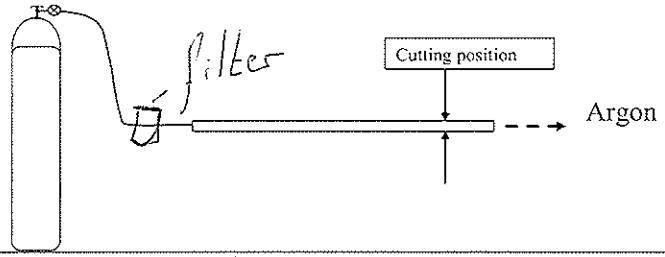
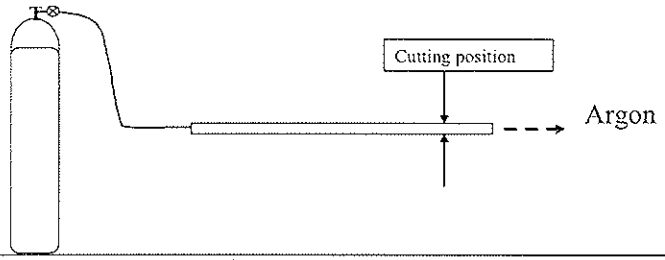
	Tube cutting procedure sheet		company: NLR		date: 14/01/2009	
	Fill in by hand.		engineer: J. VEs		location: MT.	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-			
2	Record pipe part drawing number	ET5998-07.3.3			Cold orbit heater	√
3	Make picture of part	Record picture time as on photo	11:49 :53 :55	JA N.14 2009		√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease	12:08			√
5	Clean outside tube with IPA and lint-free cloth					
6	Record cutting equipment used	Manufacturer, type/serial number	-	12V DC CENOM 2002	Metabo BST 12 impacts. Serie no: 02274000	
7	Record filter type	Manufacturer/filter size	~~0.45 µm~~	TBC	on spec. send to CCY.	√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			√

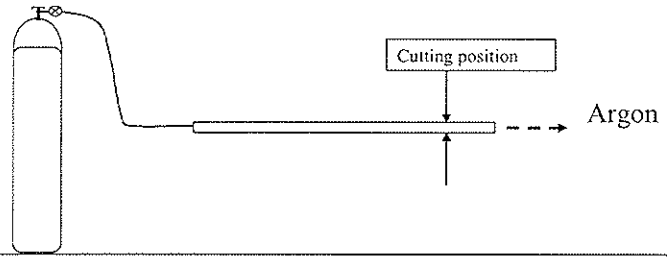
~~Radius~~ Using also "brazen" equipment on drill.

	Tube cutting procedure sheet		company:		date: 2009/01/14	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						√
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		6 ~~[illegible]~~ LPM ~~[illegible]~~	√
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			√
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				√
12	Cut tube				See pic at 3.	√
13	Make picture of set-up and record picture time					.
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				√
15	Cover tube end with caps and store in a clean box or clean environment for further integration					√
16	End cutting of part (mention part number at comments)				12:25.	√

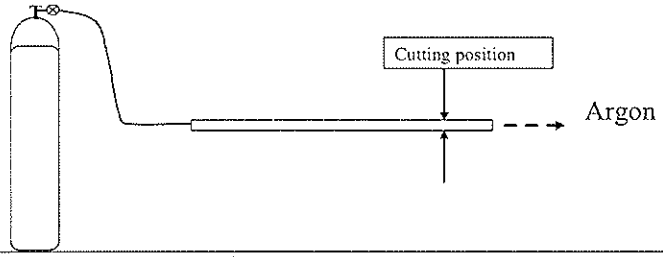
	Tube cutting procedure sheet		company: NLR		date: 14/01/2009	
	Fill in by hand.		engineer: J. v Fs		location: MT.	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-			✓
2	Record pipe part drawing number	ET5998-06	- 19.18.		Condenser return line	✓
3	Make picture of part	Record picture time as on photo			#142 15:25 #143 15:28	✓
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				
5	Clean outside tube with IPA and lint-free cloth					
6	Record cutting equipment used	Manufacturer, type/serial number	-	12V DC	Metabo serie no: 0227400	✓
7	Record filter type	Manufacturer/filter size	0.45 µm		Spec welding equipment	✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		± 12 LPM	V
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			V
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube				15:25 / 15:28	V
13	Make picture of set-up and record picture time			JAN.14.2009	#142 / #143	V
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				V
15	Cover tube end with caps and store in a clean box or clean environment for further integration				After welding	V
16	End cutting of part (mention part number at comments)				16:35	V

