Compressed Air System Leakage Audit

Auto Manufacturing
Co. Galway

April 2023

Compressed Air System Leakage Audit Building 1

Auto Manufacturing
Attn. Joe Murphy
IDA Business Park
GLENBRACK ROAD
Gort
Galway
H91 PD92
j.murphy@automanufacturing.com

Your Energy Consultant

Mark Hayes
Atlas Copco
014505978
0874157485
mark.hayes@atlascopco.com

Auto Manufacturing
Compressed Air System Leakage Audit

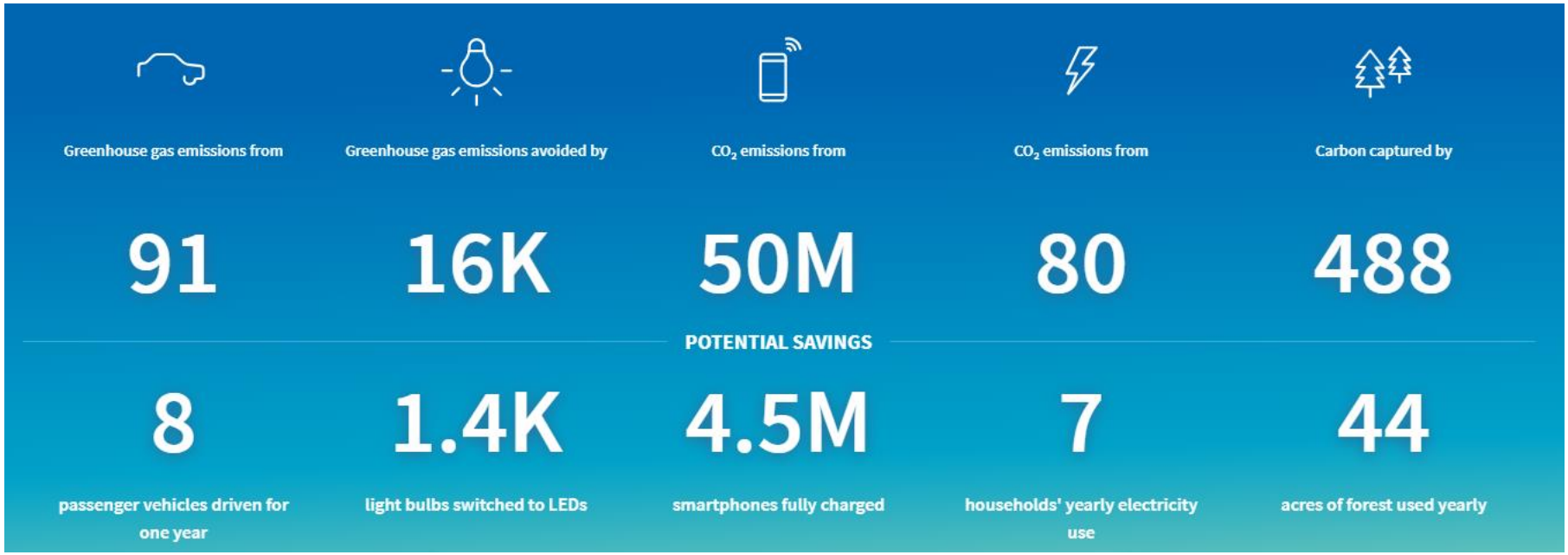
Dear Joe Murphy,

thank you for offering us the opportunity to perform this leakage detection audit on your compressed air system.

We have identified.

27,349 € potential saving,

and a CO2 emission reduction of 36,867 kg.
CO2 reduction of 36,867kg shown in practical terms.



This saving can be obtained by repairing the

118 identified leakages, listed in this report, representing in total.

1,746.6 l/min of wasted flow in the audited compressed air system.

Our Sales Team will contact you to offer their assistance in repairing the identified leakages.

Yours faithfully,

Mark Hayes
Your Energy Consultant
mark.hayes@atlascopco.com
0874157485

Scope of the Audit and Measuring Method

The purpose of the audit is to identify and quantify the leaks present in your compressed air distribution system, so that you can repair them and save energy, reducing costs.

To identify compressed air leaks, it is necessary to use specific tools. Atlas Copco tools are specifically designed to detect ultrasonic signals produced by the loss of compressed air, which are typically not audible by the human ear.
The Atlas Copco tool uses 124 microphones to form a very accurate acoustic image in the desired direction. This acoustic image is transposed in real-time on top of a digital camera picture, which allows the user to accurately see from which directions sound is arriving to the camera. Interesting sound sources can then be separated from background noise and saved.

For each leak, a tag is fixed at the point where the loss is. On the tag, the intensity of the leak is indicated. A detailed list of leaks will follow in this report, where you can find the intensity of the leak, according to the following color code:

- Yellow = small leak
- Orange = medium leak
- Red = big leak

The intensity of the leak is calculated by the camera based on the sound value, expressed in dB, and the distance to the leak.

In order to better identify the leak, an image of the point where the leak is identified is also attached, to allow the operator to repair the leak.

Installation data

Working pressure (compressor room outlet):
7.8

Compressed air distribution piping type:
Alum & Hose Mix

Compressors:

Name	Brand	Type	Serial Number	Nominal Flow Rate l/min	Nominal Power kW	Compressor room
compressor 1	Atlas Copco	GA55P FF	API600001	10,620	55	Building 6 Compressor Area
compressor 2	Atlas Copco	GA90VSD+FF	API600002	18,342	90	Building 6 Compressor Area

SER: 429 J/l

Energy Cost: 0.25 €/kWh

CO2 Factor: 0.337 kg/kWh

Results

Total Number of Identified leakages	Total Wasted Flow l/min	Total Yearly Energy Cost of Leakages €
118	1,746.6	27,349

Air leakages distribution by size

	Small	Medium	Big
Number	54	63	1
% of total	46%	53%	1%
Wasted Flow (l/min)	296.2	1,389.4	61.0
Wasted Flow Cost [local currency]	4,638	21,756	955

Air leakages cost/year by Building

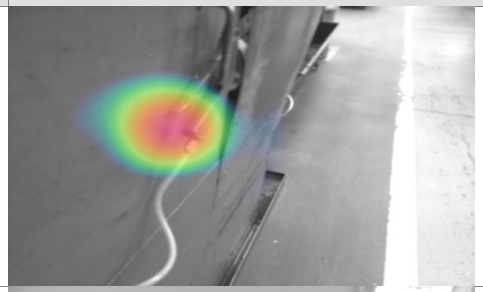
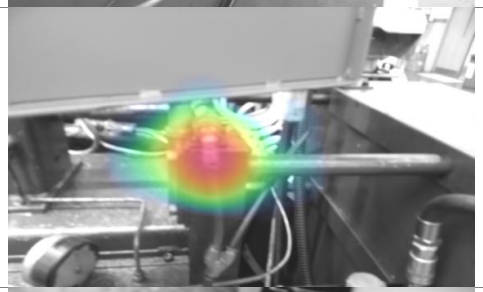
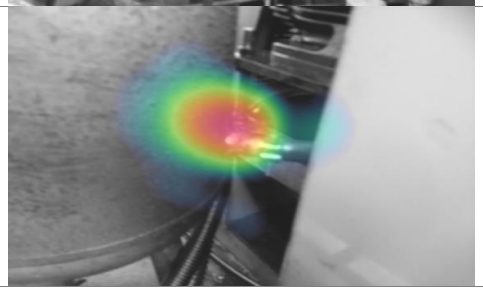
	Other Floor Plan
leaks cost/year [local currency] €	27,349

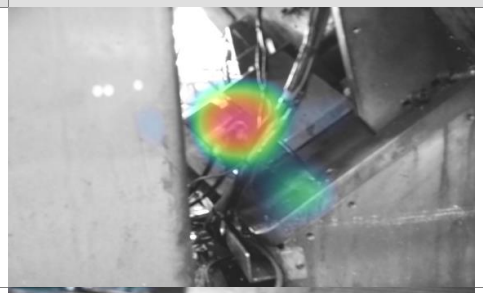
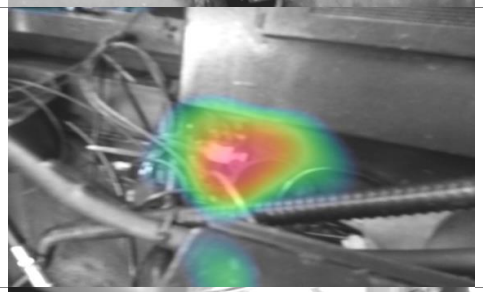
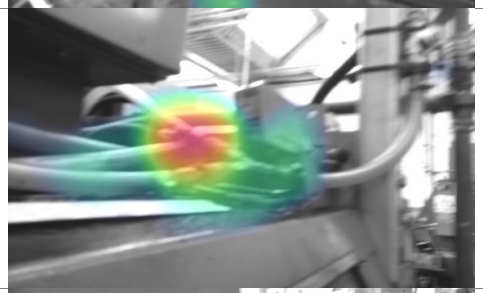
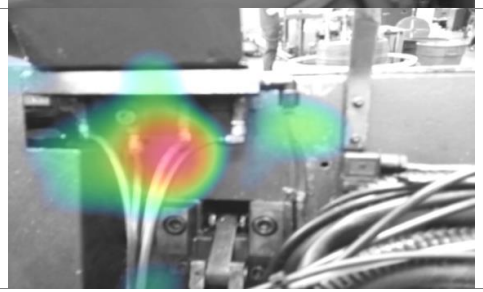
Distribution of the leaks

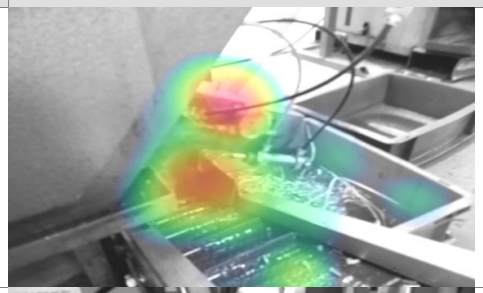
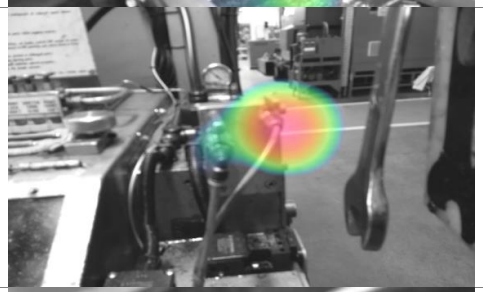
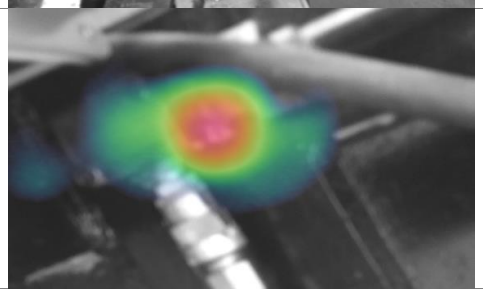
Air leakages cost/year [local currency] - Other Floor Plan

	Building 6	Compressor Area	Other Location
leaks cost/year [local currency] €	26,439	507	402

