

Appendice 9

Rapporti Programma LDAR

B.8.1 Fonti di emissioni in atmosfera di tipo non convogliato (parte storica) – REV 1/2010			<u>Anno di riferimento: 2008</u>	
Fase	Emissioni fuggitive o diffuse	Descrizione	Inquinanti presenti	
			Tipologia	Quantità t/anno ⁽¹⁾
1 (PP2)	<input type="checkbox"/> DIF <input checked="" type="checkbox"/> FUG	Sorgenti: valvole, flange, pompe, compressori e altri componenti suscettibili di perdite	VOC	17,6 (S)
2 (P9T)	<input type="checkbox"/> DIF <input checked="" type="checkbox"/> FUG	Sorgenti: valvole, flange, pompe, compressori e altri componenti suscettibili di perdite	VOC	26 (S)

Note:

(1) Una Ditta specializzata (The Sniffers nv/sa) ha rilevato le perdite fuggitive, sulla base dei risultati di una campagna campagna LDAR (Leak Detection And Repair) condotta nel 2008.

La leak detection è stata effettuata mediante misura.

I punti di perdita rilevante che sono stati identificati durante la leak detection sono stati mantenuti, quindi le rilevazioni sono state ripetute, per accertare il rientro alle condizioni di normalità.

B.8.2 Fonti di emissioni in atmosfera di tipo non convogliato (alla capacità produttiva)
Non si ritiene che le emissioni fuggitive possano variare al raggiungimento della capacità produttiva.

Fugitive emission monitoring

Project 2008



BASELL Brindisi P9T



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Project introduction:

We received the honor from **Basell “Polyolefins”** to perform a complete Leak Detection And Repair program for the units **P9T** inclusive re-measurement after first repair attempt reparations. At the end of the project we prepared a full emission report of all gathered data and results.

Following project phase have been executed:

- Project preparation;
- Complete monitoring of P9T;
- Replacement of the missing tags of existent leaks in P9T of previous measurement rounds;
- Inventarisation of new leaks in P9T comparable to previous measurement rounds;
- Tagging of new leaks in P9T with alu tags.
- Re-measurements during and after maintenance work at P9T;
- Extra Re-measurement after maintance work at P9T;
- All leaks above repair definition are provided with visible yellow labels concerning P9T;
- Taking pictures of the leaks remaining above repair definition at P9T;
- Update Fugitive emission management database with the performed measuring rounds;
- Prepare 3 sets of emission reports for P9T;
- Project Presentation.

All these tasks have been performed during January 2008 and have been performed conform our Standard Operating Procedures.

We used the standard **EPA Correlation “SOCMP” Approach** (Cfr. *United states Environmental Protection Agency 1994*) to calculate the emission losses. This method utilizes fixed emission factors, which are used to convert the measured ppm values into kg/yr per source.

To avoid calculation errors with very small leaks (leak-rate < 8 ppm), the method is using a fixed factor while anyhow there are always some minimal emissions. The solution used for the Chemical industry by EPA is the usage of fixed zero-reading factors to represent these minimal losses.

Each measurement with a leak-rate > 250.000 ppm will be converted by the “pegged-reading” factors. This EPA rule is created due to the limited measurement range of the detection devices.





The detection devices which we used during the project are a TVA 1000 (Thermo Instruments) and a solo-200 (Imbema). The procedures, which guarantee successful usage of these detection devices, can be requested at any time from our administration office. For each source with a leak-rate > 8 ppm, the software uses a equation calculation.

All data has been produced with the relational SfempX database software

Following sources have been registered in the Basell "Polyolefins" SfempX database :

FL	Flange
SV	Stem Valve
SC	Stem Control Valve
PS	Pump Seal
OS (<i>Mixer, agitator</i>)	Other Seal
CS	Compressor seal
OE	Open End
RO	Relief valve, Outlet
CN	Connection

Medium service:

Gas; medium which is on process conditions under gaseous- or vapor form.

Light Liquid: medium with vapor pressure > 0.3 kpa at 20°C.

Heavy Liquid: medium with vapor pressure > 0.3kpa at 20°C.

Tag-definition; → All equipments with a leak-rate > 9 ppm

Following streams have been monitored

stream name	desc_1	leak_def	repair_def	tag_def
BLOW-D	Blow down	9	10000	9
ETHYLENE	Etylheen (etheen)	9	10000	9
HYDROGEN	Hydrogen	9	10000	9
OFFGAS	Offgas	9	10000	9
PROPYLEN	Propeen (propeen, methylethyleen)	9	10000	9



Below you can find the list of all drawings, which have been monitored during this LDAR project for P9T.

site_id	unit_id	section_id	drawing_id	desc_1
BRINDISI	P9T	BATTERY-L	403030-001	Battery limit
BRINDISI	P9T	BLOW DOWN	403030-020	Blow down
BRINDISI	P9T	BLOW DOWN	403030-020A	Blow down network
BRINDISI	P9T	BLOW DOWN	403030-129B	Blow down network
BRINDISI	P9T	CHILLING	403030-174	Refrigerated water system
BRINDISI	P9T	CHILLING	403030-174A	PK1740 refrigeratde water unit pack.
BRINDISI	P9T	DEGASSING	403030-010	Polymer degassing
BRINDISI	P9T	DEGASSING	403030-010A	H463 sample point
BRINDISI	P9T	DEGASSING	403030-016	Teal removal
BRINDISI	P9T	DEGASSING	403030-019	P301 compressor
BRINDISI	P9T	DEGASSING	403030-124	H2 and ethylene sep. colums
BRINDISI	P9T	DEGASSING	403030-131	High pressure monomer degassing
BRINDISI	P9T	DEGASSING	403030-132	Monomer recovery
BRINDISI	P9T	ETHYLENE F	403030-017	Ethylene stripper
BRINDISI	P9T	ETHYLENE F	403030-026A	P401B ethlene compressor
BRINDISI	P9T	ETHYLENE F	403030-027	P405- P405B ethylene compressor
BRINDISI	P9T	GAS PHASE	403030-011	R403 gas phase reactor
BRINDISI	P9T	GAS PHASE	403030-012	R404 gas phase reactor
BRINDISI	P9T	GAS PHASE	403030-023	Seals pressurization system
BRINDISI	P9T	GAS PHASE	403030-024	Seals pressurization system
BRINDISI	P9T	HYDROGEN R	403030-124A	PK1240 hydrogen recycle compressor
BRINDISI	P9T	MONOMER TR	403030-013	SEZ. scrubber
BRINDISI	P9T	MONOMER TR	403030-013A	Propylene feed tank
BRINDISI	P9T	MONOMER TR	403030-029	COS removal
BRINDISI	P9T	MONOMER TR	403030-030	Light ends stripping
BRINDISI	P9T	MONOMER TR	403030-031	Drying unit
BRINDISI	P9T	MONOMER TR	403030-031A	PK502 drying unit
BRINDISI	P9T	MONOMER TR	403030-032	Arsine removal
BRINDISI	P9T	POLYMERIZ	403030-007	Prepolymerization
BRINDISI	P9T	POLYMERIZ	403030-008	HY-LM proc. spheripol sez. reazione
BRINDISI	P9T	POLYMERIZ	403030-120	Precontacting pot
BRINDISI	P9T	POLYMERIZ	403030-121	Prepolymerization reactor
BRINDISI	P9T	POLYMERIZ	403030-122	MZCR monomer feeds-analyzer
BRINDISI	P9T	POLYMERIZ	403030-123	Multizone circulation reactor
BRINDISI	P9T	POLYMERIZ	403030-125	C1250 compressor
BRINDISI	P9T	POLYMERIZ	403030-126	MZCR reactor killing
BRINDISI	P9T	STEAMING	403030-014	Polymer steaming unit
BRINDISI	P9T	STEAMING	403030-015	Polymer drying unit
BRINDISI	P9T	STEAMING	403030-033	Off gas recovery



MANAGEMENT SUMMARY

1. Summary P9T: First measurement (Project 2008-347-F)

The first measurement of P9T in 2008 indicates there are **295 leaks**, which represent **64.205 kg/yr** of fugitive emissions, calculated with the EPA correlation method.

Concerning the non-leaking sources:

899 not accessible sources with an extrapolated emission loss of **8673 kg/yr**

9126 Default-zero sources with a calculated loss of **50 kg/yr**

Rest emissions (repaired sources) with a calculated loss of **197 kg/jr**

Total losses of 73.125 kg/year

Explanation:

Not accessible sources:

These are all the sources which can not be measured without help of extra equipment (e.g. scaffolding), with other words, these sources are not reachable in normal and/or save conditions.

The emission calculation is based on the results of all monitored sources, meaning, depending the % of leak-rate of the total emission losses in kg/yr for the total monitored sources. This equation will than also be used for the total number of not accessible sources.

Default-zero

This equation is valid for are all the accessible sources with a leak value between 0 and 8 ppm.

A fixed EPA emission calculation rule is used for all these sources.

Also the remaining losses overtime of the repaired sources are added to this field.

Rest emissions This is the loss of a repaired leak during the past year.

1.1 The YTD situation of all leaks.

1.1.1 By equipment type:

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	2560	2358	57	2,42%	26311.79621
CS	16	16	0	0,00%	0
FL	5799	5225	98	1,88%	13431.90699
OE	52	52	3	5,77%	2075.136192
OS	0	0	0	0,00%	0
OT	0	0	0	0,00%	0
PS	6	6	0	0,00%	0
RO	0	0	0	0,00%	0
SC	165	161	36	22,36%	9513.375883
SV	1722	1603	101	6,30%	12872.7977
TOTAL	10320	9421	295	3,13%	64205.01297

1.1.2 By leak class:

* **260** leaks in the class of measured readings (9-250.000 ppm)

* **35** leaks in the class of pegged readings (>250.000 ppm)

1.1.3 By kg/yr:

* In the class of measured readings (9-250.000 ppm) -> **12.953 kg/yr**

* In the class of pegged readings (>250.000 ppm) -> **51.252 kg/yr**

2. Summary P9T: Measurement after tightening (Project: 2008-347-R)

After the tightening round in 2008, there are still **283 leaks**, which represent **38.784 kg/yr** of fugitive emissions, calculated with the EPA correlation method.

Concerning the non-leaking sources:

899 not accessible sources with an extrapolated emission loss of **8673 kg/yr**

9138 Default-zero sources with a calculated loss of **50 kg/yr**

Rest emissions (repaired sources) with a calculated loss of **535 kg/jr**

Total losses of 48.042 kg/year

Explanation:

Not accessible sources:

These are all the sources which can not be measured without help of extra equipment (e.g. scaffolding), with other words, these sources are not reachable in normal and/or save conditions.

The emission calculation is based on the results of all monitored sources, meaning, depending the % of leak-rate of the total emission losses in kg/yr for the total monitored sources. This equation will than also be used for the total number of not accessible sources.

Default-zero

This equation is valid for are all the accessible sources with a leak value between 0 and 8 ppm.

A fixed EPA emission calculation rule is used for all these sources.

Also the remaining losses overtime of the repaired sources are added to this field.

Rest emissions This is the loss of a repaired leak during the past year.

2.1 The YTD situation of all leaks.

2.1.1 By equipment type:

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	2560	2358	51	2,16%	16463.93707
CS	16	16	0	0,00%	0
FL	5799	5225	98	1,88%	11382.03673
OE	52	52	2	3,85%	121.535394
OS	0	0	0	0,00%	0
OT	0	0	0	0,00%	0
PS	6	6	0	0,00%	0
RO	0	0	0	0,00%	0
SC	165	161	35	21,74%	5350.419435
SV	1722	1603	97	6,05%	5465.678251
TOTAL	10320	9421	283	3,00%	38783.60688

2.1.2 By leak class:

* **265** leaks in the class of measured readings (9-250.000 ppm)

* **18** leaks in the class of pegged readings (>250.000 ppm)

2.1.3 By kg/yr:

* In the class of measured readings (9-250.000 ppm) -> **11.242 kg/yr**

* In the class of pegged readings (>250.000 ppm) -> **27.542 kg/yr**



3. Summary P9T:Extra Measurement After tightening(YTD- 2008-347-S)

After the tightening round in 2008, there are still **264 leaks**, which represent **28.075 kg/yr** of fugitive emissions, calculated with the EPA correlation method.

Concerning the non-leaking sources:

899 not accessible sources with an extrapolated emission loss of **8673 kg/yr**

9157 Default-zero sources with a calculated loss of **50 kg/yr**

Rest emissions (repaired sources) with a calculated loss of **10.147 kg/jr**

Total losses of 46.945 kg/year

Explanation:

Not accessible sources:

These are all the sources which can not be measured without help of extra equipment (e.g. scaffolding), with other words, these sources are not reachable in normal and/or save conditions.

The emission calculation is based on the results of all monitored sources, meaning, depending the % of leak-rate of the total emission losses in kg/yr for the total monitored sources. This equation will than also be used for the total number of not accessible sources.

Default-zero

This equation is valid for are all the accessible sources with a leak value between 0 and 8 ppm.

A fixed EPA emission calculation rule is used for all these sources.

Also the remaining losses overtime of the repaired sources are added to this field.

Rest emissions This is the loss of a repaired leak during the past year.

3.1 The YTD situation of all leaks.

3.1.1 By equipment type:

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	2560	2358	46	1,95	12027
CS	16	16	0	0	0
FL	5799	5225	91	1,74	6873
OE	52	52	2	3,85	122
OS	0	0	0	0	0
OT	0	0	0	0	0
PS	6	6	0	0	0
RO	0	0	0	0	0
SC	165	161	31	19,25	3863
SV	1722	1603	94	5,86	5190
TOTAL	10320	9421	264	2,80	28075

3.1.2 By leak class:

* **264** leaks in the class of measured readings (9-250.000 ppm)

* **0** leaks in the class of pegged readings (>250.000 ppm)

3.1.3 By kg/yr:

* In the class of measured readings (9-250.000 ppm) -> **28.075 kg/yr**

* In the class of pegged readings (>250.000 ppm) -> **0 kg/yr**



4. **The YTD situation of all leaks > Repair Definition(2009-001-I)**

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	2560	2358	10	0,42	6188
CS	16	16	0	0	0
FL	5799	5225	6	0,11	2705
OE	52	52	0	0	0
OS	0	0	0	0	0
OT	0	0	0	0	0
PS	6	6	0	0	0
RO	0	0	0	0	0
SC	165	161	5	3,11	1089
SV	1722	1603	7	0,44	1801
TOTAL	10320	9421	28	0,30	11783

5. **Highlights:**

- When we will repaired the **28 leaks > repair definition(10.000ppm)** we can reduce the emissions with **11.783 kg/yr** or **68 %** of the total **leak emission rate. (leaking sources)**
- The tightening round in 2008 resulted in a reduction of **25.083 kg/year** or **34%** of the total leak emissions for 2008
- The extra tightening round in 2008 resulted in a reduction of **26180 kg/year** or **36 %** of the total leak emissions for 2008.
- The total amount between the measurement and the calculated estimations for 2009 will reduce by **47.099 kg/yr** or **64 %** of the total fugitive emissions.



6. Historical summary P9T

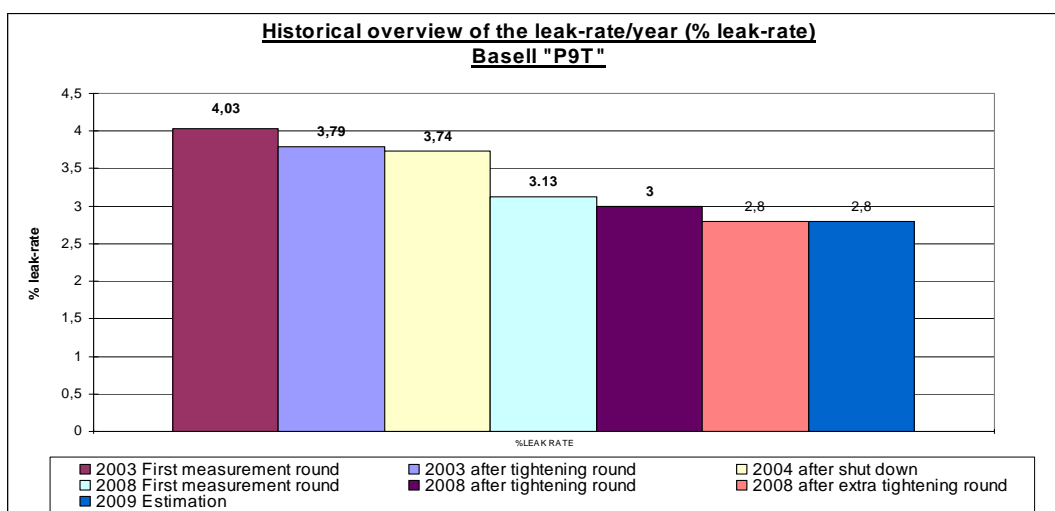
6.1 Summary in number of sources & leaks

Class	Full measuring 2008 2008-347-F	After Tightening round 2008 2008-347-R	After Extra Tightening Round 2008-347-S	Initialize 2009 2009-001-I
Not accessible	899	899	899	899
Default zero	9126	9138	9157	9157
9 – 250.000 ppm	260	265	264	264
>250.000 ppm (pegged)	35	18	0	0
Total	10320	10320	10320	10320

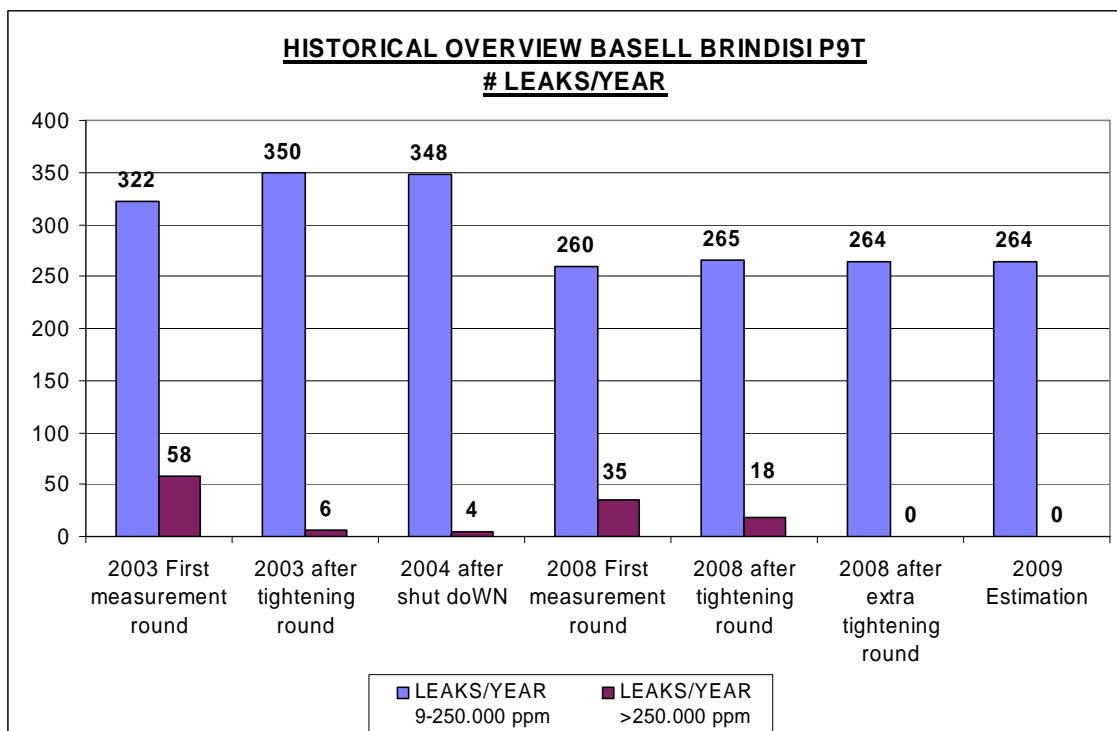
6.2 Summary of losses in kg/yr

Class	Full measuring 2008 2008-347-F	After Tightening round 2008 2008-347-R	After Extra Tightening Round 2008-347-S	Initialize 2009 2009-001-I
Not accessible	8673	8673	8673	8673
Rest Emissions	197	535	10146	0
Default zero	50	50	50	50
9 – 250.000 ppm	12953	11242	28076	17303
>250.000 ppm (pegged)	51252	27542	0	0
Total	73125	48042	46945	26026

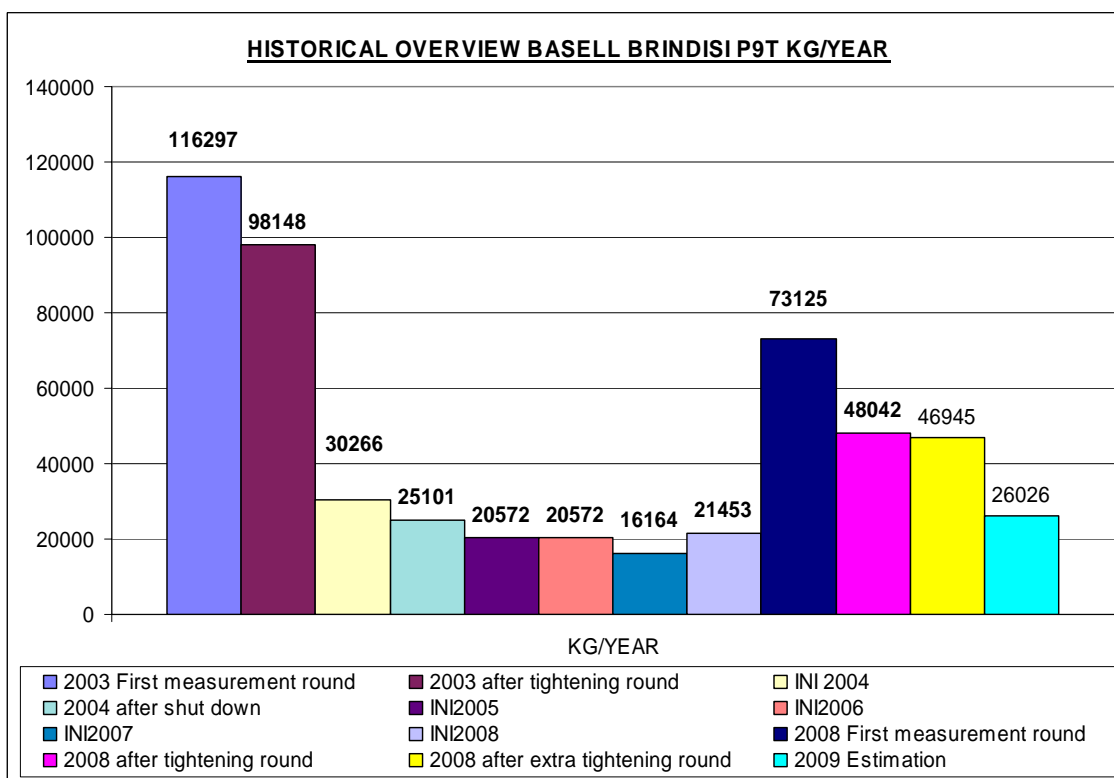
6.3 Historical overview in # leak-rate/year



6.4 Historical overview in # leaks/year



6.5 Historical overview in kg/year



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2008-347-F

Site : BRINDISI Unit : P9T

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	2560	2358	202	2301	45	12	57	57	2,42%	27	1,15%	7
Compressor seals												
All	16	16	0	16	0	0	0	0	0,00%	0	0,00%	0
Flanges												
All	5799	5225	574	5127	93	5	98	98	1,88%	18	0,34%	1
Open-ended lines												
All	52	52	0	49	2	1	3	3	5,77%	2	3,85%	0
Other seals												
Gas/Vapor	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	6	6	0	6	0	0	0	0	0,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	118	116	2	90	21	5	26	26	22,41%	11	9,48%	2
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	47	45	2	35	7	3	10	10	22,22%	5	11,11%	5
Valves												
Gas/Vapor	1127	1041	86	982	52	7	59	59	5,67%	26	2,50%	2
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	595	562	33	520	40	2	42	42	7,47%	11	1,96%	3
TOTALS	10320	9421	899	9126	260	35	295	295	3,13%	100	1,06%	20

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Project YTD : 2008-347-F

Site : BRINDISI

Unit : P9T

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	2560	3857.55	40.05	12.30	3684.87	22626.93	30221.69	57	26311,80	27	25456,65	7,00
Compressor seals												
All	16	0.00	0.00	1.05	0.00	0.00	1.05	0	0,00	0	0,00	0,00
Flanges												
All	5799	3469.49	97.99	27.40	4039.69	9392.22	17026.78	98	13431,91	18	11448,43	1,00
Open-ended lines												
All	52	0.00	6.35	0.26	273.03	1802.11	2081.74	3	2075,14	2	2024,28	0,00
Other seals												
Gas/Vapor	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	6	0.00	0.00	0.39	0.00	0.00	0.39	0	0,00	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	118	133.15	13.89	0.52	737.05	4694.68	5579.29	26	5431,73	11	5205,35	2,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	47	478.30	10.42	0.15	389.16	3692.49	4570.51	10	4081,65	5	3920,91	5,00
Valves												
Gas/Vapor	1127	226.01	14.58	5.68	2451.86	6568.28	9266.40	59	9020,14	26	8412,21	2,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	595	508.78	13.55	2.23	1377.18	2475.48	4377.22	42	3852,66	11	3375,32	3,00
TOTALS	10320	8673.28	196,82	49.98	12952.84	51252.18	73125.09	295	64205,01	100	59843,16	20

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** P9T **Section :** * **Drawing :** * **Stream :** * **Project YTD : 2008-347-F**

Program inception year : 2007 **Total YTD Fugitive Emissions :** 48.042,09 kg/yr.
Total emissions of inception year : 18.316,41 kg/yr. **% fugitive emission saved with inception year :** -162 %
YTD emissions for default-zero: 0-8 ppm : 50,04 kg/yr. **YTD emissions for not accessible sources :** 8.673,28 kg/yr.