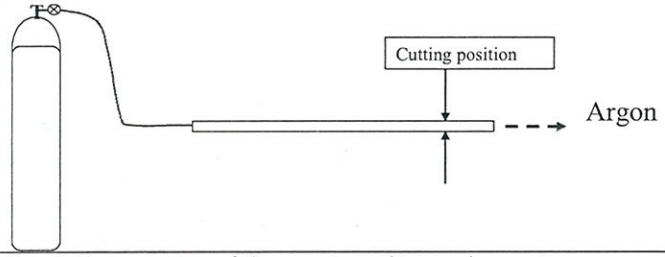
	Tube cutting procedure sheet		company: NLR		date: 14/01/2009	
	Fill in by hand.		engineer: J.v.Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-			
2	Record pipe part drawing number	ET5998.06-19.19			Condenser return line	✓
3	Make picture of part	Record picture time as on photo			#144 15:35	
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			done at AIDC clean check	✓
5	Clean outside tube with IPA and lint-free cloth				done at AIDC clean check.	✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo No. 022400	✓
7	Record filter type	Manufacturer/filter size	0.45 µm		Spec. weld equipment filter	✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						√
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			√
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			√
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				√
12	Cut tube					√
13	Make picture of set-up and record picture time				# 144	√
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface			8	√
15	Cover tube end with caps and store in a clean box or clean environment for further integration				After welding	√
16	End cutting of part (mention part number at comments)				16:35	√

	Tube cutting procedure sheet		company:		date: 14/01/2009	
	Fill in by hand.		engineer: J.v.Es		location: # MT.	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-			
2	Record pipe part drawing number	5998-07	4.3 Cb	rev E.	Preheater. 1	
3	Make picture of part	Record picture time as on photo			# 140 15:17 JAN. 14. 2009	V
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				
5	Clean outside tube with IPA and lint-free cloth					
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo 0227409	
7	Record filter type	Manufacturer/filter size	0.45 µm		Spec. Mach Tech welding equipment	
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

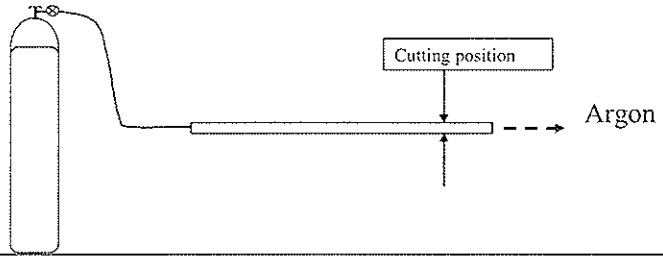
	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		3 LPM	
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			✓
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				✓
12	Cut tube					✓
13	Make picture of set-up and record picture time				# 154→16:39	
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				✓
15	Cover tube end with caps and store in a clean box or clean environment for further integration				After welding	✓
16	End cutting of part (mention part number at comments)				After welding	✓

	Tube cutting procedure sheet		company: NLR		date: 14/01/2009	
	Fill in by hand.		engineer: J. v E		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-			
2	Record pipe part drawing number	5990-07	4.3c	rev E	Preheater #145 #146	✓
3	Make picture of part	Record picture time as on photo			JAN. 14. 2009 15:36 15:40	
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			Done at AIDC	✓
5	Clean outside tube with IPA and lint-free cloth				Done at AIDC	✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo #022740	✓
7	Record filter type	Manufacturer/filter size	0.45 µm		weld equipment MT filter.	✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

	Tube cutting procedure sheet		company:		date: 14/01/09	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						√
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		5 LPM	
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			√
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				√
12	Cut tube				16:37	√
13	Make picture of set-up and record picture time				# 152	
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface			# 153 (16:39)	
15	Cover tube end with caps and store in a clean box or clean environment for further integration				After welding	√
16	End cutting of part (mention part number at comments)				After welding	√

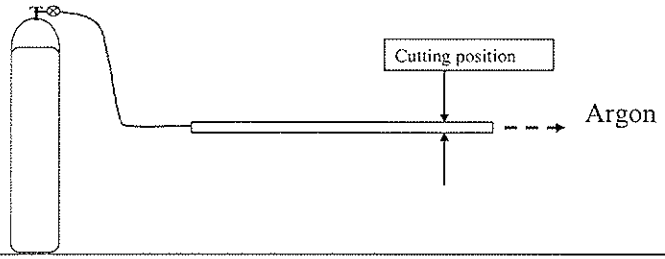
checked at 20/01 2009 dec.
9:37 JAN. 20. 2009