Largest Leaks

Sequence	Tag number	Description	Picture	Wasted Flow	Waste Flow Cost €/year
1	80	MC 95 Blower		61.0	955
2	26	MC 59 8mm Elbow		48.9	766
3	52	MC 75 Receiver Connection		44.1	691

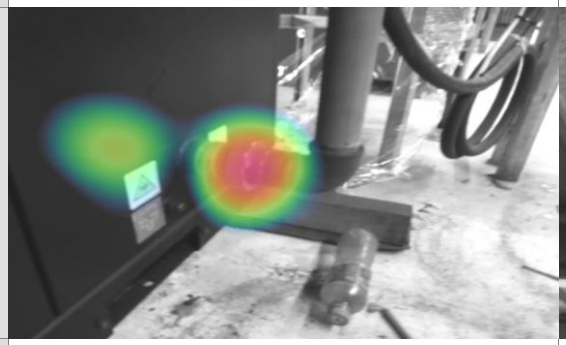
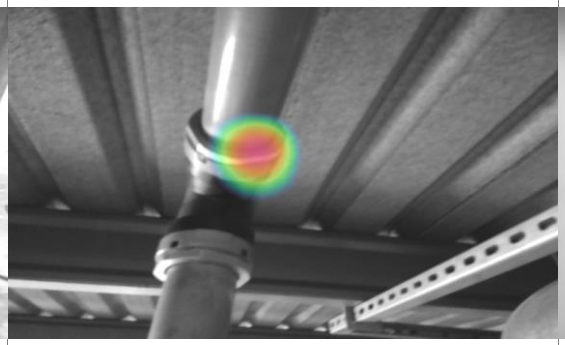
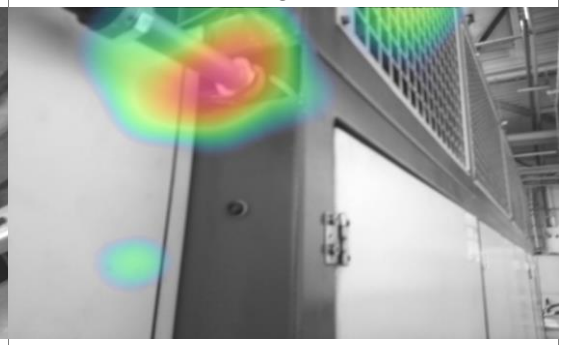
Sequence	Tag number	Description	Picture	Wasted Flow	Waste Flow Cost €/year
4	15	MC 9 8mm Elbow		42.3	662
5	12	MC 49 6mm Connection		40.3	631
6	103	MC 26 Push Fitting		37.8	592
7	19	MC 43 6mm Elbow		36.1	565

Sequence	Tag number	Description	Picture	Wasted Flow	Waste Flow Cost €/year
8	23	MC 67 Open Port		33.7	528
9	24	MC 19 Valve Fitting		33.7	528
10	60	MC 24 BSP Fitting		32.2	504

Leaks Details

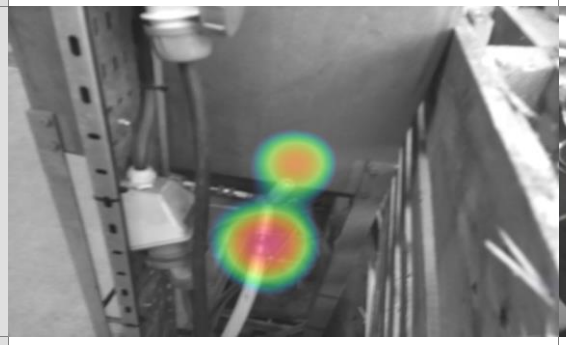
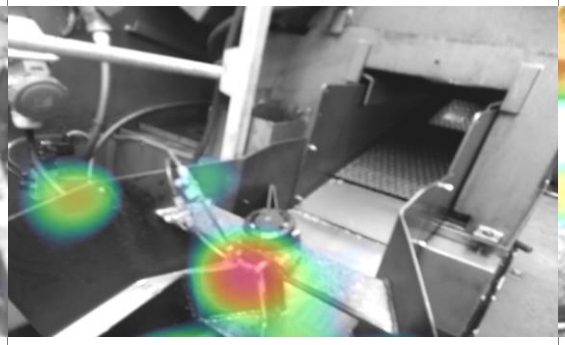
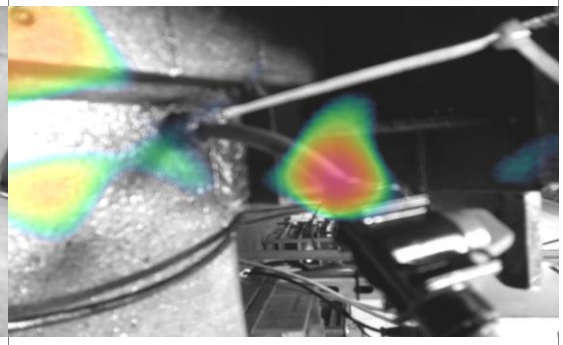
1. Other Floor Plan

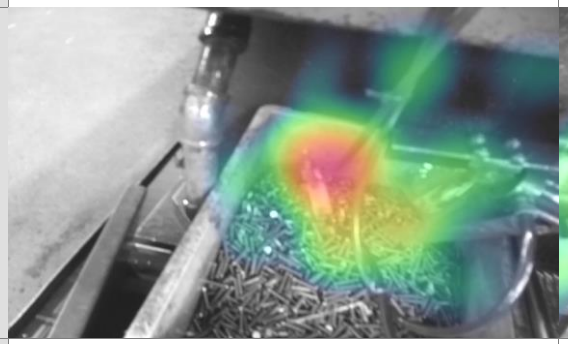
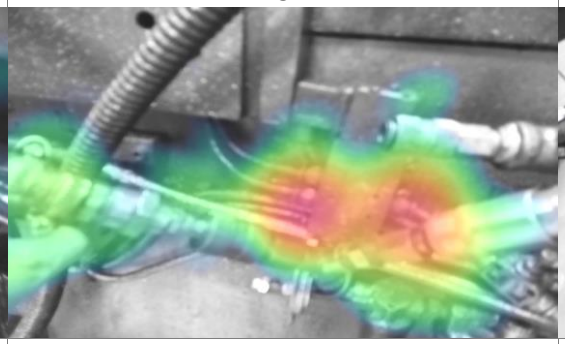
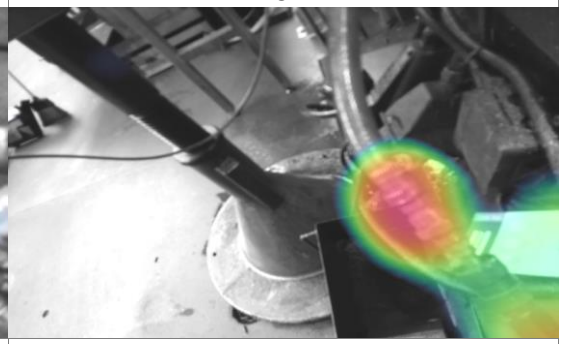
1.1. Compressor Room

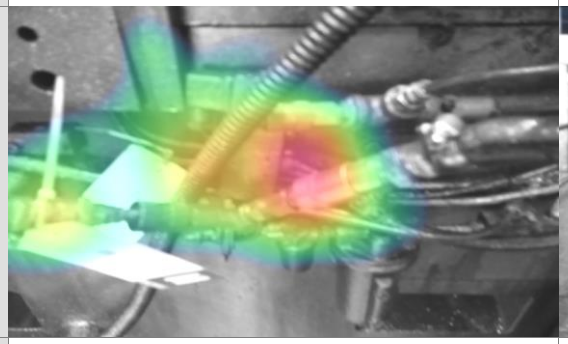
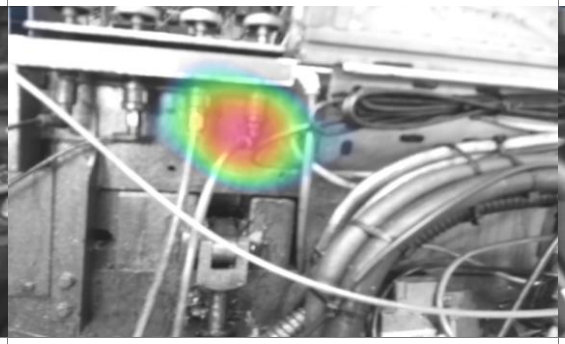
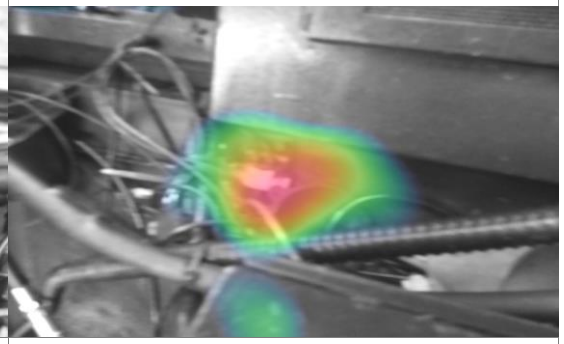
Tag number	1	2	3
Picture			
Description	Compressor Connection	Joint Behind GA55	610 Inlet
Wasted Flow	24.4 l/min	2.8 l/min	5.2 l/min
Waste Flow Cost	382 €/year	44 €/year	81 €/year

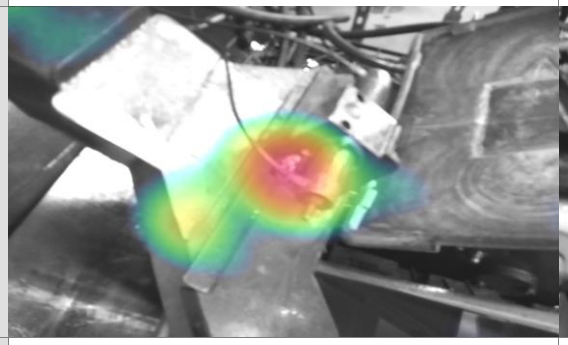
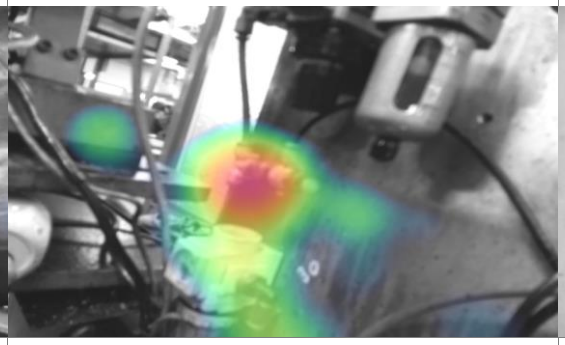
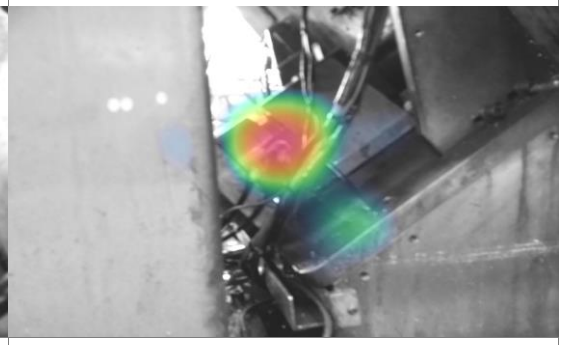
1. Other Floor Plan

