 g	33835235
❍	Silica Gel plus indicator	100 g	33840035
❍	Molecular Sieve 3 Å	100 g	33801801
R1	Pre-Packed HPAR Reactor; 25 mm OD	1	46802008
C1	HPAR Crucible 18 mm OD	1	25205011
R1/R2	Empty HPAR Reactor; 25 mm OD	1	46820075
F1/F2	Empty Adsorption Filter (Large Size) without Fast Connectors	2	28113064
CC1	Nitrogen Separation (N-Brew) Column (PTFE; 1 m; 8x6 mm)	1	26070004
--	Large “Soft” Tin Containers (Set of 100)	1	25208000
--	Tin Disk 30 mm diameter (Set of 100)	1	25208015
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	Atropine	2 g	33824400
--	Lubricant Reference Material	2 g	33835240

Figure 8-1. Size of the Filling Material



Tip The following consumable is also available:

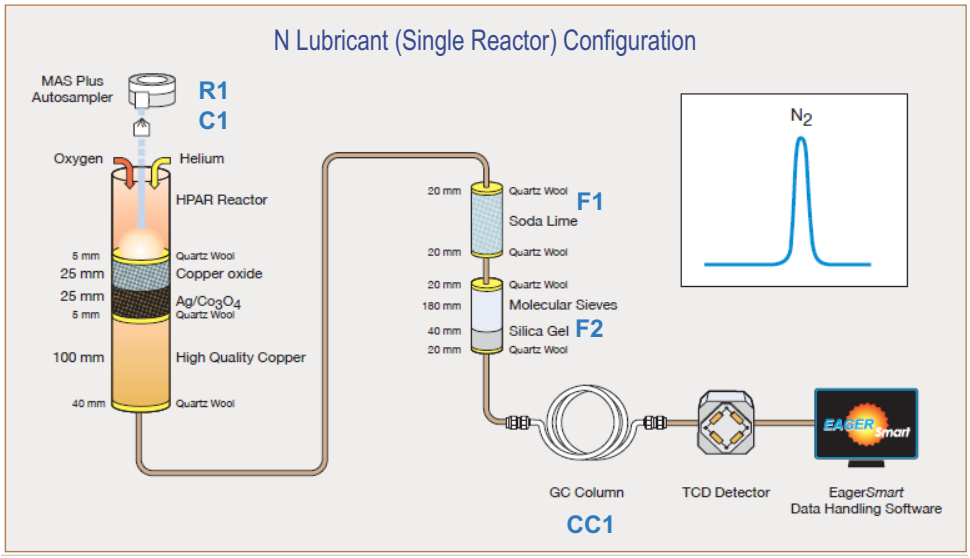
- **Quartz Wool** (15 g) P/N 33822205

N Lubricant Determination (Single Reactor)

Table 8-2. Consumables and Spare Parts for N Lubricant (Single Reactor) Determination

Refer to:	Description	Qty	Part Number
--	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
--	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Silver Cobaltous - Cobaltic Oxide	25 g	33824500
❍	High Quality Copper	50 g	33835312
❍	Soda Lime	100 g	33835235
❍	Silica Gel plus indicator	100 g	33840035
❍	Molecular Sieve 3 A	100 g	33801801
C1	HPAR Crucible, 18 mm OD	1	25205011
R1	Empty HPAR Reactor, 25 mm OD	1	46820075
F1/F2	Empty Adsorption Filter (Large Size) without Fast Connectors	2	28113064
CC1	Nitrogen Separation Column (PTFE, 0.5 m, 8x6 mm)	1	26007820
--	Large “Soft” Tin Containers (Set of 100)	1	25208000
--	Tin Disk 30 mm diameter (Set of 100)	1	25208015
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	Atropine	2 g	33824400
--	Lubricant Reference Material	2 g	33835240

Figure 8-2. Size of the Filling Materials



Tip The following consumable is also available:

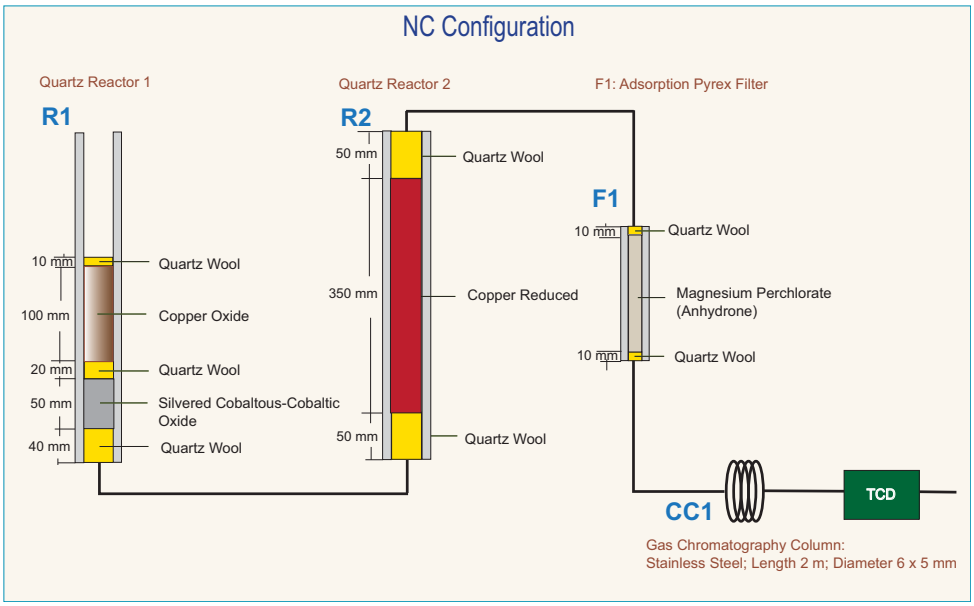
- **Quartz Wool** (15 g) P/N 33822205

NC Determination

Table 9-1. Consumables and Spare Parts for NC Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Silvered Cobaltous-Cobaltic Oxide	25 g	33824500
❍	High Quality Copper	50 g	33835312
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
R1/R2	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
F1	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	Multiseparation Column (SS; 2m; 6x5 mm)	1	26007920
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	Nicotinamide STD	2 g	33840019
--	Aspartic Acid STD	2 g	33840022
	Atropine STD	2 g	33824400

Figure 9-1. Size of the Filling Material



Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)

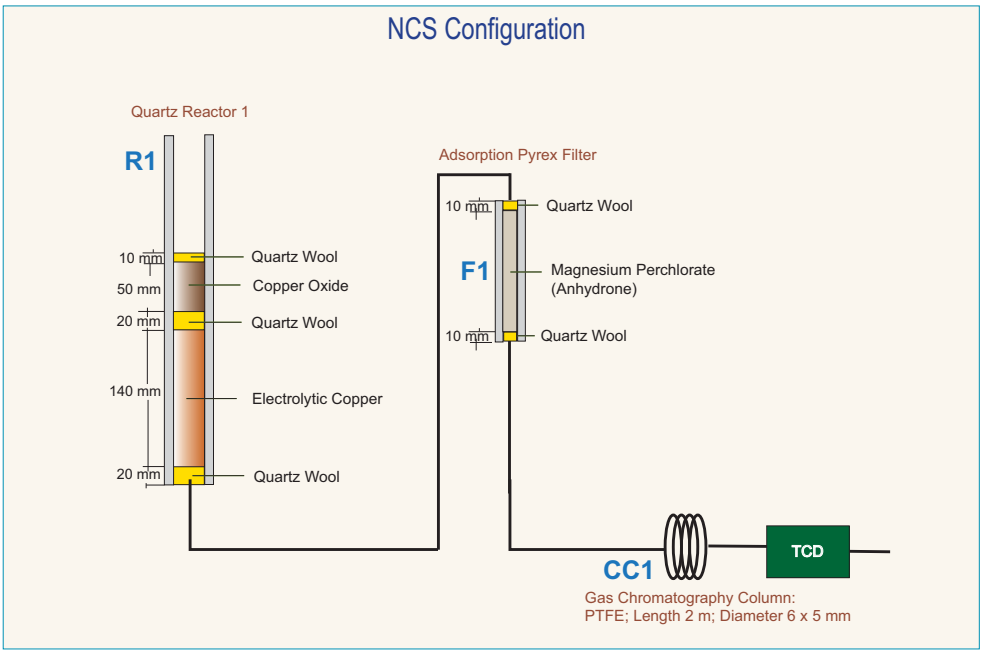
NCS Determination

Table 10-1. Consumables and Spare Parts for NCS Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Electrolytic Copper	80 g	33835314
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
--	Vanadium Pentoxide	1g	33837510
R1	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
--	Pre-Packed Quartz Reactor for CHNS/NCS/S Determinations	1	46802015
C1	Quartz Crucible	1	25204510
F1	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	CHNS/NCS Separation Column (PTFE 2 m; 6x5 mm)	1	26008215
--	Tin Containers Megabox (Set of 1000)	1	24006410
--	Tin Containers (Set of 100)	1	24006400
--	Forceps	1	20500500
--	Small Spatula for Container Filling	1	20500600
--	BBOT STD	2 g	33835210
--	Sulphanilamide STD	2 g	33825100
--	L-Cystine STD	2 g	33840018

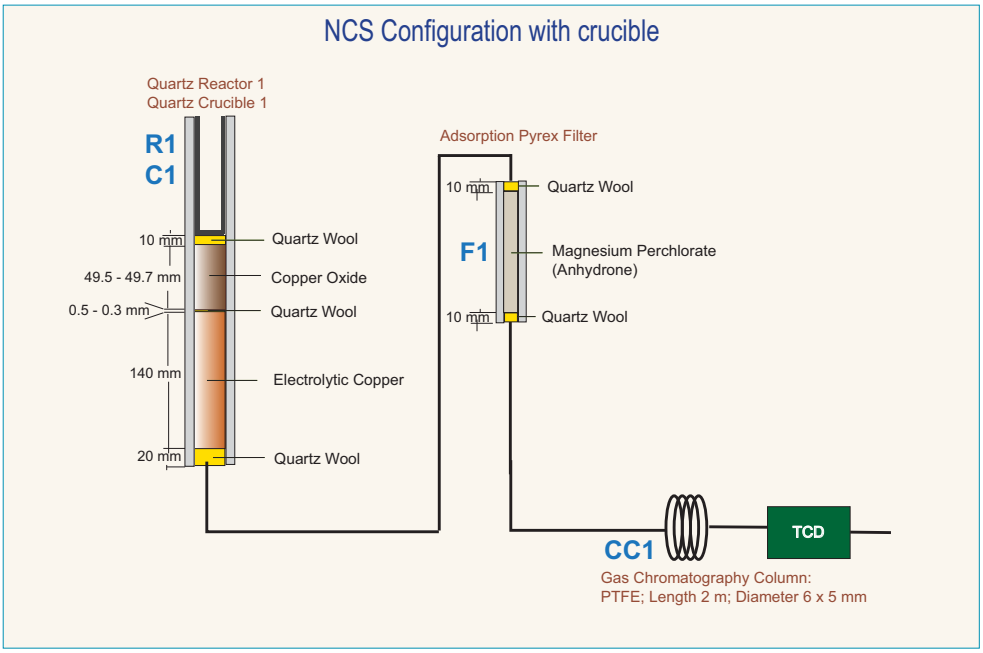
Tip **Vanadium Pentoxide** (V_2O_5) is an oxygen donor. According to the sample nature, it is suggested to insert it into the tin container with the sample, for a proper oxidation of material and consequently a quantitative sulfur determination.

Figure 10-1. Size of the Filling Material (1)



Tip If the sample has a high presence of inorganic material, we suggest to insert the quartz crucible into the oxidation/reduction reactor. In this case, it is necessary to reduce the quartz wool between the copper oxide and the electrolytic copper up to obtain a thin layer and to reduce the copper oxide proportionally.