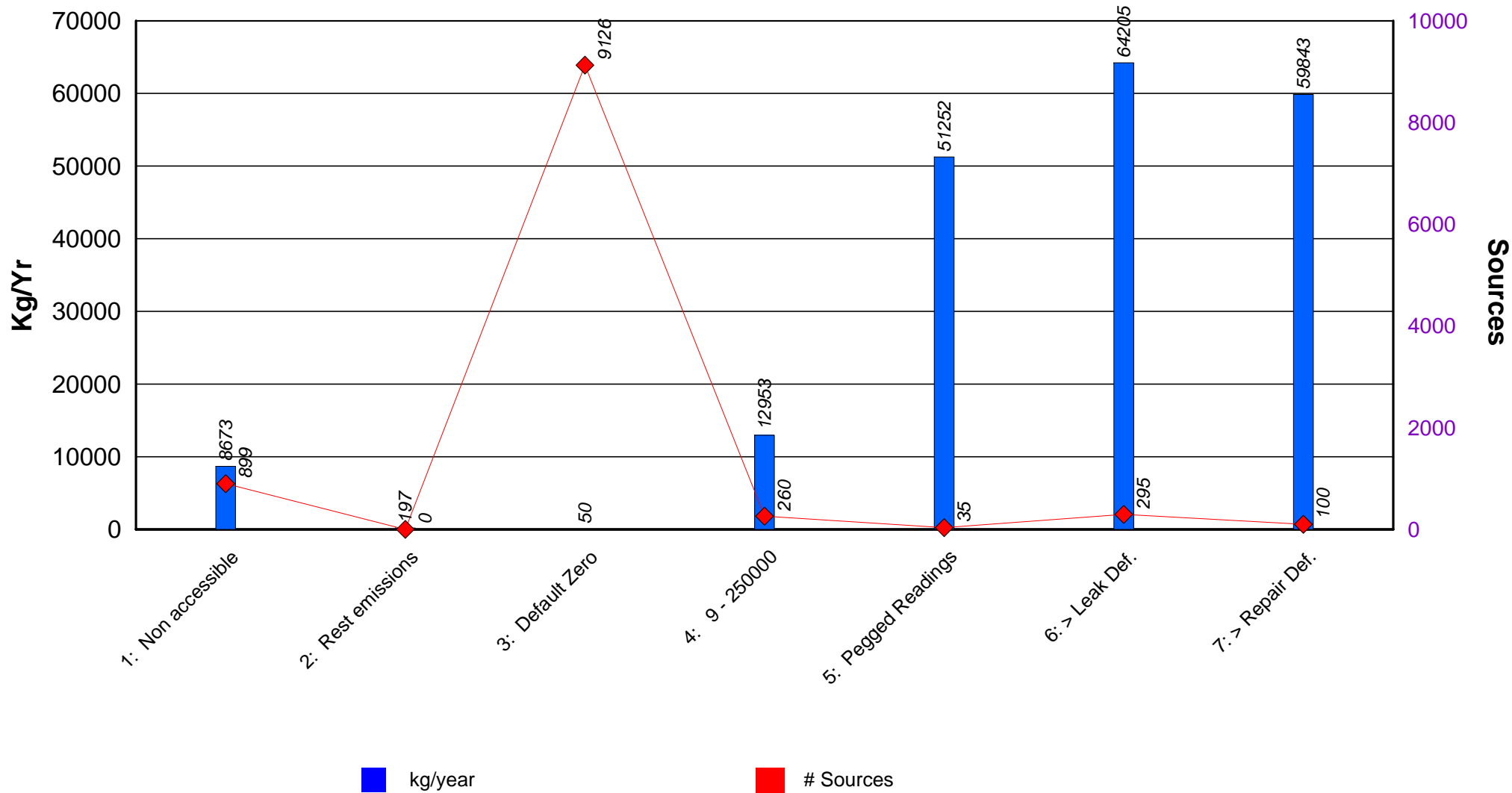
	Total emission last year											Selected YTD emission	Delta emissions	
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve			
Etylheen (etheen)	3.013,80	734,63	0,40	2.193,20	222,27						1.159,57	5.086,63	9.396,70	6.382,90
Propaan	270,48	77,72	0,01	152,34	0,01						45,81	17,88	293,76	23,28
Propeen (propeen, methylethyleen)	14.928,80	29.193,04	0,64	14.425,45	1.859,46			0,39			8.917,52	8.536,03	62.932,54	48.003,74
Waterstof	103,34	216,30		255,78	0,01						26,91	3,08	502,09	398,75
TOTAL EMISSIONS	18.316,41	30.221,69	1,05	17.026,78	2.081,74			0,39			10.149,80	13.643,62	73.125,09	54.808,67

Total # of sources	2.560	16	5.799	52			6		165	1.722	10.320
# Measurable sources	2.358	16	5.225	52			6		161	1.603	9.421
# Leakers>Zero reading	57		98	3					36	101	295
# Leakers > Leak Definition	57		98	3					36	101	295
# Leakers > Repair Definition	27		18	2					16	37	100
# Registered measurements	87		216	6					55	134	498
% Random of registered meas./total sources	3,40		3,72	11,54					33,33	7,78	4,83
% Leakers>Zero readings/measurable sources	2,42		1,88	5,77					22,36	6,30	3,13
% Leakers>Leak def./measurable sources	2,42		1,88	5,77					22,36	6,30	3,13
% Leakers>Repair def./measurable sources	1,15		0,34	3,85					9,94	2,31	1,06
Minimal emission losses (no leakers) in kg/yr	13,68	1,05	30,99	0,28			0,39		0,88	9,07	56,34

Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2008-347-F

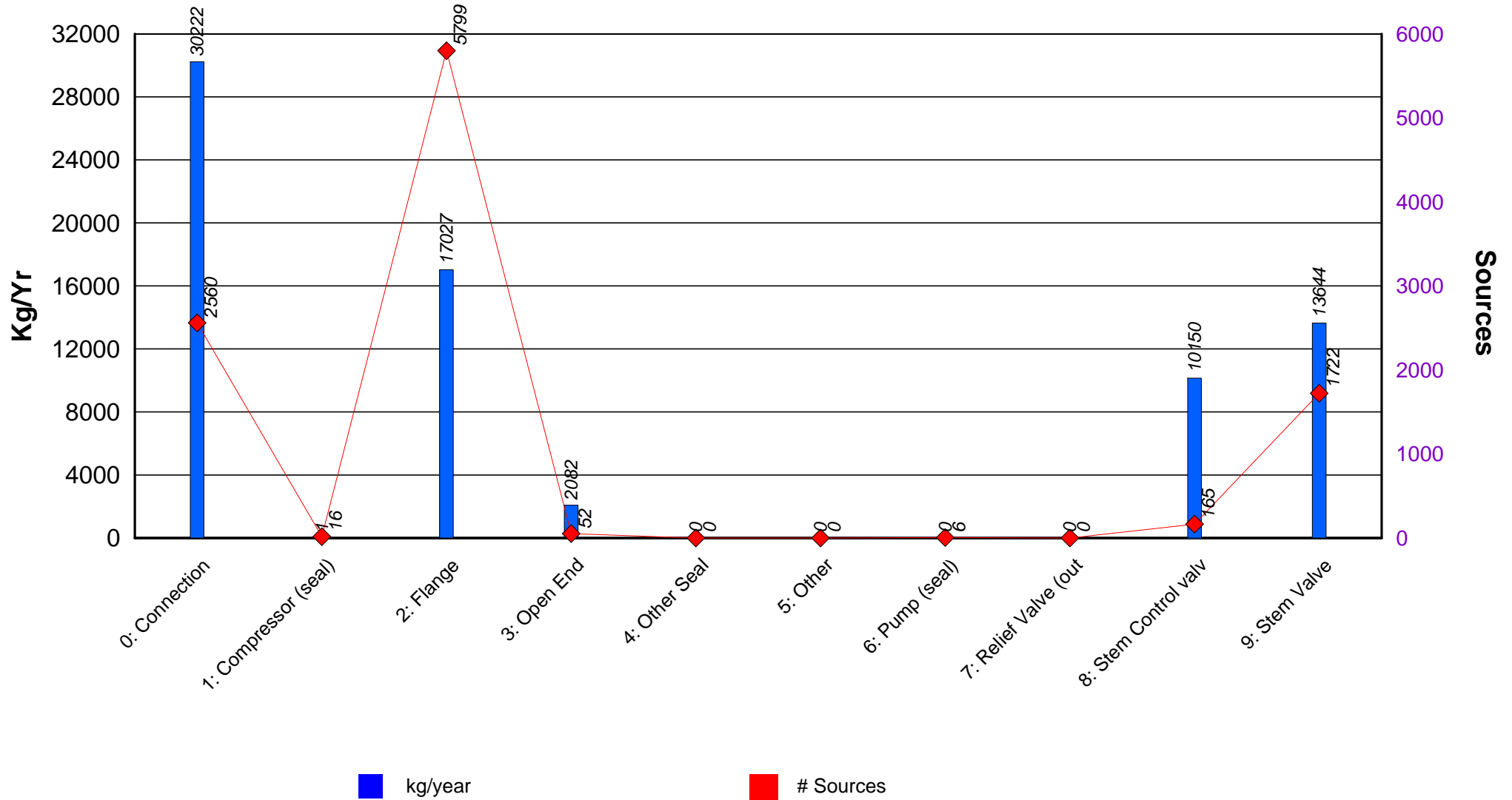
Total : 73.125 kg/yr.

Total : 10320 Sources



Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2008-347-F

Total : 73.125 kg/yr.
 Total : 10320 Sources

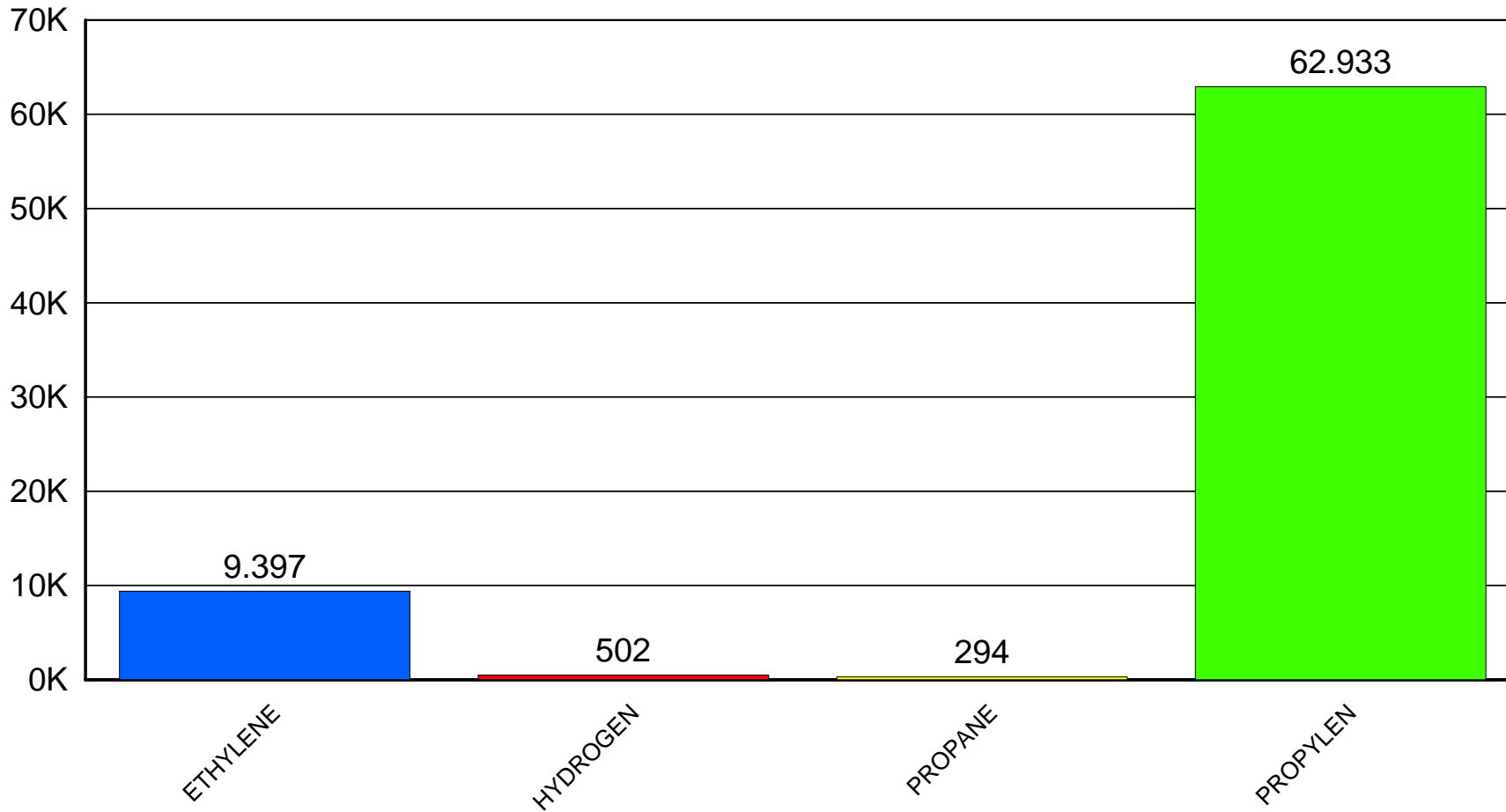


Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : * Project YTD : 2008-347-F

Limit from : 0 to : 9999999

Total : 73.125 kg/yr.

Kg / Yr



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2008-347-R

Site : BRINDISI Unit : P9T

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	2560	2358	202	2307	44	7	51	51	2,16%	16	0,68%	18
Compressor seals												
All	16	16	0	16	0	0	0	0	0,00%	0	0,00%	0
Flanges												
All	5799	5225	574	5127	94	4	98	98	1,88%	15	0,29%	4
Open-ended lines												
All	52	52	0	50	2	0	2	2	3,85%	0	0,00%	2
Other seals												
Gas/Vapor	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	6	6	0	6	0	0	0	0	0,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	118	116	2	91	22	3	25	25	21,55%	7	6,03%	6
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	47	45	2	35	9	1	10	10	22,22%	4	8,89%	6
Valves												
Gas/Vapor	1127	1041	86	986	52	3	55	55	5,28%	10	0,96%	18
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	595	562	33	520	42	0	42	42	7,47%	0	0,00%	14
TOTALS	10320	9421	899	9138	265	18	283	283	3,00%	52	0,55%	68

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Project YTD : 2008-347-R

Site : BRINDISI

Unit : P9T

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	2560	3857.55	283.01	12.33	3099.51	13364.43	20616.83	51	16463,94	16	15308,81	18,00
Compressor seals												
All	16	0.00	0.00	1.05	0.00	0.00	1.05	0	0,00	0	0,00	0,00
Flanges												
All	5799	3469.49	97.99	27.40	3917.02	7465.02	14976.91	98	11382,04	15	9102,21	4,00
Open-ended lines												
All	52	0.00	6.35	0.27	121.54	0.00	128.15	2	121,54	0	0,00	2,00
Other seals												
Gas/Vapor	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	6	0.00	0.00	0.39	0.00	0.00	0.39	0	0,00	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	118	133.15	20.82	0.53	787.54	2767.48	3709.51	25	3555,02	7	3176,35	6,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	47	478.30	10.42	0.15	564.17	1231.23	2284.27	10	1795,40	4	1611,08	6,00
Valves												
Gas/Vapor	1127	226.01	103.03	5.70	1681.61	2713.88	4730.23	55	4395,49	10	3351,53	18,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	595	508.78	13.55	2.23	1070.19	0.00	1594.75	42	1070,19	0	0,00	14,00
TOTALS	10320	8673.28	535,16	50.05	11241.58	27542.03	48042.09	283	38783,61	52	32549,97	68

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** P9T **Section :** * **Drawing :** * **Stream :** *

Project YTD : 2008-347-R

Program inception year : 2007

Total YTD Fugitive Emissions : 48.042,09 kg/yr.

Total emissions of inception year : 18.316,41 kg/yr.

% fugitive emission saved with inception year : -162 %

YTD emissions for default-zero: 0-8 ppm : 50,04 kg/yr.

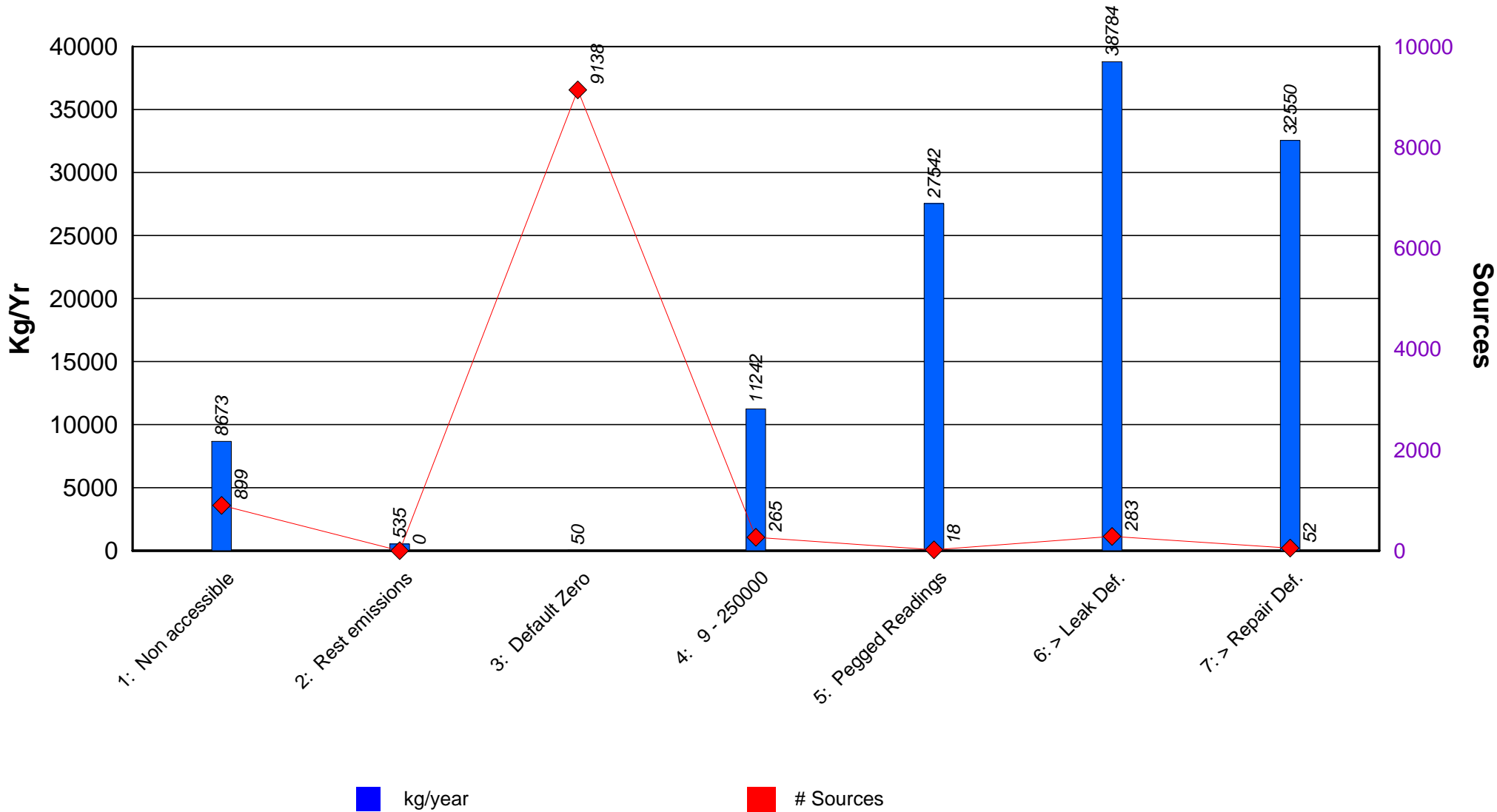
YTD emissions for not accessible sources : 8.673,28 kg/yr.

	Total emission last year											Selected YTD emission	Delta emissions
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve		
Etylheen (etheen)	3.013,80	581,52	0,40	466,75	0,11					272,80	1.123,57	2.445,14	-568,66
Propaan	270,48	77,72	0,01	152,34	0,01					32,47	17,88	280,42	9,94
Propeen (propeen, methylethyleen)	14.928,80	19.939,39	0,64	14.102,04	128,03			0,39		5.661,61	5.180,45	45.012,55	30.083,75
Waterstof	103,34	18,20		255,78	0,01					26,91	3,08	303,98	200,64
TOTAL EMISSIONS	18.316,41	20.616,83	1,05	14.976,91	128,15			0,39		5.993,78	6.324,98	48.042,09	29.725,68

Total # of sources	2.560	16	5.799	52			6		165	1.722	10.320
# Measurable sources	2.358	16	5.225	52			6		161	1.603	9.421
# Leakers>Zero reading	51		98	2					35	97	283
# Leakers > Leak Definition	51		98	2					35	97	283
# Leakers > Repair Definition	16		15						11	10	52
# Registered measurements	88		216	5					55	134	498
% Random of registered meas./total sources	3,44		3,72	9,62					33,33	7,78	4,83
% Leakers>Zero readings/measurable sources	2,16		1,88	3,85					21,74	6,05	3,00
% Leakers>Leak def./measurable sources	2,16		1,88	3,85					21,74	6,05	3,00
% Leakers>Repair def./measurable sources	0,68		0,29						6,83	0,62	0,55
Minimal emission losses (no leakers) in kg/yr	13,68	1,05	30,99	0,28			0,39		0,88	9,07	56,34

Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2008-347-R

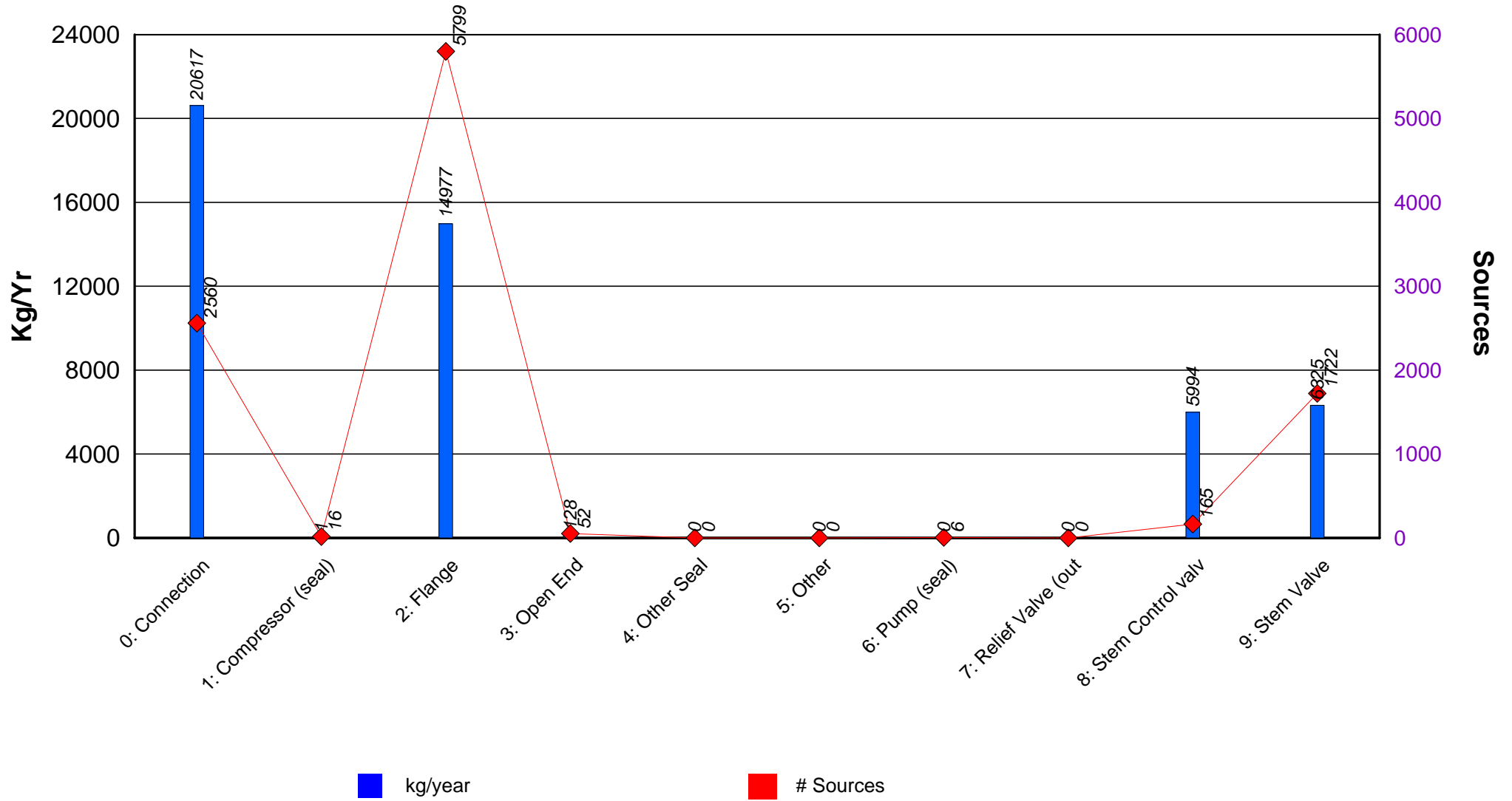
Total : 48.042 kg/yr.
 Total : 10320 Sources



Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2008-347-R

Total : 48.042 kg/yr.

Total : 10320 Sources

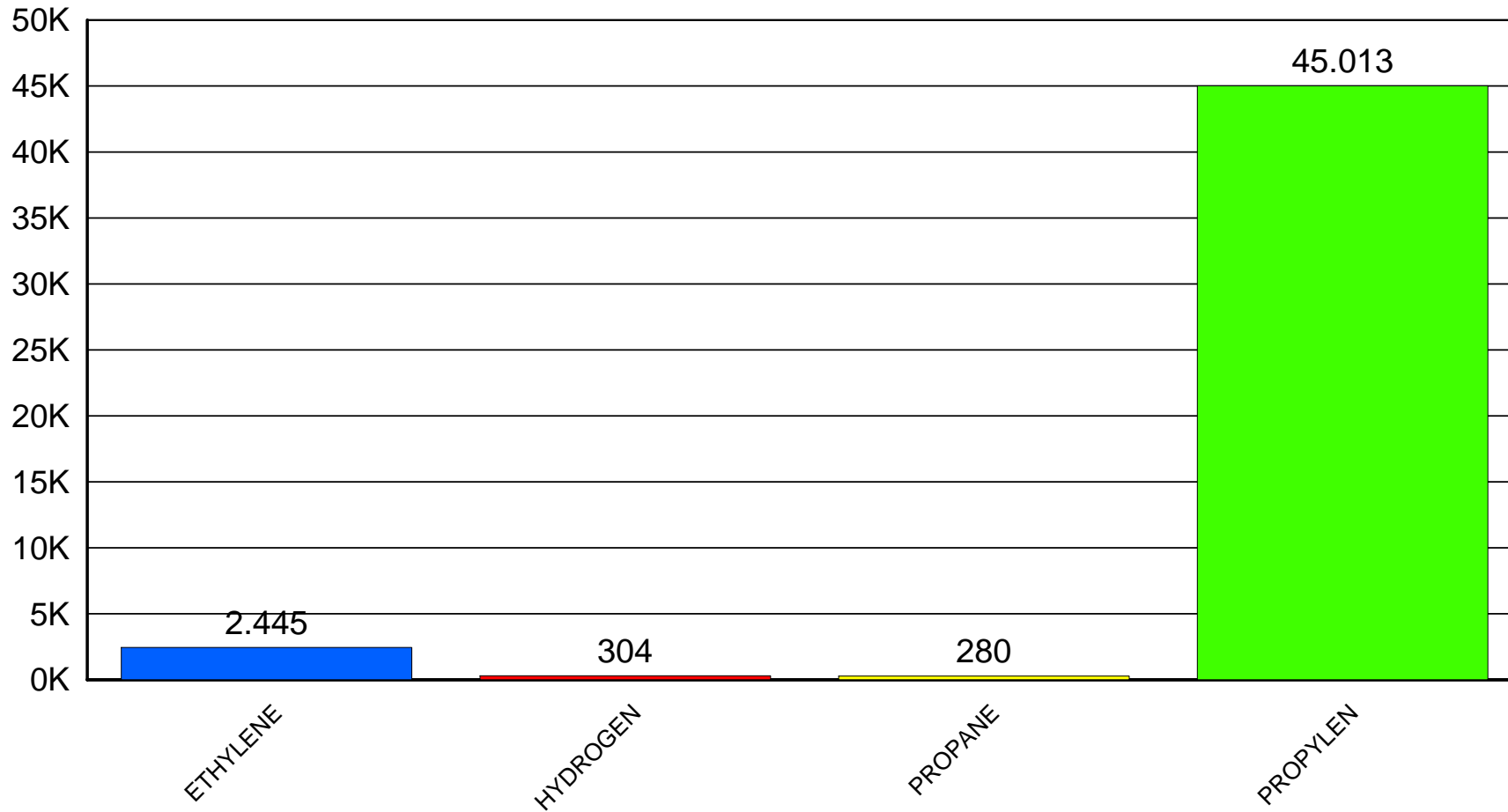


Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : * Project YTD : 2008-347-R

Limit from : 0 to : 9999999

Total : 48.042 kg/yr.