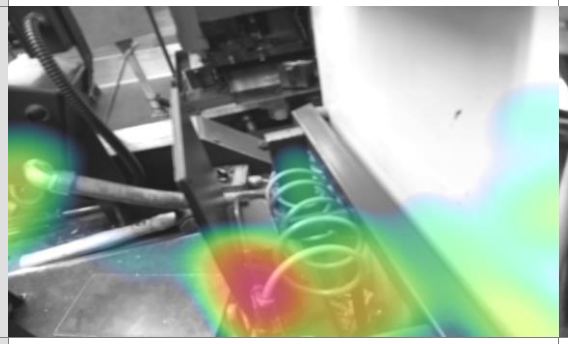
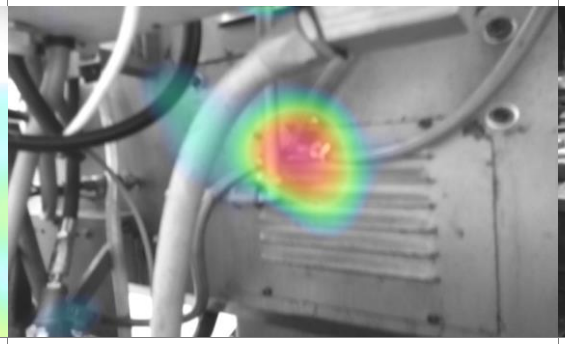
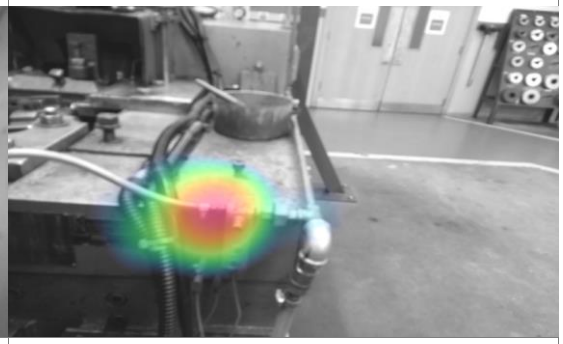
1.2. Production Floor

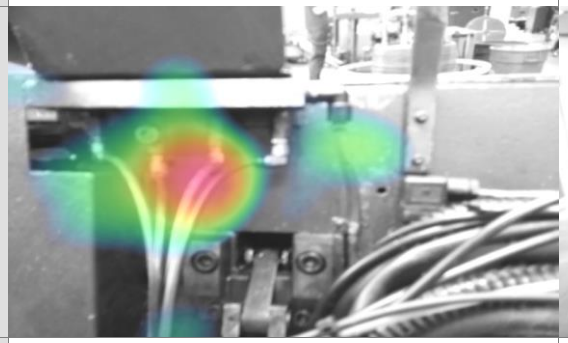
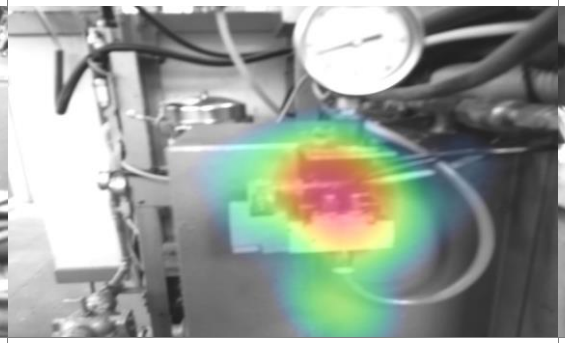
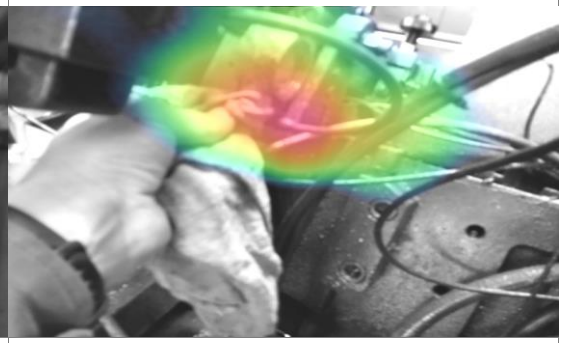
Tag number	4	5	6
Picture			
Description	522 Coupling	Lubricator Supply	Valve Connection
Wasted Flow	6.3 l/min	15.8 l/min	20.0 l/min
Waste Flow Cost	99 €/year	247 €/year	313 €/year

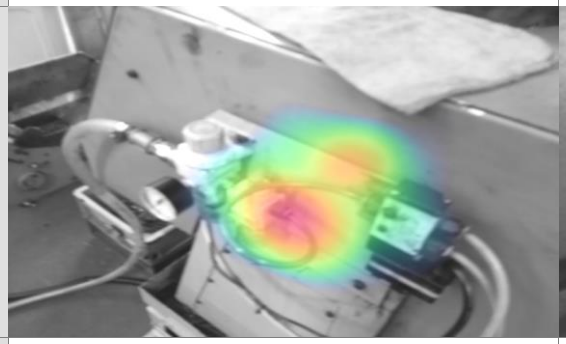
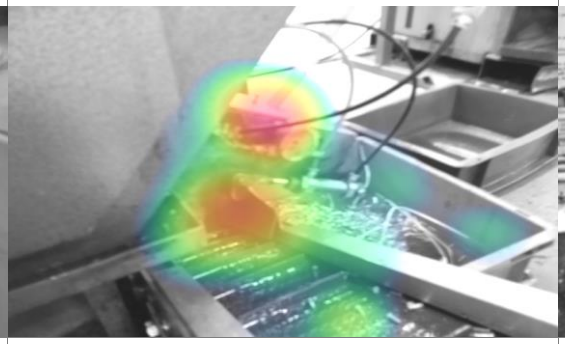
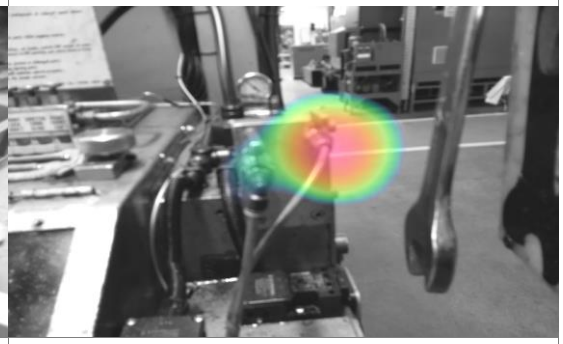
Tag number	7	8	9
Picture			
Description	MC24 6mm Connector	MC26 Solenoid	MC26 Supply Coupling
Wasted Flow	23.0 l/min	18.3 l/min	12.8 l/min
Waste Flow Cost	360 €/year	287 €/year	200 €/year

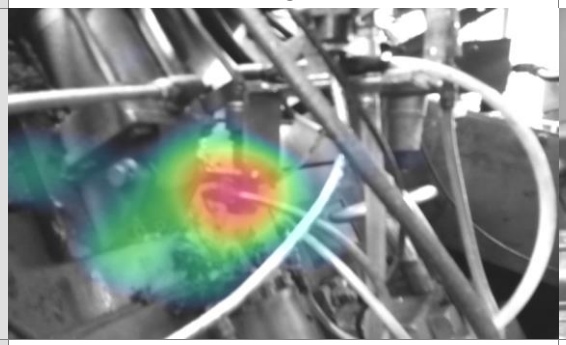
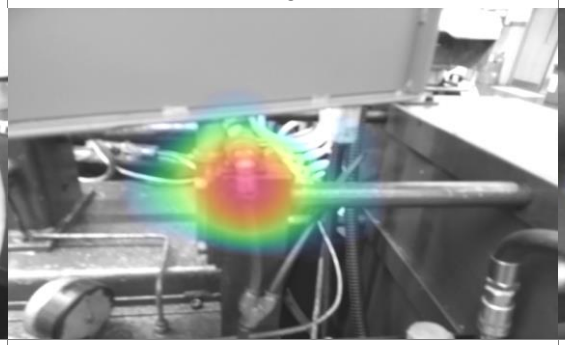
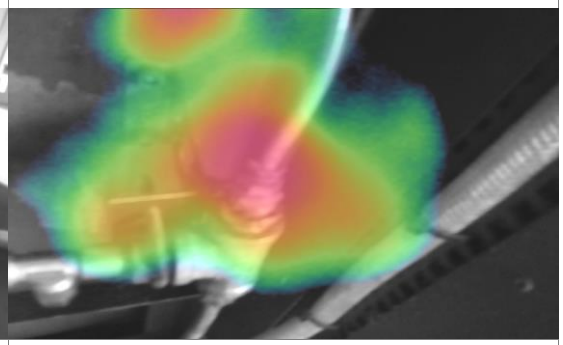
Tag number	10	11	12
Picture			
Description	MC26 Solenoid Connector	MC26 6mm Elbow	MC49 6mm Connection
Wasted Flow	18.5 l/min	17.0 l/min	40.3 l/min
Waste Flow Cost	290 €/year	266 €/year	631 €/year

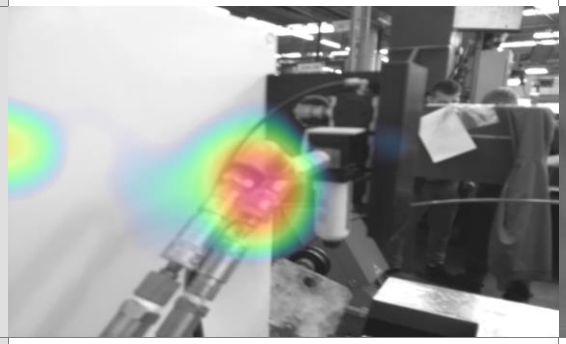
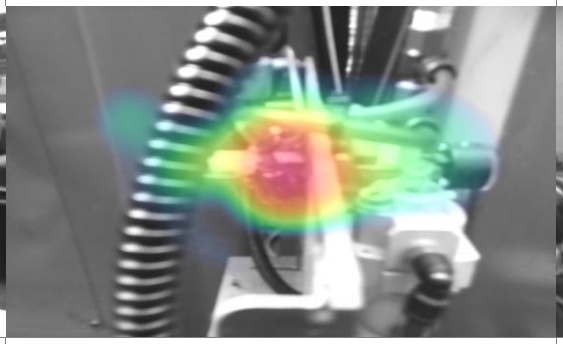
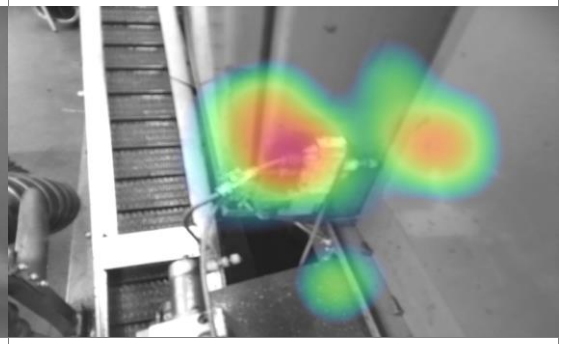
Tag number	13	14	15
Picture			
Description	MC49 4mm Connector	MC9 6mm Tee	MC9 8mm Elbow
Wasted Flow	30.0 l/min	14.7 l/min	42.3 l/min
Waste Flow Cost	470 €/year	230 €/year	662 €/year