Figure 10-2. Size of the Filling Material (2)



Tip The following consumables are also available:

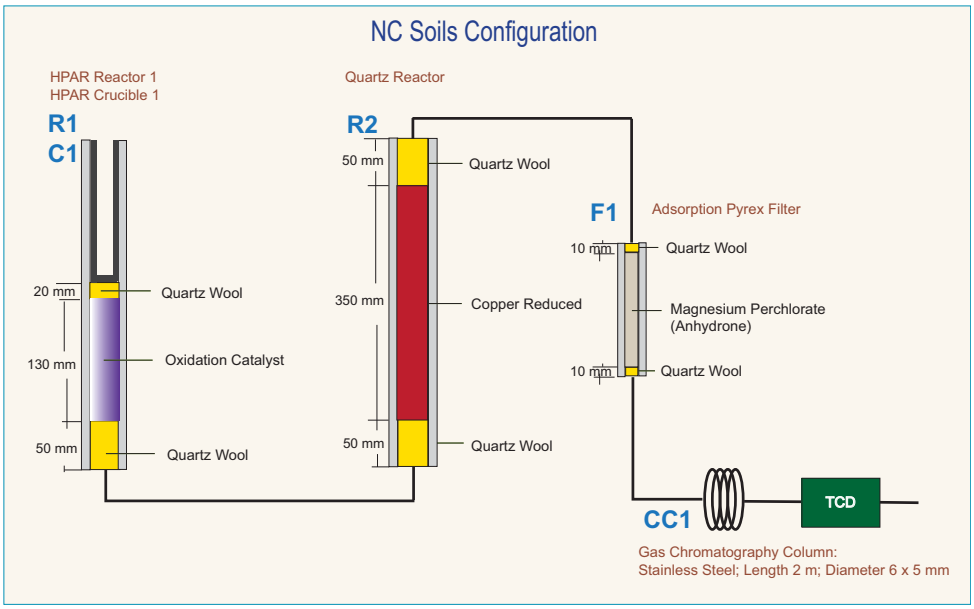
- **Quartz Wool** (15 g) P/N 33822205
- **Quartz Wool Disk** (15 mm diameter) P/N 33822210 (Set of 25)

NC Soils Determinations

Table 11-1. Consumables and Spare Parts for NC Soils Determination

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29020640
--	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
--	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
--	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
❍	Quartz Wool	5 g	33822200
❍	Oxidation Catalyst	40 g	33840000
❍	High Quality Copper	50 g	33835312
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
R1	Pre-Packed HPAR Reactor	1	46802008
--	Empty HPAR 25 mm OD	1	46820075
C1	HPAR Crucible	1	25205011
R2	Empty Quartz Reactor 18 mm OD (Set of 2)	1	46820070
F1	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	Multiseparation Column (SS; 2m; 6x5 mm)	1	26007920
--	Large “Soft” Tin Containers (Set of 100)	1	25208000
--	Tin Disk 30 mm diameter (Set of 100)	1	25208015
--	Tin Disk 35 mm diameter (Set of 100)	1	25208018
--	Forceps	1	20500500
--	Large Spatula for Container Filling	1	20500620
--	Aspartic Acid STD	2 g	33840022
--	Soil NC Reference Material	5 g	33840025

Figure 11-1. Size of the Filling Material



Tip The following consumables are also available:

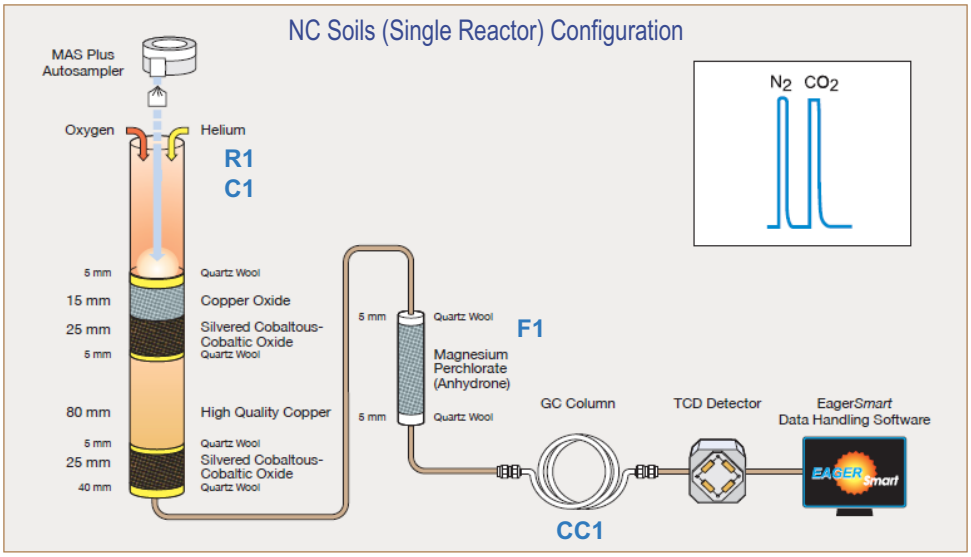
- **Quartz Wool** (15 g) P/N 33822205

NC Soils Determinations (Single Reactor)

Table 11-2. Consumables and Spare Parts for N Lubricant (Single Reactor) Determination

Refer to:	Description	Qty	Part Number
--	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
--	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Silver Cobaltous - Cobaltic Oxide	25 g	33824500
❍	High Quality Copper	50 g	33835312
❍	Magnesium Perchlorate (Anhydrone)	100 g	33821900
C1	HPAR Crucible, 18 mm OD	1	25205011
R1	Empty HPAR Reactor, 25 mm OD	1	46820075
F1/F2	Empty Adsorption Filter (Small Size) without Fast Connectors	1	28113104
CC1	Multiseparation Column (SS, 2 m, 6x5 mm)	1	26007920
--	Large “Soft” Tin Containers (Set of 100)	1	25208000
--	Tin Disk 30 mm diameter (Set of 100)	1	25208015
--	Tin Disk 35 mm diameter (Set of 100)	1	25208018
--	Forceps	1	20500500
--	Large Spatula for Container Filling	1	20500600
--	Aspartic Acid	10 g	33840023
--	Soil NC Reference Material	5 g	33840025

Figure 11-2. Size of the Filling Materials



Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205

N/Protein, N/Brew Determinations

Table 12-1. Consumables and Spare Parts for N/Protein, N/Brew Determinations

Refer To:	Description	Qty	Part Number
--	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
--	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
❍	Quartz Wool	5 g	33822200
❍	Oxidation Catalyst	40 g	33840000
❍	High Quality Copper	50 g	33835312
❍	Soda Lime	100 g	33835235
❍	Silica Gel plus indicator	100 g	33840035
❍	Molecular Sieve 3 Å	100 g	33801801
--	Chromosorb™ WAW 30/60 mesh	25 g	33837530
R1	Pre-Packed HPAR Reactor; 25 mm OD	1	46802008
C1	HPAR Crucible	1	25205011
R1/R2	Empty HPAR Reactor; 25 mm OD	1	46820075
F1/F2	Empty Adsorption Filter (Large Size) without Fast Connectors	2	28113064
CC1	Nitrogen Separation Column (PTFE; 0.5 m; 8x6 mm)	1	26007820
CC1	Nitrogen Separation (N-Brew) Column (PTFE; 1 m; 8x6 mm)	1	26070004
--	Large “Soft” Tin Containers (Set of 100)	1	25208000
--	Tin Disk 30 mm diameter (Set of 100)	1	25208015
--	Tin Disk 35 mm diameter (Set of 100)	1	25208018
--	Forceps	1	20500500
--	Large Spatula for Container Filling	1	20500620
--	Urea STD	10 g	33840002
--	Aspartic Acid STD	10 g	33840023
--	Pasta Reference Material	10 g	33840024

Figure 12-1. Size of the Filling Material

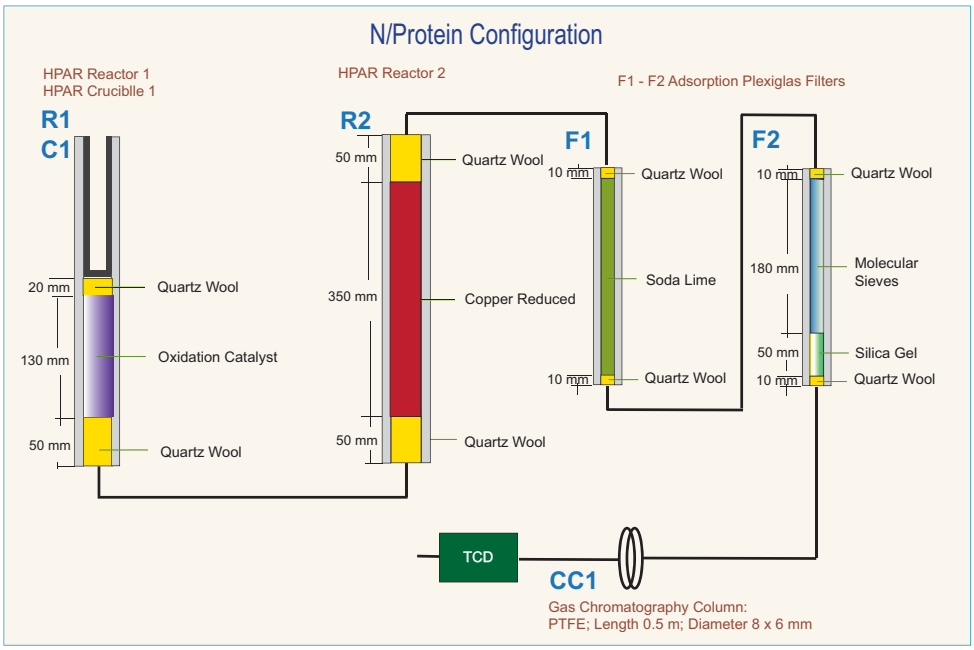
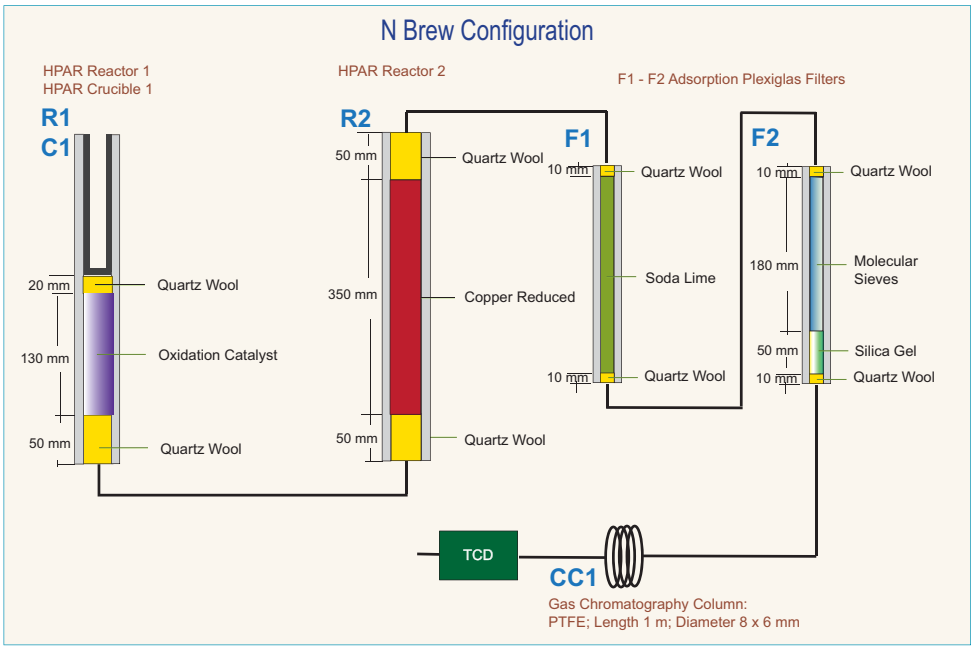


Figure 12-2. Size of the Filling Material (2)



Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205

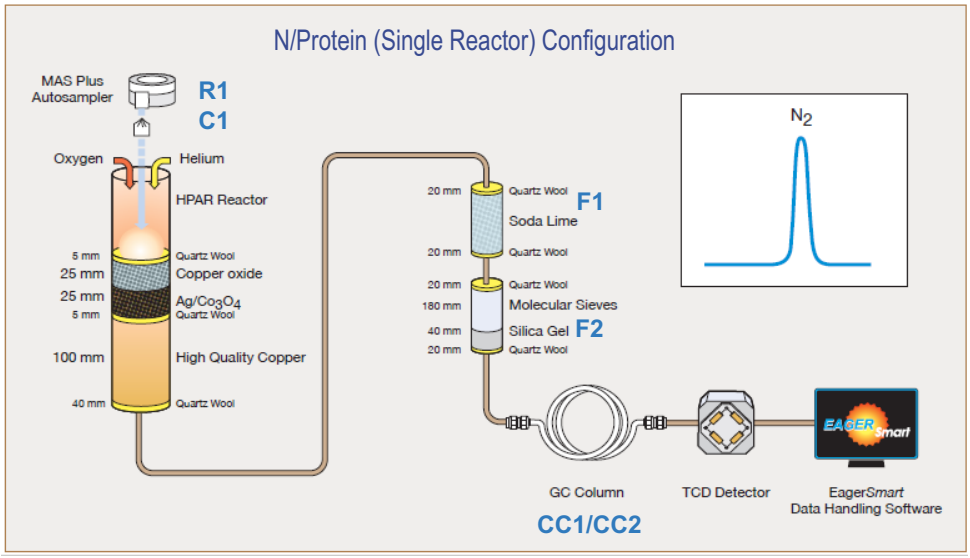
Tip For the correct reactor filling, follow the instructions reported in Chapter 6 of the *FlashSmart Operating Manual* (P/N 31707001) and the corresponding video available in the green USB stick named OEA Documents.