	Tube cutting procedure sheet		company: NLR		date: 15/01/2009	
	Fill in by hand.		engineer: J. v. E.		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	ET5998-6-19.4		Pump section	✓
2	Record pipe part drawing number				'	✓
3	Make picture of part	Record picture time as on photo			13:12 JAN. 15.2009	✓
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			Incoming inspection	✓
5	Clean outside tube with IPA and lint-free cloth					
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo #0227400	
7	Record filter type	Manufacturer/filter size	0.45 µm		weld equipment filter.	✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			✓

	Tube cutting procedure sheet		company: NLR		date: 15/01/2009	
	Fill in by hand.		engineer: J. v. Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
						V
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		6 LPM	V.
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			V
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				V.
12	Cut tube				14:02	V
13	Make picture of set-up and record picture time				~~14:02~~ JAN.15.2009	V
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration				clean check after spot weld	V
16	End cutting of part (mention part number at comments)					

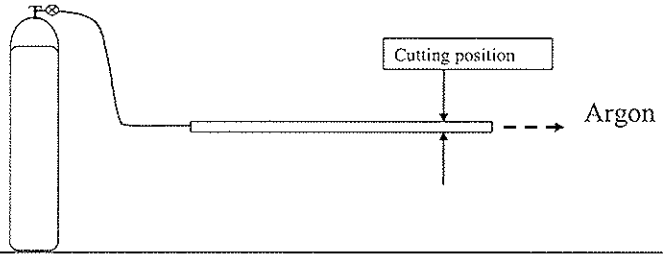
15 sec. purge

	Tube cutting procedure sheet		company: NLR		date: 15/01/2009	
	Fill in by hand.		engineer: J. v. Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	- ET5998-06- ig.2 Rcvc ET5998-06 ig.1 Rcvc		pump section	
2	Record pipe part drawing number				14:19 15/01/09. 13:12	
3	Make picture of part	Record picture time as on photo				√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			clean check after cutting	√
5	Clean outside tube with IPA and lint-free cloth					√
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo	
7	Record filter type	Manufacturer/filter size	0.45 µm		argon facility MT	√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

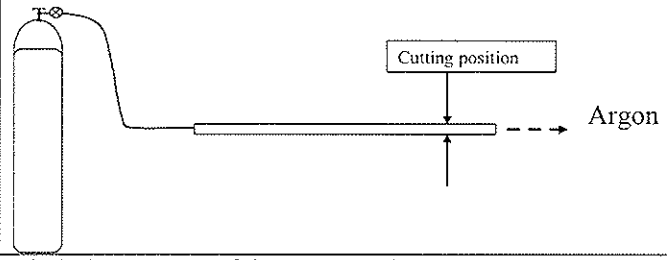
	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						✓
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-		6 LPM	✓
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside			Clean check after cutting	✓
12	Cut tube					
13	Make picture of set-up and record picture time				14:19 JAN 15.2009	✓
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				.
15	Cover tube end with caps and store in a clean box or clean environment for further integration				After welding bag	
16	End cutting of part (mention part number at comments)					

Different.

	Tube cutting procedure sheet		company: NLR		date: 15 ~~feb~~ 01/2009	
	Fill in by hand.		engineer: J. v. E		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-		APS DPS 4 mm pieces	✓
2	Record pipe part drawing number	ET3998-06	— 19.9		Rev C. (2x)	✓
3	Make picture of part	Record picture time as on photo			cut befor	
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			cleaned in IPA	
5	Clean outside tube with IPA and lint-free cloth				~~by~~ ~~ultrasonic~~ IPA bath	✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		~~dried with~~ ~~or clean or~~	✓
7	Record filter type	Manufacturer/filter size	0.45 µm		and blown ~~towel~~. through by Argon	
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-		gas filtered ~~10 LPS~~. 20 LPM.	