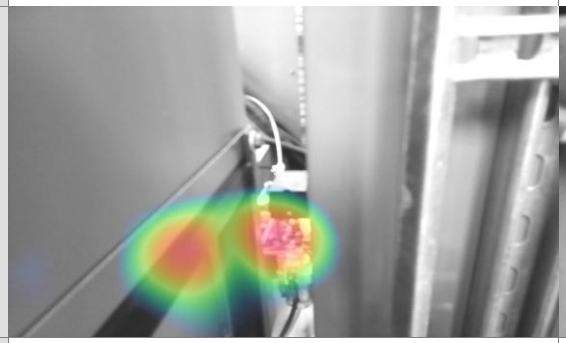
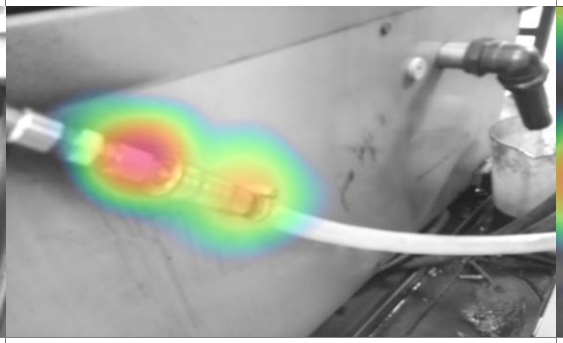
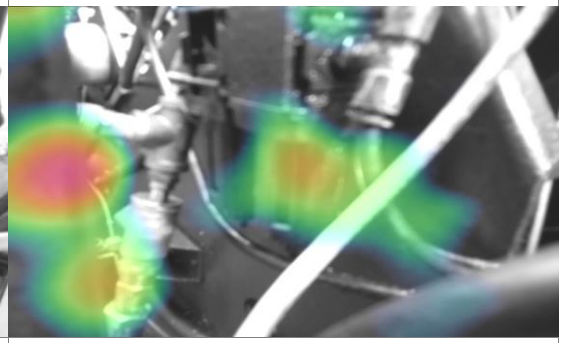
Tag number	16	17	18
Picture			
Description	MC65 8mm Tee	MC47 Supply Hose	MC47 Flex Pipe Connection
Wasted Flow	25.3 l/min	29.8 l/min	25.4 l/min
Waste Flow Cost	396 €/year	467 €/year	398 €/year

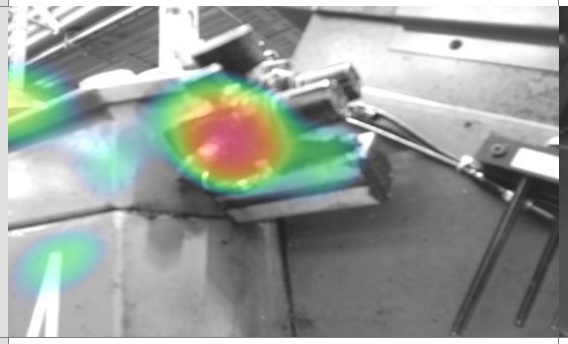
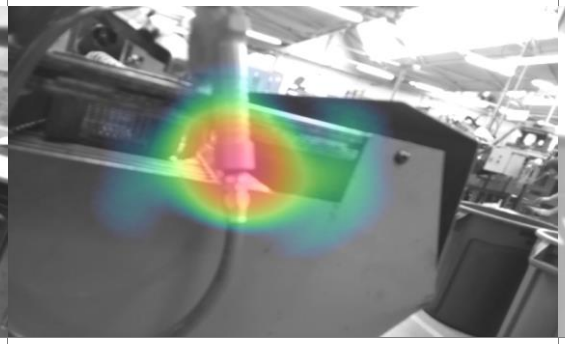
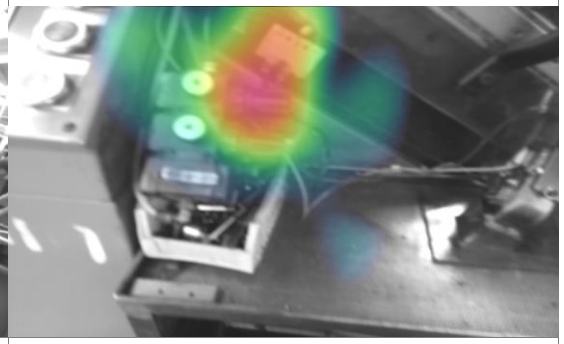
Tag number	19	20	21
Picture			
Description	MC43 6mm Elbow	MC46 4mm Pipe	MC23 6mm Fitting
Wasted Flow	36.1 l/min	19.3 l/min	29.3 l/min
Waste Flow Cost	565 €/year	302 €/year	459 €/year

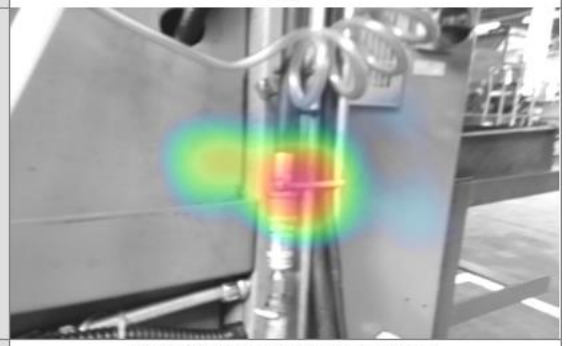
Tag number	22	23	24
Picture			
Description	MC06 6mm Fitting	MC67 Open Port	MC19 Valve Fitting
Wasted Flow	17.6 l/min	33.7 l/min	33.7 l/min
Waste Flow Cost	276 €/year	528 €/year	528 €/year

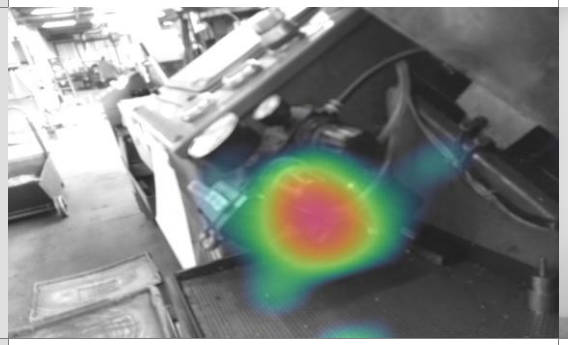
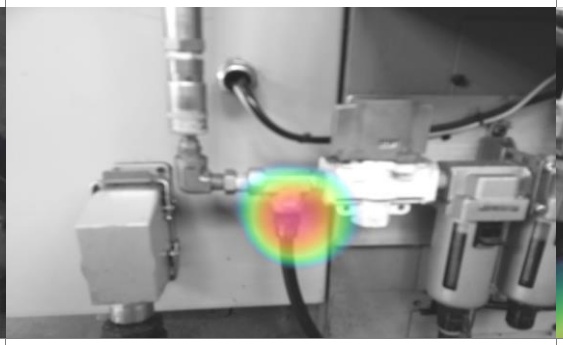
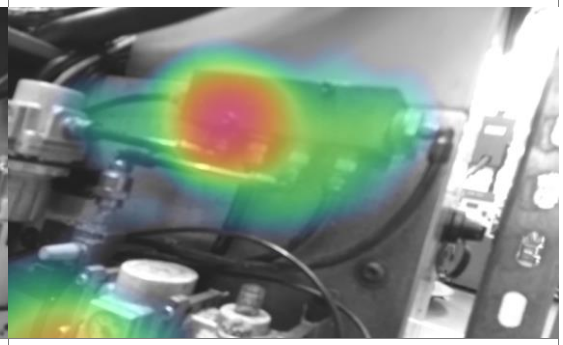
Tag number	25	26	27
Picture			
Description	MC50 8mm Fitting	MC59 8mm Elbow	MC64
Wasted Flow	24.3 l/min	48.9 l/min	20.4 l/min
Waste Flow Cost	381 €/year	766 €/year	319 €/year

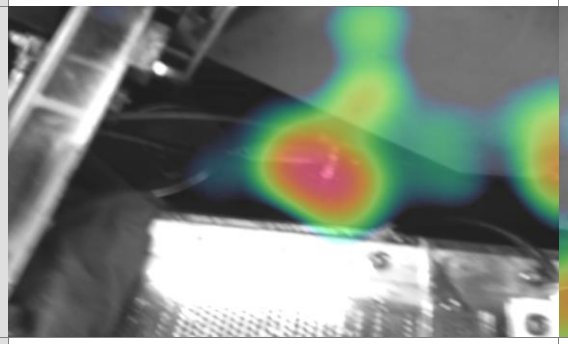
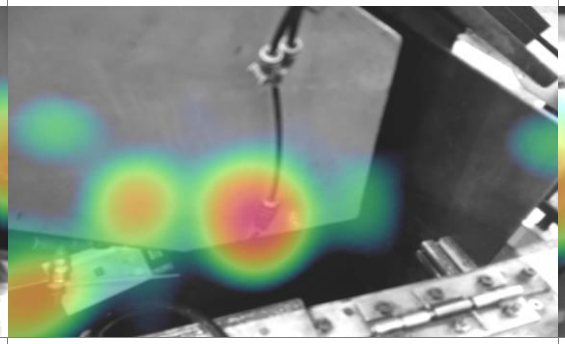
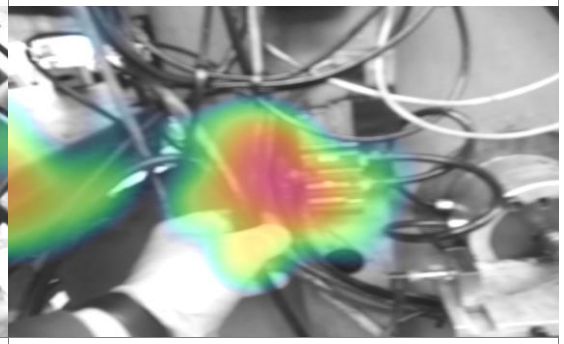
Tag number	28	29	30
Picture			
Description	MC68 BSP Fitting	MC68 Regulator 8mm Elbow	MC66 4mm Fitting
Wasted Flow	7.6 l/min	16.7 l/min	28.0 l/min
Waste Flow Cost	119 €/year	261 €/year	438 €/year