N/Protein Determination (Single Reactor)

Table 12-2. Consumables and Spare Parts for N Lubricant (Single Reactor) Determination

Refer to:	Description	Qty	Part Number
--	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
--	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
❍	Quartz Wool	5 g	33822200
❍	Copper Oxide	50 g	33821710
❍	Silver Cobaltous - Cobaltic Oxide	25 g	33824500
❍	High Quality Copper	50 g	33835312
❍	Soda Lime	100 g	33835235
❍	Silica Gel plus indicator	100 g	33840035
❍	Molecular Sieve 3 A	100 g	33801801
C1	HPAR Crucible, 18 mm OD	1	25205011
R1	Empty HPAR Reactor, 25 mm OD	1	46820075
F1/F2	Empty Adsorption Filter (Large Size) without Fast Connectors	2	28113064
CC1	Nitrogen Separation Column (PTFE, 0.5 m, 8x6 mm)	1	26007820
CC1	Nitrogen Separation Column (PTFE, 1 m, 8x6 mm)	1	26070004
--	Chromosorb™ WAW 30/60 mesh	1	33837530
--	Large “Soft” Tin Containers (Set of 100)	1	25208000
--	Tin Disk 30 mm diameter (Set of 100)	1	25208015
--	Tin Disk 35 mm diameter (Set of 100)	1	25208018
--	Forceps	1	20500500
--	Large Spatula for Container filling	1	20500600
--	Urea	10 g	33840002
--	Aspartic Acid	10 g	33840023
--	Pasta Reference Material	10 g	33840024

Figure 12-3. Size of the Filling Materials



Tip The following consumables are also available:

- **Quartz Wool** (15 g) P/N 33822205

Kits of Consumables and Spare Parts

Contents

Kit for 1000 Analyses

Table 13-1. Consumables for CHN Determination

No	Description	Qty	Part Number
	CHN Determination	**1**	**19002562**
1	Tin Containers Megabox (Set of 1000)	1	24006410
2	Quartz Wool (5 g)	1	33822200
3	Chromium Oxide (25 g)	2	33822900
4	Silvered Cobaltous-Cobaltic Oxide (25 g)	2	33824500
5	High Quality Copper (50 g)	4	33835312
6	Empty Quartz 18 mm OD Reactor Tube (Set of 2)	2	46820070

Table 13-2. Consumables for CHNS/NCS/S Determination with no Pre-Packed Reactor

No	Description	Qty	Part Number
	CHNS / NCS / S Determination with *Empty* Quartz Reactor	**1**	**19002564**
1	Tin Containers Megabox (Set of 1000)	1	24006410
2	Copper Oxide (50 g)	2	33821710
3	Magnesium Perchlorate [Anhydrone] (100 g) *Only for NCS and S determinations*	1	33821900
4	Quartz Wool (5 g)	1	33822200
5	Electrolytic Copper (80 g)	4	33835314
6	Vanadium Pentoxide (1 g)	1	33837510
7	Empty Quartz 18-mm Reactor Tube (Set of 2)	2	46820070

Table 13-3. Consumables for CHNS/NCS/S Determination with Pre-Packed Reactor

No	Description	Qty	Part Number
	CHNS / NCS / S Determination with *Pre-Packed* Quartz Reactor	**1**	**19002565**
1	Tin Containers Megabox (Set of 1000)	1	24006410
2	Quartz Wool (5 g)	2	33822200
3	Magnesium Perchlorate [Anhydrone] (100 g)	1	33821900
4	Vanadium Pentoxide (1 g)	1	33837510
5	Pre-Packed 18-mm OD Quartz Reactor CHNS/NCS	4	46802015

Table 13-4. Consumables for Oxygen Determination

No	Description	Qty	Part Number
	Oxygen Determination	**1**	**19002563**
1	Silver Containers Megabox (Set of 1000)	1	24005410
2	Magnesium Perchlorate [Anhydrone] (100 g)	1	33821900
3	Quartz Wool (5 g)	1	33822200
4	Quartz Turnings (50 g)	1	33822300
5	Nickel Plated Carbon (5 g)	4	33823800
6	Nickel Wool (2 g)	1	33825000
7	Soda Lime (100 g)	1	33835235
8	Empty 18 mm OD Quartz Reactor (Set of 2)	1	46820070

Table 13-5. Consumables for N Org Determination (1)

No	Description	Qty	Part Number
	N Org Determination	**1**	**19002566**
1	Tin Containers Megabox (Set of 1000)	1	24006410
2	Molecular Sieve 3 Å (100 g)	1	33801801
3	Copper Oxide (50 g)	2	33821710
4	Quartz Wool (5 g)	2	33822200
5	Silvered Cobaltous-Cobaltic Oxide (25 g)	2	33824500
6	Soda Lime (200 g)	2	33835230
7	High Quality Copper (50 g)	6	33835312
8	Silica Gel plus indicator (100 g)	1	33840035
9	Empty 18 mm OD Quartz Reactor (Set of 2)	2	46820070

Table 13-6. Consumables for N Lubricant Determination (Sheet 1 of 2)

No	Description	Qty	Part Number
	N Lubricant Determination	**1**	**19002568**
1	Large “Soft” Tin Containers (Set of 100)	10	25208000
2	Molecular Sieve 3 Å (100 g)	1	33801801
3	Quartz Wool (5 g)	2	33822200
4	Soda Lime (200 g)	2	33835230
5	High Quality Copper (50 g)	6	33835312
6	Oxidation Catalyst (40 g)	2	33840000
7	Silica Gel with Indicator (100 g)	1	33840035

Table 13-6. Consumables for N Lubricant Determination (Sheet 2 of 2)

No	Description	Qty	Part Number
8	Bottom O-Ring for HPAR Reactor; 25 mm OD (set of 5)	1	29020649
9	Top O-Ring for HPAR Reactor; 25 mm OD (set of 5)	1	29020682

Table 13-7. Consumables for NC Org Determination

No	Description	Qty	Part Number
	NC Org Determination	**1**	**19002567**
1	Tin Containers Megabox (Set of 1000)	1	24006410
2	Copper Oxide (50 g)	2	33821710
3	Magnesium Perchlorate [Anhydrone] (100 g)	2	33821900
4	Quartz Wool (5 g)	2	33822200
5	Silvered Cobaltous-Cobaltic Oxide (25 g)	2	33824500
6	High Quality Copper (50 g)	6	33835312
7	Empty Quartz 18 mm Reactor Tube (Set of 2)	2	46820070

Table 13-8. Consumables for NC Soils

No	Description	Qty	Part Number
	NC-Soil Determination	**1**	**19002561**
1	Large “Soft” Tin Container (Set of 100)	10	25208000
2	Magnesium Perchlorate [Anhydrone] (100 g)	1	33821900
3	Quartz Wool (5 g)	2	33822200
4	High Quality Copper (50 g)	6	33835312
5	Oxidation Catalyst (40 g)	2	33840000
6	Empty 18 mm OD Quartz Reactor Tube (Set of 2)	1	46820070

Table 13-9. Consumables for N/Protein (for Solid Samples) (Sheet 1 of 2)

No	Description	Qty	Part Number
	N/Protein Determination (for Solid Samples)	**1**	**19002560**
1	HPAR Crucible	1	25205011
2	Large “Soft” Tin Container (Set of 100)	10	25208000
3	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649

Table 13-9. Consumables for N/Protein (for Solid Samples) (Sheet 2 of 2)

No	Description	Qty	Part Number
4	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
5	Molecular Sieve 3 Å (100 g)	1	33801801
6	Quartz Wool (5 g)	2	33822200
7	Soda Lime (200 g)	3	33835230
8	High Quality Copper (50 g)	12	33835312
9	Oxidation Catalyst (40 g)	2	33840000
10	Aspartic Acid STD (10 g)	1	33840023
11	Pasta Reference Material (10 g)	1	33840024
12	Silica Gel plus Indicator (100 g)	1	33840035

Table 13-10. N/Protein and N/Brew Determination (for Liquid Samples)

No	Description	Qty	Part Number
	N/Protein Determination (for Liquid Samples with AI/AS autosampler)	**1**	**19002569**
1	Complete Vials 2 SVW Package (Set of 100)	10	24014019
2	Vial Solvent 4 mL ST 4-SVQ (Set of 5)	1	24014032
3	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
4	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
5	Septa for Waste Bottle (Set of 5)	1	31303218
6	BTO Septa for Flash EA Injectors (Set of 50)	1	31303230
7	Molecular Sieve 3 Å (100 g)	1	33801801
8	Quartz Wool (5 g)	1	33822200
9	Soda Lime (200 g)	3	33835230
10	High Quality Copper (50 g)	6	33835312
11	Oxidation Catalyst (40 g)	2	33840000
12	Silica Gel plus indicator (100 g)	2	33840035
13	Urea STD (10 g)	1	33840002
14	Screw Caps 8-SC (Set of 5)	10	38606085

Kit for 5000 Analyses

Table 13-11. Consumables for N/Protein (for Solid Samples)

No	Description	Qty	Part Number
	N/Protein Determination (for Solid Samples)	**1**	**19002575**
1	HPAR Crucible	2	25205011
2	Tin Container (Set of 100)	50	25208000
3	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
4	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
5	Molecular Sieve 3 Å (100 g)	5	33801801
6	Quartz Wool (5 g)	10	33822200
7	Soda Lime (200 g)	15	33835230
8	High Quality Copper (50 g)	60	33835312
9	Oxidation Catalyst (40 g)	10	33840000
10	Aspartic Acid STD (10 g)	2	33840023
11	Pasta Reference Material (10 g)	2	33840024
12	Silica Gel plus Indicator (100 g)	4	33840035

14

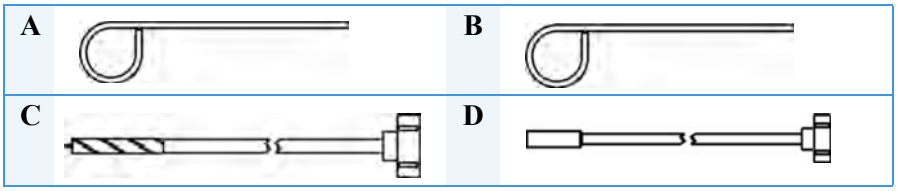
Reactors, Adsorption Filters, GC Columns and Fittings

Contents

Reactors

Table 14-1. Reactors, Consumables, O-Rings and Tools

No	Description	Qty	Part Number
1	Empty 18 mm OD Quartz Reactor (Set of 2)	1	46820070
2	Top O-Ring for 18 mm OD Quartz Reactor (Set of 5)	1	29022910
3	Bottom O-Ring 18 mm OD Quartz Reactor (Set of 5)	1	29020640
4	Empty 25 mm OD Quartz Reactor	1	46820080
5	Tapered (18/12 mm OD) Quartz Reactor	1	46820078
6	Empty HPAR Reactor 25 mm OD	1	46820075
7	Top O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020682
8	Bottom O-Ring for HPAR Reactor; 25 mm OD (Set of 5)	1	29020649
9	Empty Ceramic Reactor18 mm OD	1	46802010
10	Empty Ceramic Reactor 25 mm OD	1	BRE0018735
11	Pre-Packed Quartz Reactor for CHNS / NCS / S Determinations	1	46802015
12	Pre-Packed HPAR Reactor for N-Protein / NC-Soils Determinations	1	46802008
13	Pre-Packed Quartz Reactor NC / CHN Determinations - Argon sealed	1	46802009
14	HPAR Crucible	1	25205011
15	Nickel Sheet 0.15x130x130 mm (Set of 2)	1	25205110
16	Quartz Crucible (13 mm OD)	1	25204510
17	Small Quartz Crucible for 12 mm OD Quartz Reactor 15x6.75 mm (Set of 5)	1	25204500
	HPAR Reactor Extractor (see **A**)	1	20500626
	Crucible Extractor (see **B**)	1	20500627
	Cleaning Device for HPAR Reactor (see **C**)	1	20500625
	Cleaning Device for Quartz Reactor and SS Crucible (see **D**)	1	27606010