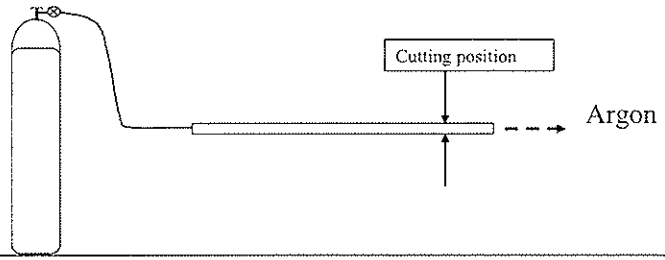
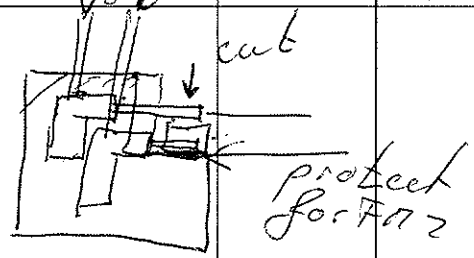
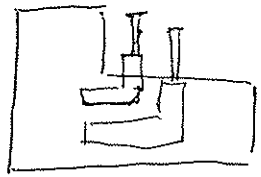
	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
					N/A see page 1	
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					

	Tube cutting procedure sheet		company: NLR		date: 16-01-2009	
	Fill in by hand.		engineer: J.v.Es		location: MT.	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model	-	TTCB-A	second piece first was trashed	
2	Record pipe part drawing number	ET3990-06-19.9		rev c		
3	Make picture of part	Record picture time as on photo		15.43		√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			clean check with purge gas after spotweld	√
5	Clean outside tube with IPA and lint-free cloth					
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo #022740	√
7	Record filter type	Manufacturer/filter size	0.45 µm		weld equipment filter	√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

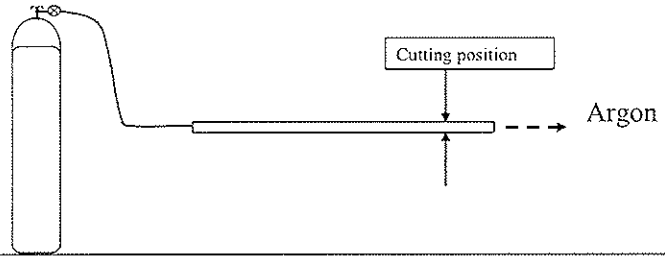
	Tube cutting procedure sheet		company: NLR		date: 16-01-2009	
	Fill in by hand.		engineer: J.v.Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
						V
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		5 LPM.	.
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			V
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					V
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				V
15	Cover tube end with caps and store in a clean box or clean environment for further integration				clean check with purge after welding"	
16	End cutting of part (mention part number at comments)					V.

	Tube cutting procedure sheet		company: NLR		date: 16/01/2009	
	Fill in by hand.		engineer: J. v. Es		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model	-		Outlet pump cutting	
2	Record pipe part drawing number	ET5998-06-4C			outlet pumps	√
3	Make picture of part	Record picture time as on photo			17:23 after cutting	√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			purge during	
5	Clean outside tube with IPA and lint-free cloth				before and after	√
6	Record cutting equipment used	Manufacturer, type/serial number	-		Normal steel saw	√
7	Record filter type	Manufacturer/filter size	0.45 µm		purge filter of welding equipment	√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

purge purge ~~to~~ 15 LPM

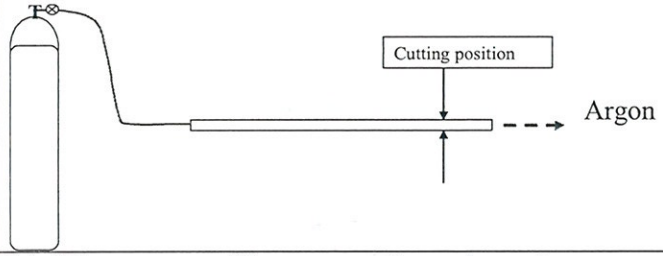
	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		flow out	V
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-		15 LPM	V
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube				with normal saw	V
13	Make picture of set-up and record picture time					V
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface			clean check with tapping on white cloth	V
15	Cover tube end with caps and store in a clean box or clean environment for further integration				~~in~~ purge on white cloth.	
16	End cutting of part (mention part number at comments)					V

	Tube cutting procedure sheet		company: NLR		date: 19/01/2009	
	Fill in by hand.		engineer: J.v.E.		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-			√
2	Record pipe part drawing number	ET5998	-06- 06-	19.10 19.11	Preheater connection to HX.	√
3	Make picture of part	Record picture time as on photo			18.29 18:36 18:51 18.52	√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				√
5	Clean outside tube with IPA and lint-free cloth					√
6	Record cutting equipment used	Manufacturer, type/serial number	-			√
7	Record filter type	Manufacturer/filter size	0.45 µm			√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			√