Kg / Yr



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2008-347-S

Site : BRINDISI Unit : P9T

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	2560	2358	202	2312	46	0	46	46	1,95%	10	0,42%	26
Compressor seals												
All	16	16	0	16	0	0	0	0	0,00%	0	0,00%	0
Flanges												
All	5799	5225	574	5134	91	0	91	91	1,74%	6	0,11%	24
Open-ended lines												
All	52	52	0	50	2	0	2	2	3,85%	0	0,00%	2
Other seals												
Gas/Vapor	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	6	6	0	6	0	0	0	0	0,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	118	116	2	93	23	0	23	23	19,83%	4	3,45%	10
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	47	45	2	37	8	0	8	8	17,78%	1	2,22%	13
Valves												
Gas/Vapor	1127	1041	86	989	52	0	52	52	5,00%	7	0,67%	21
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	595	562	33	520	42	0	42	42	7,47%	0	0,00%	14
TOTALS	10320	9421	899	9157	264	0	264	264	2,80%	28	0,30%	110

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Site : BRINDISI

Unit : P9T

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	2560	3857.55	4241.33	12.35	12027.09	0.00	20138.33	46	12027,09	10	9042,67	26,00
Compressor seals												
All	16	0.00	0.00	1.05	0.00	0.00	1.05	0	0,00	0	0,00	0,00
Flanges												
All	5799	3469.49	4264.55	27.43	6872.78	0.00	14634.25	91	6872,78	6	4335,25	24,00
Open-ended lines												
All	52	0.00	6.35	0.27	121.54	0.00	128.15	2	121,54	0	0,00	2,00
Other seals												
Gas/Vapor	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	6	0.00	0.00	0.39	0.00	0.00	0.39	0	0,00	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	118	133.15	1082.65	0.54	2355.33	0.00	3571.67	23	2355,33	4	1123,85	10,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	47	478.30	243.67	0.16	1507.67	0.00	2229.80	8	1507,67	1	156,57	13,00
Valves												
Gas/Vapor	1127	226.01	294.39	5.72	4120.32	0.00	4646.44	52	4120,32	7	3076,36	21,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	595	508.78	13.55	2.23	1070.19	0.00	1594.75	42	1070,19	0	0,00	14,00
TOTALS	10320	8673.28	10146,49	50.15	28074.92	0.00	46944.84	264	28074,92	28	17734,70	110

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** P9T **Section :** * **Drawing :** * **Stream :** *

Project YTD : 2008-347-S

Program inception year : 2007

Total YTD Fugitive Emissions : 26.025,61 kg/yr.

Total emissions of inception year : 18.316,41 kg/yr.

% fugitive emission saved with inception year : -42 %

YTD emissions for default-zero: 0-8 ppm : 50,14 kg/yr.

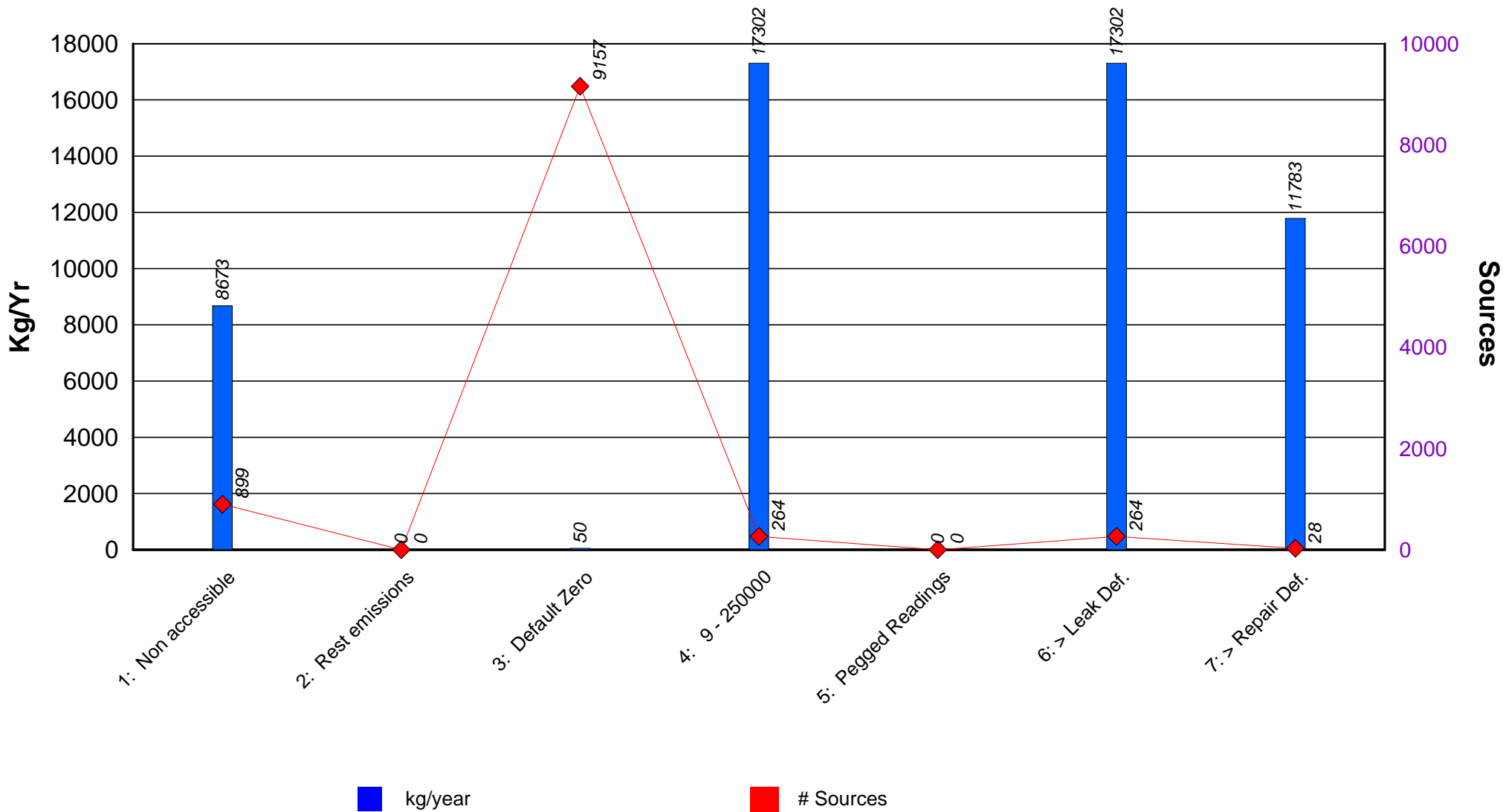
YTD emissions for not accessible sources : 8.673,28 kg/yr.

	Total emission last year											Selected YTD emission	Delta emissions
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve		
Etylheen (etheen)	3.013,80	581,52	0,40	466,75	0,11					275,11	1.141,11	2.464,99	-548,81
Propaan	270,48	77,72	0,01	152,34	0,01					32,47	17,88	280,42	9,94
Propeen (propeen, methylethyleen)	14.928,80	19.460,89	0,64	13.759,38	128,03			0,39		5.466,99	5.079,12	43.895,45	28.966,65
Waterstof	103,34	18,20		255,78	0,01					26,91	3,08	303,98	200,64
TOTAL EMISSIONS	18.316,41	20.138,33	1,05	14.634,25	128,15			0,39		5.801,47	6.241,19	46.944,84	28.628,42

Total # of sources	2.560	16	5.799	52			6		165	1.722	10.320
# Measurable sources	2.358	16	5.225	52			6		161	1.603	9.421
# Leakers>Zero reading	46		91	2					31	94	264
# Leakers > Leak Definition	46		91	2					31	94	264
# Leakers > Repair Definition	10		6						5	7	28
# Registered measurements	88		216	5					55	134	498
% Random of registered meas./total sources	3,44		3,72	9,62					33,33	7,78	4,83
% Leakers>Zero readings/measurable sources	1,95		1,74	3,85					19,25	5,86	2,80
% Leakers>Leak def./measurable sources	1,95		1,74	3,85					19,25	5,86	2,80
% Leakers>Repair def./measurable sources	0,42		0,11						3,11	0,44	0,30
Minimal emission losses (no leakers) in kg/yr	13,68	1,05	30,99	0,28			0,39		0,88	9,07	56,34

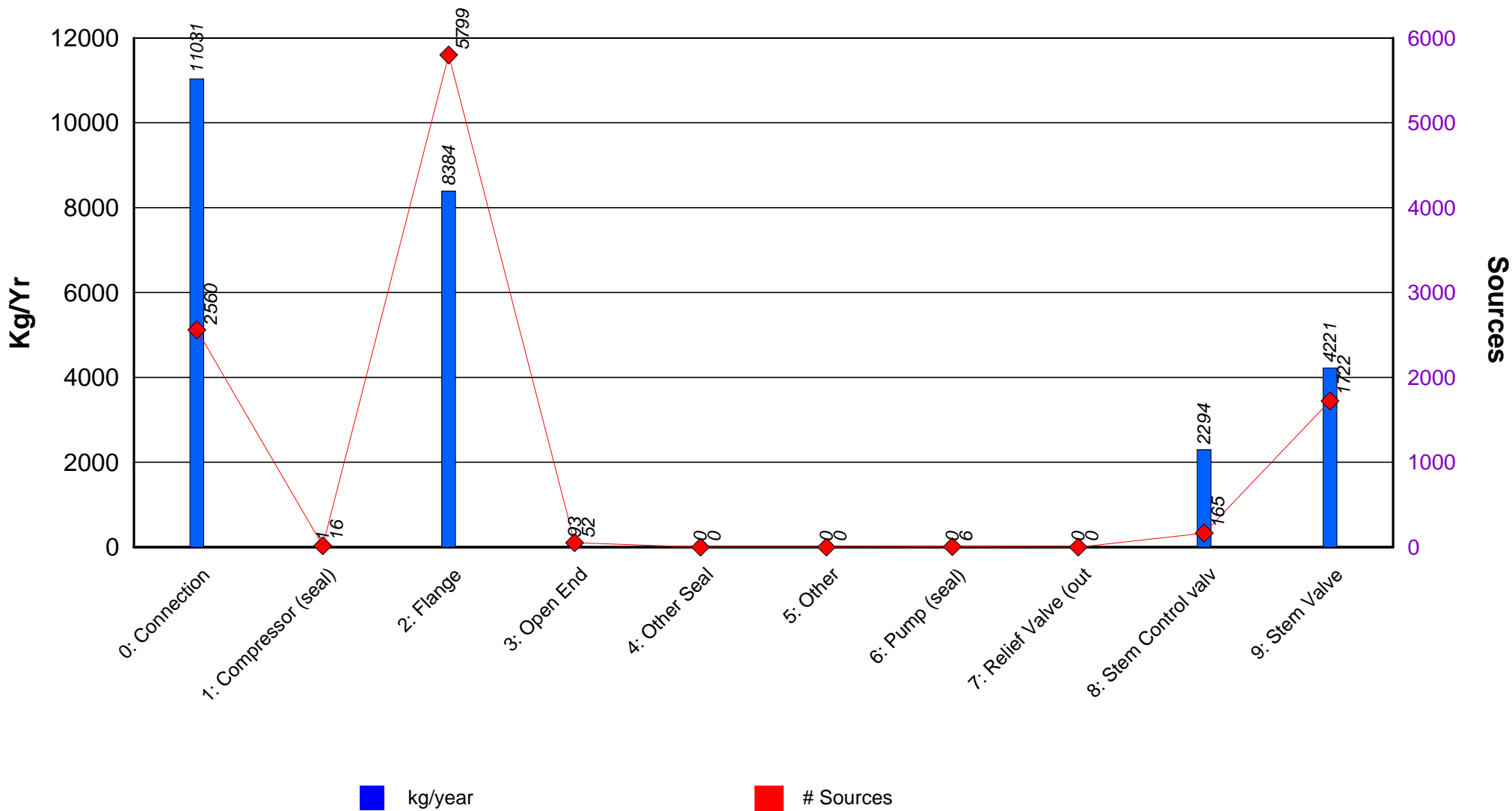
Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2008-347-S

Total : 26.026 kg/yr.
 Total : 10320 Sources



Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2008-347-S

Total : 26.026 kg/yr.
 Total : 10320 Sources

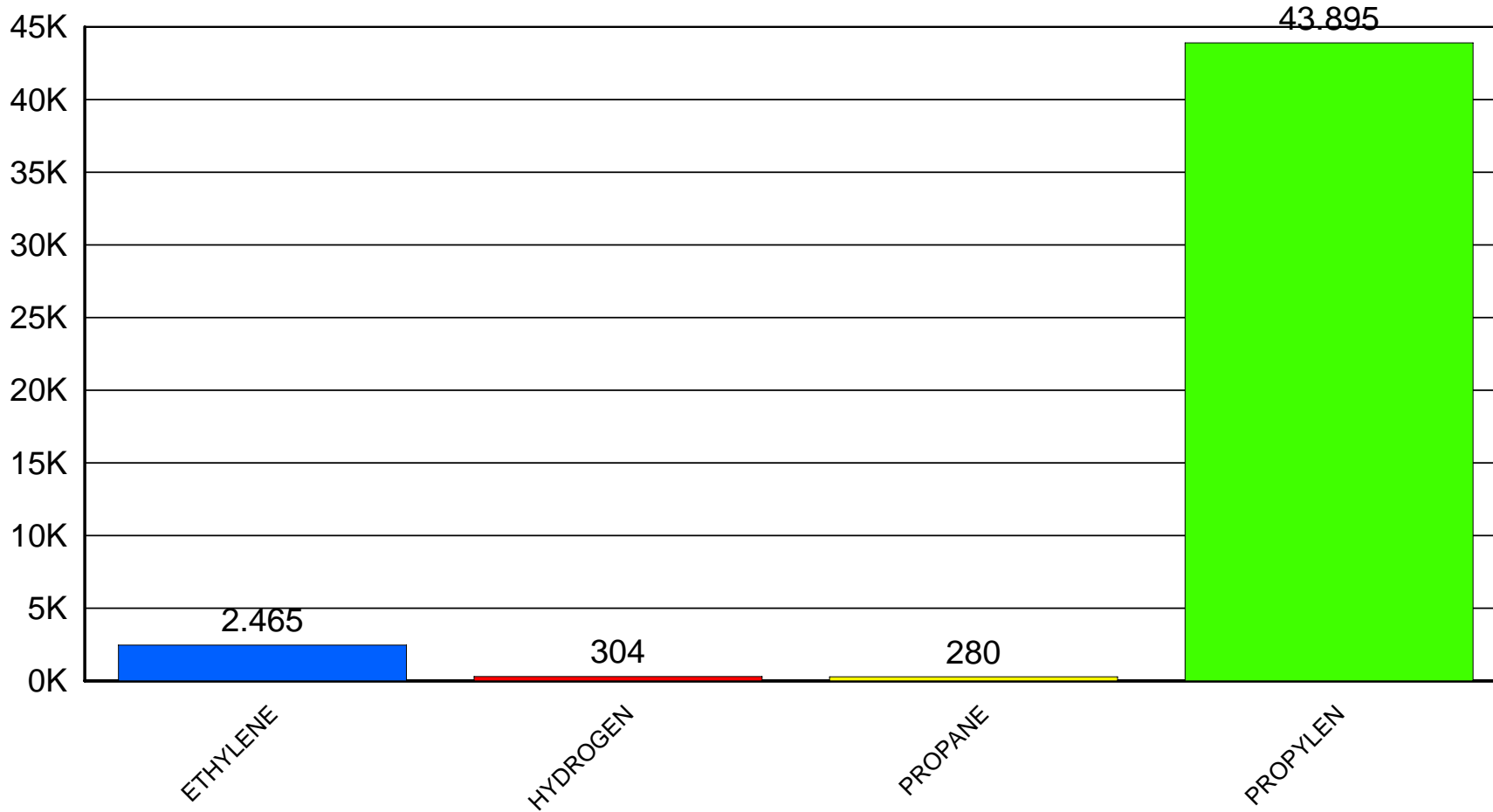


Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : * Project YTD : 2008-347-S

Limit from : 0 to : 9999999

Total : 46.945 kg/yr.

Kg / Yr



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2009-001-I

Site : BRINDISI Unit : P9T

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	2560	2358	202	2312	46	0	46	46	1,95%	10	0,42%	26
Compressor seals												
All	16	16	0	16	0	0	0	0	0,00%	0	0,00%	0
Flanges												
All	5799	5225	574	5134	91	0	91	91	1,74%	6	0,11%	24
Open-ended lines												
All	52	52	0	50	2	0	2	2	3,85%	0	0,00%	2
Other seals												
Gas/Vapor	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	6	6	0	6	0	0	0	0	0,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	118	116	2	93	23	0	23	23	19,83%	4	3,45%	10
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	47	45	2	37	8	0	8	8	17,78%	1	2,22%	13
Valves												
Gas/Vapor	1127	1041	86	989	52	0	52	52	5,00%	7	0,67%	21
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	595	562	33	520	42	0	42	42	7,47%	0	0,00%	14
TOTALS	10320	9421	899	9157	264	0	264	264	2,80%	28	0,30%	110

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Site : BRINDISI

Unit : P9T

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	2560	3857.55	0.00	12.35	7161.02	0.00	11030.93	46	7161,02	10	6187,96	26,00
Compressor seals												
All	16	0.00	0.00	1.05	0.00	0.00	1.05	0	0,00	0	0,00	0,00
Flanges												
All	5799	3469.49	0.00	27.43	4887.53	0.00	8384.45	91	4887,53	6	2705,12	24,00
Open-ended lines												
All	52	0.00	0.00	0.27	93.11	0.00	93.38	2	93,11	0	0,00	2,00
Other seals												
Gas/Vapor	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	6	0.00	0.00	0.39	0.00	0.00	0.39	0	0,00	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	118	133.15	0.00	0.54	879.97	0.00	1013.66	23	879,97	4	542,09	10,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	47	478.30	0.00	0.16	802.27	0.00	1280.73	8	802,27	1	546,77	13,00
Valves												
Gas/Vapor	1127	226.01	0.00	5.72	2486.58	0.00	2718.31	52	2486,58	7	1800,70	21,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	595	508.78	0.00	2.23	991.71	0.00	1502.73	42	991,71	0	0,00	14,00
TOTALS	10320	8673.28	0,00	50.15	17302.20	0.00	26025.62	264	17302,20	28	11782,64	110

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** P9T **Section :** * **Drawing :** * **Stream :** * **Project YTD : 2009-001-I**

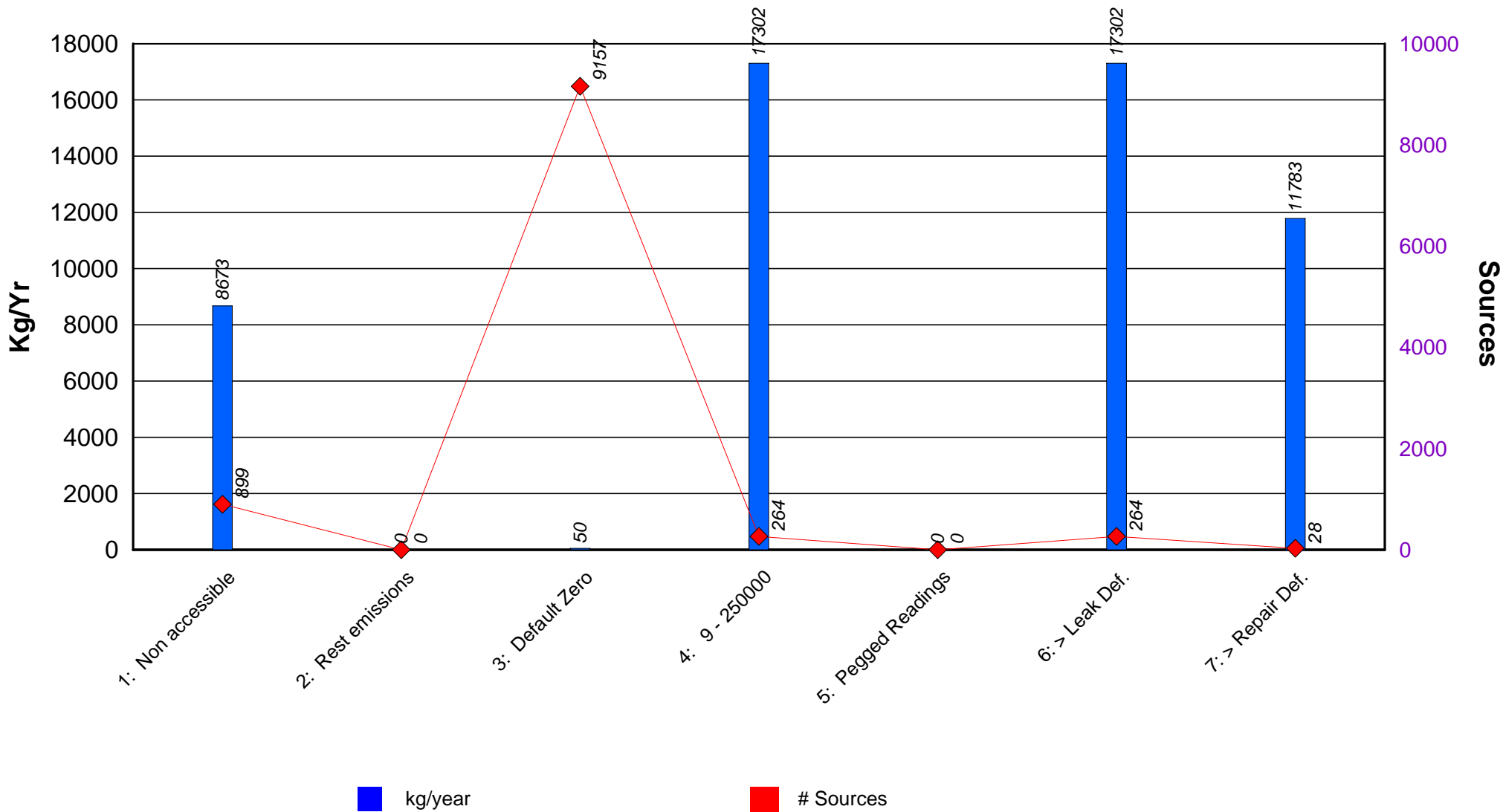
Program inception year : 2007 **Total YTD Fugitive Emissions :** 26.025,61 kg/yr.
Total emissions of inception year : 18.316,41 kg/yr. **% fugitive emission saved with inception year :** -42 %
YTD emissions for default-zero: 0-8 ppm : 50,14 kg/yr. **YTD emissions for not accessible sources :** 8.673,28 kg/yr.