Adsorption Filters

Table 14-2. Adsorption Filters

No	Description	Qty	Part Number
1	Adsorption Pyrex® Filter FC (Small Size) without Fast Connectors	1	28113104
2	Adsorption Plexiglas® Filter FC (Large Size) without Fast Connectors	1	28113064
3	Fast Connectors Couple (Male plus Female) - *See* Figure 14-1	1	19050208
4	Fast Connector Couples plus Fast Connectors Adapters - *See* Figure 14-1 consisting of: - Fast Connectors (male + female), Set of 2 and Fast Connector Adapters, Set of 2	1	19050209
5	Sealing O-Ring for Adsorption Filter FC [P/N 28113104] (Set of 2)	1	29003635
6	Sealing O-Ring for Adsorption Filter FC [P/N 28113064] (Set of 2)	1	29010082

Figure 14-1. Fast Connection Couples & Fast Connection Couples Plus Fast Connectors Adapters

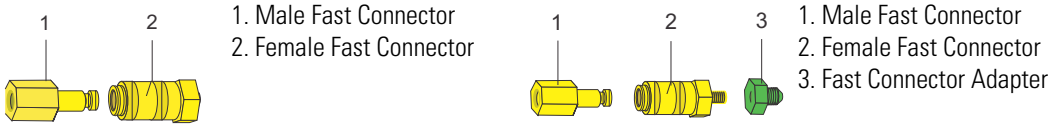


Table 14-3. Adsorption Filters (Old Types)

No	Description	Qty	Part Number
1	Adsorption Filter (Small Size)	1	28113100
2	Sealing O-Ring for Adsorption Filter [P/N 28113100] (Set of 2)	1	29013603
3	Adsorption Filter (Large Size)	1	28113060
4	Sealing O-Ring for Adsorption Filter [P/N 28113060] (Set of 2)	1	29010082

Table 14-4. Adsorption Traps (Pyrex Type)*

No	Description	Qty	Part Number
1	Large Adsorption Trap (Pyrex™ Type) without Fast Connectors	1	28113106
2	Sealing O-Ring for Pyrex Type Large Adsorption Filter (Set of 2)	1	29003635

* It substitutes the Adsorption Filter (Large Size) with Fast Connectors P/N 28113065 in N/Protein and NC Soil Configurations when the sample contains very high humidity percentage and when several daily analyses are required.

Table 14-5. Clips for Adsorption Filters

No	Description		Qty	Part Number
1	Clip for Small Adsorption Filter, 12.5 mm (Set of 2)		1	42920152
2	Clip for Large Adsorption Filter- N/Protein, 29 mm (Set of 2)		1	42920156

Gas Chromatographic Columns

Table 14-6. Gas Chromatographic Columns

No	Description	Qty	Part Number
1	Multiseparation Column (PTFE; 2 m; 6x5 mm)	1	26008220
2	Multiseparation Column (SS; 2 m; 6x5 mm)	1	26007920
3	CHNS/NCS Separation Column (PTFE; 2 m; 6x5 mm)	1	26008215
4	Oxygen Separation Column (Stainless Steel; 1 m; 6x5 mm)	1	26007900
5	Sulfur Separation Column (PTFE; 0.8 m; 6x4 mm)	1	26007800
6	Sulfur Separation Column for OEA / FPD (PTFE; 0.15 m; 6x4 mm)	1	26007801
7	Nitrogen Separation Column (PTFE; 0.5 m; 8x6 mm)	1	26007820
8	Nitrogen Separation (N-Brew and N-Lubricant) Column (PTFE; 1 m; 8x6 mm)	1	26070004
9	NC Separation Column (SS; 3 m; 6x5 mm)	1	26007931
10	NC Separation Column (SS; 5 m; 6x5 mm)	1	26007950

	Characteristics				Analytical Determination											
	Material	Length (cm)	OD (mm)	ID (mm)	CHNS	CHN	NCS	S (TCD)	S (FPD)	Oxygen	N	N/Protein	N/Brew, N-Lubricant	NC	NC-Soils	NC, NC Soils (argon carrier gas)
Columns	Stainless Steel	100	6	5						✘						
		200	6	5										✘	✘	
		300	6	5												
		500	6	5												✘
	PTFE	15	6	4					✘							
		50	8	6							✘	✘				
		80	6	4				✘								
		100	8	6									✘			
		200	6	5	✘	✘	✘									

Fittings & Tubes

Table 14-7. Fittings & Tubes (Sheet 1 of 2)

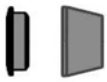
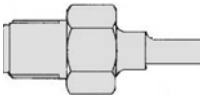
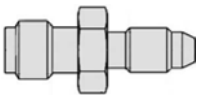
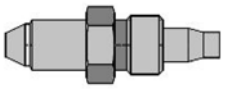
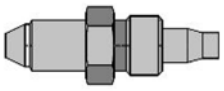
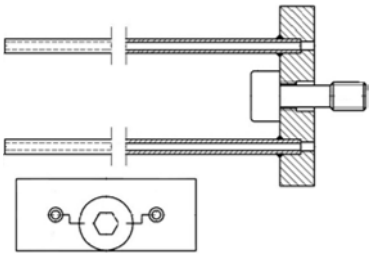
No	Description	Qty	Part Number
O-rings			
1	O-ring for 6 mm OD tube (Set of10) *(for bottom connector 25 mm diameter, 6x4 mm)* 	1	29030567
Ferrules			
2	Aluminum Ferrule, 2 mm (Set of 10) *(for bottom connector 18 mm diameter, 2x1 mm and tubing 2x1 mm)* 	1	29034045
3	Aluminum Ferrule, 4 mm (Set of 10) *(for bottom connector 18 and 25 mm diameter, 4x2 mm and tubing 4x2 mm)* 	1	29034051
4	Brass Ferrule 1/8”, Back/Front (Set 0f 5) *(for bottom connector 25 mm diameter, 4x2 mm for NC Soils, N/Protein and N Lubricant single reactor)* 	1	29024666
Nuts			
5	Knurled nut for Polyethylene Tube, Blue Color P/N 42010000 	1	35002124
6	SS Tubing Nut; 2 mm (Set of 10) 	1	35040403
7	6 MB Brass Blind Nut (Set of 10) 	1	35045100
8	Hexagonal Nut, 4x2 mm 	1	35000413
9	Hexagonal Nut, 6x4 mm 	1	35000414
10	Brass Nut 1/8” (Set of 5) *(for bottom connector 25 mm diameter, 4x2 mm for NC Soils, N/Protein and N Lubricant single reactor)* 	1	35013063
Unions			
11	6MB-1/8” Swagelok Union *(for gas connections and single reactor connection for NC Soils, N/Protein and N Lubricant)* 	1	34705452
12	6MB x 6MB Union 	1	34704400

Table 14-7. Fittings & Tubes (Sheet 2 of 2)

No	Description	Qty	Part Number
13	Push Fit Connector Tube; 6 MB Brass (Set of 5) 	1	35034108
14	Male hose adapter for Polyethylene Tube P/N 42010000 	1	35004137
15	Male hose adapter for Polyethylene Tube P/N 42010000 (Set of 10) 	1	35044137
16	EFCt Double Connection Block 	1	22204625
Tubes			
17	Stainless Steel Tube; 2x1 mm	3 m	39102500
18	Polyethylene Tube, Blue Color; 5x3 mm	5 m	42010000
19	PTFE Tube; 2x1 mm	1 m	42001500
20	PTFE Tube; 2x1mm	5 m	42001501
21	PTFE Tube; 4x2 mm	1 m	42001600
22	PTFE Tube; 6x4 mm	1 m	42001700

Analytical Standards and Reference Materials

Table 15-1. Analytical Standards

No	Description	Qty	Part Number
1	Acetanilide	2 g	33836700
2	Aspartic Acid	2 g	33840022
3	Aspartic Acid	10 g	33840023
4	Atropine	2 g	33824400
5	BBOT[a]	2 g	33835210
6	Benzoic Acid	2 g	33822500
7	Cyclohexanone 2,4 DNPH[b]	1 g	33822400
8	dl-Methionine	25 g	33835220
9	EDTA[c]	1 g	BRE0018733
10	EDTA[c]	100 g	33800110
11	Fluorene	1 g	33821951
12	Imidazole	1 g	33835430
13	L-Cystine	2 g	33840018
14	Nicotinamide	2 g	33840019
15	Nicotinic acid	1 g	BRE0018734
16	Polyethylene	1 g	33840037
17	Polystyrene	1 g	33840038
18	Sulphanilamide	2 g	33825100
19	Sulphanilic Acid	1 g	33840039
20	Sulphamethazine	1	33840040
21	Tocopherol Nicotinate	1 g	33840036
22	Urea	2 g	33840001
23	Urea	10 g	33840002

[a] 2,5 bis (5-ter-butyl-benzoxazol-2-yl) thiophene

[b] Cyclohexanone 2,4-dinitrophenylhydrazone

[c] Ethylenediaminetretaacetic acid

Table 15-2. Standard Kits

No	Description	Qty	Part Number
1	CHNS/CHNSO Standard Kit The kit includes: - BBOT STD 0.5 g n. - Cystine STD 0.5 g - Methionine STD 0.5 g - Sulphanilamide STD 0.5 g n.	1	33840010
2	CHN/CHNO Standard Kit The kit includes: - Acetanilide STD 0.5 g - Atropine STD 0.5 g - Cyclohexanone STD 0.5 g - Nicotinamide STD 0.5 g	1	33840011

Table 15-3. Reference Materials

No	Description	Qty	Part Number
1	Lubricant Reference Material	2 g	33835240
2	Pasta Reference Material	10 g	33840024
3	Pasta Reference Material for S determination (OEA / FPD)	2 g	33840027
4	Soil NC Reference Material	5 g	33840025
5	Soil NCS Reference Material for NCS determination and S determination (OEA/FPD)	2 g	33840026
6	OEA/FPD Reference Solutions Kit constituted by 4 flasks (2 mL each) containing 10, 50, 100, and 500 ppm for sulfur	1	33819040

Standards

Standard	N%	C%	H%	S%	O%
Acetanilide	10.36	71.09	6.71	---	11.84
Aspartic Acid	10.52	36.09	5.30	---	48.08
Atropine	4.84	70.56	8.01	---	16.59
BBOT	6.51	72.53	6.09	7.44	7.43
Benzoic Acid	---	68.85	4.95	---	26.20
Cyclohexanone 2-4 DNPH	20.14	51.79	5.07	---	23.00
dl-Methionine	9.39	40.25	7.43	21.49	21.45
EDTA	9.59	41.10	5.52	---	43.79
Fluorene	---	93.94	6.06	---	---
Imidazole	41.15	52.93	5.92	---	---
L-Cystine	11.66	29.99	5.03	26.69	26.63
Nicotinamide	22.94	59.01	4.95	---	13.10
Nicotinic acid	11.38	58.54	4.09	---	25.99
Polyethylene	---	85.71	14.47	---	---
Polystyrene	---	91.95	7.84	---	---
Sulphanilamide	16.27	41.84	4.68	18.62	18.58
Sulphanilic Acid	8.09	41.61	4.07	18.51	27.71
Sulphamethazine	20.12	51.78	5.07	11.52	11.49
Tocopherol Nicotinate	2.61	78.46	9.97	---	8.96
Urea	46.65	20.00	6.71	---	26.64

Reference Materials

Reference Material	N%	C%	H%	S%
Lubricant (batch N° O12A)	0.58	76.44	12.00	2.40
Pasta (batch N° H13A)	1.89	---	---	---
Pasta for OEA/FPD (batch N° N12A)	---	---	---	0.134
Soil NC (batch N° N12A)	0.20	2.01	---	---
Soil NCS (batch N° N12A)	0.20	2.01	---	0.032

Tip The values vary from batch to batch.