	Tube cutting procedure sheet		company: NLR		date: 19/01/2009	
	Fill in by hand.		engineer: J. v. Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
						✓
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		6 - 10 LPM	✓
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			✓
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside			19.10 18:37	✓
12	Cut tube				19.10 18:57	✓
13	Make picture of set-up and record picture time				20:01 (assy)	✓
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				✓
15	Cover tube end with caps and store in a clean box or clean environment for further integration					✓
16	End cutting of part (mention part number at comments)					✓

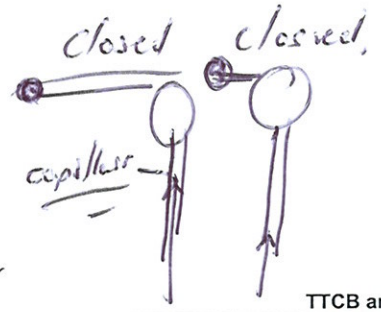
checked cleanliness ok 20/01/2009 (small tube) ok
No picture

	Tube cutting procedure sheet		company: NLR		date: 19/01/2009	
	Fill in by hand.		engineer: J v.E.		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-		Cold orbit heater cutting en. HX side	
2	Record pipe part drawing number	ET3998-07-001A				✓
3	Make picture of part	Record picture time as on photo			18:13 JAN. 19 2009	✓
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				✓
5	Clean outside tube with IPA and lint-free cloth					✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo	
7	Record filter type	Manufacturer/filter size	0.45 µm		weld equip. filter.	
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			✓

	Tube cutting procedure sheet		company:		date: 19/01/'09	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						√
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar	After cutting	12 LPM	√
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-	cut equipment stuck.		√
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				√
12	Cut tube					√
13	Make picture of set-up and record picture time				18:13	
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				√
15	Cover tube end with caps and store in a clean box or clean environment for further integration					√
16	End cutting of part (mention part number at comments)					

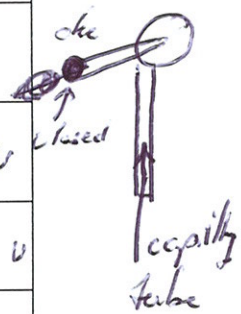
9:47
JAN. 20. 2009

Check cleanliness on 20/01/2009!

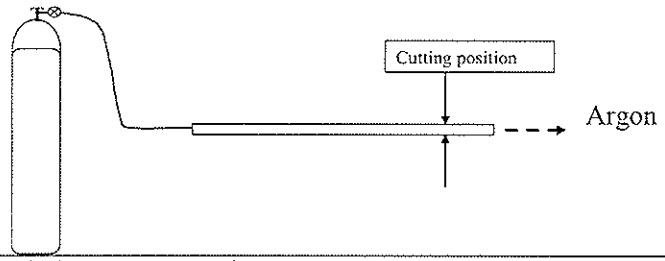


2 × (1 for test welding, 1 for fit of pump inlet)

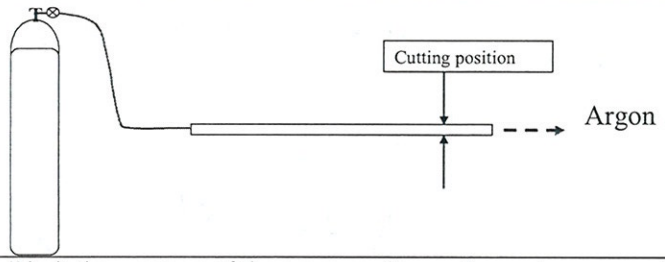
	Tube cutting procedure sheet		company: NLR		date: 19/01/2009	
	Fill in by hand.		engineer: J.v E.		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model	-		pump inlet section test weld	
2	Record pipe part drawing number				Pump drawings	
3	Make picture of part	Record picture time as on photo	~~13:51 cutting~~ 1st		pump inlet has been cut and flattened ↓ orientation	
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			After that purged with exit closed with capillary tube	
5	Clean outside tube with IPA and lint-free cloth				1 pics 16:49 2nd cut 17:48.	✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo #0227400	✓
7	Record filter type	Manufacturer/filter size	0.45 µm		welding equipment filter	✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			✓



Agreed is to cut samples (pump) off-line and spot weld to pump so no more ~~pipe~~ pump inlet cutting is needed. (less contamination)