	Total emission last year											Selected YTD emission	Delta emissions	
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve			
Etylheen (etheen)	3.013,80	569,15	0,40	311,42	0,11						238,84	995,46	2.115,38	-898,42
Propaan	270,48	77,72	0,01	151,60	0,01						31,54	17,42	278,29	7,82
Propeen (propeen, methylethyleen)	14.928,80	10.383,55	0,64	7.666,85	93,26			0,39			1.995,21	3.205,07	23.344,97	8.416,17
Waterstof	103,34	0,51		254,58	0,01						28,79	3,08	286,97	183,64
TOTAL EMISSIONS	18.316,41	11.030,93	1,05	8.384,45	93,38			0,39			2.294,39	4.221,03	26.025,62	7.709,21

Total # of sources	2.560	16	5.799	52			6		165	1.722	10.320
# Measurable sources	2.358	16	5.225	52			6		161	1.603	9.421
# Leakers>Zero reading	46		91	2					31	94	264
# Leakers > Leak Definition	46		91	2					31	94	264
# Leakers > Repair Definition	10		6						5	7	28
# Registered measurements	88		216	5					55	134	498
% Random of registered meas./total sources	3,44		3,72	9,62					33,33	7,78	4,83
% Leakers>Zero readings/measurable sources	1,95		1,74	3,85					19,25	5,86	2,80
% Leakers>Leak def./measurable sources	1,95		1,74	3,85					19,25	5,86	2,80
% Leakers>Repair def./measurable sources	0,42		0,11						3,11	0,44	0,30
Minimal emission losses (no leakers) in kg/yr	13,68	1,05	30,99	0,28			0,39		0,88	9,07	56,34

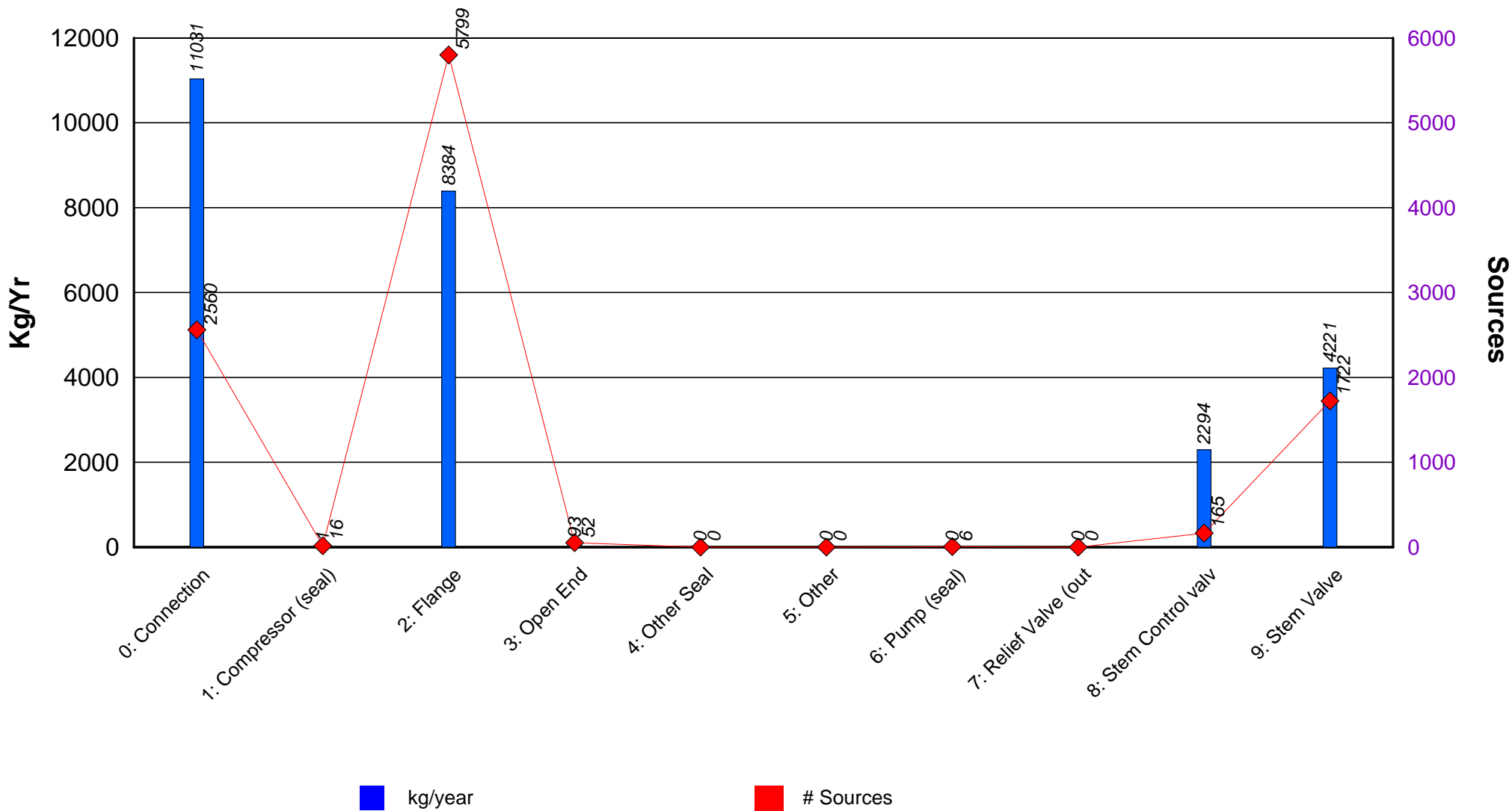
Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2009-001-I

Total : 26.026 kg/yr.
 Total : 10320 Sources



Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
 Project YTD : 2009-001-I

Total : 26.026 kg/yr.
 Total : 10320 Sources

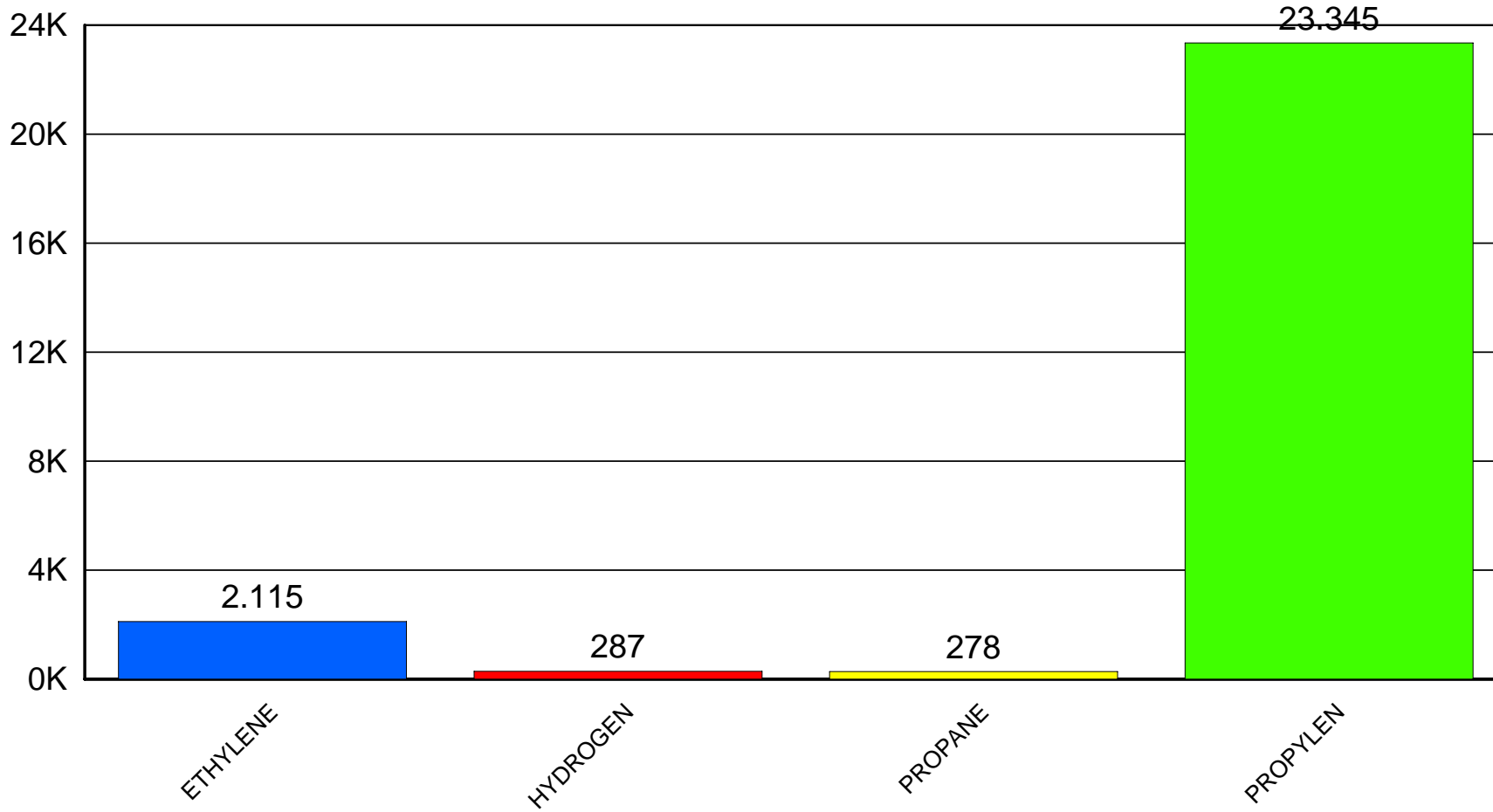


Site : BRINDISI Unit : P9T Section : * Drawing : * Stream : *
Project YTD : 2009-001-I

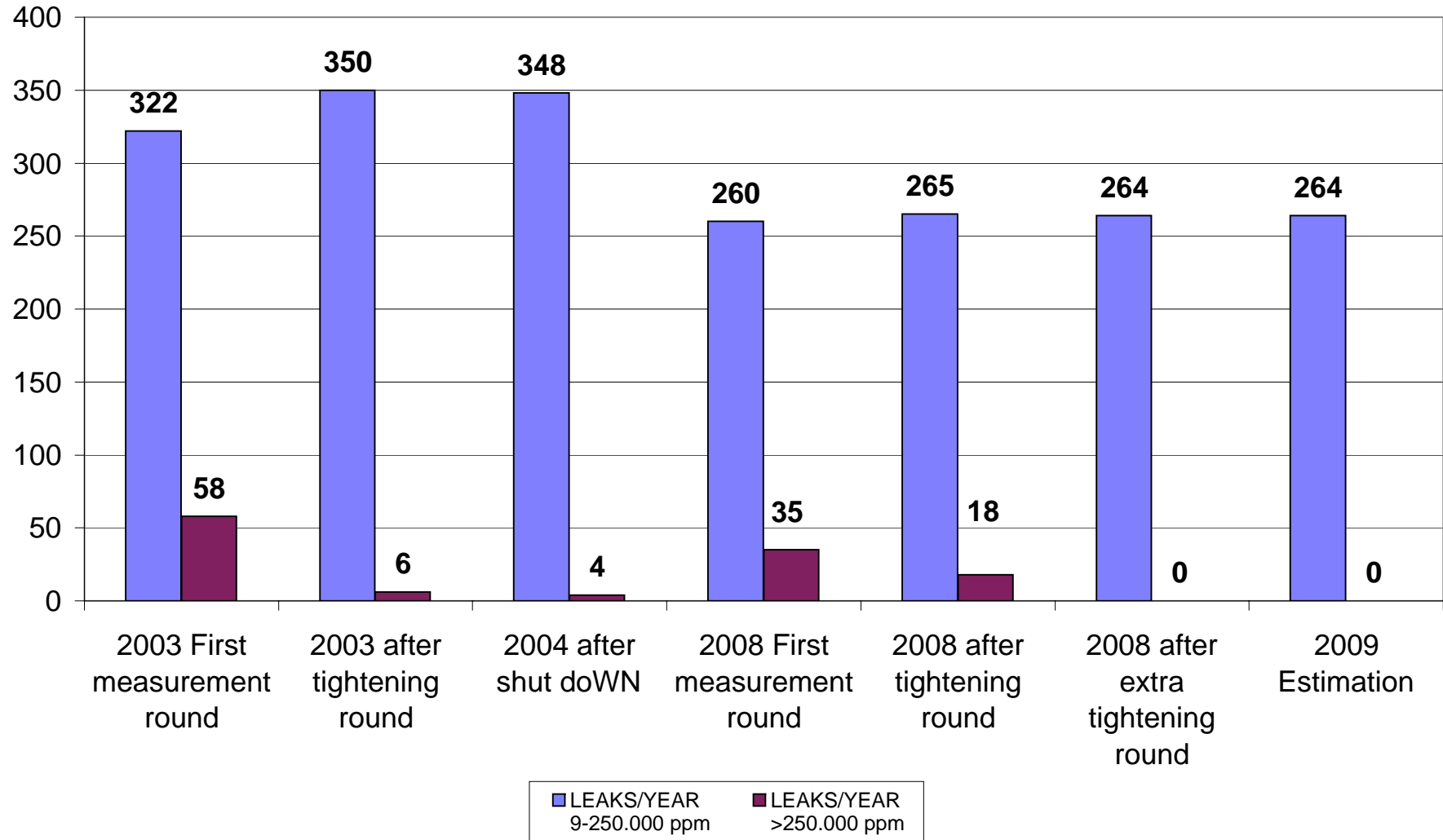
Limit from : 0 to : 9999999

Total : 26.026 kg/yr.

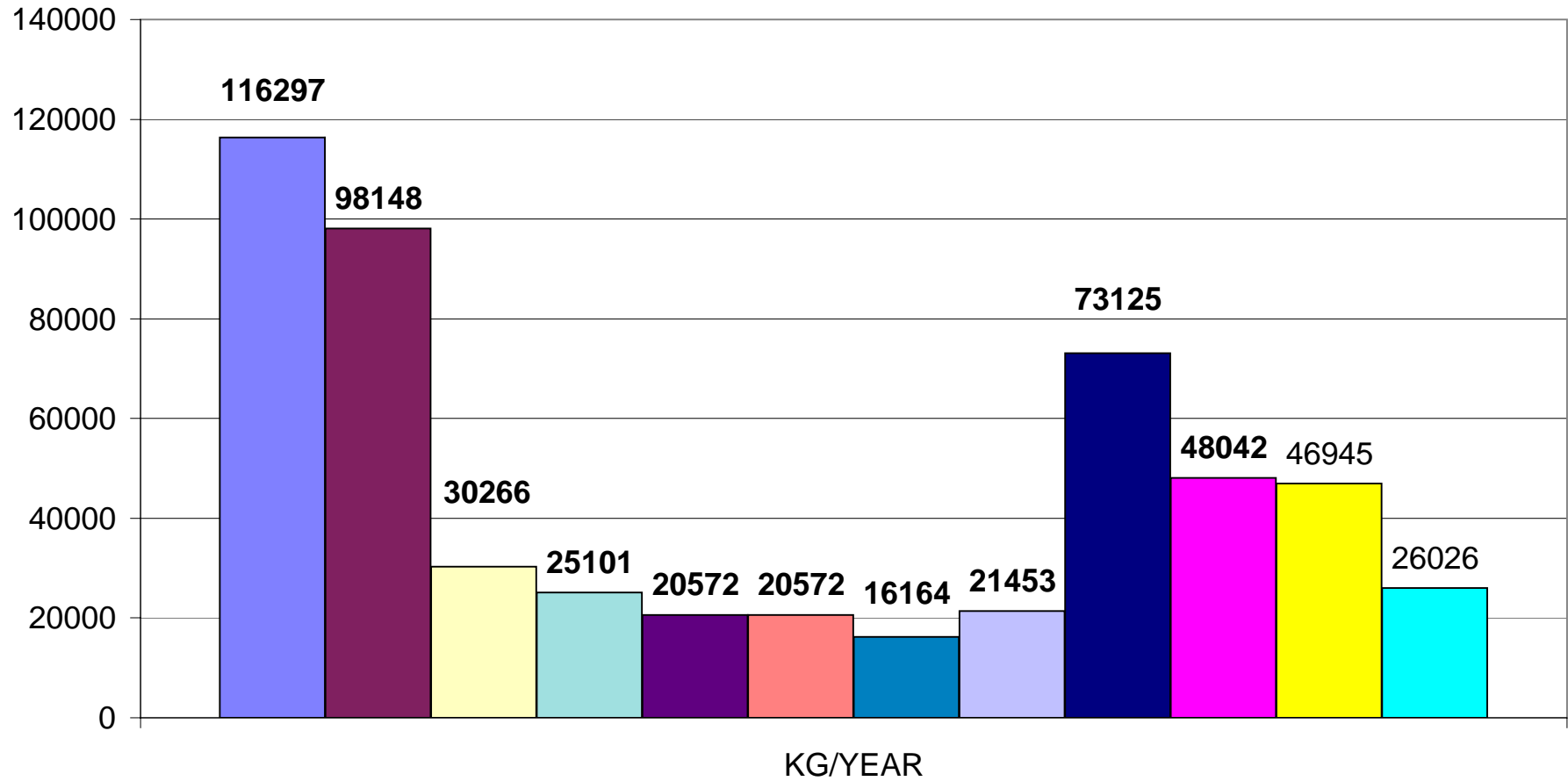
Kg / Yr



HISTORICAL OVERVIEW BASELL BRINDISI P9T
LEAKS/YEAR

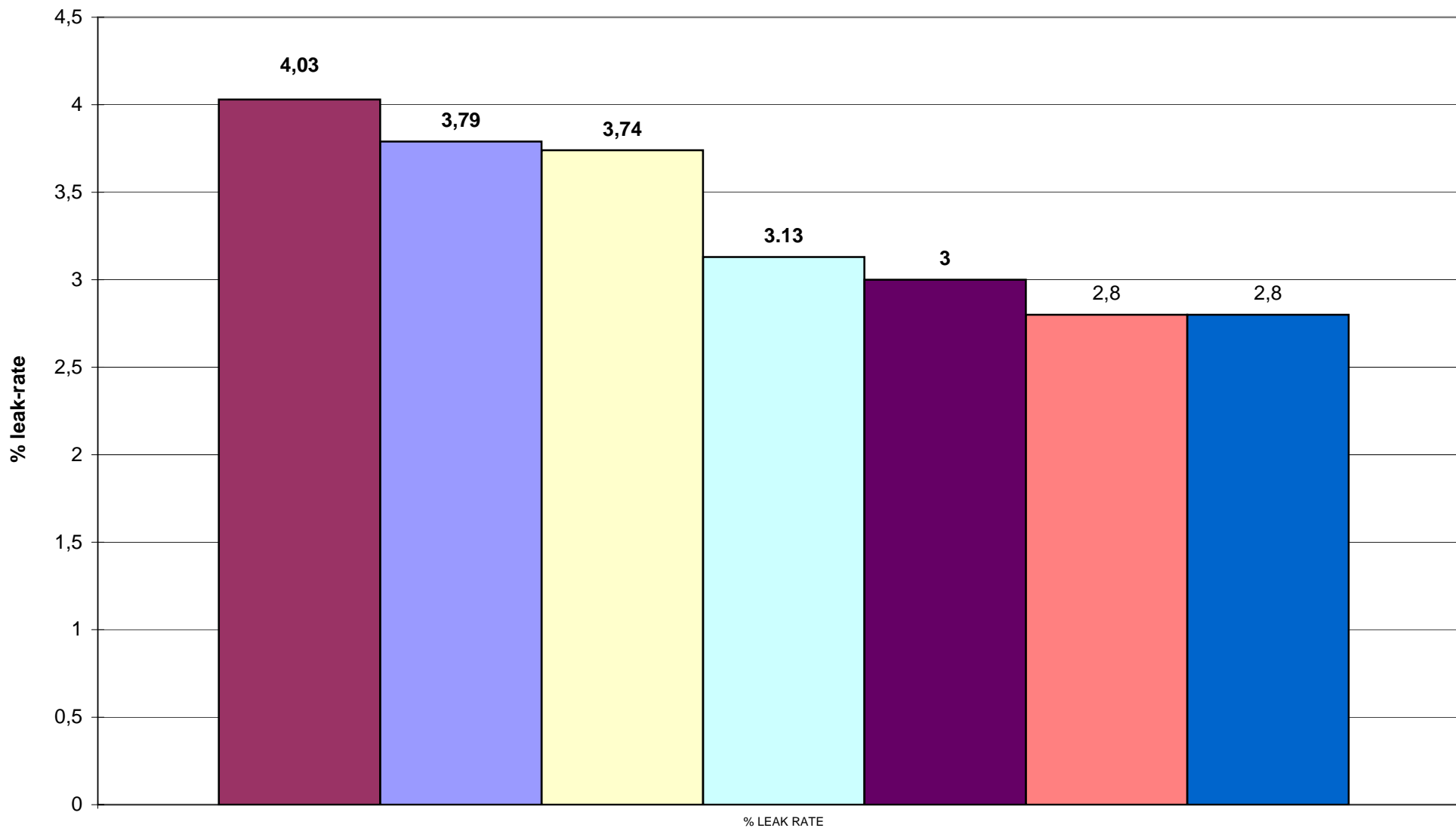


HISTORICAL OVERVIEW BASELL BRINDISI P9T KG/YEAR



- | | | |
|------------------------------|-----------------------------------|------------------------------|
| 2003 First measurement round | 2003 after tightening round | INI 2004 |
| 2004 after shut down | INI2005 | INI2006 |
| INI2007 | INI2008 | 2008 First measurement round |
| 2008 after tightening round | 2008 after extra tightening round | 2009 Estimation |

Historical overview of the leak-rate/year (% leak-rate) Basell "P9T"



- 2003 First measurement round
- 2003 after tightening round
- 2004 after shut down
- 2008 First measurement round
- 2008 after tightening round
- 2008 after extra tightening round
- 2009 Estimation

Calibration logfile

		Gas Bottle					Controlement													
Equipm.	No.	Cal-medium	Low-span ppm	SN-number Low-span	High-span ppm	SN-number High-span	1°check Low-Span	2°check Low-Span	1°check High-Span	2°check High-Span	Noon check Low span	Noon check High-span	1°check Dil pr. /10	2°check Dil pr. /10	PSI check Hydrogen	PSI check Low span	PSI check High span	Date	Hour	Operator
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	523	521	1%	1%	NA	NA	NA	NA	1950	1000	1000	14/01/2008	11u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	527	519	9975	1%	525	8650	NA	NA	1950	1000	1000	15/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	520	516	1%	1,01%	NA	NA	NA	NA	1950	1000	1000	15/01/2008	13u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	501	503	9996	1%	520	9970	NA	NA	1800	1000	1000	16/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	494	495	1%	1%	600	1,09%	NA	NA	1800	1000	1000	17/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	503	504	1%	1%	NA	NA	NA	NA	1800	1000	1000	17/01/2008	14u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	498	503	1%	1%	513	1%	NA	NA	1800	1000	1000	18/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	503	499	1%	1%	535	9945	NA	NA	1800	1000	1000	19/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	505	506	1%	1%	522	1%	1179	1016	1800	1000	1000	21/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	498	503	1,01%	1%	370	7750	1004	1012	1800	1000	1000	22/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	502	505	1%	1%	NA	NA	1001	995	1800	1000	1000	22/01/2008	13u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	507	505	1%	1%	505	9715	1009	1012	1800	1000	1000	23/01/2008	10u10	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	508	499	1%	1%	490	1,01%	1003	1004	1800	1000	1000	24/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	501	503	1%	1%	479	9650	1015	1020	1800	1000	1000	25/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	494	495	1%	1%	410	6700	1011	1010	1500	1000	1000	25/01/2008	8u30	SP
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	503	504	1%	1%	539	1%	NA	NA	1500	1000	1000	25/01/2008	13u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	498	503	1%	1%	NA	NA	NA	NA	1500	1000	1000	26/01/2008	8u30	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	503	499	1%	1%	498	1%	1045	1012	1500	1000	1000	26/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	507	510	1%	1%	520	1,01%	1011	1012	1500	870	800	28/01/2008	8u30	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	515	513	1%	1%	580	1,18	NA	NA	1500	870	800	28/01/2008	8u40	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	508	507	1%	1%	NA	NA	NA	NA	1500	870	800	28/01/2008	13u15	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	523	519	1%	1%	235	6078	987	988	1500	870	800	29/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	499	504	1%	1%	NA	NA	NA	NA	1500	870	800	29/01/2008	8u40	PM

Company: Basell
 Project no.: ED-2008-346

Site: Brindisi

Unit: PP2 / P9T

Calibration logfile

		Gas Bottle					Controlement													
Equipm.	No.	Cal-medium	Low-span ppm	SN-number Low-span	High-span ppm	SN-number High-span	1°check Low-Span	2°check Low-Span	1°check High-Span	2°check High-Span	Noon check Low span	Noon check High-span	1°check Dil pr. /10	2°check Dil pr. /10	PSI check Hydrogen	PSI check Low span	PSI check High span	Date	Hour	Operator
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	515	510	1%	1%	NA	NA	NA	NA	1500	870	800	29/01/2008	13u10	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	498	498	1%	1%	305	6840	1014	1010	1500	870	800	30/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	510	520	1%	1%	525	1,01%	NA	NA	1500	870	800	30/01/2008	8u40	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	515	523	1%	1%	NA	NA	NA	NA	1500	870	800	30/01/2008	13u00	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	559	526	1%	1%	523	1%	1019	1010	1450	730	540	31/01/2008	8u30	PM

ANALYSIS CERTIFICATION

METHOD OF PREPARATION : GRAVIMETRIC / PRESSURE TRANSFILLING

METHOD OF ANALYSIS : GC(FID)

ACCURACY : ± 2% RELATIVE

```
=====
LOT NO.      COMP. 1      COMP. 2      COMP. 3      COMP. 4      COMP. 5      COMP. 6      Exp Date
& QTY.      CH4        AIR
=====
96636(1)    500PPM      BALANCE
=====
09/04/10
=====
```

(GAS MIXTURES MANUFACTURED WITH BALANCE CALIBRATED USING N.I.S.T. TRACEABLE WEIGHTS.)
N.I.S.T. WEIGHT SET TEST NUMBERS: 822/266926-02, 822/272801-06, 822/270236-04, 12512, 12615, 12616, 12617, 12618

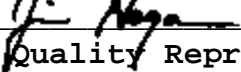
No effecting enviromental conditions during analysis.

REQUESTED BY : CALGAZ

CUSTOMER PURCHASE ORDER NUMBER : 5281

PACKING LIST NUMBER : 264663

CERTIFICATION DATE : September 4, 2007

ANALYSIS BY : 
Quality Representative

"We certify that all the cylinders for the Lot numbers identified herein are manufactured and tested within the requirements of CFR 49 part 178.65 and that physical and chemical test reports are on file and copies will be furnished upon request."

CALGAZ, DIV. OF AL ADVANCED TECHNOLOGIES U.S. LLC
821 Chesapeake Drive, Cambridge, MD 21613-0149
Phone: (410)228-6400 Fax: (410)228-4251

ANALYSIS CERTIFICATION

METHOD OF PREPARATION : GRAVIMETRIC / PRESSURE TRANSFILLING

METHOD OF ANALYSIS : GC(FID)

ACCURACY : ± 2% RELATIVE

LOT NO. & QTY.	COMP. 1 CH ₄	COMP. 2 AIR	COMP. 3	COMP. 4	COMP. 5	COMP. 6	Exp Date
98314(1)	1.00%	BALANCE					09/01/10

(GAS MIXTURES MANUFACTURED WITH BALANCE CALIBRATED USING N.I.S.T. TRACEABLE WEIGHTS.)
N.I.S.T. WEIGHT SET TEST NUMBERS: 822/266926-02, 822/272801-06, 822/270236-04, 12512, 12615, 12616, 12617, 12618

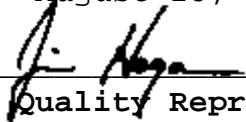
No effecting enviromental conditions during analysis.

REQUESTED BY : CALGAZ

CUSTOMER PURCHASE ORDER NUMBER : 5248

PACKING LIST NUMBER : 264206

CERTIFICATION DATE : August 28, 2007

ANALYSIS BY : 
Quality Representative

"We certify that all the cylinders for the Lot numbers identified herein are manufactured and tested within the requirements of CFR 49 part 178.65 and that physical and chemical test reports are on file and copies will be furnished upon request."

CALGAZ, DIV. OF AL ADVANCED TECHNOLOGIES U.S. LLC
821 Chesapeake Drive, Cambridge, MD 21613-0149
Phone: (410)228-6400 Fax: (410)228-4251



Fugitive emission monitoring

Project 2008



BASELL Brindisi PP2



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1. Project introduction

2. Management summary

3. Unit PP2 - First measurement (2008-346-F)

Fugitive Emissions: Total # sources /emission class

Fugitive Emissions: Total kg/year /emission class

Total overview medium/ source-type in kg/yr

Graphs

Comparisation between # Sources and kg/year, by classes

Comparisation between # Sources and kg/year, by sources

Overview for kg/year, by medium

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Fugitive Emissions: Total # sources /emission class

Fugitive Emissions: Total kg/year /emission class

Total overview medium/ source-type in kg/yr

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Comparisation between # Sources and kg/year, by sources

Overview for kg/year, by medium

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Fugitive Emissions: Total kg/year /emission class

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6. Unit PP2 Estimation 2009 (2009-001-I)

Fugitive Emissions: Total # sources /emission class

Fugitive Emissions: Total kg/year /emission class

Total overview medium/ source-type in kg/yr

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Comparisation between # Sources and kg/year, by sources

Overview for kg/year, by medium

7. Unit PP2- historical overviews

Historical overview leaks/year.