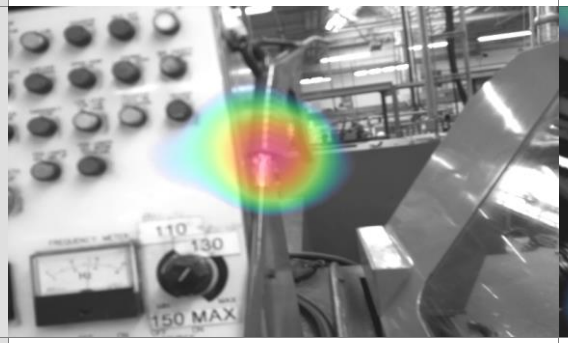
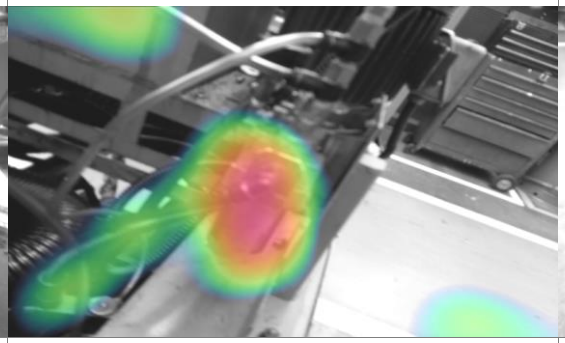
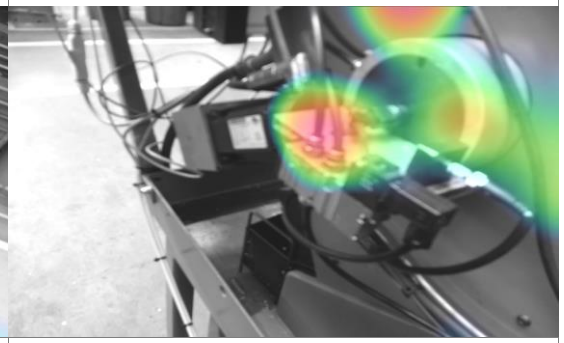
Tag number	31	32	33
Picture			
Description	MC71 Pressure Regulator	MC44	MCA5 Lubricator Housing
Wasted Flow	12.7 l/min	21.4 l/min	10.1 l/min
Waste Flow Cost	199 €/year	335 €/year	158 €/year

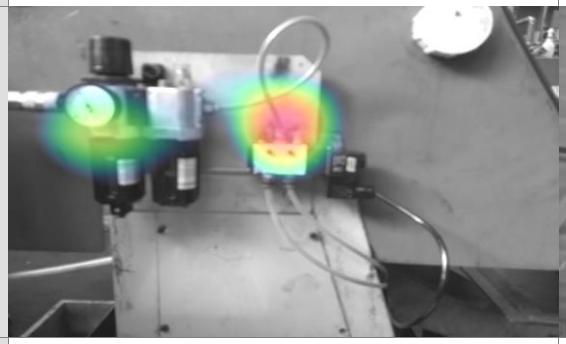
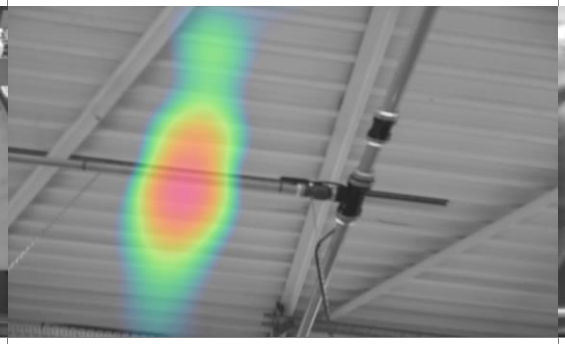
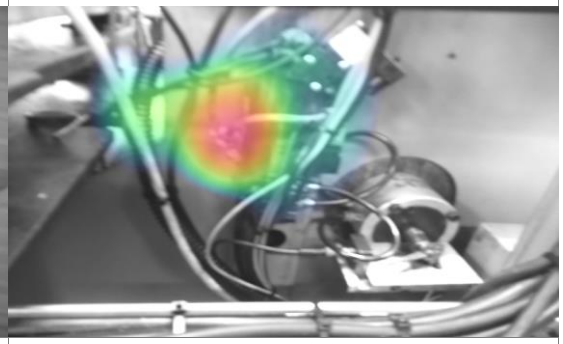
Tag number	34	35	36
Picture			
Description	MCA4 Regulator	MCA2 Blower	MC10 Regulator
Wasted Flow	5.4 l/min	14.9 l/min	19.1 l/min
Waste Flow Cost	85 €/year	233 €/year	299 €/year

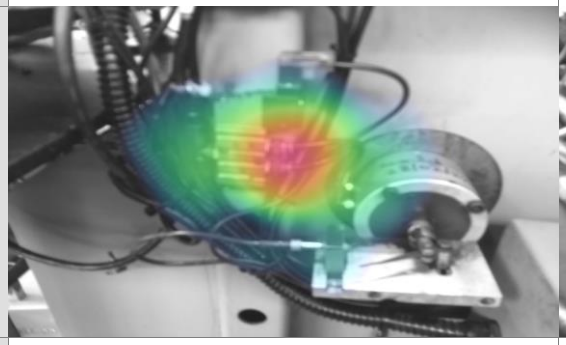
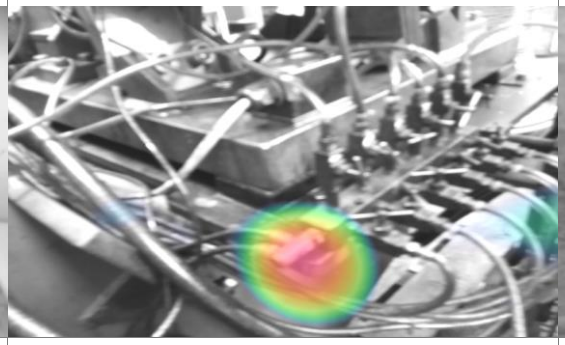
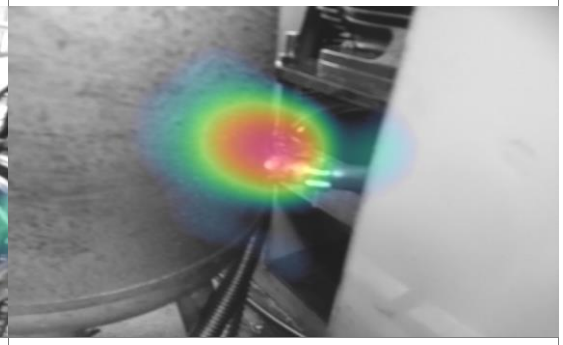
Tag number	37
Picture	
Description	DT014 Supply Connection
Wasted Flow	20.7 l/min
Waste Flow Cost	324 €/year

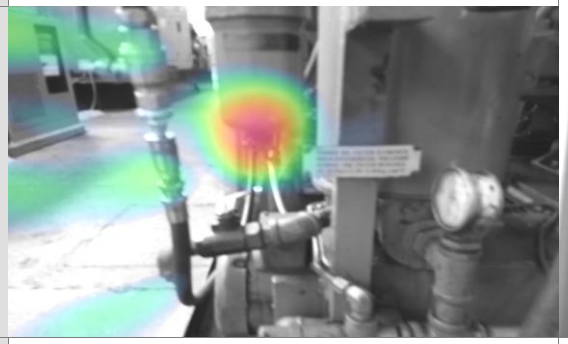
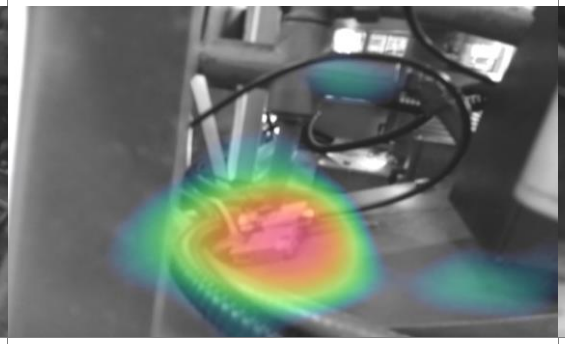
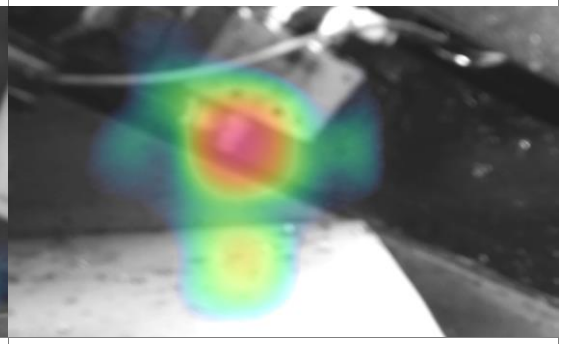
Tag number	38	39	40
Picture			
Description	MC08 Regulator	MC85 10mm Fitting	MC85 Block Fitting
Wasted Flow	7.3 l/min	9.2 l/min	16.0 l/min
Waste Flow Cost	114 €/year	144 €/year	251 €/year

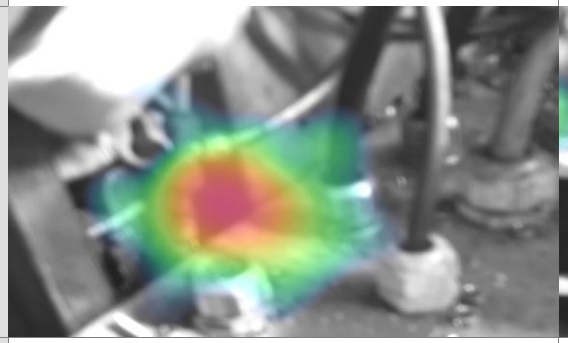
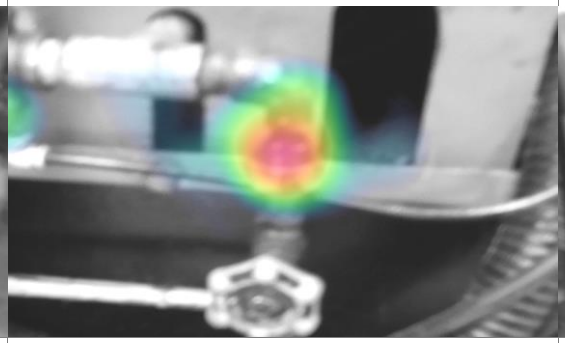
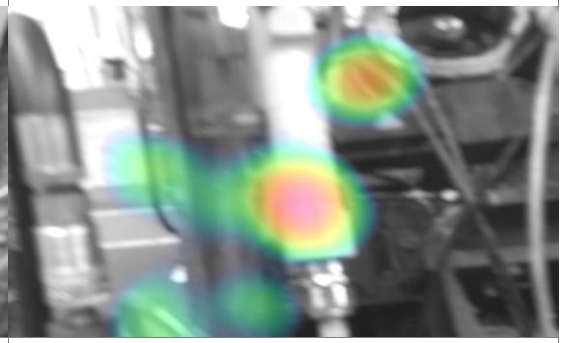
Tag number	41	42	43
Picture			
Description	MC31 8mm Fitting	MC33 6mm Valve	MC33 6mm Tee
Wasted Flow	19.5 l/min	20.4 l/min	9.4 l/min
Waste Flow Cost	305 €/year	319 €/year	147 €/year