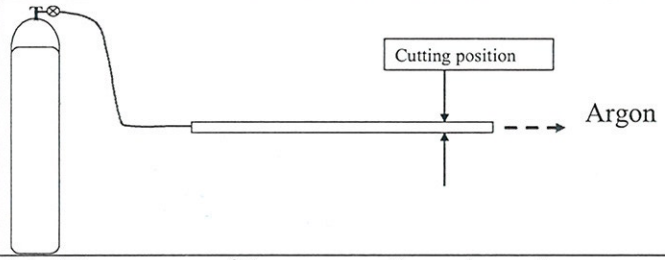
	Tube cutting procedure sheet		company: NLR		date: 19/04/2009	
	Fill in by hand.		engineer: J. VES		location: MT.	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					

	Tube cutting procedure sheet		company: NLR		date: 19/01/2009	
	Fill in by hand.		engineer: J. vE		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model ET3998-06	- 19.5 revc.		piece between pump on avoid	√
2	Record pipe part drawing number		4.3 revc		pre-fit 16:03 16:04 – 16:14	√
3	Make picture of part	Record picture time as on photo			16:23 (after cutting + integration	√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			oke	√
5	Clean outside tube with IPA and lint-free cloth				oke	√
6	Record cutting equipment used	Manufacturer, type/serial number	-		metabo #0227400	√
7	Record filter type	Manufacturer/filter size	0.45 µm		welding equipment filter	√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			√

	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						✓
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		12 LPM	✓
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			✓
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				✓
12	Cut tube					✓
13	Make picture of set-up and record picture time					✓
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface			cleanliness check afterwards	✓
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					

Additional Cleanliness check on 20/01/2009.

	Tube cutting procedure sheet		company: NLR		date: 19/01/2009	
	Fill in by hand.		engineer: J.v.E.		location: MT.	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	- Accu	Pellier	section both sides	✓
2	Record pipe part drawing number		Accu Pellier side.	HX	Accu Pellier section pump side	✓
3	Make picture of part	Record picture time as on photo	pics 13:35		12:23. 13.45 – 13.51	✓
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			zie p.12.	✓
5	Clean outside tube with IPA and lint-free cloth					✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo #022700	
7	Record filter type	Manufacturer/filter size	0.45 µm		wet equipment filters	✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			✓

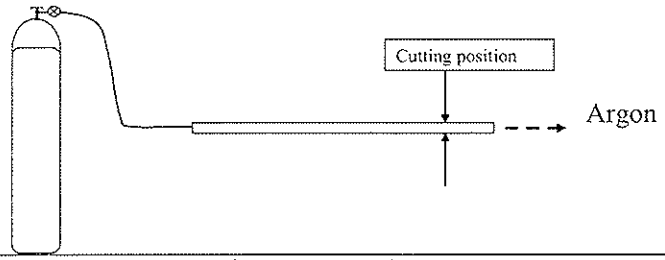
	Tube cutting procedure sheet		company: NLR		date: 19/01/2006	
	Fill in by hand.		engineer: J. v. E.		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						√
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		10LPM	√
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			√
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				√
12	Cut tube					√
13	Make picture of set-up and record picture time				see 3	√
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					√
16	End cutting of part (mention part number at comments)					√

20/01/2009 9:37 → Flow through check before final welding. TBC 20/1/2009

	Tube cutting procedure sheet		company: NLR		date: 19/01/2009	
	Fill in by hand.		engineer: J. v Es.		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-10	-	draw no!		✓
2	Record pipe part drawing number	ET 59988-6	—	19.23		✓
3	Make picture of part	Record picture time as on photo			pic 18:59 19:45 (after cutting) 19:54	
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				✓
5	Clean outside tube with IPA and lint-free cloth					✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo	✓
7	Record filter type	Manufacturer/filter size	0.45 µm			✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			✓

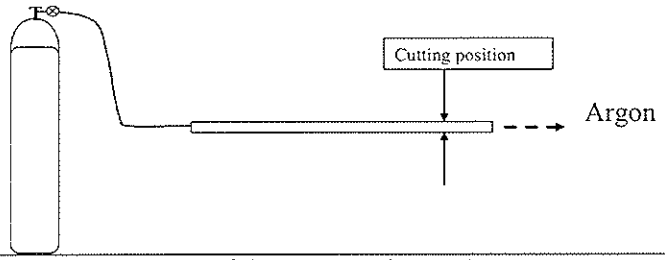
not important!