Historical overview kg/year

Historical overview of the leak rate (% leak-rate)

8. Repair list PP2. (leaks > repair def.)

9. Calibration log file and analyzing certificates gas bottles



Project introduction:

We received the honor from **Basell “Polyolefins”** to perform a complete Leak Detection And Repair program for the units **PP2** inclusive re-measurement after first repair attempt reparations. At the end of the project we prepared a full emission report of all gathered data and results.

Following project phase have been executed:

- Project preparation;
- Complete monitoring of PP2;
- Replacement of the missing tags of existent leaks in PP2 of previous measurement rounds;
- Inventarisation of new leaks in PP2 comparable to previous measurement rounds;
- Tagging of new leaks in PP2 with alu tags.
- Re-measurements during and after maintenance work at PP2;
- Extra Re-measurement after maintenance work at PP2
- All leaks above repair definition are provided with visible yellow labels concerning PP2;
- Taking pictures of the leaks remaining above repair definition at PP2;
- Update Fugitive emission management database with the performed measuring rounds;
- Prepare 3 sets of emission reports for PP2;
- Project Presentation.

All these tasks have been performed during January 2008 and have been performed conform our Standard Operating Procedures.

We used the standard **EPA Correlation “SOCMP” Approach** (Cfr. *United states Environmental Protection Agency 1994*) to calculate the emission losses. This method utilizes fixed emission factors, which are used to convert the measured ppm values into kg/yr per source.

To avoid calculation errors with very small leaks (leak-rate < 8 ppm), the method is using a fixed factor while anyhow there are always some minimal emissions. The solution used for the Chemical industry by EPA is the usage of fixed zero-reading factors to represent these minimal losses.



Each measurement with a leak-rate > 250.000 ppm will be converted by the “pegged-reading” factors. This EPA rule is created due to the limited measurement range of the detection devices.

The detection devices which we used during the project are a TVA 1000 (Thermo Instruments) and a solo-200 (Imbema). The procedures, which guarantee successful usage of these detection devices, can be requested at any time from our administration office. For each source with a leak-rate > 8 ppm, the software uses a equation calculation.

All data has been produced with the relational SfempX database software

Following sources have been registered in the Basell “Polyolefins” SfempX database :

FL	Flange
SV	Stem Valve
SC	Stem Control Valve
PS	Pump Seal
OS (<i>Mixer, agitator</i>)	Other Seal
CS	Compressor seal
OE	Open End
RO	Relief valve, Outlet
CN	Connection

Medium service:

Gas; medium which is on process conditions under gaseous- or vapor form.

Light Liquid: medium with vapor pressure > 0.3 kpa at 20°C .

Heavy Liquid: medium with vapor pressure > 0.3 kpa at 20°C .

Tag-definition; → All equipments with a leak-rate > 9 ppm

Following streams have been monitored



stream name	desc_1	leak_def	repair_def	tag_def
BLOW-D	Blow down	9	10000	9
ETHYLENE	Etylheen (etheen)	9	10000	9
HYDROGEN	Hydrogen	9	10000	9
OFFGAS	Offgas	9	10000	9
PROPYLEN	Propeen (propeen, methylethleen)	9	10000	9

Below you can find the list of all drawings, which have been monitored during this LDAR project for PP2.

site_id	unit_id	section_id	drawing_id	desc_1
BRINDISI	PP2	BATTERY-L	500003-01A	South battery limit
BRINDISI	PP2	BATTERY-L	500003-01B	East-west-north b.l.
BRINDISI	PP2	BATTERY-L	500003-01C	Hydrogen feed
BRINDISI	PP2	BLOW DOWN	500003-060	Blow down
BRINDISI	PP2	BLOW DOWN	500003-060A	Blow down network
BRINDISI	PP2	CHILLING	500003-062	Acqua refrigerata
BRINDISI	PP2	CHILLING	500003-062A	Chilling unit
BRINDISI	PP2	DEGASSING	500003-030	High pres. polymer degassing
BRINDISI	PP2	DEGASSING	500003-031	Propylene scrubbing h.p.
BRINDISI	PP2	DEGASSING	500003-033	Low pres. polymer deagassing
BRINDISI	PP2	DEGASSING	500003-033A	Propylene scrubbing low pres.
BRINDISI	PP2	DEGASSING	500003-034	Recylce propylene compressor
BRINDISI	PP2	DEGASSING	500003-035	Seals pressurization system
BRINDISI	PP2	DEGASSING	500003-036	Propylene cond. and H2 strip.
BRINDISI	PP2	DEGASSING	500003-037	Monomer recovery
BRINDISI	PP2	ETHYLENE F	500003-074	PK704 Ethylene compressor
BRINDISI	PP2	HYDROGEN R	500003-037A	C302 compr. hydrogen recovery
BRINDISI	PP2	HYDROGEN R	500003-037B	C302B compr. hydrogen recovery
BRINDISI	PP2	MONOMER TR	500003-032	Propylene feed tank
BRINDISI	PP2	MONOMER TR	500003-071	PK702 propylene drying unit
BRINDISI	PP2	POLYMERIZ	500003-020	Reactors propylene feed
BRINDISI	PP2	POLYMERIZ	500003-021	Precontacting pot
BRINDISI	PP2	POLYMERIZ	500003-022	Prepoly reactor
BRINDISI	PP2	POLYMERIZ	500003-023	Reactor surge drum
BRINDISI	PP2	POLYMERIZ	500003-024	First stage reactor
BRINDISI	PP2	POLYMERIZ	500003-025	Second stage reactor
BRINDISI	PP2	POLYMERIZ	500003-026	Reactor killing
BRINDISI	PP2	POLYMERIZ	500003-027	Seals pressurization system
BRINDISI	PP2	STEAMING	500003-050	Polymer steaming
BRINDISI	PP2	STEAMING	500003-051	Polymer drying
BRINDISI	PP2	STEAMING	500003-052	Off gas recovery

MANAGEMENT SUMMARY

1. Summary PP2: First measurement (project 2008-346-F)

The first measurement of PP2 in 2008 indicates there are **203 leaks**, which represent **39.500 kg/yr** of fugitive emissions, calculated with the EPA correlation method.

Concerning the non-leaking sources:

595 not accessible sources with an extrapolated emission loss of **6545 kg/yr**

6359 Default-zero sources with a calculated loss of **57 kg/yr**

Rest emissions (repaired sources) with a calculated loss of **34 kg/jr**

Total losses of 46.137 kg/year

Explanation:

Not accessible sources:

These are all the sources which can not be measured without help of extra equipment (e.g. scaffolding), with other words, these sources are not reachable in normal and/or save conditions.

The emission calculation is based on the results of all monitored sources, meaning, depending the % of leak-rate of the total emission losses in kg/yr for the total monitored sources. This equation will than also be used for the total number of not accessible sources.

Default-zero

This equation is valid for are all the accessible sources with a leak value between 0 and 8 ppm.

A fixed EPA emission calculation rule is used for all these sources.

Also the remaining losses overtime of the repaired sources are added to this field.

Rest emissions This is the loss of a repaired leak during the past year.

1.1 The YTD situation of all leaks.

1.1.1 By equipment type:

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	1936	1782	58	3,25%	10184.77334
CS	8	8	2	25,00%	5534.607706
FL	3939	3590	85	2,37%	11873.82862
OE	22	22	3	13,64%	75.185376
OS	1	1	0	0,00%	0
OT	0	0	0	0,00%	0
PS	5	5	1	20,00%	42.353281
RO	0	0	0	0,00%	0
SC	119	115	29	25,22%	9739.264032
SV	1127	1039	25	2,41%	2050.433902
TOTAL	7157	6562	203	3,09%	39500.44625

1.1.2 By leak class:

* **185** leaks in the class of measured readings (9-250.000 ppm)

* **18** leaks in the class of pegged readings (>250.000 ppm)

1.1.3 By kg/yr:

* In the class of measured readings (9-250.000 ppm) -> **7.019 kg/yr**

* In the class of pegged readings (>250.000 ppm) -> **32.481 kg/yr**



2. Summary PP2: Measurement after tightening (project 2008-346-R)

After the tightening round in 2008, there are still **199 leaks**, which represent **31.666 kg/yr** of fugitive emissions, calculated with the EPA correlation method.

Concerning the non-leaking sources:

595 not accessible sources with an extrapolated emission loss of **6545 kg/yr**

6363 Default-zero sources with a calculated loss of **35 kg/yr**

Rest emissions (repaired sources) with a calculated loss of **144 kg/jr**

Total losses of 38.389 kg/year

Explanation:

Not accessible sources:

These are all the sources which can not be measured without help of extra equipment (e.g. scaffolding), with other words, these sources are not reachable in normal and/or save conditions.

The emission calculation is based on the results of all monitored sources, meaning, depending the % of leak-rate of the total emission losses in kg/yr for the total monitored sources. This equation will than also be used for the total number of not accessible sources.

Default-zero

This equation is valid for are all the accessible sources with a leak value between 0 and 8 ppm.

A fixed EPA emission calculation rule is used for all these sources.

Also the remaining losses overtime of the repaired sources are added to this field.

Rest emissions This is the loss of a repaired leak during the past year.

2.1 The YTD situation of all leaks.

2.1.1 By equipment type:

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	1936	1782	57	3,20%	11501.19068
CS	8	8	2	25,00%	5534.607706
FL	3939	3590	85	2,37%	10235.36003
OE	22	22	3	13,64%	75.185376
OS	1	1	0	0,00%	0
OT	0	0	0	0,00%	0
PS	5	5	1	20,00%	42.353281
RO	0	0	0	0,00%	0
SC	119	115	28	24,35%	3792.631503
SV	1127	1039	23	2,21%	483.995623
TOTAL	7157	6562	199	3,03%	31665.3242

2.1.2 By leak class:

* **187** leaks in the class of measured readings (9-250.000 ppm)

* **12** leaks in the class of pegged readings (>250.000 ppm)

2.1.3 By kg/yr:

* In the class of measured readings (9-250.000 ppm) -> **6.910 kg/yr**

* In the class of pegged readings (>250.000 ppm) -> **24.756 kg/yr**



3. Summary PP2: Extra Measurement after tightening(YTD: 2008-346-S)

After the tightening round in 2008, there are still **186 leaks**, which represent **17.850 kg/yr** of fugitive emissions, calculated with the EPA correlation method.

Concerning the non-leaking sources:

595 not accessible sources with an extrapolated emission loss of **6545 kg/yr**

6376 Default-zero sources with a calculated loss of **35 kg/yr**

Rest emissions (repaired sources) with a calculated loss of **12.783kg/jr**

Total losses of 37.213 kg/year

Explanation:

Not accessible sources:

These are all the sources which can not be measured without help of extra equipment (e.g. scaffolding), with other words, these sources are not reachable in normal and/or save conditions.

The emission calculation is based on the results of all monitored sources, meaning, depending the % of leak-rate of the total emission losses in kg/yr for the total monitored sources. This equation will than also be used for the total number of not accessible sources.

Default-zero

This equation is valid for are all the accessible sources with a leak value between 0 and 8 ppm.

A fixed EPA emission calculation rule is used for all these sources.

Also the remaining losses overtime of the repaired sources are added to this field.

Rest emissions This is the loss of a repaired leak during the past year.

3.1 The YTD situation of all leaks.

3.1.1 By equipment type:

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	1936	1782	55	3,09	7595
CS	8	8	2	25,00	5385
FL	3939	3590	76	2,12	1853
OE	22	22	3	13,64	75
OS	1	1	0	0	0
OT	0	0	0	0	0
PS	5	5	1	20,00	42
RO	0	0	0	0	0
SC	119	115	26	22,61	2416
SV	1127	1039	23	2,21	484
TOTAL	7157	6562	186	2,83	17850

3.1.2 By leak class:

* **186** leaks in the class of measured readings (9-250.000 ppm)

* **0** leaks in the class of pegged readings (>250.000 ppm)

3.1.3 By kg/yr:

* In the class of measured readings (9-250.000 ppm) -> **17.850 kg/yr**

* In the class of pegged readings (>250.000 ppm) -> **0 kg/yr**





4. The YTD situation of all leaks > repair definition(2009-001-I)

Code	Nr. of sources	Nr. measured	Nr. leakers	Percent leakers	Total Loss amount
CN	1936	1782	9	0,51	3491
CS	8	8	1	12,50	2212
FL	3939	3590	1	0,03	120
OE	22	22	0	0	0
OS	1	1	0	0	0
OT	0	0	0	0	0
PS	5	5	0	0	0
RO	0	0	0	0	0
SC	119	115	3	2,61	1291
SV	1127	1039	0	0	0
TOTAL	7157	6562	14	0,21	7114

5. Highlights:

- When we will repaired the **14 leaks > repair definition**(10.000ppm) we can reduce the emissions with **7.114 kg/yr** or **65 %** of the total **leak emission rate**. (*leaking sources*)
- The tightening round in 2008 resulted in a reduction of **7.748 kg/year** or **17%** of the total leak emissions for 2008
- The **extra** tightening round in 2008 resulted in a reduction of **8.924 kg/year** or **19%** of the total leak emissions for 2008
- The total amount between the measurement and the calculated estimations for **2009** will reduce by **28.567 kg/yr** or **62 %** of the total fugitive emissions.



6. Historical summary PP2

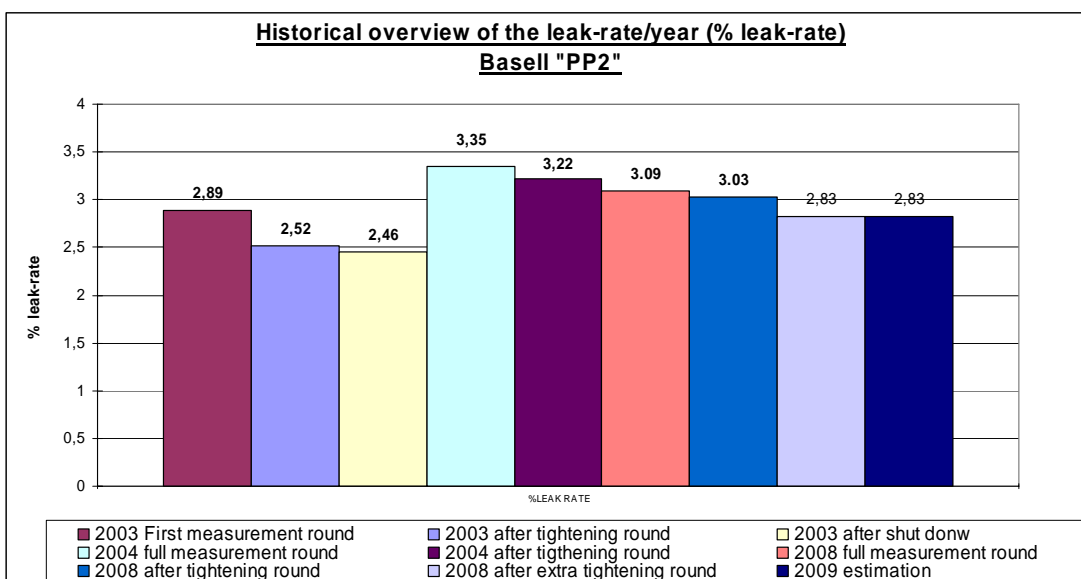
6.1 Summary in number of sources & leaks

Class	Full measuring 2008 2008-346-F	After Tightening round 2008 2008-346-R	After Extra Tightening Round 2008-346-S	Initialize 2009 2009-001-I
Not accessible	595	595	595	595
Default zero	6359	6363	6376	6376
9 – 250.000 ppm	185	187	186	186
>250.000 ppm (pegged)	18	12	0	0
Total	7157	7157	7157	7157

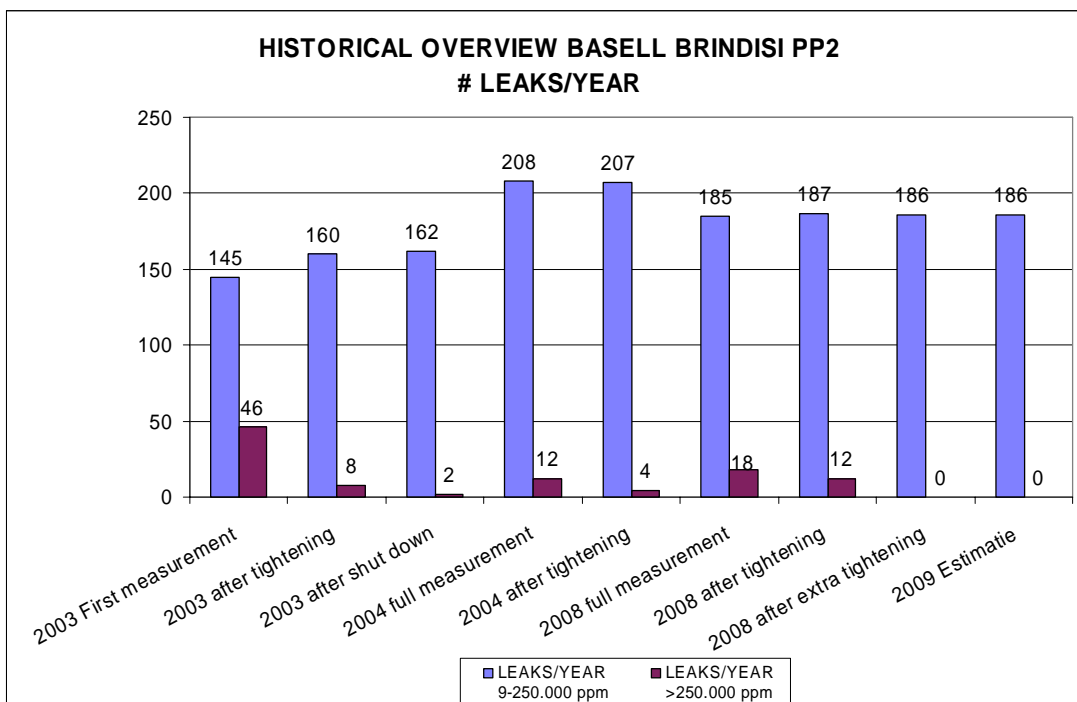
6.2 Summary of losses in kg/yr

Class	Full measuring 2008 2008-346-F	After Tightening round 2008 2008-346-R	After Extra Tightening Round 2008-346-S	Initialize 2009 2009-001-I
Not accessible	6545	6545	6545	6545
Rest Emissions	57	144	12783	0
Default zero	34	34	35	35
9 – 250.000 ppm	7019	6910	17850	10990
>250.000 ppm (pegged)	32482	24756	0	0
Total	46137	38389	37213	17570

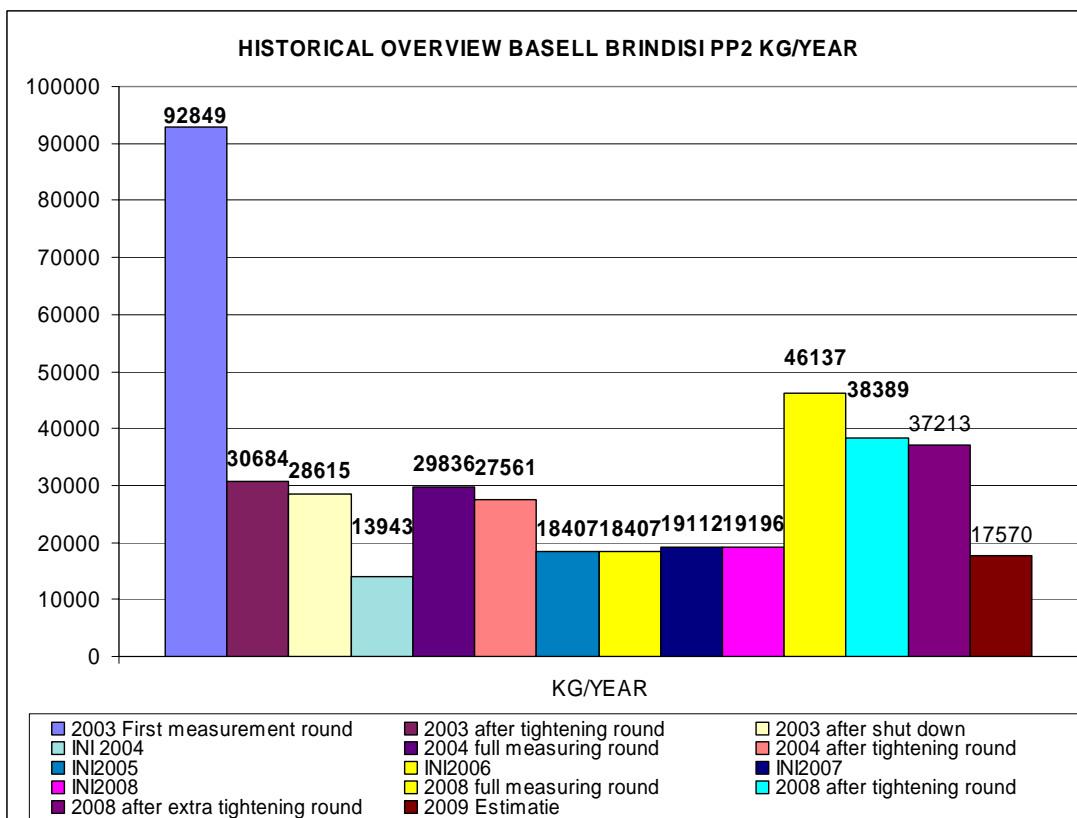
6.3 Historical overview in # leak-rate/year



6.4 Historical overview in # leaks/year



6.5 Historical overview in kg/year



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2008-346-F

Site : BRINDISI Unit : PP2

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	1936	1782	154	1724	54	4	58	58	3,25%	15	0,84%	12
Compressor seals												
All	8	8	0	6	1	1	2	2	25,00%	1	12,50%	0
Flanges												
All	3939	3590	349	3505	80	5	85	85	2,37%	13	0,36%	8
Open-ended lines												
All	22	22	0	19	3	0	3	3	13,64%	0	0,00%	2
Other seals												
Gas/Vapor	1	1	0	1	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	5	5	0	4	1	0	1	1	20,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	67	67	0	57	9	1	10	10	14,93%	3	4,48%	5
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	52	48	4	29	13	6	19	19	39,58%	11	22,92%	5
Valves												
Gas/Vapor	652	588	64	584	4	0	4	4	0,68%	1	0,17%	14
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	475	451	24	430	20	1	21	21	4,66%	2	0,44%	7
TOTALS	7157	6562	595	6359	185	18	203	203	3,09%	46	0,70%	53

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Project YTD : 2008-346-F

Site : BRINDISI

Unit : PP2

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	1936	2940.91	13.27	9.21	2565.35	7619.43	13148.16	58	10184,77	15	9047,41	12,00
Compressor seals												
All	8	0.00	0.00	0.39	103.41	5431.20	5535.00	2	5534,61	1	5431,20	0,00
Flanges												
All	3939	2109.50	29.58	18.73	2325.05	9548.77	14031.63	85	11873,83	13	10610,97	8,00
Open-ended lines												
All	22	0.00	0.00	0.10	75.19	0.00	75.29	3	75,19	0	0,00	2,00
Other seals												
Gas/Vapor	1	0.00	0.00	0.07	0.00	0.00	0.07	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	5	0.00	0.90	0.26	42.35	0.00	43.52	1	42,35	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	67	0.00	9.08	0.33	276.98	918.94	1205.33	10	1195,92	3	1058,11	5,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	52	956.59	0.58	0.12	894.33	7649.02	9500.65	19	8543,35	11	8186,51	5,00
Valves												
Gas/Vapor	652	168.19	2.70	3.38	76.45	0.00	250.72	4	76,45	1	72,53	14,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	475	370.02	0.78	1.85	659.99	1314.00	2346.63	21	1973,99	2	1508,87	7,00
TOTALS	7157	6545.21	56,89	34.44	7019.09	32481.36	46136.98	203	39500,45	46	35915,61	53

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** PP2 **Section :** * **Drawing :** * **Stream :** *

Project YTD : 2008-346-F

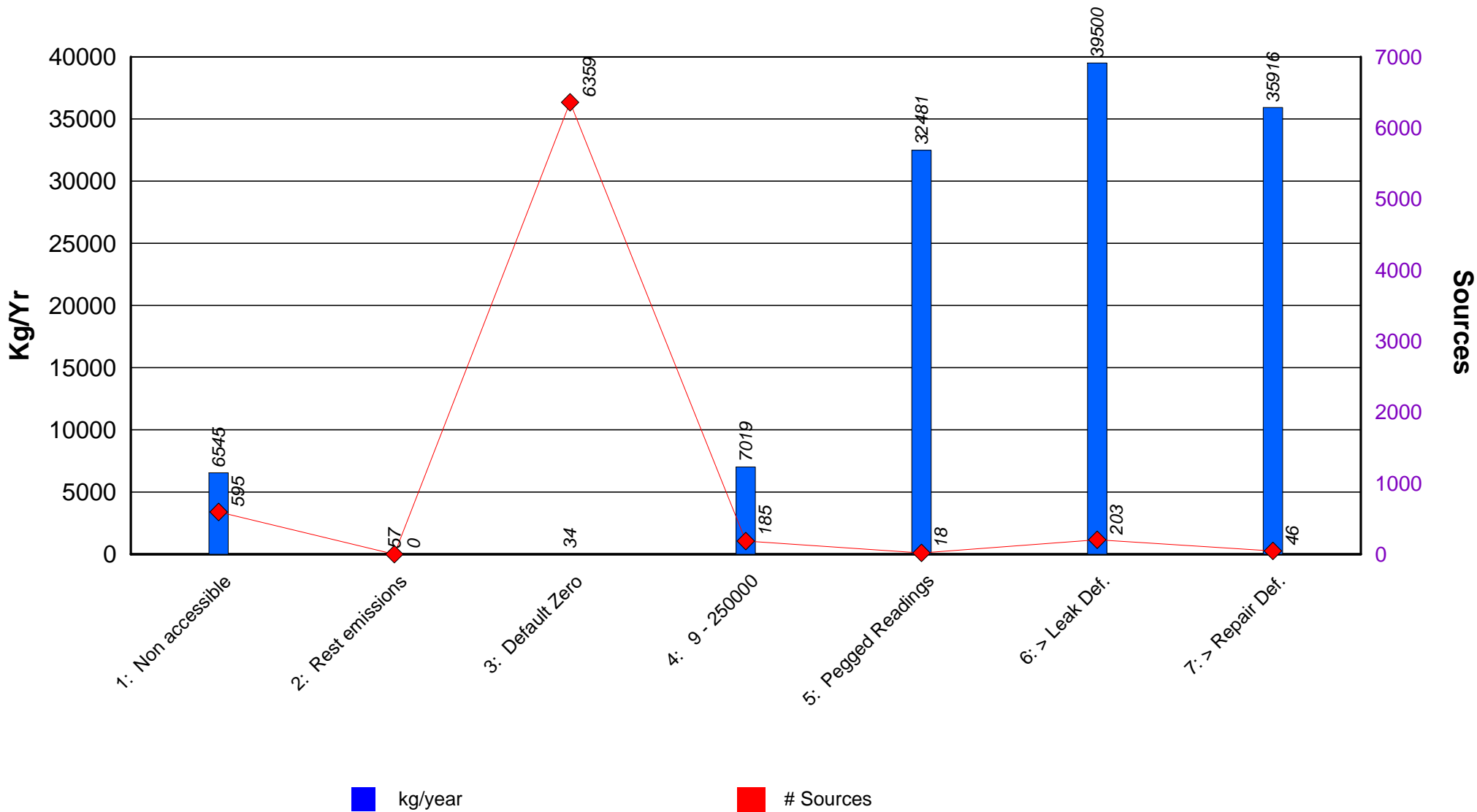
Program inception year : 2007 **Total YTD Fugitive Emissions :** 38.389,38 kg/yr.
Total emissions of inception year : 19.111,54 kg/yr. **% fugitive emission saved with inception year :** -101 %
YTD emissions for default-zero: 0-8 ppm : 34,46 kg/yr. **YTD emissions for not accessible sources :** 6.545,21 kg/yr.