OEA/FPD Reference Solution Kit

OEA/FPD Reference Solutions Kit P/N 33819040
10 ppm of Sulfur (2 mL flask)
50 ppm of Sulfur (2 mL flask)
100 ppm of Sulfur (2 mL flask)
500 ppm of Sulfur (2 mL flask)

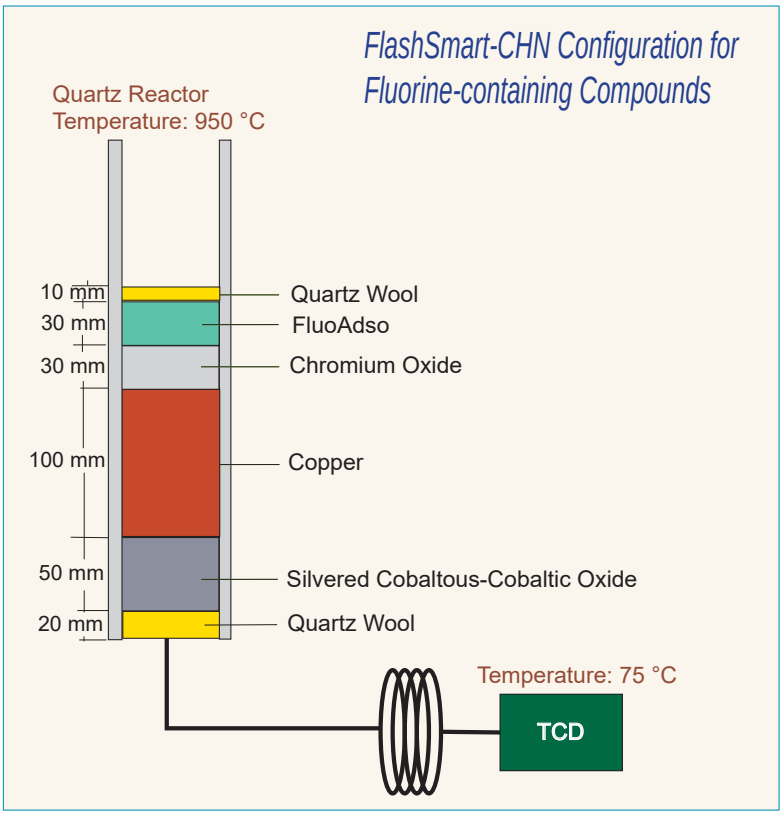
Tip All the standards and the references material are accompanied with a quality certificate including the storage condition and the lifetime of the products.

Adsorber for Fluorine Compound

Table 16-1. Adsorber for Fluorine Compounds

No	Description	Qty	Part Number
1	FluoAdso Specific adsorber for Fluorine compounds for CHN, NC, and N Determinations	15 g	33840030

Figure 16-1. Size of the Filling Material



For more details on CHN determination of fluorine-containing compounds, refer to the **OEA Application Note n. 42162.**

Upgrade Kits

Contents

Kit for Total Organic Carbon (TOC) in Solid Sample P/N 19004145

Total Organic Carbon is a very important parameter for soil or for other organic matrix.

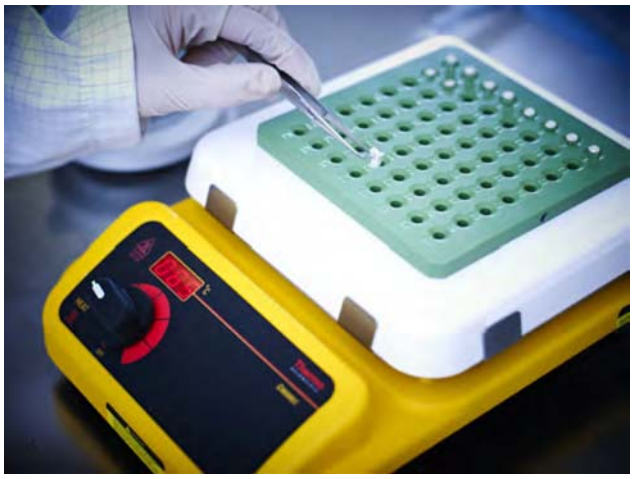
The kit for TOC allows to eliminate all inorganic carbon as Carbon Dioxide by effect of the acidification and heating of the sample in special containers.

Table 17-1 lists the materials included into the kit.

Table 17-1. Kit for Total Organic Carbon in Solid Sample

Part Number	Description	Quantity
24005405	Silver sample container for solid (Set of 100)	1
	Sample holder plate (see Figure 17-1)	1
	Electric heater (see Figure 17-1)	1
	Syringe 250 µL	1

Figure 17-1. Sample Holder Plate and Electric Heater



Conversion Kit from NC to S Determination P/N 19004240

Table 17-2 lists the materials included into the kit.

Table 17-2. Conversion Kit from NC to S Determination

No	Description	Qty
1	Universal "Soft" Tin Containers (P/N 24006400; Set of 100)	1
2	Sulfur Separation Column (PTFE; 0.8 m; 6x5 mm)	1
3	BBOT[a] (N: 6.51%; C: 72.53%; S: 7.44%)	1
4	Vanadium Pentoxide (1 g)	1
5	Soil NCS Reference Material (2 g) [The percentage of the elements in this Ref. Mat. will vary batch-to-batch as indicated to analytical data sheet included] Soil NCS R.M. (Batch n. N12A) N%: 0.20; C%: 2.01; S%: 0.032	1
6	Bottom Adapter Connection, 18 mm - 6MB (complete)	1
7	Pre-Packed Quartz Reactor for NCS Determination	1

[a] 2,5 bis (5-tert-butyl-benzoxazol-2-yl) thiophene

Conversion Kit from NC to NCS Determination P/N 19004245

Table 17-3 lists the materials included into the kit.

Table 17-3. Conversion Kit from NC to NCS Determination

No	Description	Qty
1	Universal "Soft" Tin Containers (P/N 24006400; Set of 100)	1
2	CHNS / NCS Separation Column (PTFE; 2 m; 6x5 mm)	1
3	BBOT[a] (N: 6.51%; C: 72.53%; S: 7.44%)	1
4	Vanadium Pentoxide (1 g)	1
5	Soil NCS Reference Material (2 g) [The percentage of the elements in this Ref. Mat. will vary batch-to-batch as indicated to analytical data sheet included] Soil NCS R.M. (Batch n. N12A) N%: 0.20; C%: 2.01; S%: 0.032	1
6	Bottom Adapter Connection, 18 mm - 6MB (complete)	1
7	Pre-Packed Quartz Reactor for NCS Determination	1

[a] 2,5 bis (5-tert-butyl-benzoxazol-2-yl) thiophene

Conversion Kit from CHN to CHNS Configuration P/N 19004246

Table 17-4 lists the materials included into the kit for upgrading a CHN analyzer to CHNS.

Table 17-4. Conversion from CHN to CHNS Configuration

No	Description	Qty
1	CHNS / NCS Separation Column (PTFE; 2 m; 6x5 mm)	1
2	BBOT[a] (N: 6.51%; C: 72.53%; S: 7.44%)	1
3	Vanadium Pentoxide (1 g)	1
4	Pre-Packed Quartz Reactor for CHNS/NCS/S Determinations	1

[a] 2,5 bis (5-tert-butyl-benzoxazol-2-yl) thiophene

Conversion Kit from CHN/CHNS to Oxygen Configuration P/N 19004247

Table 17-5 lists the materials included into the kit for upgrading a CHN/CHNS analyzer to Oxygen.

Table 17-5. Conversion from CHN/CHNS to Oxygen Configuration

No	Description	Qty
1	Silver Containers (set of 100)	1
2	Oxygen Separation Column (SS; 1 m; 6x5 mm)	1
3	Empty Adsorption Filter (small size)	1
4	Magnesium Perchlorate [Anhydrone] (100 g)	1
5	Quartz Wool (5 g)	1
6	Quartz Turnings (50 g)	1
7	Nickel Plated Carbon (5 g)	1
8	Soda Lime (100 g)	1
9	Empty Quartz Reactor (Set of 2)	1

Sample Containers

Contents

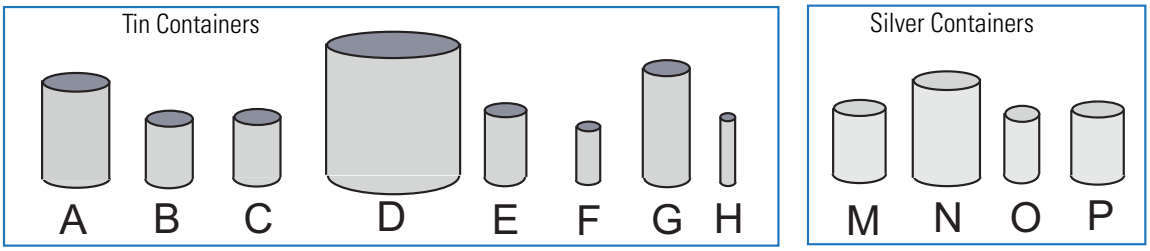
Tip You will find here an optimized guide for the best choice of containers tailored to your specific analytical needs, through a detailed specification both for tin and silver containers to be used according to the different applications. To avoid deformation problems and to guarantee a complete use of all the sample containers, these are conveniently supplied and protected in adequate plastic boxes in package of 50 and 100 pieces.

Tin Containers

Table 18-1. Tin Containers (See Figure 18-1)

Refer To:	Description	Height	Diameter	Weight (mg)	Qty	Part Number
A	Universal "Soft" Tin Containers	8 mm	5 mm	19	100	24006400
	Universal "Soft" Tin Containers Megabox	8 mm	5 mm	19	1000	24006410
B	Small "Soft" Tin for Solid Sample	5 mm	3.5 mm	12	100	24005300
C	Lightweight "Soft" Tin container	5 mm	35 mm	8	100	24005310
D	Large "Soft" Tin Containers for N/Protein and N-Brew Analysis	10 mm	10 mm	62	100	25208000
E	"Hard" Tin Containers	6 mm	3 mm	48	100	24008810
F	"Hard" Tin Containers	4.5 mm	2 mm	23	100	24008820
G	"Hard" Tin Containers	9 mm	3.5 mm	90	50	24007200
H	"Hard" Tin Capillary Containers	5.5 mm	1.06 mm	8	50	24007000
I	Tin Disk	---	30 mm	19	100	25208015
L	Tin Disk	---	35 mm	85	100	25208018

Figure 18-1. Tin and Silver Containers



1. "Soft" containers are obtained by pressing light metal foil.
2. "Hard" tin containers are heavier than the "Soft" ones and allow hermetic sealing. For this reason, the "Hard" tin containers are obtained by moulding ultrapure tin sheets.

Tin Container Type	Use
A	Recommended for solid samples (organics, soils, sediments, food, plastic, coal, and so on), or liquid samples adsorbed on inert solid material Chromosorb™ WAW 30/60 mesh (P/N 33837530). See Figure 18-1.
B	Recommended for solid samples.
C	Recommended for trace C, H level
D	Recommended for N/Protein and N-Brew Determinations.
E	Recommended for the analysis of any viscous sample. See Figure 18-2.