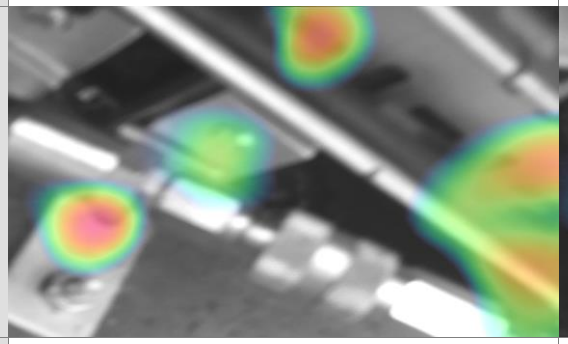
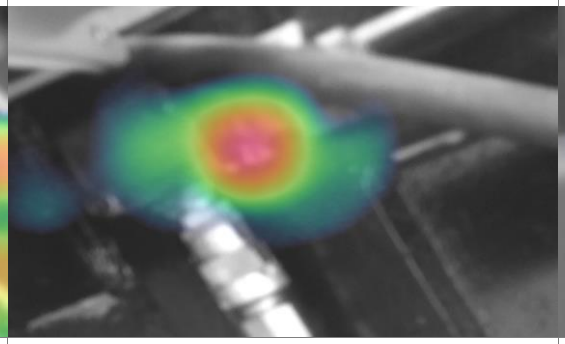
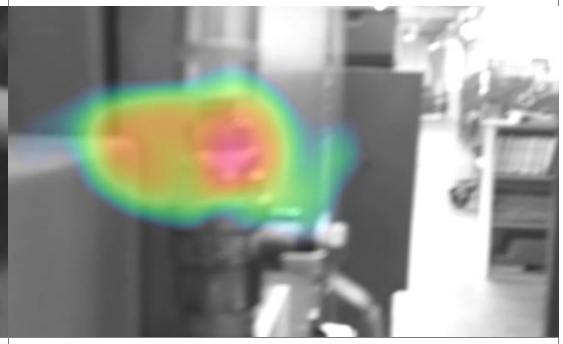
Tag number	44	45	46
Picture			
Description	MC83 Blower	MC83 Regulator Fitting	MC83 8mm Fitting
Wasted Flow	14.9 l/min	5.0 l/min	4.0 l/min
Waste Flow Cost	233 €/year	78 €/year	63 €/year

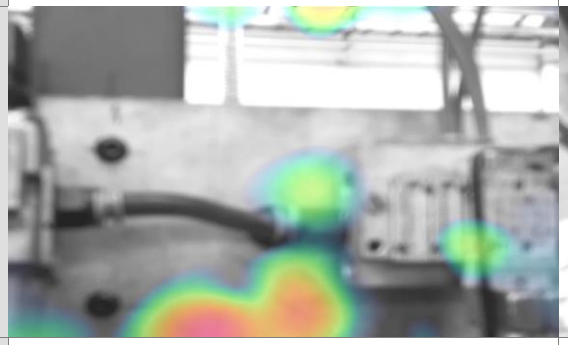
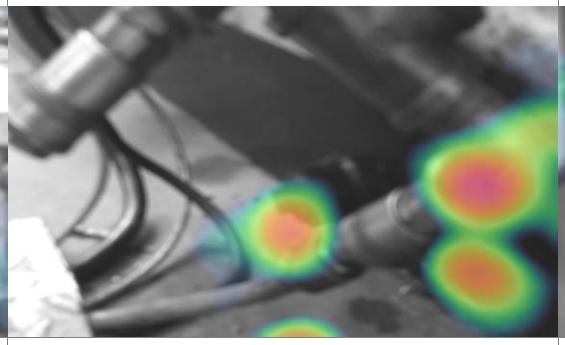
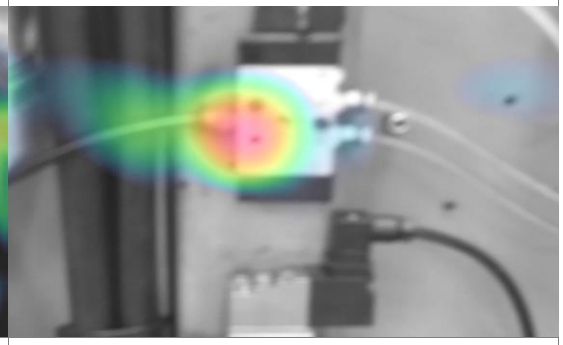
Tag number	47	48	49
Picture			
Description	MC 85 Solenoid Fitting	Ring Main Valve Above MC 85	MC 53 Y Joiner
Wasted Flow	6.2 l/min	15.0 l/min	15.5 l/min
Waste Flow Cost	97 €/year	235 €/year	243 €/year

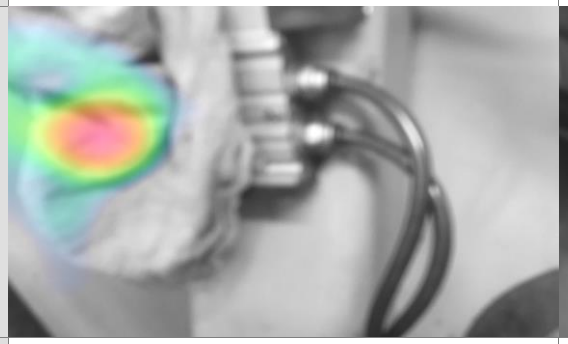
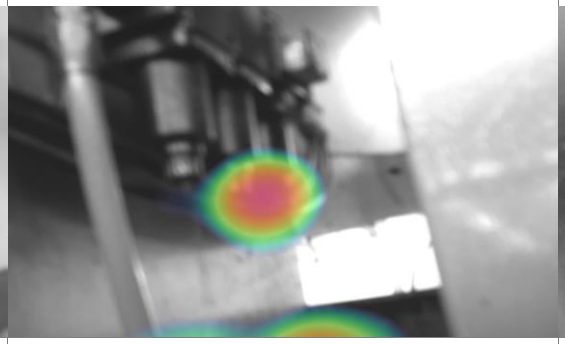
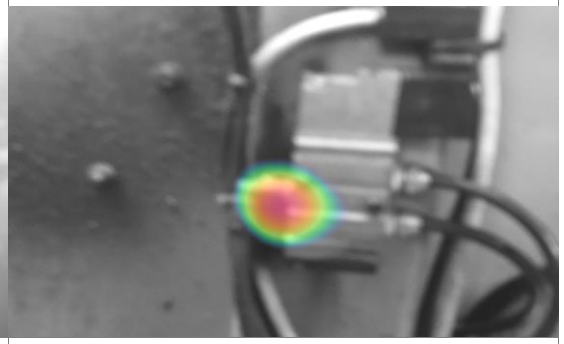
Tag number	50	51	52
Picture			
Description	MC 53 8mm Fitting	MC 75 Block Fitting	MC 75 Receiver Connection
Wasted Flow	26.7 l/min	22.0 l/min	44.1 l/min
Waste Flow Cost	418 €/year	344 €/year	691 €/year

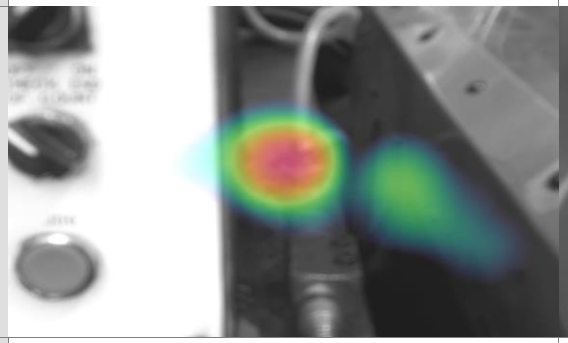
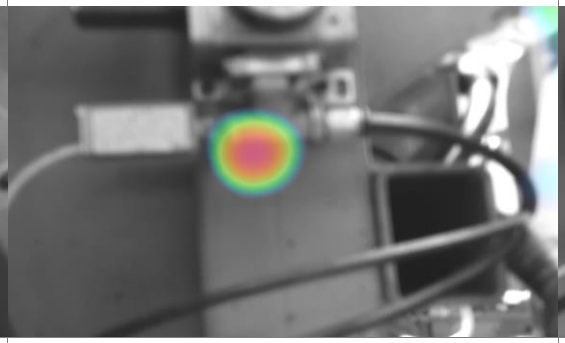
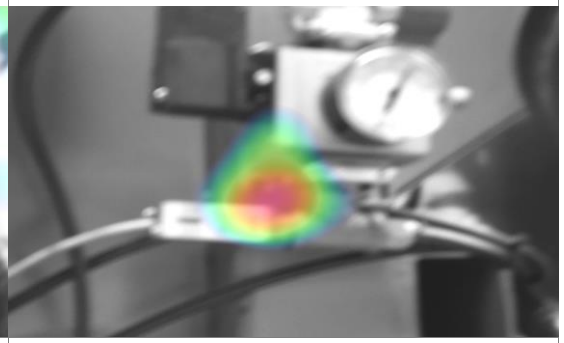
Tag number	53	54	55
Picture			
Description	MC 24 Filter Drain	MC 23 Solenoid	MC 08 Solenoid 6mm Connector
Wasted Flow	11.3 l/min	29.5 l/min	30.7 l/min
Waste Flow Cost	177 €/year	462 €/year	481 €/year

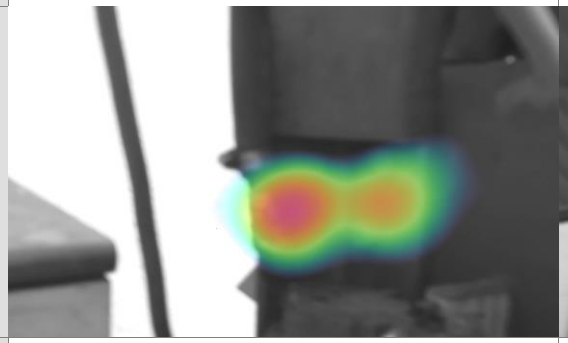
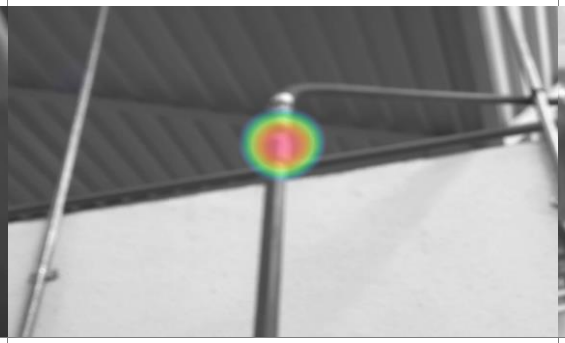
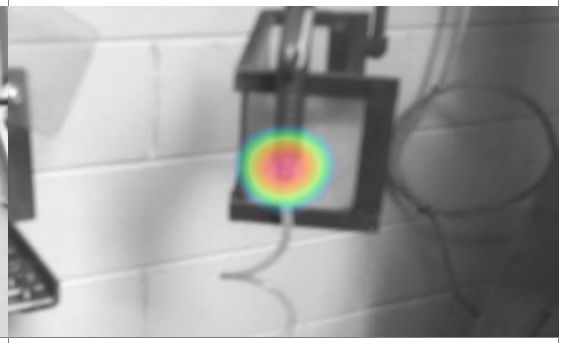
Tag number	56	57	58
Picture			
Description	MC 08 6mm Fitting	MC 07 BSP Fitting	MC 01 Blower
Wasted Flow	24.2 l/min	19.9 l/min	6.4 l/min
Waste Flow Cost	379 €/year	312 €/year	100 €/year