	Total emission last year											Selected YTD emission	Delta emissions
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve		
Etylheen (etheen)	604,88	248,72	0,13	262,61	14,53					82,73	78,66	687,39	82,51
Propaan	207,92	94,35		62,12	0,00					6,17	6,48	169,12	-38,79
Propeen (propeen, methylethyleen)	18.068,67	12.766,37	5.534,87	13.688,00	60,75	0,07		43,52		10.609,11	2.509,24	45.211,94	27.143,26
Waterstof	230,07	38,72		18,89						7,96	2,96	68,53	-161,54
TOTAL EMISSIONS	19.111,54	13.148,16	5.535,00	14.031,63	75,29	0,07		43,52		10.705,97	2.597,35	46.136,98	27.025,44

Total # of sources	1.936	8	3.939	22	1		5		119	1.127	7.157
# Measurable sources	1.782	8	3.590	22	1		5		115	1.039	6.562
# Leakers>Zero reading	58	2	85	3			1		29	25	203
# Leakers > Leak Definition	58	2	85	3			1		29	25	203
# Leakers > Repair Definition	15	1	13						14	3	46
# Registered measurements	92	2	157	4	1		5		38	43	342
% Random of registered meas./total sources	4,75	25,00	3,99	18,18	100,00		100,00		31,93	3,82	4,78
% Leakers>Zero readings/measurable sources	3,25	25,00	2,37	13,64			20,00		25,22	2,41	3,09
% Leakers>Leak def./measurable sources	3,25	25,00	2,37	13,64			20,00		25,22	2,41	3,09
% Leakers>Repair def./measurable sources	0,84	12,50	0,36						12,17	0,29	0,70
Minimal emission losses (no leakers) in kg/yr	10,35	0,53	21,05	0,12	0,07		0,33		0,61	5,81	38,85

Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
 Project YTD : 2008-346-F

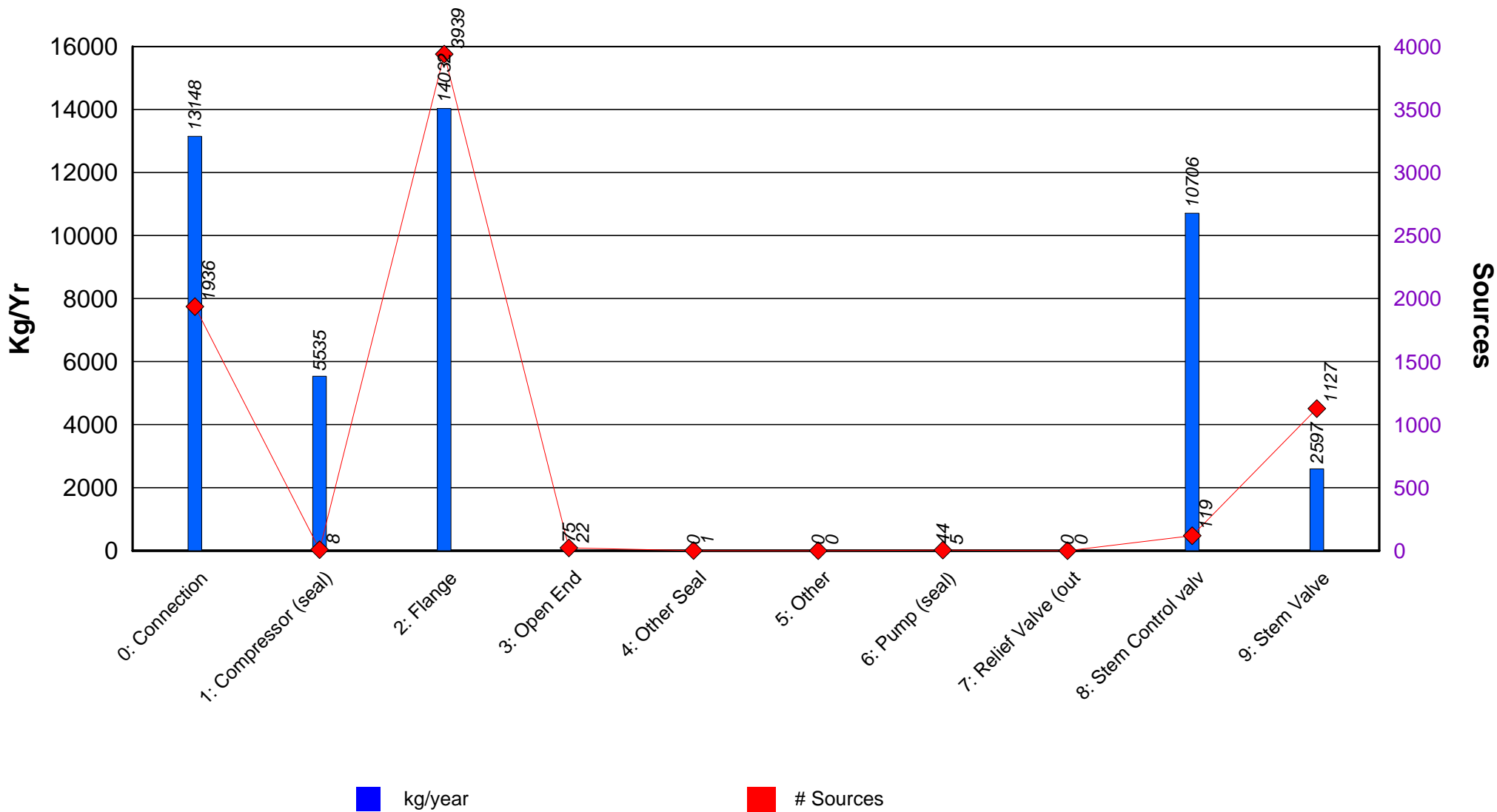
Total : 46.137 kg/yr.
 Total : 7157 Sources



Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
 Project YTD : 2008-346-F

Total : 46.137 kg/yr.

Total : 7157 Sources

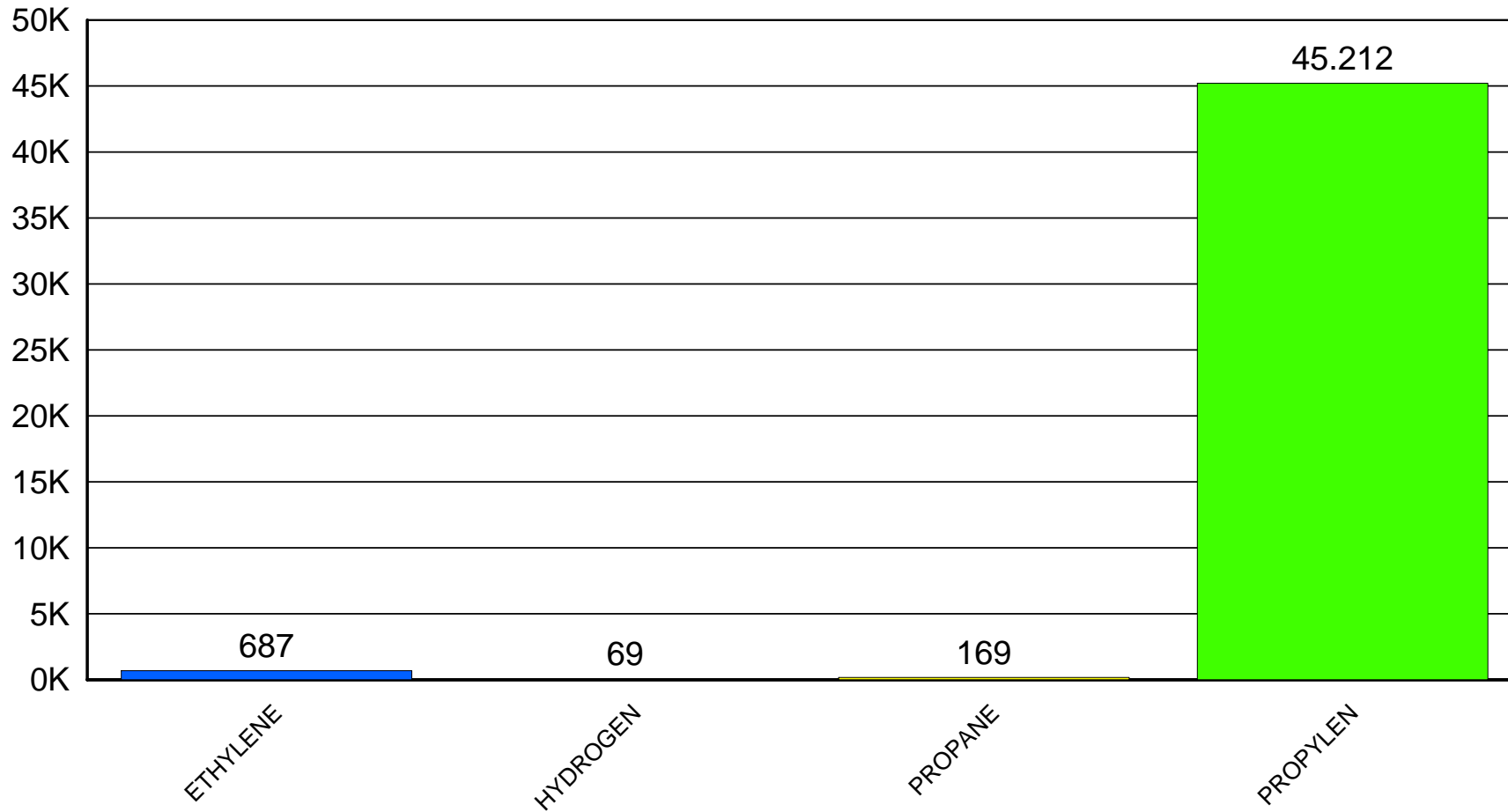


Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : * Project YTD : 2008-346-F

Limit from : 0 to : 9999999

Total : 46.137 kg/yr.

Kg / Yr



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2008-346-R

Site : BRINDISI Unit : PP2

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	1936	1782	154	1725	52	5	57	57	3,20%	11	0,62%	16
Compressor seals												
All	8	8	0	6	1	1	2	2	25,00%	1	12,50%	0
Flanges												
All	3939	3590	349	3505	81	4	85	85	2,37%	13	0,36%	8
Open-ended lines												
All	22	22	0	19	3	0	3	3	13,64%	0	0,00%	2
Other seals												
Gas/Vapor	1	1	0	1	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	5	5	0	4	1	0	1	1	20,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	67	67	0	58	8	1	9	9	13,43%	2	2,99%	6
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	52	48	4	29	18	1	19	19	39,58%	6	12,50%	10
Valves												
Gas/Vapor	652	588	64	585	3	0	3	3	0,51%	0	0,00%	15
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	475	451	24	431	20	0	20	20	4,43%	0	0,00%	9
TOTALS	7157	6562	595	6363	187	12	199	199	3,03%	33	0,50%	66

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Site : BRINDISI

Unit : PP2

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	1936	2940.91	15.38	9.22	2063.98	9437.21	14466.69	57	11501,19	11	10215,32	16,00
Compressor seals												
All	8	0.00	0.00	0.39	103.41	5431.20	5535.00	2	5534,61	1	5431,20	0,00
Flanges												
All	3939	2109.50	29.58	18.73	2526.56	7708.80	12393.16	85	10235,36	13	8972,50	8,00
Open-ended lines												
All	22	0.00	0.00	0.10	75.19	0.00	75.29	3	75,19	0	0,00	2,00
Other seals												
Gas/Vapor	1	0.00	0.00	0.07	0.00	0.00	0.07	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	5	0.00	0.90	0.26	42.35	0.00	43.52	1	42,35	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	67	0.00	10.42	0.34	199.12	918.94	1128.81	9	1118,06	2	980,25	6,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	52	956.59	0.58	0.12	1414.90	1259.67	3631.88	19	2674,57	6	2109,51	10,00
Valves												
Gas/Vapor	652	168.19	4.17	3.38	3.92	0.00	179.67	3	3,92	0	0,00	15,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	475	370.02	83.35	1.85	480.08	0.00	935.30	20	480,08	0	0,00	9,00
TOTALS	7157	6545.21	144,38	34.46	6909.50	24755.83	38389.38	199	31665,32	33	27708,79	66

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** PP2 **Section :** * **Drawing :** * **Stream :** *

Project YTD : 2008-346-R

Program inception year : 2007

Total YTD Fugitive Emissions :

38.389,38 kg/yr.

Total emissions of inception year : 19.111,54 kg/yr.

% fugitive emission saved with inception year :

-101 %

YTD emissions for default-zero: 0-8 ppm :

34,46 kg/yr.

YTD emissions for not accessible sources :

6.545,21 kg/yr.

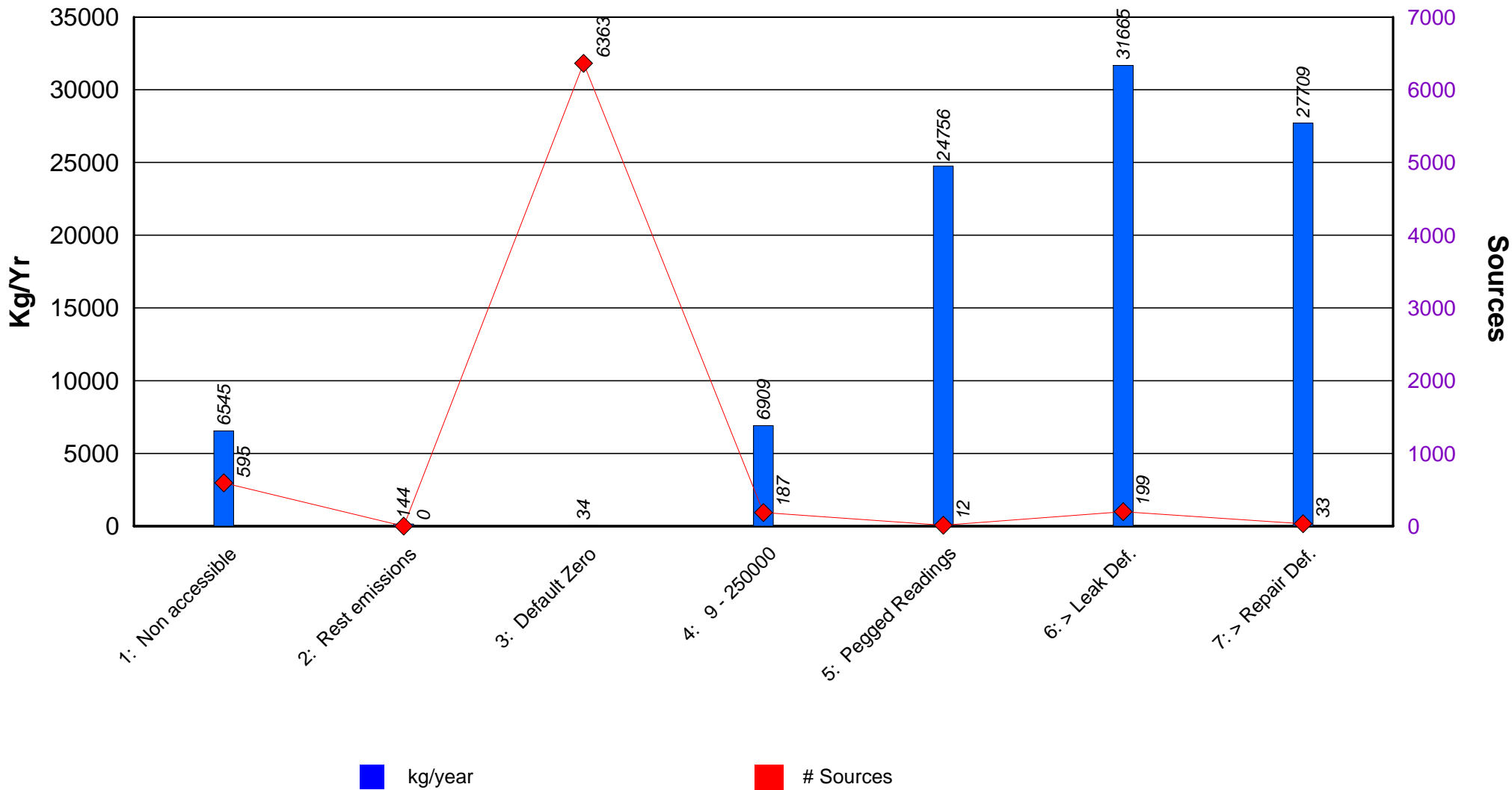
	Total emission last year											Selected YTD emission	Delta emissions
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve		
Etylheen (etheen)	604,88	153,02	0,13	262,61	14,53					6,22	7,62	444,12	-160,76
Propaan	207,92	94,35		62,12	0,00					6,17	6,48	169,12	-38,79
Propeen (propeen, methylethyleen)	18.068,67	14.180,61	5.534,87	12.049,53	60,75	0,07		43,52		4.740,34	1.097,91	37.707,60	19.638,93
Waterstof	230,07	38,72		18,89						7,96	2,96	68,53	-161,54
TOTAL EMISSIONS	19.111,54	14.466,69	5.535,00	12.393,16	75,29	0,07		43,52		4.760,69	1.114,96	38.389,38	19.277,83

Total # of sources	1.936	8	3.939	22	1		5		119	1.127	7.157
# Measurable sources	1.782	8	3.590	22	1		5		115	1.039	6.562
# Leakers>Zero reading	57	2	85	3			1		28	23	199
# Leakers > Leak Definition	57	2	85	3			1		28	23	199
# Leakers > Repair Definition	11	1	13						8		33
# Registered measurements	92	2	157	4	1		5		38	43	342
% Random of registered meas./total sources	4,75	25,00	3,99	18,18	100,00		100,00		31,93	3,82	4,78
% Leakers>Zero readings/measurable sources	3,20	25,00	2,37	13,64			20,00		24,35	2,21	3,03
% Leakers>Leak def./measurable sources	3,20	25,00	2,37	13,64			20,00		24,35	2,21	3,03
% Leakers>Repair def./measurable sources	0,62	12,50	0,36						6,96		0,50
Minimal emission losses (no leakers) in kg/yr	10,35	0,53	21,05	0,12	0,07		0,33		0,61	5,81	38,85

Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
 Project YTD : 2008-346-R

Total : 38.389 kg/yr.

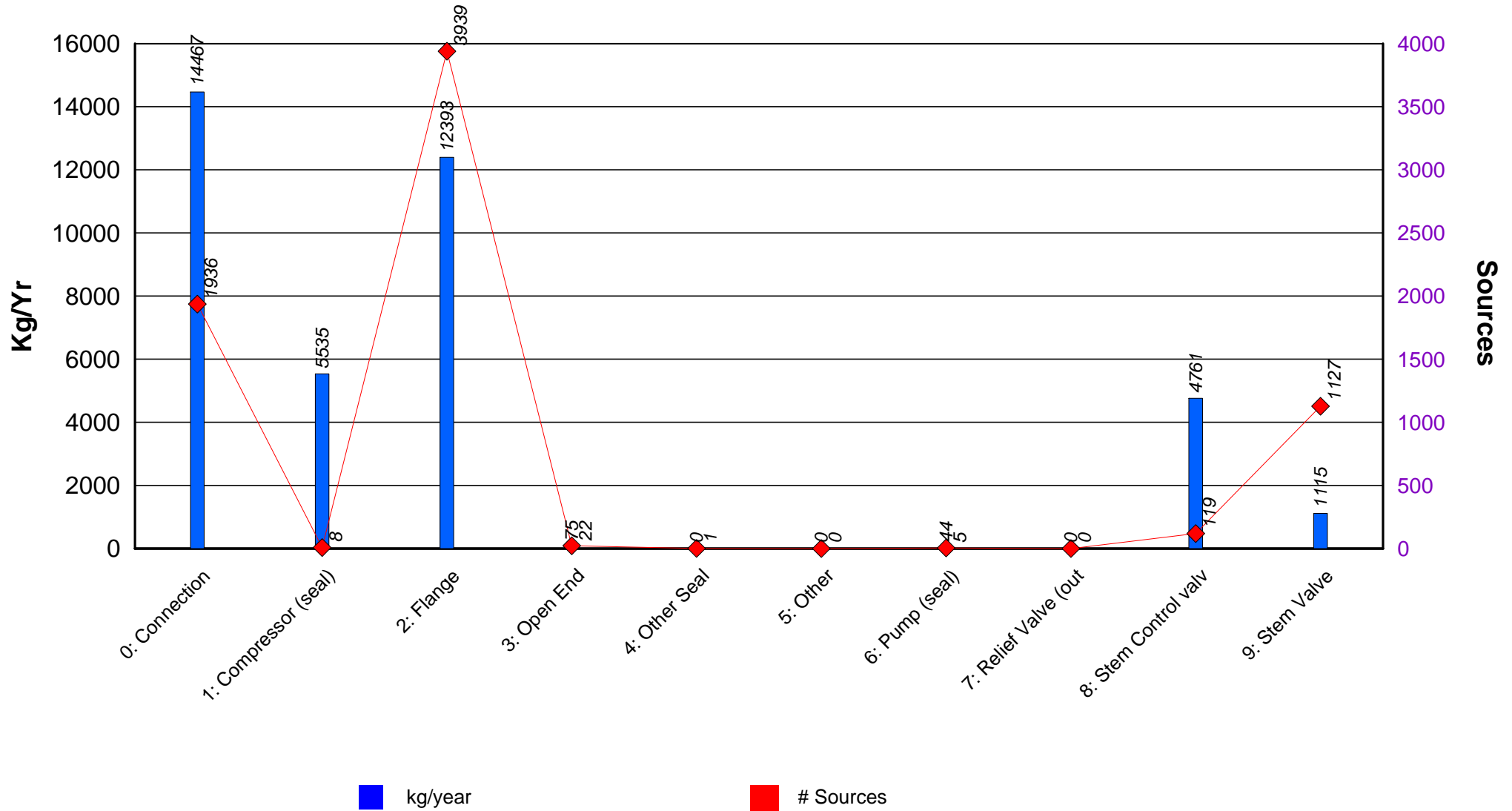
Total : 7157 Sources



Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
 Project YTD : 2008-346-R

Total : 38.389 kg/yr.

Total : 7157 Sources

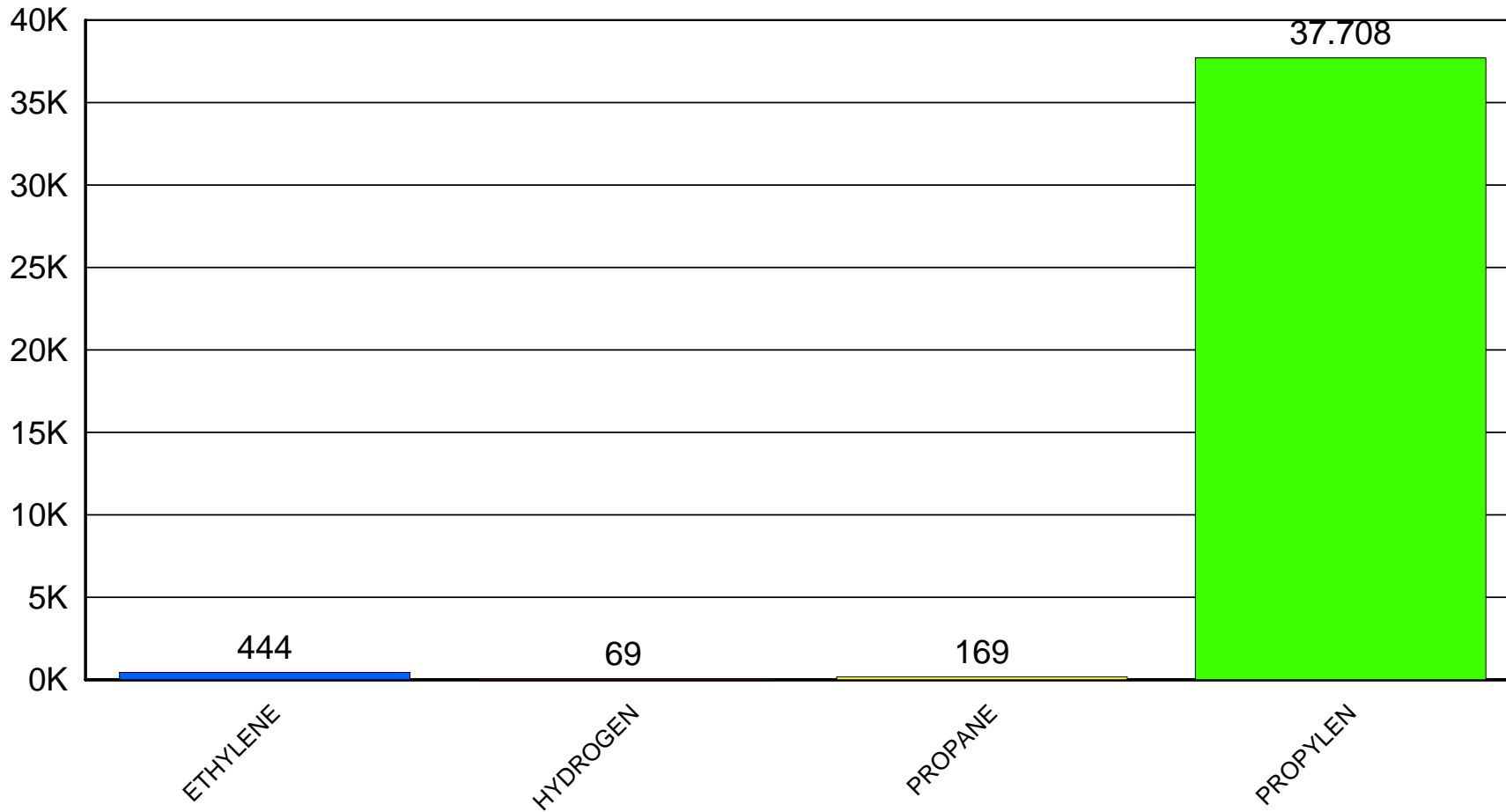


Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : * Project YTD : 2008-346-R

Limit from : 0 to : 9999999

Total : 38.389 kg/yr.