Tin Container Type	Use
F	Recommended for the analysis of any liquids. For volatile liquids we recommended the use of liquid sealing device (P/N 20503002).
G	Suggested for analysis of trace elements (N, C, S) in liquids such as water, wine, beer, milk, urine, and so on.
H	Suggested for the analysis of liquid samples when the material is available in very small amounts. Useful for volatile samples. The use of Sealing Device (P/N 20503002) is highly recommended. For more details on Sealing Device, see Chapter 19, "Sample Preparation Accessories."
I	Use Sealing Device (P/N 25209010)
L	Use Sealing Device (P/N 25209010)

Silver Containers

Table 18-2. Silver Containers (See Figure 18-1)

Refer To:	Description	Height	Diameter	Weight (mg)	Qty	Part Number
M	Universal "Soft" Silver Containers	6 mm	4 mm	16	100	24005400
	Universal "Soft" Silver Containers Megabox	6 mm	4 mm	16	1000	24005410
N	"Soft" Silver Containers	8 mm	5 mm	54	100	24005405
O	"Hard" Silver Containers	5 mm	2 mm	34	50	24005100
P	Heavy Silver Container	6 mm	4 mm	32	100	24005411

Silver Container Type	Use
M	Recommended for oxygen determination for solid samples.
N	Recommended for Total Organic Carbon (TOC) determination according to the Thermo Fisher Scientific method (patent n. 90110186.5). See Figure 18-3 and "Kit for Total Organic Carbon (TOC) in Solid Sample P/N 19004145" on page 17-2.
O	Recommended for oxygen analysis of liquid samples (e.g. gasoline). The Sealing Device (P/N 20503002) is highly suggested for these liquid samples.
P	Recommended for special application on inorganic carbon determination

Figure 18-2. Sampling Techniques

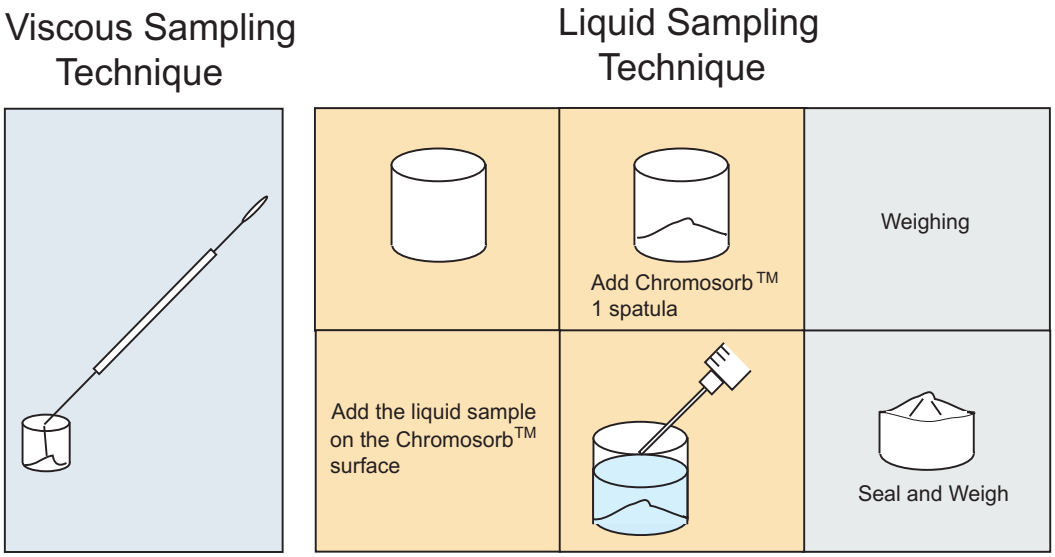
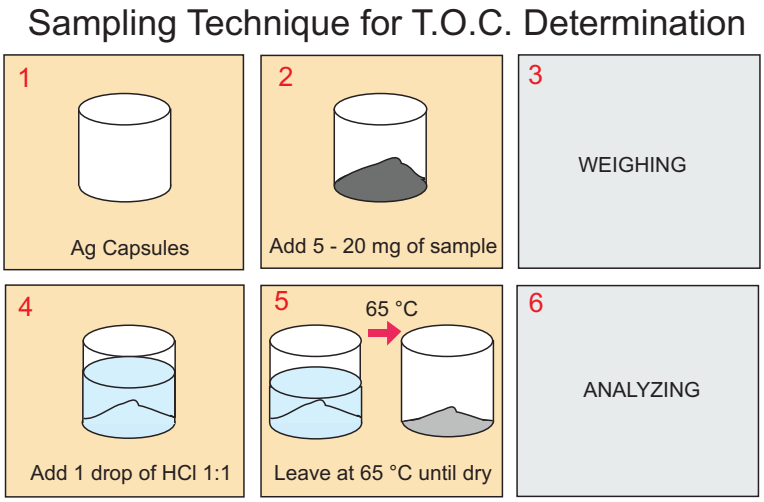


Figure 18-3. T.O.C. Determination



Sample Preparation Accessories

Table 19-1. Sample Preparation Accessories

Refer To:	Description	Qty	Part Number
A	Sample Support Plate	1	20500310
B	Sealing Device for Large Tin Containers	1	25209010
C	Sealing Device for Liquid Containers	1	20503002
D	Sample Holder (small size) Sample Holder (large size) Reactor/ Crucible Holder	1 1 1	24010053 24010054 24010057
E	Cleaning Device for Quartz Reactor and Crucible	1	27606010
F	Cleaning Device for HPAR Reactor	1	20500625
--	Forceps	1	20500500
--	Crucible Extractor	1	20500627
--	HPAR Extractor	1	20500626
--	Small Spatula for Container Filling	1	20500600
--	Large Spatula for Container Filling	1	20500620
--	Syringe 100 µL (710 SNR)	1	36500204
--	Syringe 10 µL	1	36502001

Table 19-2. Accessories Description

Reference	Comments
A	*Available on request*.
B	Inserted in N/Protein, N-Brew, NC-Soils, NC-Sediments and NC Filters Standard Outfit.
C	Liquid device for liquid containers (*available on request*), allows the analysis of hygroscopic solid compounds and volatile liquid substances without variation of weight. The samples are introduced in the container using a spatula, syringes or generic needles. We suggest the use of liquid tin containers or capillaries according to the viscosity of the liquid sample. The container is then placed in the sealing device slide. The container is to be purged with a flow of oxygen or helium before closing. The container is tightly closed and the constancy of weight is monitored by an electronic balance. For liquids with high vapor pressure, use tin capillaries: the treatment with inert gas in not necessary because the vapor pressure generated by the liquid sample is sufficient to flush the atmospheric gases from the container.
D	**Sample Holder (small size)** is used to carry up to 90 weighed and sealed containers from the balance to the autosampler mounted on the instrument. **Sample Holder (large size)** is used to carry up to 12 weighed and sealed containers from the balance to the autosampler mounted on the instrument. **Reactor/Crucible Holder**, *available on request*, is used to place reactors and crucibles.
E	Available in all Flash*Smart* Standard Outfit Configurations. Recommended tools to clean the reactor when replacing the catalyst.
F	Inserted in N/Protein, N/Brew and NC Soils Standard Outfit.

Figure 19-1. Accessories

A	B	C
		
D	**E**	**F**
		

MAS Plus Autosampler for Solid Samples

The MAS Plus Autosampler for sold samples is shown in Figure 20-1.

Figure 20-1. MAS Plus Autosampler for Solid Samples

Spare Parts

Table 20-1. MAS Plus Autosampler for Solid Sample - Spare Parts (Sheet 1 of 2)

No	Description	Qty	Part Number
1	MAS Plus Autosampler (complete) one drum	1	25106100
2	Loading Spring	1	31505211
3	Positioning Spring	1	31505212
4	Gear Plate	1	35800626
5	MAS Plus Geared Motor	1	31807628
6	MAS Plus Aluminum Front Cover 	1	24105536
7	MAS Plus Complete Shaft (piston) 	1	34301512

Table 20-1. MAS Plus Autosampler for Solid Sample - Spare Parts (Sheet 2 of 2)

No	Description	Qty	Part Number
8	MAS Plus Drum No 1 (1-32 Position) 	1	25106101
9	Additional MAS Plus Drum No 2 (33 - 63 Position) 	1	25106102
10	Additional MAS Plus Drum No 3 (64 - 94 Position) 	1	25106103
11	Additional MAS Plus Drum No 4 (95 - 125 Position) 	1	25106104
12	Window O-ring (Set of 10)	1	29030014
13	MAS Plus Internal O-ring (Set of 10)	1	29030017
14	MAS Plus Plastic Cover 	1	24104477
15	MAS Plus Plastic Inner Window	1	30108020
16	MAS O-ring Replacement Tool 	1	20502613
17	Green O-ring MAS Plus Shaft (Set of 3) 	1	29030343

AI/AS 1310 Autosampler for Liquids for the Flash*Smart* Elemental Analyzers

Figure 21-1. AI/AS 1310 Autosampler

AI 1310 AS 1310

Table 21-1. AI 1310 / AS 1310 Autosampler for Liquid Samples for Flash*Smart* EA (Sheet 1 of 2)

No	Description	Qty	Part Number
1	AI 1310 for liquids	1	25117571
2	AS 1310 for liquids	1	25117572
3	Upgrade option AI 1310 to AS 1310	1	19050299
4	0.5 µL syringe	1	36504045
5	10 µL syringe	1	36500525
6	50 µL syringe	1	36504040
7	100 µL syringe	1	36504041
8	250 µL syringe	1	36504042
9	8-position tray with label	1	24010140
10	105-position tray for AS 1310	1	24010145

Table 21-1. AI 1310 / AS 1310 Autosampler for Liquid Samples for Flash*Smart* EA (Sheet 2 of 2)

No	Description	Qty	Part Number
11	Waste bottle complete with 5 septa and caps 	1	24012416
12	Complete Vials 2 SVW Package (Set of 100) - Sample Vials [Screw top cap and septa are included] 	1	24014019
13	Vial Solvent 4 mL S T4-SVQ (Set of 5) - Solvent Vials [Screw top cap and septa are included] 	1	24014032
14	Septa 8-ST (Set of 5) [This septa can be used for Sample Vials and Solvent Vial; see points 12 and 13.]	1	31303218
15	BTO Septa for Flash EA injector (Set of 50)	1	31303230
16	Complete Screw Caps (blue) for 2 mL vials (Set of 100)	1	38606092
17	Screw Caps 8-SC for Waste bottle (Set of 5)	1	38606085
18	Insulating Collar 	1	32100310
19	Insulating Injector for Biodiesel **Tip** For more details on Biodiesel liquid samples (AS 1310 and insulating injector & collar), require the OEA Application Note No. 11008. 	1	24705250

Table 21-2. AI 1310 / AS 1310 AI/AS 1310 Spare Parts

No	Description	Qty	Part Number
1	AI/AS 1310 M/S printing circuit board assembly	1	15220080
2	Portable External Power Supply, Level VI efficiency; 90-264 Vac/24Vdc	1	20806061
3	Complete Base assembly AI/AS 1310	1	22107110
4	RS232/USB adapter	1	23038131
5	Complete Top cover assembly AI/AS 1310	1	24105570
6	Slide stepper motor AI/AS 1310	1	31802925
7	Front door AI/AS 1310	1	33311045
8	AI/AS 1310 bracket for Flash*Smart*	1	36812742
9	Complete Tower assembly AI/AS 1310	1	37001440
10	Fitting Liquid Injection, 18 mm diameter 	1	24725001
11	Fitting Liquid Injection, 25 mm diameter 	1	35008419
12	Nut ¼ G inj PKD 	1	35001051

Table 21-3. AI 1310 / AS 1310 Cables

No	Description	Qty	Part Number
1	Power Cable 10A/250V	1	23033000
2	Power Cable 10A/125V	1	23033035
3	RS232 Cable (10 m)	1	23043501
4	Flat Cable Flex 26F/16F	1	23045615

Accessories for Injection of Liquid and Gas Samples

Table 22-1. Accessories for Injection of Liquid and Gas Samples

No	Description	Qty	Part Number
1	Manual Injection kit for Liquid or Gas Sampling  The kit includes: • Fitting Liquid Injection 18 mm diameter (P/N 24725001) and 25 mm diameter (P/N 3500841) • Coupling joint for liquid/gas • Injection connection • Various septum holders for every *FlashSmart* EA and previous OEA models • 10 µL; 100 µL; 500 µL Syringes • Septa BTO 11.5 mm OD (Set of 50)	1	19004138

Recommended Spare Parts

Table 23-1. Recommended Spare Parts (Sheet 1 of 2)

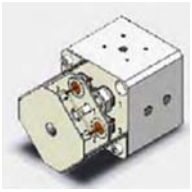
No	Description	Qty	Part Number
1	Complete Furnace (25 mm furnace adapter) for Flash*Smart*. **Tip** Complete Furnace includes the Pt/Pt-Rh thermocouple. 	1	35406100
2	Thermal Conductivity Detector (TCD) 	1	41907510
3	Heater for Oven	1	35421510
4	Temperature Sensor Pt 100 for Oven	1	40311095
5	Thermocouple Pt/Pt-Rh 	1	40320005
6	Furnace Transformer for all Flash*Smart* versions 	1	41325075
7	NiCd 3.6 V Battery	1	21901505
8	Fan V2S	1	40600300
9	Fuse, slow-blow, 1.6 A, 5x20 mm	1	28204018
10	Fuse, slow-blow, 800 mA, 5x20 mm	1	28205011
11	Magnetic Circuit Protector Main Switch (Breaker 7 A)	1	23709912
12	Pressure Regulator for Helium and Oxygen 	1	42506800

Table 23-1. Recommended Spare Parts (Sheet 2 of 2)

No	Description	Qty	Part Number
13	Manometer (0-500 kPa) 	1	36716041
14	Bulkhead Fitting for 2 mm OD Tubings 	1	34703100

Flash*Smart* FPD Option

The OEA / FPD option—**P/N 43210145**—increases the sensitivity in **sulfur** determination by using a highly selective and sensitive Flame Photometric Detector (FPD) coupled with the Elemental Analyzer.