Gas tightness check

	Tube cutting procedure sheet		company: NLR		date: 29/01/2009	
	Fill in by hand.		engineer: J.C.F.		location: TTF	
Step	Action	Monitoring	Value	**Result**	Comment	√
					BPS to pump and cutting piece checked!	
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					

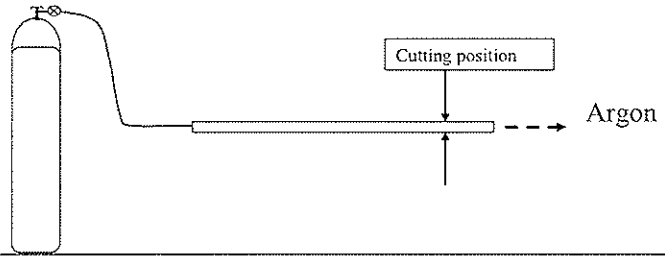
Cleanliness check on tube before final welding

	Tube cutting procedure sheet		company: NLR		date: 20/01/2009	
	Fill in by hand.		engineer: J.v.E.		location: ITT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model	-		Connection DAS to clean to pump inlet	
2	Record pipe part drawing number				check with purge gas + white cloth.	
3	Make picture of part	Record picture time as on photo			g:20 JA20, 2009 g:16	
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			ok	
5	Clean outside tube with IPA and lint-free cloth				End sheet. J.v.E 20/01/2009	
6	Record cutting equipment used	Manufacturer, type/serial number	-			
7	Record filter type	Manufacturer/filter size	0.45 µm			
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

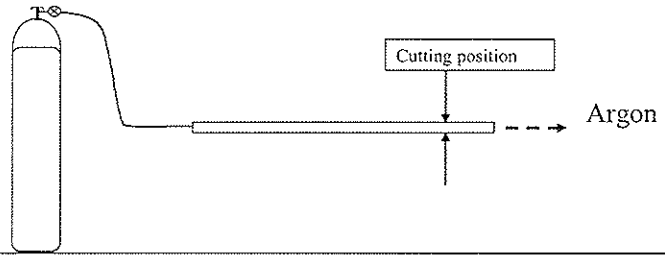
	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					

Cleanliness check more in I sheet

	Tube cutting procedure sheet		company: NLK		date: 20/01/2009	
	Fill in by hand.		engineer: J. v Es		location: MT.	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB	- -P		COH cleaning	v
2	Record pipe part drawing number				9:47 JAN. 20. 2009	
3	Make picture of part	Record picture time as on photo			Peltier cleaning 9:37 JAN. 20. 2009	
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			~~Fm~~ Fill tube to APS/DPS	
5	Clean outside tube with IPA and lint-free cloth				9:29 JAN. 20. 2009	
6	Record cutting equipment used	Manufacturer, type/serial number	-		Condenser inlets to pump horizontal.	
7	Record filter type	Manufacturer/filter size	0.45 µm		9:25 JAN. 20. 2009	
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					

	Tube cutting procedure sheet		company: NLR		date: 20/01/2009	
	Fill in by hand.		engineer: J.v.E.		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-		Inlet tube out 6mm	
2	Record pipe part drawing number	ET5998-06	- 19.6			
3	Make picture of part	Record picture time as on photo			17:14	✓
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				✓
5	Clean outside tube with IPA and lint-free cloth					✓
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo A0227400	✓
7	Record filter type	Manufacturer/filter size	0.45 µm		weld purge filter	✓
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-		✓	✓

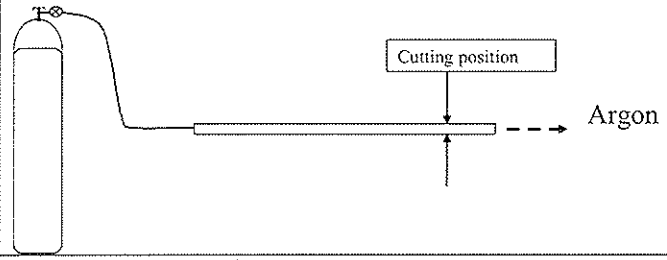
	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						✓
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		5 LPM	✓
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			✓
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				✓
12	Cut tube					✓
13	Make picture of set-up and record picture time				17:14	✓
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				✓
15	Cover tube end with caps and store in a clean box or clean environment for further integration				weld right after	✓
16	End cutting of part (mention part number at comments)					✓