Kg / Yr



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2008-346-S

Site : BRINDISI Unit : PP2

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	1936	1782	154	1727	55	0	55	55	3,09%	9	0,51%	20
Compressor seals												
All	8	8	0	6	2	0	2	2	25,00%	1	12,50%	0
Flanges												
All	3939	3590	349	3514	76	0	76	76	2,12%	1	0,03%	15
Open-ended lines												
All	22	22	0	19	3	0	3	3	13,64%	0	0,00%	2
Other seals												
Gas/Vapor	1	1	0	1	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	5	5	0	4	1	0	1	1	20,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	67	67	0	58	9	0	9	9	13,43%	1	1,49%	7
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	52	48	4	31	17	0	17	17	35,42%	2	4,17%	10
Valves												
Gas/Vapor	652	588	64	585	3	0	3	3	0,51%	0	0,00%	18
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	475	451	24	431	20	0	20	20	4,43%	0	0,00%	14
TOTALS	7157	6562	595	6376	186	0	186	186	2,83%	14	0,21%	86

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Site : BRINDISI

Unit : PP2

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	1936	2940.91	3601.36	9.23	7594.95	0.00	14146.44	55	7594,95	9	6309,08	20,00
Compressor seals												
All	8	0.00	0.00	0.39	5385.09	0.00	5385.48	2	5385,09	1	5281,68	0,00
Flanges												
All	3939	2109.50	7784.87	18.78	1852.91	0.00	11766.06	76	1852,91	1	120,03	15,00
Open-ended lines												
All	22	0.00	0.00	0.10	75.19	0.00	75.29	3	75,19	0	0,00	2,00
Other seals												
Gas/Vapor	1	0.00	0.00	0.07	0.00	0.00	0.07	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	5	0.00	0.90	0.26	42.35	0.00	43.52	1	42,35	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	67	0.00	10.42	0.34	1088.80	0.00	1099.55	9	1088,80	1	891,97	7,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	52	956.59	1298.26	0.13	1326.81	0.00	3581.79	17	1326,81	2	545,55	10,00
Valves												
Gas/Vapor	652	168.19	4.17	3.38	3.92	0.00	179.67	3	3,92	0	0,00	18,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	475	370.02	83.35	1.85	480.08	0.00	935.30	20	480,08	0	0,00	14,00
TOTALS	7157	6545.21	12783,34	34.53	17850.09	0.00	37213.16	186	17850,09	14	13148,31	86

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** PP2 **Section :** * **Drawing :** * **Stream :** *

Project YTD : 2008-346-S

Program inception year : 2007

Total YTD Fugitive Emissions :

17.570,14 kg/yr.

Total emissions of inception year : 19.095,40 kg/yr.

% fugitive emission saved with inception year :

8 %

YTD emissions for default-zero: 0-8 ppm :

34,53 kg/yr.

YTD emissions for not accessible sources :

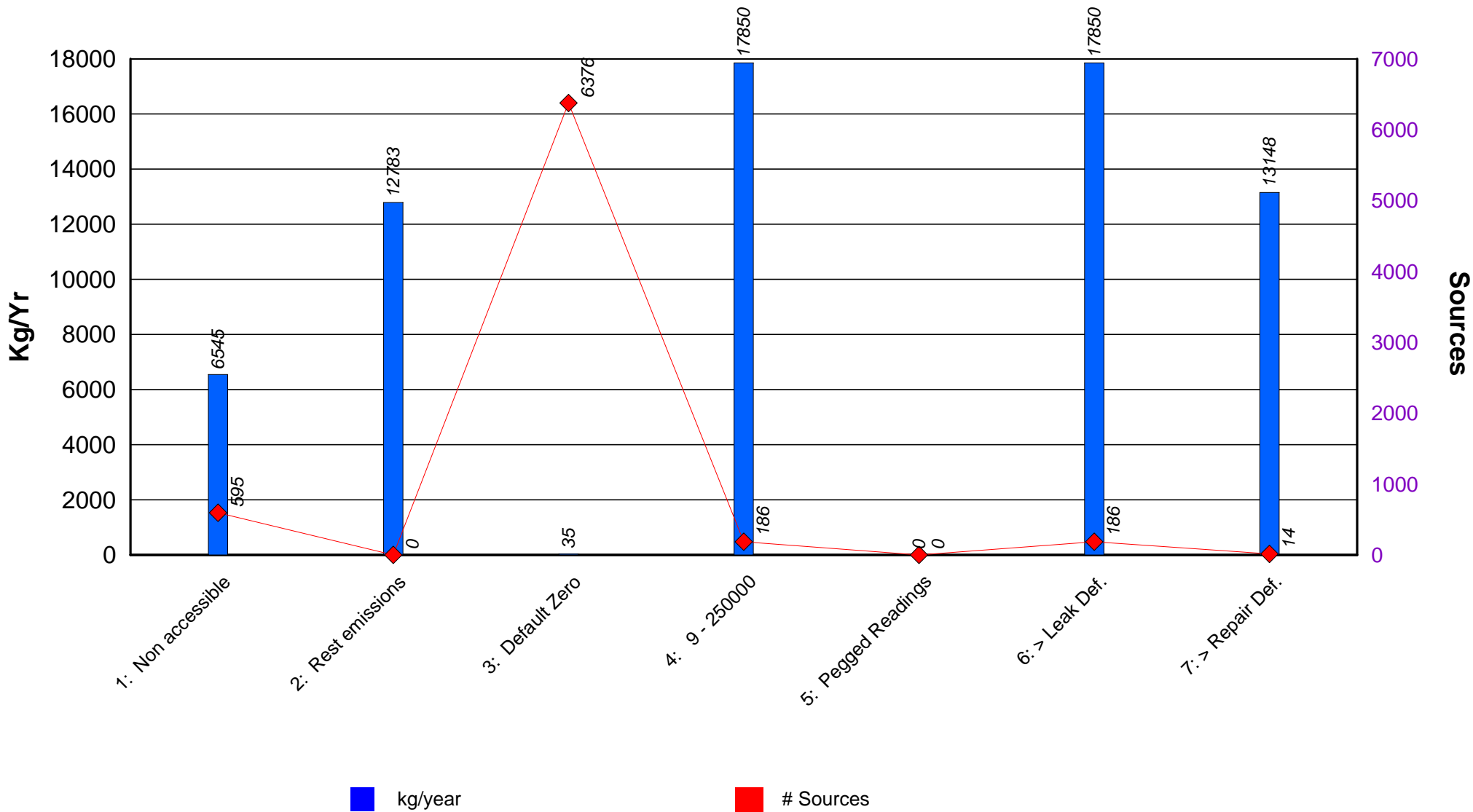
6.545,21 kg/yr.

	Total emission last year											Selected YTD emission	Delta emissions
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve		
Etylheen (etheen)	604,88	153,02	0,13	262,61	14,53					6,22	7,62	444,12	-160,76
Propaan	207,92	94,35		62,12	0,00					6,17	6,48	169,12	-38,79
Propeen (propeen, methylethyleen)	18.052,52	13.860,36	5.385,35	11.422,43	60,75	0,07		43,52		4.661,00	1.097,91	36.531,39	18.478,87
Waterstof	230,07	38,72		18,89						7,96	2,96	68,53	-161,54
TOTAL EMISSIONS	19.095,40	14.146,44	5.385,48	11.766,06	75,29	0,07		43,52		4.681,34	1.114,96	37.213,16	18.117,77

Total # of sources	1.936	8	3.939	22	1		5		119	1.127	7.157
# Measurable sources	1.782	8	3.590	22	1		5		115	1.039	6.562
# Leakers>Zero reading	55	2	76	3			1		26	23	186
# Leakers > Leak Definition	55	2	76	3			1		26	23	186
# Leakers > Repair Definition	9	1	1						3		14
# Registered measurements	92	2	156	4	1		5		38	43	341
% Random of registered meas./total sources	4,75	25,00	3,96	18,18	100,00		100,00		31,93	3,82	4,76
% Leakers>Zero readings/measurable sources	3,09	25,00	2,12	13,64			20,00		22,61	2,21	2,83
% Leakers>Leak def./measurable sources	3,09	25,00	2,12	13,64			20,00		22,61	2,21	2,83
% Leakers>Repair def./measurable sources	0,51	12,50	0,03						2,61		0,21
Minimal emission losses (no leakers) in kg/yr	10,35	0,53	21,05	0,12	0,07		0,33		0,61	5,81	38,85

Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
 Project YTD : 2008-346-S

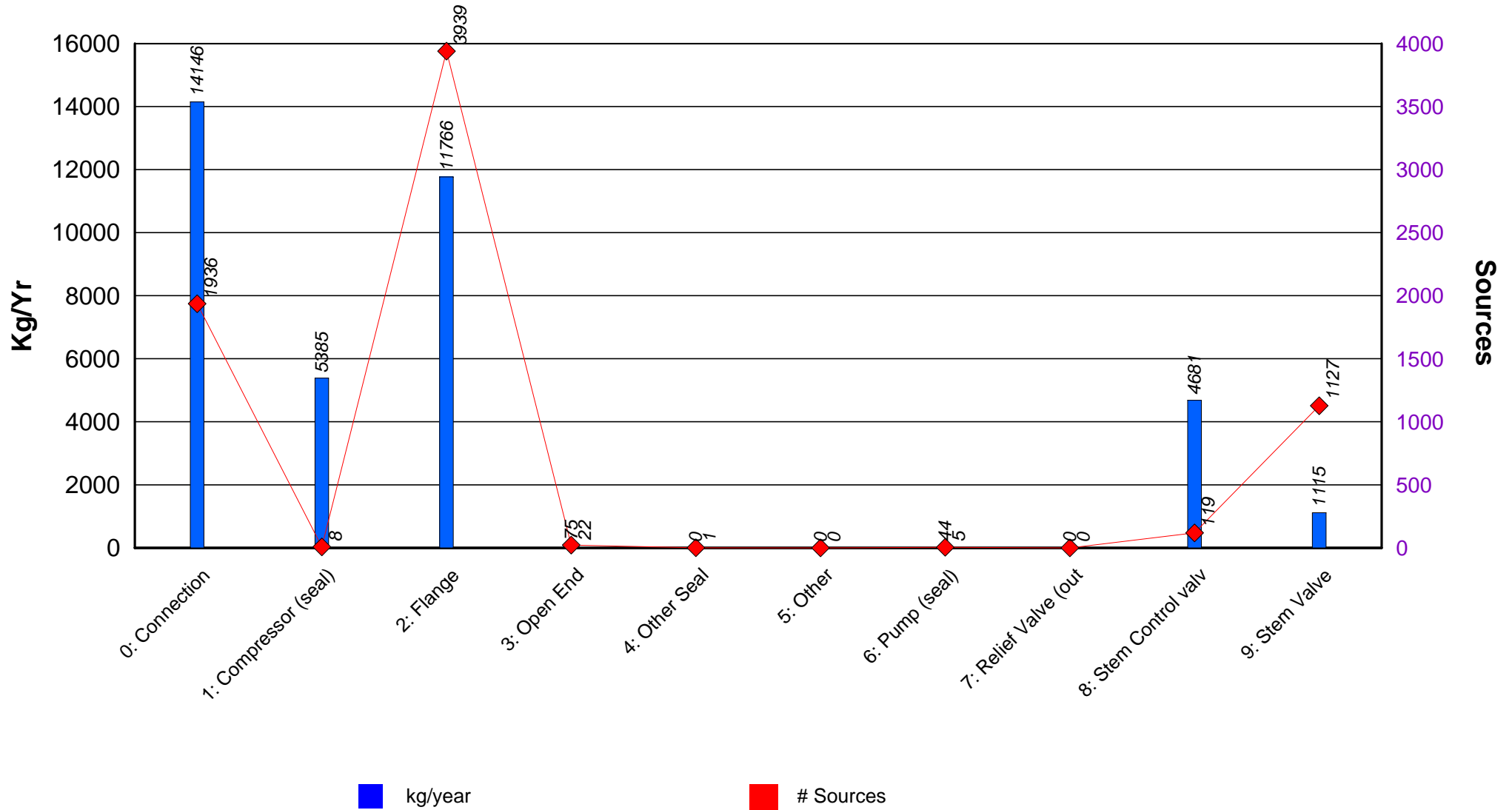
Total : 37.213 kg/yr.
 Total : 7157 Sources



Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
 Project YTD : 2008-346-S

Total : 37.213 kg/yr.

Total : 7157 Sources

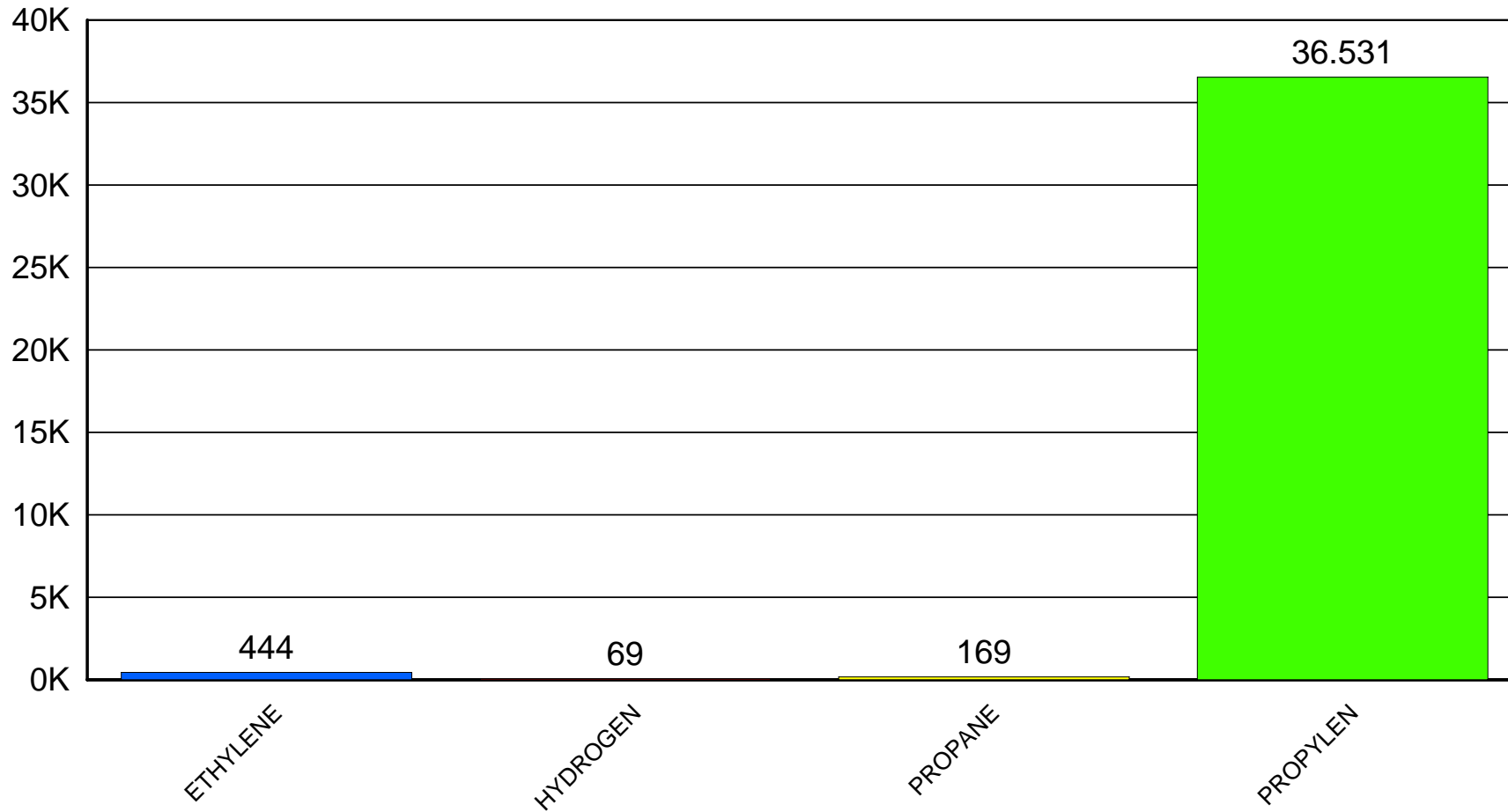


Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
Project YTD : 2008-346-S

Limit from : 0 to : 9999999

Total : 37.213 kg/yr.

Kg / Yr



Fugitive Emissions : Total # sources / emission class

Calculation method : Correlation Socmi

Project YTD : 2009-001-I

Site : BRINDISI Unit : PP2

Section : * Drawing : *

Stream : *

	Total # sources	Total # measured	Total # not acc.	Zero leaker 0 - 8 ppm	9 - 250000 9 - 250000	Pegged Re > 250000 ppm	Total # leaking sources	>Leak Def.		>Repair Def.		Repaired sources
								#	%	#	%	
Connections												
All	1936	1782	154	1727	55	0	55	55	3,09%	9	0,51%	26
Compressor seals												
All	8	8	0	6	2	0	2	2	25,00%	1	12,50%	0
Flanges												
All	3939	3590	349	3514	76	0	76	76	2,12%	1	0,03%	24
Open-ended lines												
All	22	22	0	19	3	0	3	3	13,64%	0	0,00%	2
Other seals												
Gas/Vapor	1	1	0	1	0	0	0	0	0,00%	0	0,00%	0
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Other (isolated sour												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Pump seals												
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	5	5	0	4	1	0	1	1	20,00%	0	0,00%	0
Pressure relief devi												
All	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Control valves												
Gas/Vapor	67	67	0	58	9	0	9	9	13,43%	1	1,49%	10
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	52	48	4	31	17	0	17	17	35,42%	2	4,17%	13
Valves												
Gas/Vapor	652	588	64	585	3	0	3	3	0,51%	0	0,00%	21
Heavy liquid	0	0	0	0	0	0	0	0	0,00%	0	0,00%	0
Light liquid	475	451	24	431	20	0	20	20	4,43%	0	0,00%	14
TOTALS	7157	6562	595	6376	186	0	186	186	2,83%	14	0,21%	110

Fugitive Emissions : Total kg/year / emission class

Calculation method :Correlation Socmi

Site : BRINDISI

Unit : PP2

Section : *

Drawing : *

Stream : *

	Total # sources	Emissions for not acc.	Rest emiss. repaired src	Zero leakers 0 - 8 ppm	9 - 250000 9 - 250000 pp	Pegged Rea > 250000 pp	Total kg/yr / source	> Leak Def.		> Repair Def.		Repaired sources
								#	Kg/year	#	Kg/year	
Connections												
All	1936	2940.91	0.00	9.23	4594.59	0.00	7544.72	55	4594,59	9	3490,75	26,00
Compressor seals												
All	8	0.00	0.00	0.39	2320.61	0.00	2321.01	2	2320,61	1	2212,17	0,00
Flanges												
All	3939	2109.50	0.00	18.78	1463.11	0.00	3591.39	76	1463,11	1	120,03	24,00
Open-ended lines												
All	22	0.00	0.00	0.10	75.89	0.00	75.99	3	75,89	0	0,00	2,00
Other seals												
Gas/Vapor	1	0.00	0.00	0.07	0.00	0.00	0.07	0	0,00	0	0,00	0,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Other (isolated so												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Pump seals												
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	5	0.00	0.00	0.26	44.41	0.00	44.68	1	44,41	0	0,00	0,00
Pressure relief dev												
All	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Control valves												
Gas/Vapor	67	0.00	0.00	0.34	537.66	0.00	538.00	9	537,66	1	382,93	10,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	52	956.59	0.00	0.13	1466.48	0.00	2423.20	17	1466,48	2	907,81	13,00
Valves												
Gas/Vapor	652	168.19	0.00	3.38	3.95	0.00	175.52	3	3,95	0	0,00	21,00
Heavy liquid	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0,00	0	0,00	0,00
Light liquid	475	370.02	0.00	1.85	483.70	0.00	855.57	20	483,70	0	0,00	14,00
TOTALS	7157	6545.21	0,00	34.53	10990.40	0.00	17570.14	186	10990,40	14	7113,68	110

Calculation method : Correlation Socmi

Site : BRINDISI **Unit :** PP2 **Section :** * **Drawing :** * **Stream :** * **Project YTD : 2009-001-I**

Program inception year : 2007

Total YTD Fugitive Emissions :

17.570,14 kg/yr.

Total emissions of inception year : 19.095,40 kg/yr.

% fugitive emission saved with inception year :

8 %

YTD emissions for default-zero: 0-8 ppm :

34,53 kg/yr.

YTD emissions for not accessible sources :

6.545,21 kg/yr.

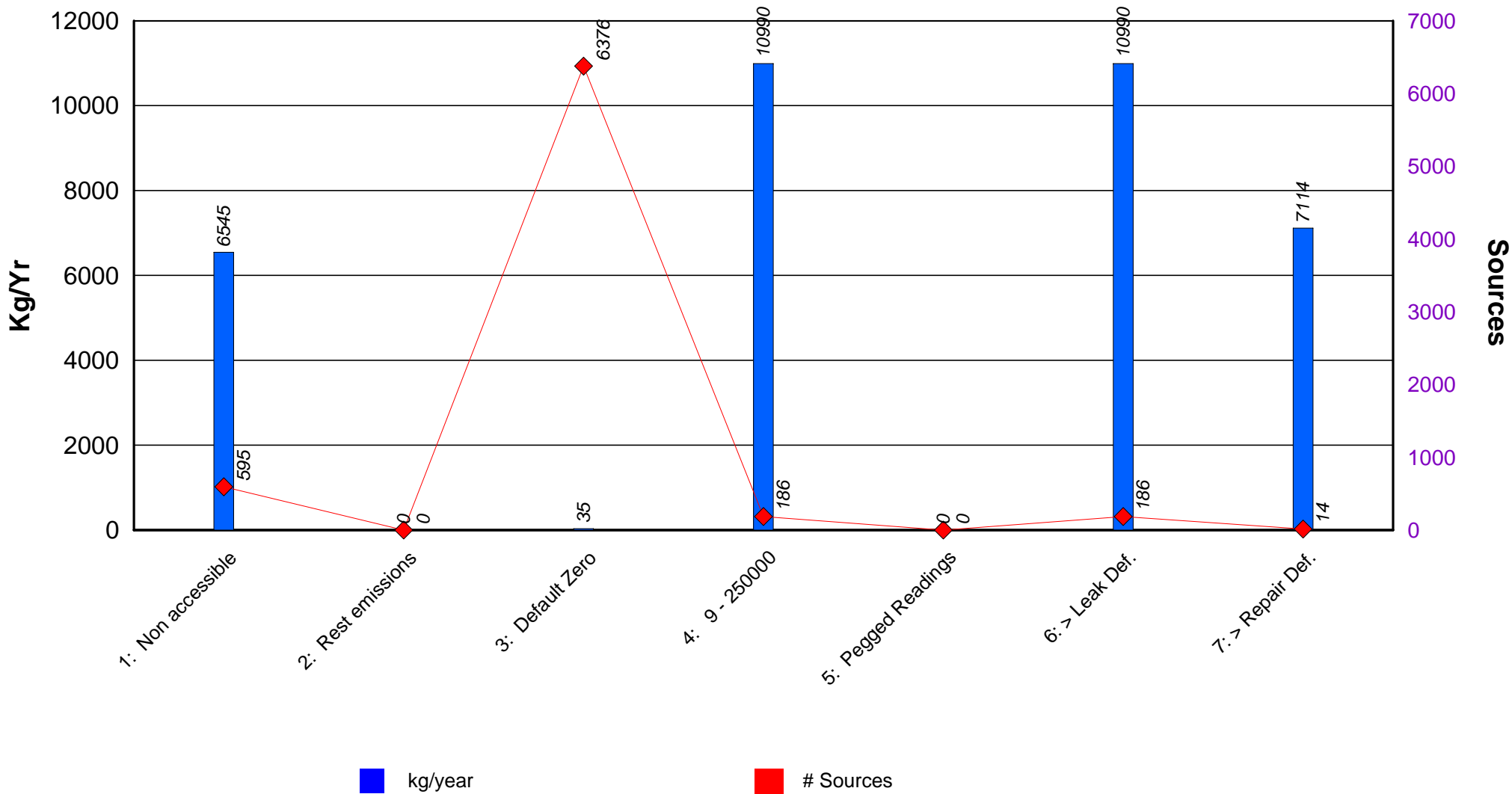
	Total emission last year											Selected YTD emission	Delta emissions	
		Connection	Compr.seal	Flange	Open end	Other seals	Other src	Pump seal	Press.Rel.D.	Control Valve	Valve			
Etylheen (etheen)	604,88	149,21	0,13	258,66	15,24						4,88	3,55	431,66	-173,22
Propaan	207,92	92,58		61,98	0,00						6,17	6,48	167,21	-40,71
Propeen (propeen, methylethyleen)	18.052,52	7.264,22	2.320,87	3.251,86	60,75	0,07			44,68		2.950,11	1.018,11	16.910,66	-1.141,86
Waterstof	230,07	38,72		18,89							0,04	2,96	60,61	-169,47
TOTAL EMISSIONS	19.095,40	7.544,72	2.321,01	3.591,39	75,99	0,07			44,68		2.961,20	1.031,10	17.570,14	1.525,25

Total # of sources	1.936	8	3.939	22	1			5		119	1.127	7.157
# Measurable sources	1.782	8	3.590	22	1			5		115	1.039	6.562
# Leakers>Zero reading	55	2	76	3				1		26	23	186
# Leakers > Leak Definition	55	2	76	3				1		26	23	186
# Leakers > Repair Definition	9	1	1							3		14
# Registered measurements	92	2	156	4	1			5		38	43	341
% Random of registered meas./total sources	4,75	25,00	3,96	18,18	100,00			100,00		31,93	3,82	4,76
% Leakers>Zero readings/measurable sources	3,09	25,00	2,12	13,64				20,00		22,61	2,21	2,83
% Leakers>Leak def./measurable sources	3,09	25,00	2,12	13,64				20,00		22,61	2,21	2,83
% Leakers>Repair def./measurable sources	0,51	12,50	0,03							2,61		0,21
Minimal emission losses (no leakers) in kg/yr	10,35	0,53	21,05	0,12	0,07			0,33		0,61	5,81	38,85

Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
 Project YTD : 2009-001-I

Total : 17.570 kg/yr.