This FPD option can be applied to any configuration and it allows the determination of trace sulfur (low limit: 10 ppm) in both liquid and solid compounds.

The OEA / FPD option comprises:

- FPD EA Detector Module that includes the FPD detector and the pneumatic circuit to control the detector gases flows P/N 43209886
- FPD Control Module to control the detector parameters P/N 16500110
- FPD Standard Outfit P/N 27509075.

Figure 24-1. Flash*Smart* EA with FPD Option

FPD Performance Specifications

Table 24-1. FPD Performance Specifications

Performance Specifications	
Low Limit	0.0005-0.0010% (5-10 ppm) Sulfur
Max Limit	0.5% (5000 ppm) Sulfur (for more info, refer to the Flash*Smart* Technical Specifications)
Gas Requirements	Helium Chromatographic-grade purity Air 99.995%; Hydrogen 99.995%
Power Requirements	120/230 Vac; 50/60 Hz
Host Hardware Requirements	Pentium Processor-operating system Windows™ 2000, XP, Vista, Windows 7, Windows 8 or Windows 10
Host Software Requirements	Eager*Smart*
Dimension	Gas Control Box: 177×235×287 mm (l×h×d) FPD Control Module: 180×85×485 mm (l×h×d)
Mass	Gas Control Box: 5 kg FPD Control Module: 6 kg

OEA / FPD Reference Material

Table 24-2. OEA / FPD Reference Material

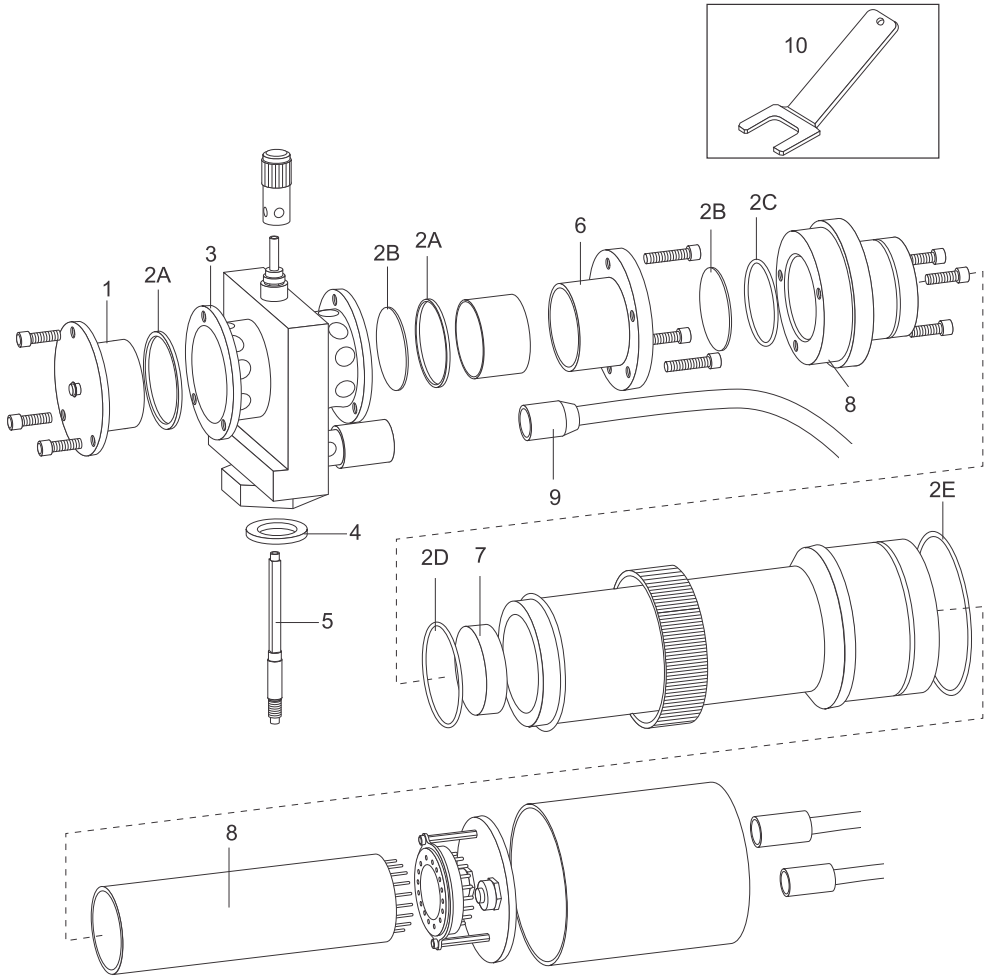
Description	Qty	Part Number
Reference Solutions Kit includes four flasks (2 mL each) containing 10, 50, 100, and 500 ppm of Sulfur	1	33819040
Pasta Reference Material for Sulfur Determination (OEA/FPD)	2 g	33840027
Soil NCS Reference Material for NCS determination and S determination (OEA/FPD)	2 g	33840026

OEA / FPD Detector Spare Parts

Table 24-3. Flame Photometric Detector Spare Parts

Ref.	Description		Qty.	Part Number
1	Mirror plug			35005350
2A	Maintenance kit for FPD	Graphite seal	2	19004589
2B		Heat shield	2	
2C		Viton™ O-ring 3106	1	
2D		Viton O-ring 3175	1	
2E		Viton O-ring 75 SH	1	
3	Detector body		1	19050111
4	Aluminum O-ring		1	29003230
5	FPD jet		1	40404511
6	Flange and relevant Viton O-ring		1	36814235
7	Interferential filter for Sulfur		1	28107000
8	Photomultiplier		1	28600450
9	Heater/sensor/coil cable (1.5 m)		1	23043587
10	FPD fixing tool		1	20502150
	Silcosteel™ tubing 1 m; 0.4 mm OD x 0.25 mm ID		1	39110025
	Graphite ferrule ID 0.45 for Silcosteel tubing (Set of 2)		1	29013487
	Nut for Silcosteel tubing (Set of 5)		1	35032423

Figure 24-2. FPD Spare Parts



Electronic Flow Controller (EFC-t) Module

Helium Standard EFC-t Module P/N 42509150

Table 25-1. Helium Standard EFC-t Module

No	Description	Qty
1	EFC-t Module (complete) for *FlashSmart* models The kit includes: • Flow Sensor • 2-way Valve (Normally Open) • 2-way Valve (Normally Closed) • Proportional Valve • 3-way Valve	1

Argon EFC-t Module P/N 42509155

Table 25-2. Argon EFC-t Module

No	Description	Qty
1	EFC-t Module (complete) for *FlashSmart* models The kit includes: • Flow Sensor • 2-way Valve (Normally Open) • 2-way Valve (Normally Closed) • Proportional Valve • 3-way Valve	1

Argon Option EFC-t Module Kit for N Determinations P/N 19004330

Table 25-3. Argon Option EFC-t Module Kit for N determinations

No	Description	Qty
1	EFC-t Module (complete) for *FlashSmart* models with Argon option The kit includes: • EFC-t Argon Module (complete) • CD-ROM or DVD or USB stick Eager*Smart* Software • Flash*Smart* Argon Option Firmware Ver. 1.12 • N Separation Column (PTFE, 1 m) • Argon Gas Up grade Kit for N determination Installation Guide	1

Argon Option EFC-t Module Kit for NC Determinations P/N 19004340

Table 25-4. Argon Option EFC-t Module Kit for NC determinations

No	Description	Qty
1	EFCt Module (complete) for *FlashSmart* models with Argon option The kit includes: • EFC-t Argon Module (complete) • CD-ROM or DVD or USB stick Eager*Smart* Software • *FlashSmart* Argon Option Firmware Version 1.12 • NC Argon Option Separation Column (SS, 5 m) • Argon Gas Up grade Kit For NC determination Installation Guide	1

Argon Option EFC-t Module Kit for N and NC Determinations P/N 19004350

Table 25-5. Argon Option EFC-t Module Kit for NC determinations

No	Description	Qty
1	EFC-t Module (complete) for Flash*Smart* models with Argon option The kit includes: • EFC-t Argon Module (complete) • CD-ROM or DVD or USB stick Eager*Smart* Software • N Separation Column (PTFE, 1 m) • NC Argon Option Separation Column (SS, 5 m) • Flash*Smart* Argon Option Firmware Version 1.12 • Argon Gas Up grade Kit for N determination Installation Guide • Argon Gas Up grade Kit For NC determination Installation Guide	1

Flash*Smart* Electronics and Cables

Printed Circuit Boards

Table 26-1. Printed Circuit Boards

No	Description	Qty	Part Number
1	TRF1112 Transformer Board	1	23648445
2	MB1112 Mother Board	1	23648450
3	AC1112 Alternative Current Board	1	23648455
4	TCR1112 Thermo Control Board	1	23648460
5	HWD1112 TCD Control Board	1	23648465
6	CPU1112 Central Processing Board	1	23648470
7	PWR1112 Power Supply Card	1	23648480
8	DPFC1112 Electronic Flow Control Board	1	23648490
9	LTA-1 Thermo Coupled Linearizer Box	1	20901700
10	Front Panel Board	1	23648413

Cables

Table 26-2. Cables

No	Description	Qty	Part Number
1	Power Cable (Part of the Flash*Smart* Standard Outfit)	1	23033000
2	RS 232 Cable with Ferrite (Part of the Flash*Smart* Standard Outfit)	1	23043145
3	Cable Assy 9P F/F Curly	1	23038132

Serial USB Converter

RS232/USB Adapter P/N 23038131

The UPort 1110 connects USB to serial adapter enables a serial device to be connected to a computer through the USB port.

The unit features a portable design that does not require external power or complicated setup procedures.

A DVD with drivers is included (Microsoft™ Windows™ 98, 2000, XP, Vista, Windows 7, Windows 8 and Windows 10). LEDs for indicating USB and transmission data (TxD), and receiving data (RxD) activity are present.

Tip The RS232/USB converter is now included in the Flash*Smart* standard outfit but it can be ordered separately.

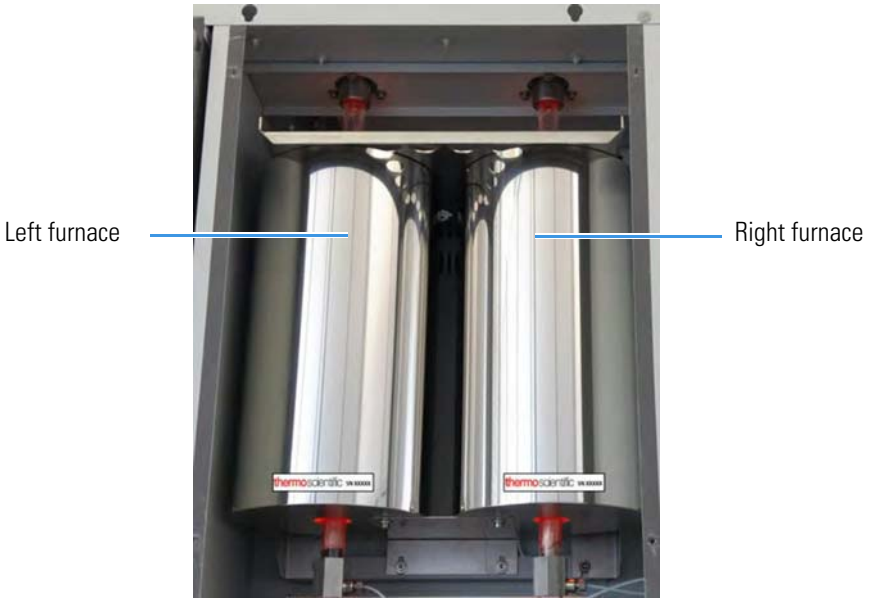
Single-to-Double Furnace Upgrade Kit

The kit allows to transform the configuration of your analyzer, for example CHN or CHNS, equipped with a single furnace, in a configuration having two furnaces (18 mm OD), for example CHN-O or CHNS-O. The kit is suitable for all Flash*Smart* models.