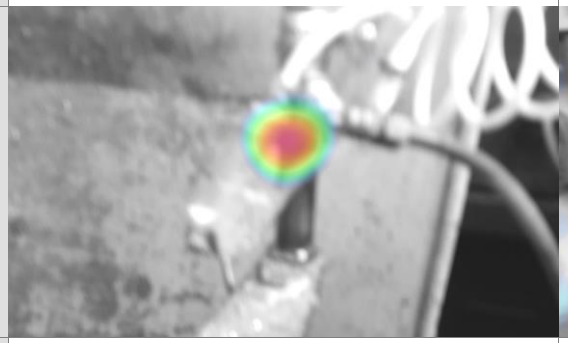
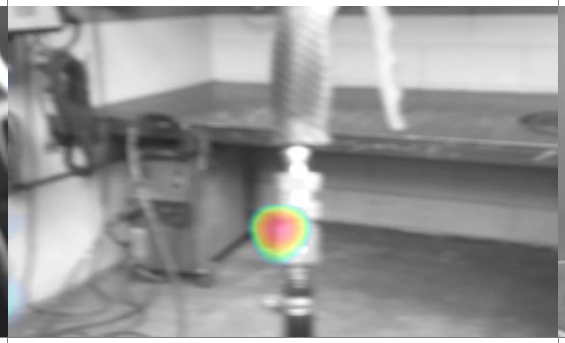
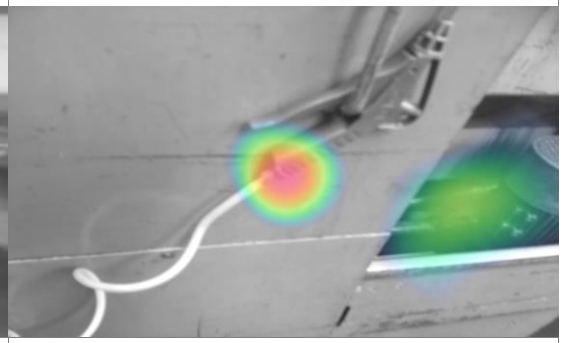
Tag number	59	60	61
Picture			
Description	MC 01 Push Fitting	MC 24 BSP Fitting	MC 24 Supply Fitting
Wasted Flow	2.4 l/min	32.2 l/min	6.3 l/min
Waste Flow Cost	38 €/year	504 €/year	99 €/year

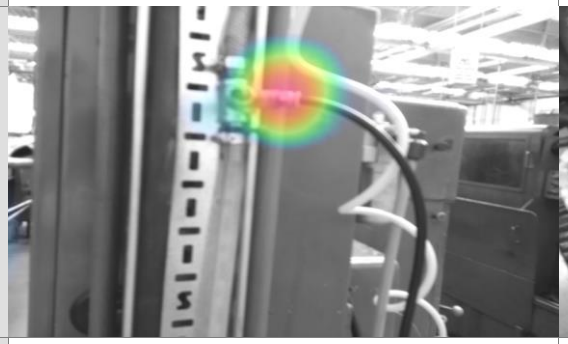
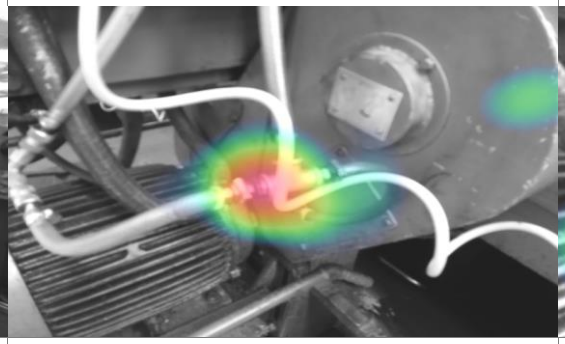
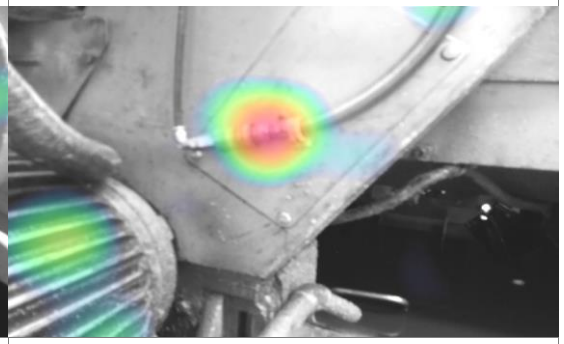
Tag number	62	63	64
Picture			
Description	MC 02 Valve Block	MC 09 Push Fitting	MC 08 - 93 8mmFitting
Wasted Flow	5.6 l/min	5.2 l/min	21.3 l/min
Waste Flow Cost	88 €/year	81 €/year	334 €/year

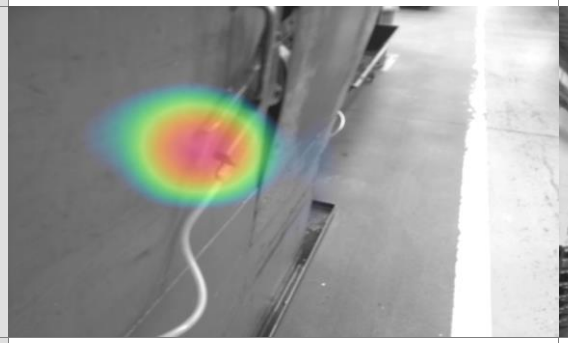
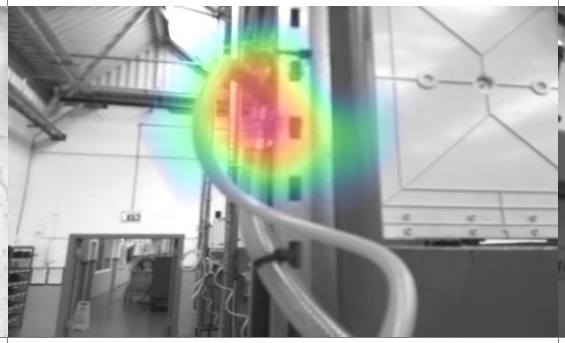
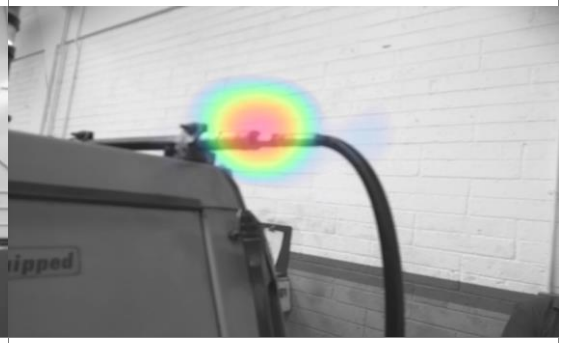
Tag number	65	66	67
Picture			
Description	MC 09 - 91 6mm Fitting	MC 84 - 42 Filter Drain	MC 84 - 42 Solenoid
Wasted Flow	7.3 l/min	7.4 l/min	3.1 l/min
Waste Flow Cost	114 €/year	116 €/year	49 €/year

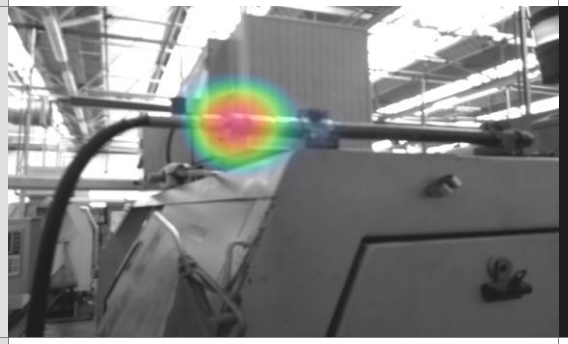
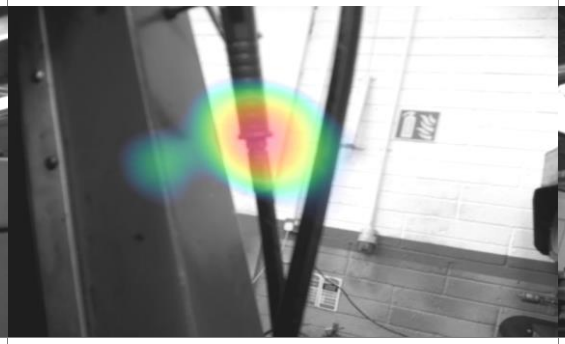
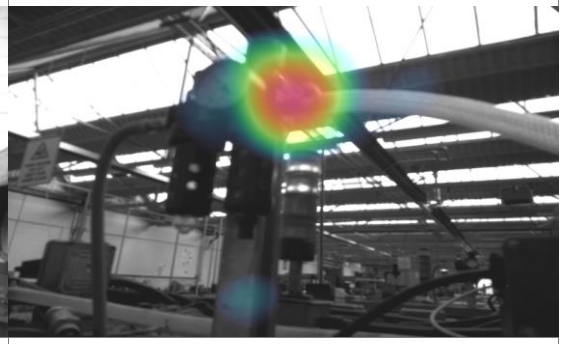
Tag number	68	69	70
Picture			
Description	MC 84 Blower Hose Fitting	MC 87 Sensor Connection	MC 86 Sensor Connector 3
Wasted Flow	21.5 l/min	2.8 l/min	3.2 l/min
Waste Flow Cost	337 €/year	44 €/year	50 €/year

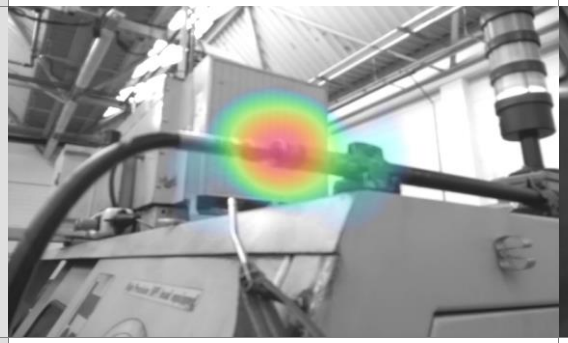
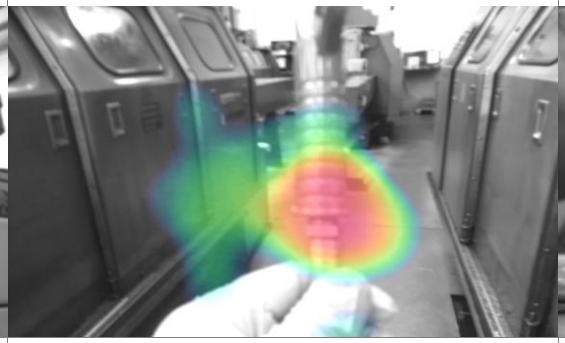
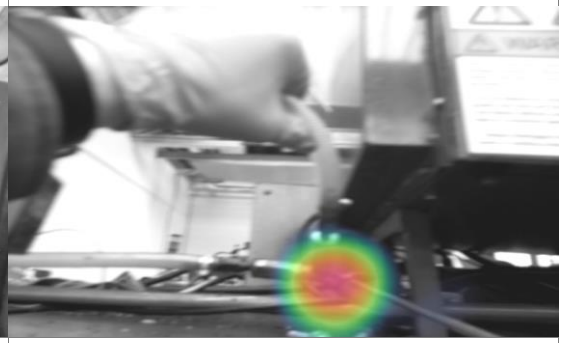
Tag number	71	72	73
Picture			
Description	Grinder Supply	Blaster Supply Fitting High Level	Workshop Air Line Blower
Wasted Flow	6.4 l/min	4.7 l/min	5.2 l/min
Waste Flow Cost	100 €/year	74 €/year	81 €/year