Total : 7157 Sources



Site : BRINDISI

Unit : PP2

Section : *

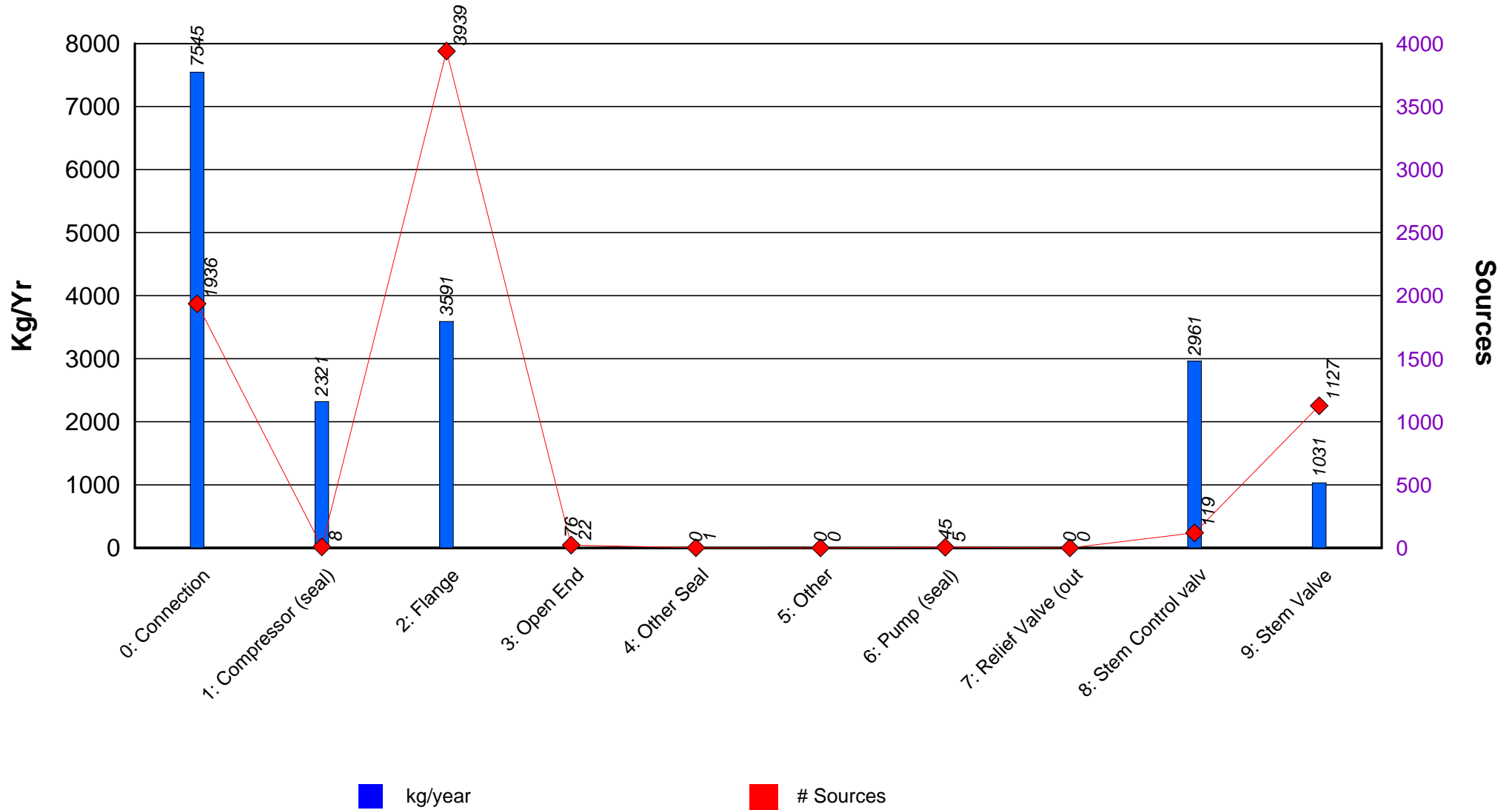
Drawing : *

Stream : *

Project YTD : 2009-001-I

Total : 17.570 kg/yr.

Total : 7157 Sources

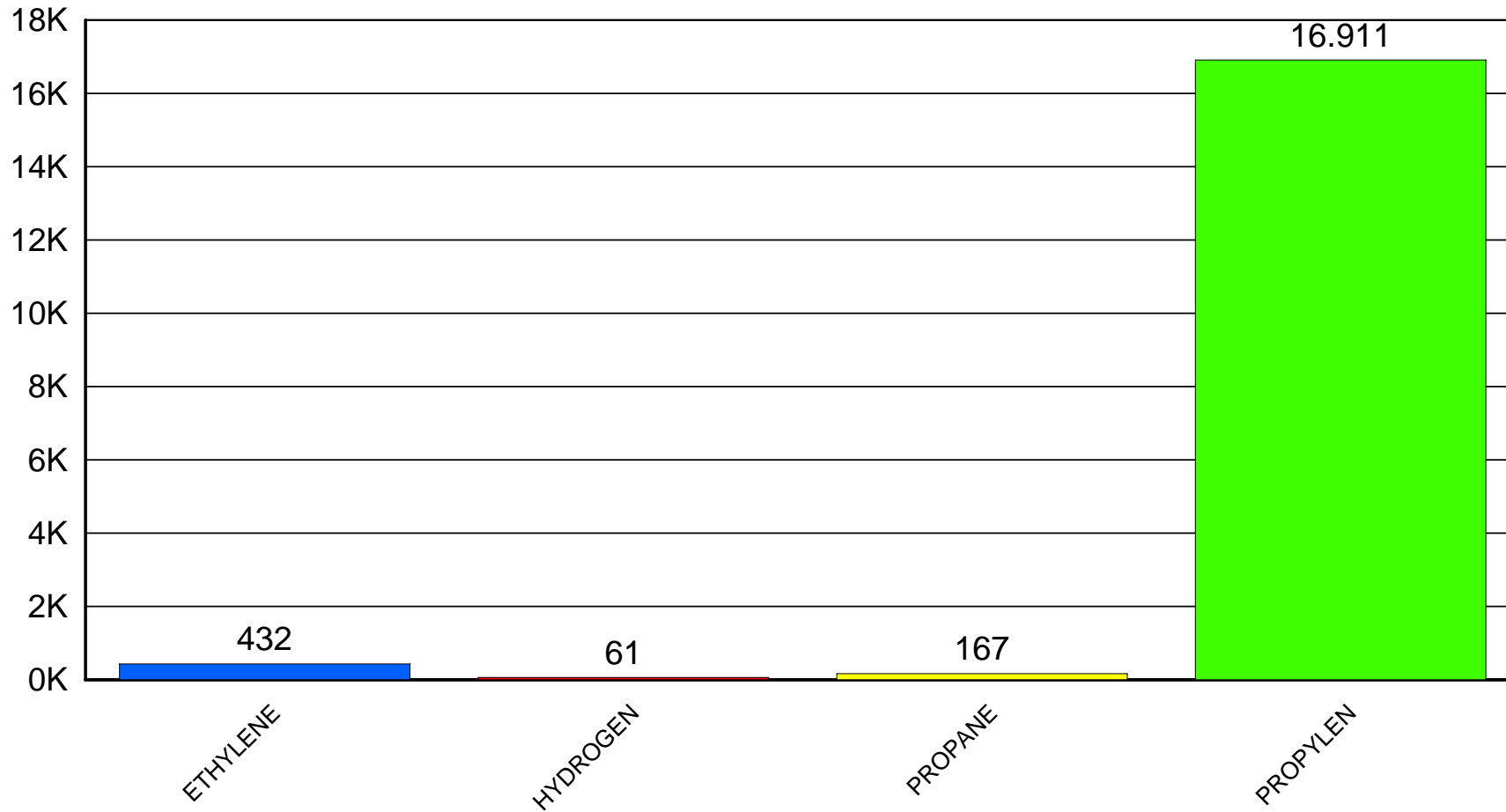


Site : BRINDISI Unit : PP2 Section : * Drawing : * Stream : *
Project YTD : 2009-001-I

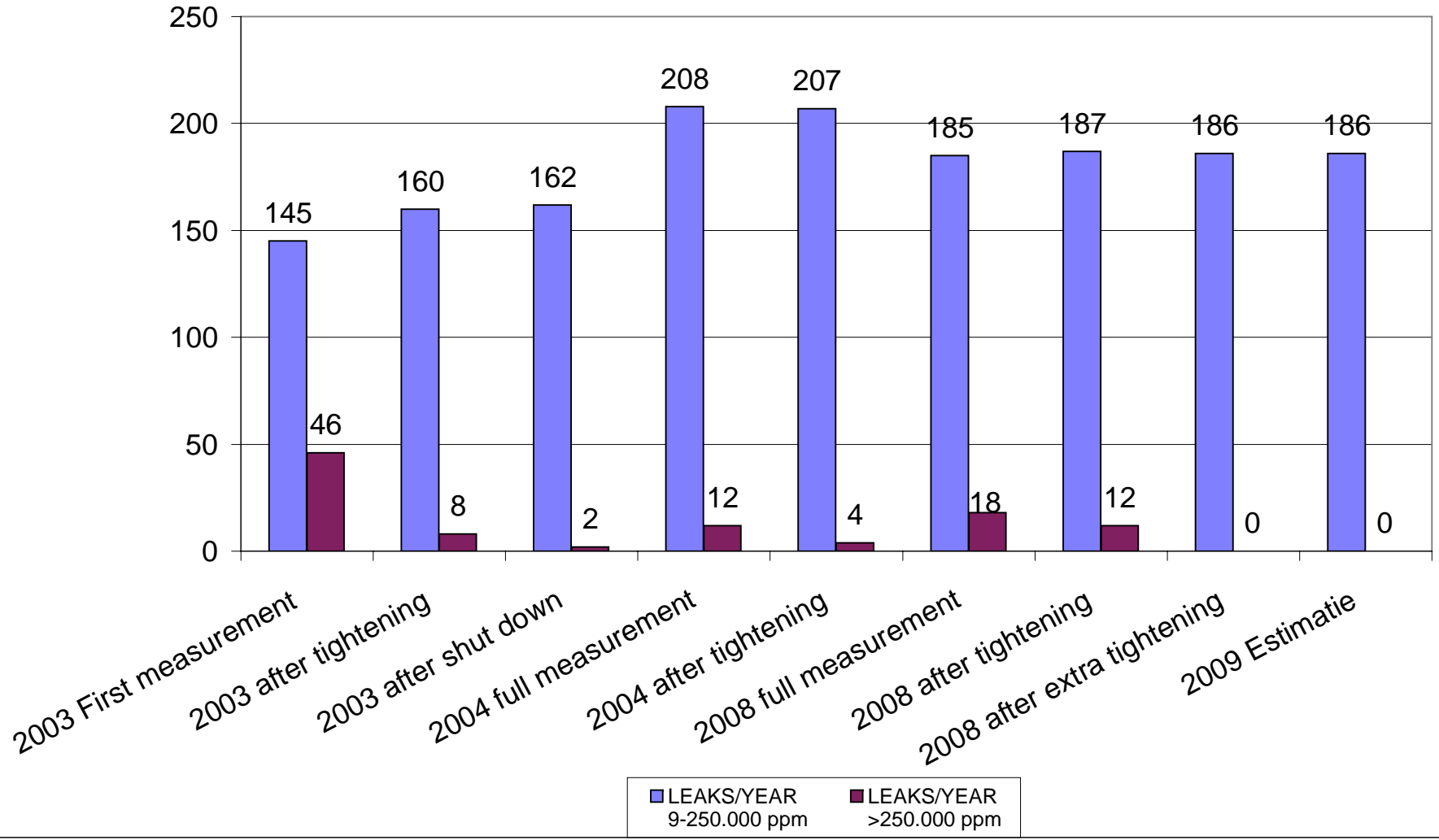
Limit from : 0 to : 9999999

Total : 17.570 kg/yr.

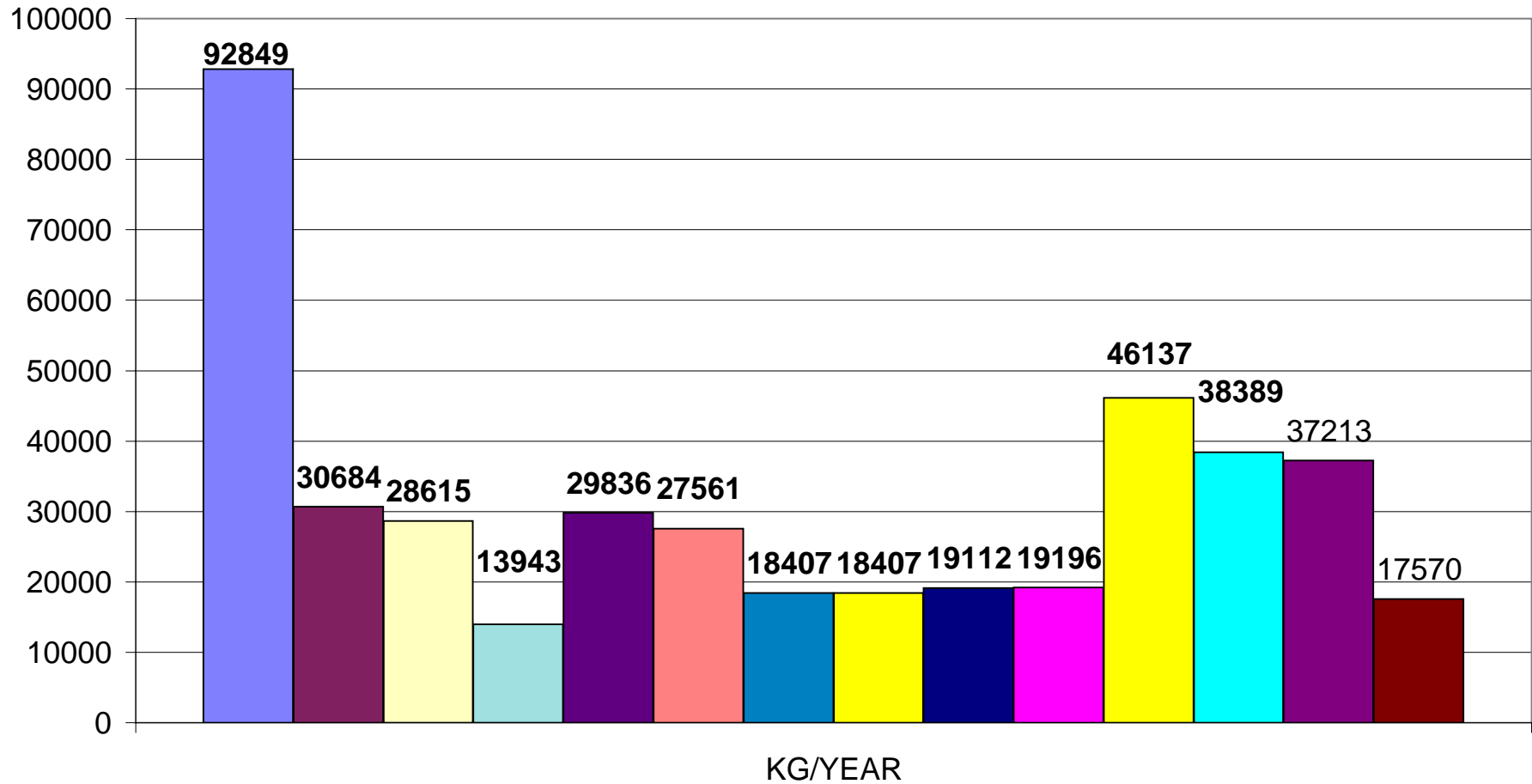
Kg / Yr



HISTORICAL OVERVIEW BASELL BRINDISI PP2 # LEAKS/YEAR

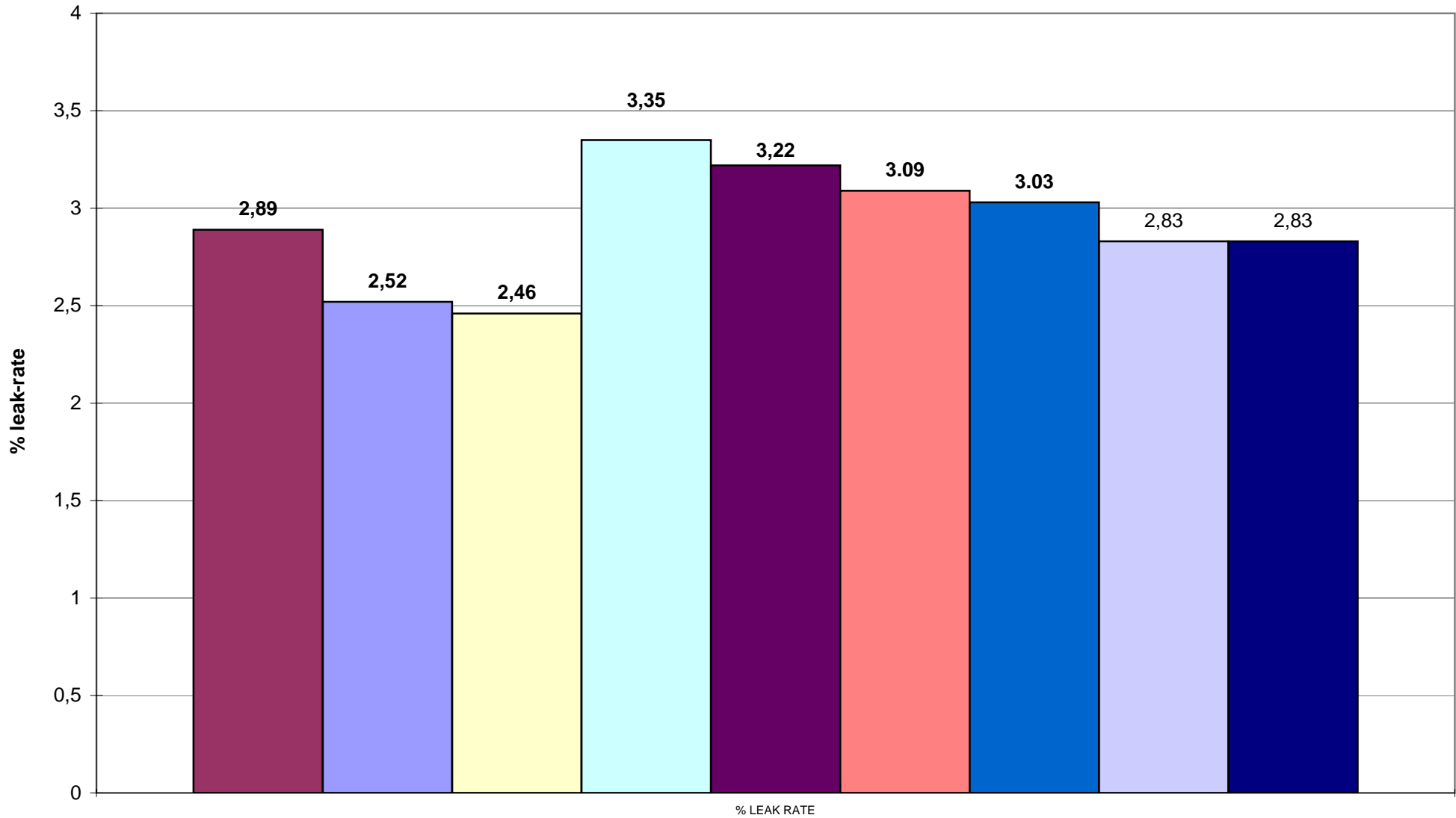


HISTORICAL OVERVIEW BASELL BRINDISI PP2 KG/YEAR



- | | | |
|-------------------------------------|-------------------------------|-------------------------------|
| ■ 2003 First measurement round | ■ 2003 after tightening round | ■ 2003 after shut down |
| ■ INI 2004 | ■ 2004 full measuring round | ■ 2004 after tightening round |
| ■ INI2005 | ■ INI2006 | ■ INI2007 |
| ■ INI2008 | ■ 2008 full measuring round | ■ 2008 after tightening round |
| ■ 2008 after extra tightening round | ■ 2009 Estimatie | |

Historical overview of the leak-rate/year (% leak-rate) Basell "PP2"



■ 2003 First measurement round	■ 2003 after tightening round	■ 2003 after shut down
■ 2004 full measurement round	■ 2004 after tightening round	■ 2008 full measurement round
■ 2008 after tightening round	■ 2008 after extra tightening round	■ 2009 estimation

Calibration logfile

		Gas Bottle					Controlement													
Equipm.	No.	Cal-medium	Low-span ppm	SN-number Low-span	High-span ppm	SN-number High-span	1°check Low-Span	2°check Low-Span	1°check High-Span	2°check High-Span	Noon check Low span	Noon check High-span	1°check Dil pr. /10	2°check Dil pr. /10	PSI check Hydrogen	PSI check Low span	PSI check High span	Date	Hour	Operator
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	523	521	1%	1%	NA	NA	NA	NA	1950	1000	1000	14/01/2008	11u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	527	519	9975	1%	525	8650	NA	NA	1950	1000	1000	15/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	520	516	1%	1,01%	NA	NA	NA	NA	1950	1000	1000	15/01/2008	13u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	501	503	9996	1%	520	9970	NA	NA	1800	1000	1000	16/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	494	495	1%	1%	600	1,09%	NA	NA	1800	1000	1000	17/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	503	504	1%	1%	NA	NA	NA	NA	1800	1000	1000	17/01/2008	14u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	498	503	1%	1%	513	1%	NA	NA	1800	1000	1000	18/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	503	499	1%	1%	535	9945	NA	NA	1800	1000	1000	19/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	505	506	1%	1%	522	1%	1179	1016	1800	1000	1000	21/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	498	503	1,01%	1%	370	7750	1004	1012	1800	1000	1000	22/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	502	505	1%	1%	NA	NA	1001	995	1800	1000	1000	22/01/2008	13u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	507	505	1%	1%	505	9715	1009	1012	1800	1000	1000	23/01/2008	10u10	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	508	499	1%	1%	490	1,01%	1003	1004	1800	1000	1000	24/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	501	503	1%	1%	479	9650	1015	1020	1800	1000	1000	25/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	494	495	1%	1%	410	6700	1011	1010	1500	1000	1000	25/01/2008	8u30	SP
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	503	504	1%	1%	539	1%	NA	NA	1500	1000	1000	25/01/2008	13u00	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	498	503	1%	1%	NA	NA	NA	NA	1500	1000	1000	26/01/2008	8u30	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	503	499	1%	1%	498	1%	1045	1012	1500	1000	1000	26/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	507	510	1%	1%	520	1,01%	1011	1012	1500	870	800	28/01/2008	8u30	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	515	513	1%	1%	580	1,18	NA	NA	1500	870	800	28/01/2008	8u40	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	508	507	1%	1%	NA	NA	NA	NA	1500	870	800	28/01/2008	13u15	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	523	519	1%	1%	235	6078	987	988	1500	870	800	29/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	499	504	1%	1%	NA	NA	NA	NA	1500	870	800	29/01/2008	8u40	PM

Company: Basell
 Project no.: ED-2008-346

Site: Brindisi

Unit: PP2 / P9T

Calibration logfile

		Gas Bottle					Controlement													
Equipm.	No.	Cal-medium	Low-span ppm	SN-number Low-span	High-span ppm	SN-number High-span	1°check Low-Span	2°check Low-Span	1°check High-Span	2°check High-Span	Noon check Low span	Noon check High-span	1°check Dil pr. /10	2°check Dil pr. /10	PSI check Hydrogen	PSI check Low span	PSI check High span	Date	Hour	Operator
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	515	510	1%	1%	NA	NA	NA	NA	1500	870	800	29/01/2008	13u10	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	498	498	1%	1%	305	6840	1014	1010	1500	870	800	30/01/2008	8u30	PM
TVA 1000B	TSPM 079	CH4	500	96636-2	10000	98314-1	510	520	1%	1%	525	1,01%	NA	NA	1500	870	800	30/01/2008	8u40	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	515	523	1%	1%	NA	NA	NA	NA	1500	870	800	30/01/2008	13u00	PM
TVA 1000B	TSPM 098	CH4	500	96636-2	10000	98314-1	559	526	1%	1%	523	1%	1019	1010	1450	730	540	31/01/2008	8u30	PM

ANALYSIS CERTIFICATION

METHOD OF PREPARATION : GRAVIMETRIC / PRESSURE TRANSFILLING

METHOD OF ANALYSIS : GC(FID)

ACCURACY : ± 2% RELATIVE

LOT NO. & QTY.	COMP. 1 CH ₄	COMP. 2 AIR	COMP. 3	COMP. 4	COMP. 5	COMP. 6	Exp Date
98314(1)	1.00%	BALANCE					09/01/10

(GAS MIXTURES MANUFACTURED WITH BALANCE CALIBRATED USING N.I.S.T. TRACEABLE WEIGHTS.)
N.I.S.T. WEIGHT SET TEST NUMBERS: 822/266926-02, 822/272801-06, 822/270236-04, 12512, 12615, 12616, 12617, 12618

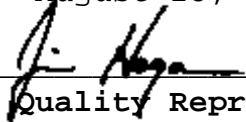
No effecting enviromental conditions during analysis.

REQUESTED BY : CALGAZ

CUSTOMER PURCHASE ORDER NUMBER : 5248

PACKING LIST NUMBER : 264206

CERTIFICATION DATE : August 28, 2007

ANALYSIS BY : 
Quality Representative

"We certify that all the cylinders for the Lot numbers identified herein are manufactured and tested within the requirements of CFR 49 part 178.65 and that physical and chemical test reports are on file and copies will be furnished upon request."

CALGAZ, DIV. OF AL ADVANCED TECHNOLOGIES U.S. LLC
821 Chesapeake Drive, Cambridge, MD 21613-0149
Phone: (410)228-6400 Fax: (410)228-4251

ANALYSIS CERTIFICATION

METHOD OF PREPARATION : GRAVIMETRIC / PRESSURE TRANSFILLING

METHOD OF ANALYSIS : GC(FID)

ACCURACY : ± 2% RELATIVE

LOT NO. & QTY.	COMP. 1 CH ₄	COMP. 2 AIR	COMP. 3	COMP. 4	COMP. 5	COMP. 6	Exp Date
96636(1)	500PPM	BALANCE					09/04/10

(GAS MIXTURES MANUFACTURED WITH BALANCE CALIBRATED USING N.I.S.T. TRACEABLE WEIGHTS.)
N.I.S.T. WEIGHT SET TEST NUMBERS: 822/266926-02, 822/272801-06, 822/270236-04, 12512, 12615, 12616, 12617, 12618

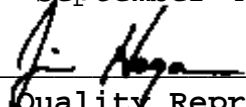
No effecting enviromental conditions during analysis.

REQUESTED BY : CALGAZ

CUSTOMER PURCHASE ORDER NUMBER : 5281

PACKING LIST NUMBER : 264663

CERTIFICATION DATE : September 4, 2007

ANALYSIS BY : 
Quality Representative

"We certify that all the cylinders for the Lot numbers identified herein are manufactured and tested within the requirements of CFR 49 part 178.65 and that physical and chemical test reports are on file and copies will be furnished upon request."

CALGAZ, DIV. OF AL ADVANCED TECHNOLOGIES U.S. LLC
821 Chesapeake Drive, Cambridge, MD 21613-0149
Phone: (410)228-6400 Fax: (410)228-4251