Table 28-1. Single to Double Furnace Upgrade Kit

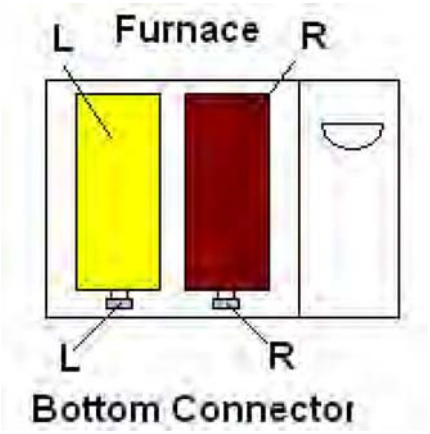
No	Description	Qty	Part Number
1	Single to Double Furnace Upgrade Kit The kit includes: - Furnace (Complete) - Connections - Fittings - Accessories - Cable - Instruction manual	1	19004281

Figure 28-1. Furnace Compartment



Furnaces Transformation Kits

Figure 29-1.



Flash*Smart* Configuration

Configuration	Reactor Into Left Furnace	Left Furnace Bottom Connector	Reactor into Right Furnace	Right Furnace Bottom Connector
CHN, CHNS, NCS, O	18 mm	2x1 mm	none	none
CHN/O or CHNS/O	18 mm	2x1 mm	18 mm	2x1 mm
N Org	18 mm	4x2 mm	18 mm	4x2 mm
N Lubricant	25 mm	6x4 mm	25 mm	6x4 mm
NC org	18 mm	4x2 mm	18 mm	4x2 mm
NC Soils	25 mm	4x2 mm	18 mm	4x2 mm
N / Protein	25 mm	6x4 mm	25 mm	6x4 mm

Transformation Kits Available

Tip The transformation kits do not include the furnace but the adapters, connectors, plate assembly, and so on.

According to the option reported in Table A and Table B, four different kits are available:		
1	Transformation furnace kit (from 25 to 18 mm, bottom connector 2x1 mm)	19004253
2	Transformation furnace kit (from 25 to 18 mm, bottom connector 4x2 mm)	19004254
3	Transformation furnace kit (from 18 to 25 mm, bottom connector 6x4 mm)	19004273
4	Transformation furnace kit (from 18 to 25 mm, bottom connector 4x2 mm)	19004274

Example: from CHNS/O to NC Soils model

CHNS/O: 2 furnaces 18 mm; both bottom connections 2x1 mm

NC Soils: 2 furnaces (25 mm, 18 mm); bottom connection 4x2 mm

For this modification needs:

- Transformation kit (from 18 to 25 mm, Bottom Connector 4x2) n.1
- Bottom Connection (18 mm, 4x2 mm) n.1
- A 4 x 2 SS tubing and relative joints

If the User Wants to Add a New Furnace (and Upgrade the Instrument Configuration)

In this case, the user needs a complete furnace and a transformation furnace kit. A furnace will be chosen according to the application (18 mm or 25 mm type) while the kit will be used for the top level Flash*Smart* reactor connection (on the top level of the instrument) and for the bottom connection according to the analysis requested:

18 mm, bottom connection 2x1 mm
18 mm, bottom connection 4x2 mm
25 mm, bottom connection 6x4 mm
25 mm, bottom connection 4x2 mm

Example: CHN (single furnace) → CHN/O (double furnaces)

For this modification, the user needs:

- Complete furnace (18 mm diameter) P/N 35460021
- Transformation kit (18 mm, bottom connector. 2x1 mm) P/N 19004251
- 2 x 1 SS tubing and relative joints

Transformation Furnace Kits List

The items inserted in the transformation kits are here listed:

Figure 29-2.

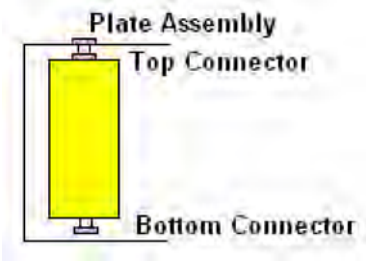


Table 29-1. Transformation Furnace Kit 18 to 25 mm bottom connection 6x4 mm

No	Description	Qty	Part Number
Transformation Furnace Kit from 18 to 25 mm bottom connection 6 x 4 mm		**1**	**19004273**
1	Bottom O-ring (Set of 5)	1	
2	Top O-ring (Set of 5)	1	
3	Aluminum Ferrule; 2 mm diameter (Set of 10)	1	
4	6MB nut (Set of 10)	1	
5	Nut 1” 1/4	1	
6	Knurled Nut for Polyethylene Tube (5x3 mm)	4	
7	Tube connector for PTFE; 5x3 mm	4	
8	Top Connector (25 mm)	1	
9	Screw (4x20 mm)	2	
10	Polyethylene Tube; 5x3 mm; 1 m	1	
11	Clip (Filter fixing)	4	
12	Pressure Equilibration Cylinder	1	
13	Clip (Pressure Equilibration Cylinder fixing)	1	
14	Teflon™ Tube; 2x1 mm; 5 m	1	
15	Bottom Connection (25 mm diameter; 6x4 mm)	1	
16	PTFE Tube; 6x4 mm; 1 m	1	
17	OR/OV Viton™ (Set of 10)	1	
18	Nut, M 12x1 mm	2	

Table 29-2. Transformation Furnace Kit from 18 to 25 mm bottom connection 4x2 mm

No	Description	Qty	Part Number
Transformation Furnace Kit from 18 to 25 mm bottom connection 4 x 2 mm		**1**	**19004274**
1	Bottom O-ring (Set of 5)	1	
2	Top O-ring (Set of 5)	1	
3	Aluminum Ferrule 2 mm diameter (Set of 10)	1	
4	6 MB nut (Set of 10)	1	
5	Nut 1” 1/4	1	
6	Top Connector (25 mm)	1	
7	Screw (4x20 mm)	2	
8	Clip (Filter fixing)	4	
9	Teflon Tube; 2x1 mm; 5 m	1	
10	Bottom Connection (25 mm diameter; 4x2 mm)	1	
11	PTFE Tube; 4x2 mm; 1 m	1	
12	4 mm OD Ferrule (Set of 10)	1	
13	Nut, M10x1 mm	2	

Table 29-3. Transformation Furnace Kit from 25 to 18 mm bottom connection 2x1 mm

No	Description	Qty	Part Number
Transformation Furnace Kit from 25 to 18 mm bottom connection 2 x 1 mm		**1**	**19004253**
1	Bottom O-ring for 18 mm OD Quartz Reactor (Set of 5)	1	
2	Top O-ring for 18 mm OD Quartz Reactor (Set of 5)	1	
3	6MB nut (Set of 10)	1	
4	Nut 304	1	
5	Top Connector (18 mm)	1	
6	Screw for Filter Clip	2	
7	Filter Clip (Set of 2)	1	
8	Teflon Tube; 2x1 mm; 5 m	1	
9	Bottom Connection; 18 mm diameter; 2x1 mm	1	
10	Stainless Steel Tube; 2x1 mm; 3 m	1	
11	Ferrule (Set of 10)	1	

Table 29-4. Transformation Furnace Kit from 25 to 18 mm bottom connection 4x2 mm

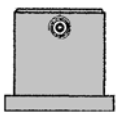
No	Description	Qty	Part Number
Transformation Furnace Kit from 25 to 18 mm bottom connection 4 x 2 mm		**1**	**19004254**
1	Bottom O-ring for 18 mm OD Quartz Reactor (Set of 5)	1	
2	Top O-ring for 18 mm OD Quartz Reactor (Set of 5)	1	
3	6MB nut (Set of 10)	1	
4	Stainless Steel Tube; 2x1 mm; 3 m	1	
5	Top Connector 18 mm	1	
6	Screw for Filter Clip	2	
7	Filter Clip (Set of 2)	1	
8	Nut 304	1	
9	Bottom Connection; 18 mm diameter; 4x2 mm	1	
10	PTFE Tube (4x2 mm); 1 m	1	
11	Ferrule 4 mm (Set of 10)	1	
12	Hexagonal Nut M10x1	2	
13	Ferrule 2 mm (Set of 10)	1	
14	PTFE Tube; 2x1 mm; 5 m	1	

Items for Transformation Furnace

Plate Assembly

No	Description	Part Number
1	Adapter Plate 18 mm	26702724
2	Adapter Plate 25 mm	26702725

Top Connections



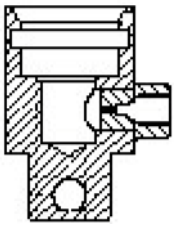
No	Description	Part Number
1	Top Connector 18 mm	35008421
2	Top Connector 25 mm	35008423

Furnace Adapters

The 18 mm washer adapter is placed on the top of the furnace. Under the washer is placed the suitable seal.

No	Description	Part Number
1	Furnace Adapter 25/18 mm	26702723
2	Seal for Furnace Adapter 18 mm	29003632
3	Seal for Furnace Adapter 25 mm	29003633

Bottom Connections



No	Description	Part Number
1	Bottom Connection (18 mm diameter; 2x1)	35008433
2	Bottom Connection (18 mm diameter; 4x2)	35008432
3	Bottom Connection (25 mm diameter.; 6x4)	35008426
4	Bottom Connection (25 mm diameter; 4x2)	35008431
5	Complete Bottom Connection for Tapered Quartz Reactor (18/12 mm; 2x1)	

a.	Lower Fitting	34744101
b.	Spacer Ring	29050632
c.	Rubber O-ring (Set of 10)	29030567
d.	Knurled Nut	35046402

MultiValve Control (MVC) Module

The MultiValve Control (MVC) Module is shown in Figure 30-1.

Figure 30-1. MultiValve Control (MVC) Module

Spare Parts

Table 30-1. MultiValve Control (MVC) Module - Spare Parts (Sheet 1 of 2)

No	Description	Qty	Part Number
1	MultiValve Control Module Kit for *FlashSmart*	1	19002473
2	MultiValve Control Module	1	43216010
3	Portable External Power Supply, Level VI efficiency; 90-264 Vac/24Vdc	1	20806061

Table 30-1. MultiValve Control (MVC) Module - Spare Parts (Sheet 2 of 2)

No	Description	Qty	Part Number
4	Gas Tubing Block for MVC 	1	25904065
5	MVC Module Valves Kit The kit includes: • Cable Assy 4 EV TYP 2/2 Wires • Cable 3-way Valve/Wires + Diode	1	19099021

FlashSmart System Qualification Package

Qualification is a process to evaluate and certify the performances of the instrument.

Qualification is a process of signing, dating and executing a Set of qualifications which can be stored in the Thermo Scientific™ Qualification folder.

FlashSmart equipment and the corresponding Flash*Smart* software is validated for the installation (Installation Qualifications IQ), and operation (Operation Qualification OQ).

The procedure requires typically two (2) days of "on-site" testing including executing, dating, and signing a Set of qualifications which are stored in the Thermo Scientific™ Qualification Folder.

No	Description	Qty	Part Number
1	Flash*Smart* System Qualification Package Folder Including AI/AS 1310 – AI/AS 3000 II for OEA Qualification Package	1	19910022

For the Flash Qualification are requested:

- The **Flash Qualification Package folder** (P/N 19910022)
- One (or more) **Qualification kit** according to the configuration which consists of consumables, standards, filters and GC separation column (all components required for the qualification procedure).

Chart of Qualification Kits

No	Description	Qty	Part Number
1	CHN Qualification Kit	1	19004280
2	CHNS Qualification Kit	1	19004285
3	O Qualification Kit	1	19004290
4	N Org Qualification Kit	1	19004295
5	N Lubricant Qualification Kit	1	19004360
6	NC Org Qualification Kit	1	19004300
7	NCS Qualification Kit	1	19004305
8	NC-Soil Qualification Kit	1	19004310
9	N/Protein Qualification Kit	1	19004315
10	N-Brew Qualification Kit	1	19004320
11	AI/AS for OEA Qualification Kit	1	19004325

NOTICE

The Qualification can be done with Thermo Fisher Scientific OEA consumables exclusively. The Qualification can be carried out only by a trained Thermo Fisher Scientific OEA specialist.

A

Customer Communication

Thermo Fisher Scientific provides comprehensive technical assistance worldwide and is dedicated to the quality of our customer relationships and services.

How to Contact Us

This appendix contains contact information for Thermo Fisher Scientific office. To contact your local Thermo Fisher Scientific office or affiliate, please refer to:

Thermo Fisher Scientific (Bremen) GmbH
Hanna-Kunath-Str. 11
28199 Bremen, Germany
Tel. +49 421 54930

Email: support.OEA.bremen@thermofisher.com
Email: walter.galotta@thermofisher.com
Email: liliana.krotz@thermofisher.com

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