	Tube cutting procedure sheet		company: NLR		date: 20/01/2009	
	Fill in by hand.		engineer: J. v Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model TTCB-P	-		COH	√
2	Record pipe part drawing number	ET5998-06 "	— —	19.21 19.22	Condenser-outlets.	√
3	Make picture of part	Record picture time as on photo			11:05	√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease			Purge long time with Argon to get rid of particles	
5	Clean outside tube with IPA and lint-free cloth					
6	Record cutting equipment used	Manufacturer, type/serial number	-		Metabo #0227400	
7	Record filter type	Manufacturer/filter size	0.45 µm		welding purgemachine	
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			

purging done on 21/01/2009

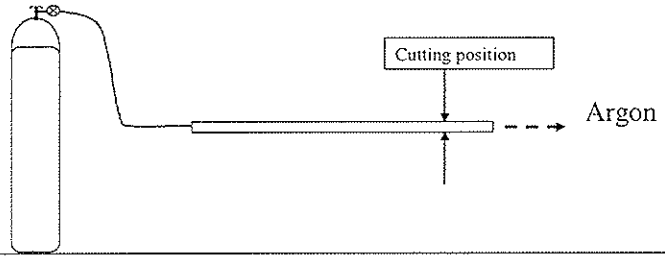
These tubes were not packed well before ⇒ purge additional

pic. 10:30 JAN.21.2009
10:32 " > oke-

	Tube cutting procedure sheet		company:		date: 20/01/2009	
	Fill in by hand.		engineer:		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar		12 LPM	
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				✓
12	Cut tube					
13	Make picture of set-up and record picture time					✓
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				✓
15	Cover tube end with caps and store in a clean box or clean environment for further integration				21/01/2009	✓
16	End cutting of part (mention part number at comments)					✓

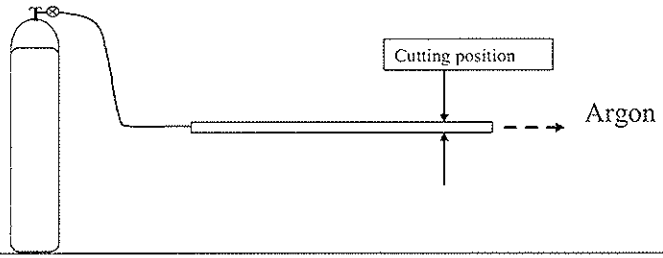
	Tube cutting procedure sheet		company: NLR		date: 21/01/2009	
	Fill in by hand.		engineer: J.v.Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model	-		Evaporator return lines	
2	Record pipe part drawing number	ETF 5998-06-19.12 Rev.C				√
3	Make picture of part	Record picture time as on photo				√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				√
5	Clean outside tube with IPA and lint-free cloth					√
6	Record cutting equipment used	Manufacturer, type/serial number	-			√
7	Record filter type	Manufacturer/filter size	0.45 µm			√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			√

Cleaning check after cutting with white cloth end sheet.

	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					

	Tube cutting procedure sheet		company: NLR		date: 21/01/2009	
	Fill in by hand.		engineer: J.v.Es		location: MT	
Step	Action	Monitoring	Value	**Result**	Comment	√
1	Record model (FM1/FM2/QM) for which the cutting of tubes is performed	Model	-			
2	Record pipe part drawing number	ET5990-06	19.17	Rev E		
3	Make picture of part	Record picture time as on photo			20.18	√
4	Perform visual inspection inlet and outlet tube	Clean/particles/ grease				√
5	Clean outside tube with IPA and lint-free cloth					√
6	Record cutting equipment used	Manufacturer, type/serial number	-			√
7	Record filter type	Manufacturer/filter size	0.45 µm			√
8	Connect the filter and a clean flexible (silicone) hose to a N_2-(or Argon)bottle delivering gaseous Argon gas as shown in figure.		-			√

Cleaning check after cutting prior to spot welding end shell

	Tube cutting procedure sheet		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
9	Limit the pressure of the gaseous nitrogen/argon to a reasonable flow (0-4bar) check the used pressure prior to connecting the tube part	Pressure	0-4 bar			
10	Flow gaseous nitrogen/argon through the hose prior to connect to the tube part		-			
11	Connect the flexible hose to the tube as shown in above figure. Set a fixed gaseous flow	Check flow at outside				
12	Cut tube					
13	Make picture of set-up and record picture time					
14	Disconnect tube, clean outside with IPA and lint free cloth & perform visual inspection of cut surface	Flat square surface				
15	Cover tube end with caps and store in a clean box or clean environment for further integration					
16	End cutting of part (mention part number at comments)					