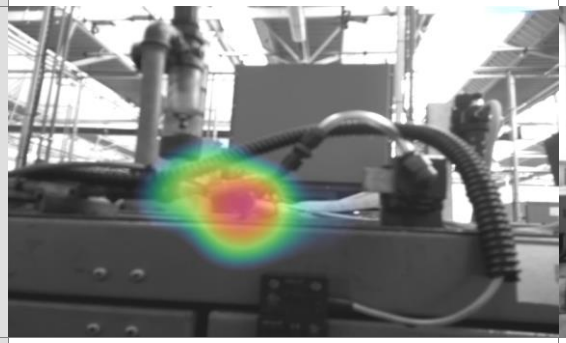
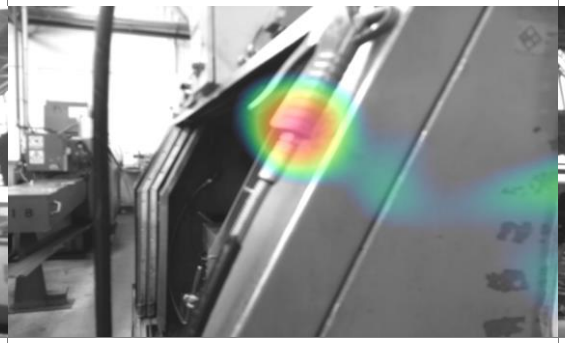
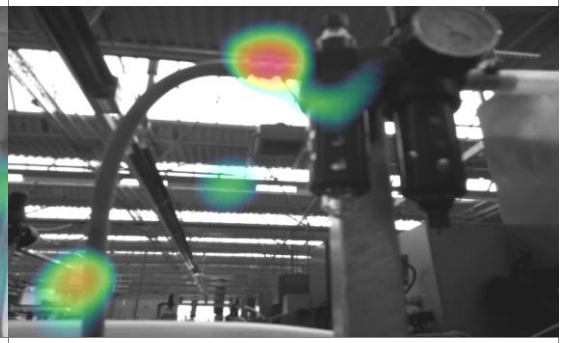
Tag number	74	75	76
Picture			
Description	Workshop Lathe Blower	Hose reel Connector	Workshop 3 Blower
Wasted Flow	4.2 l/min	2.2 l/min	3.1 l/min
Waste Flow Cost	66 €/year	34 €/year	49 €/year

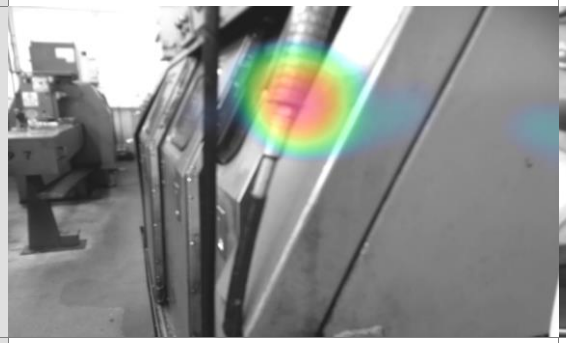
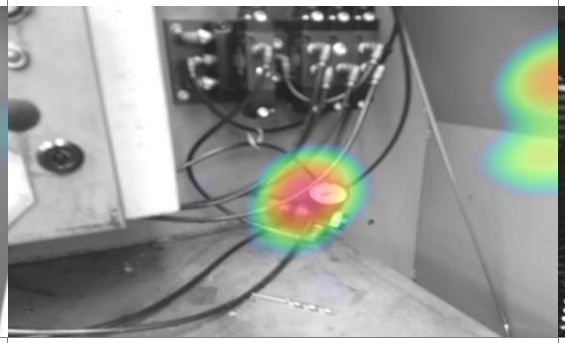
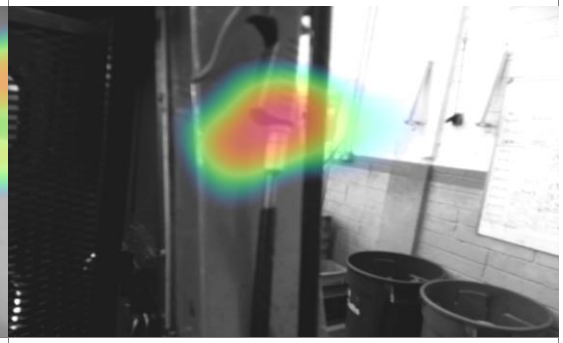
Tag number	77	78	79
Picture			
Description	MC 99 8mm fitting	MC 99 BSP Tee Nipple	MC 99 Flex Connection
Wasted Flow	6.7 l/min	10.0 l/min	8.8 l/min
Waste Flow Cost	105 €/year	157 €/year	138 €/year

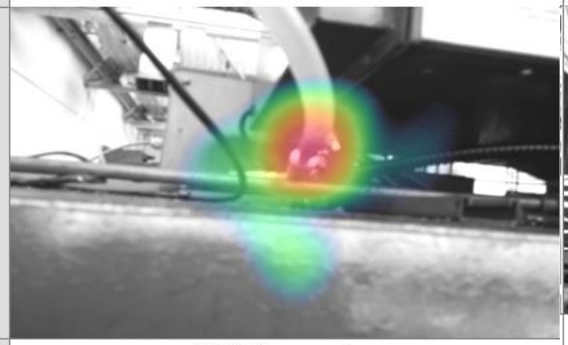
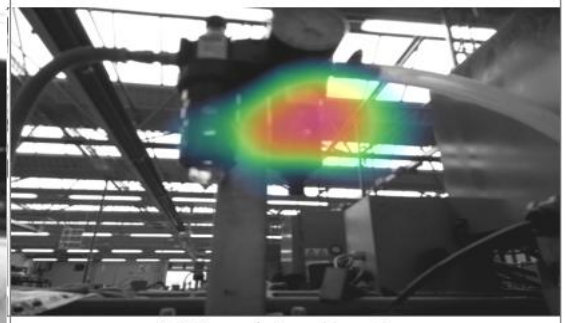
Tag number	80	81	82
Picture			
Description	MC 95 Blower	MC 95 Supply Hose Connection	1” Blower Supply
Wasted Flow	61.0 l/min	7.8 l/min	12.8 l/min
Waste Flow Cost	955 €/year	122 €/year	200 €/year

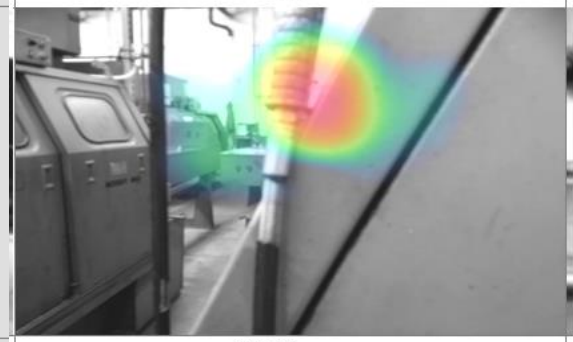
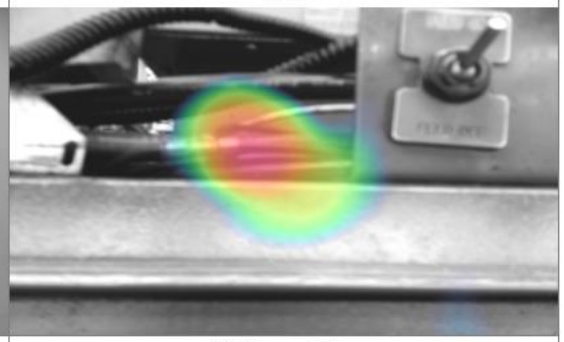
Tag number	83	84	85
Picture			
Description	MC 3 Supply to Blower	MC 5 Blower	MC 4 Regulator Connection
Wasted Flow	10.9 l/min	6.5 l/min	13.0 l/min
Waste Flow Cost	171 €/year	102 €/year	204 €/year

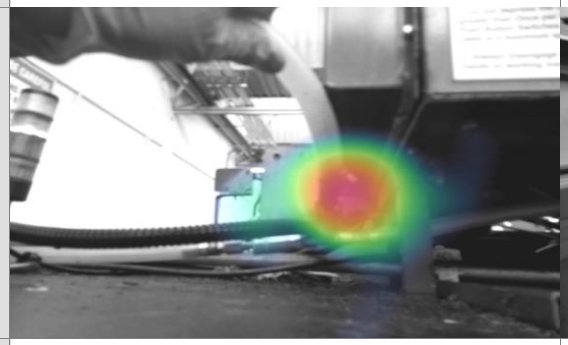
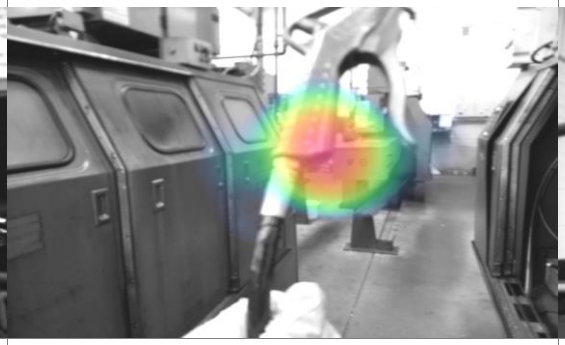
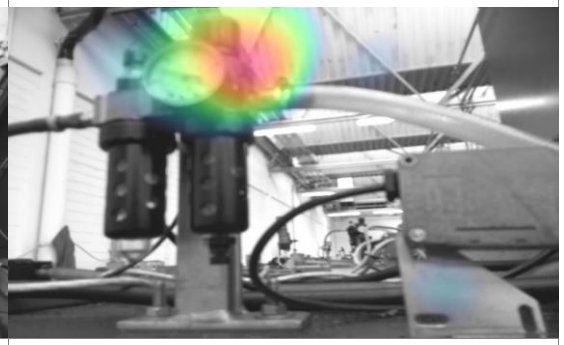
Tag number	86	87	88
Picture			
Description	MC 2 Supply to Blower	MC 6 Blower	MC 7 Y Connector
Wasted Flow	25.8 l/min	4.5 l/min	4.5 l/min
Waste Flow Cost	404 €/year	70 €/year	70 €/year

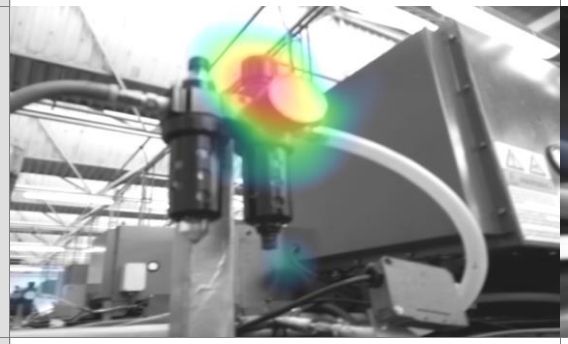
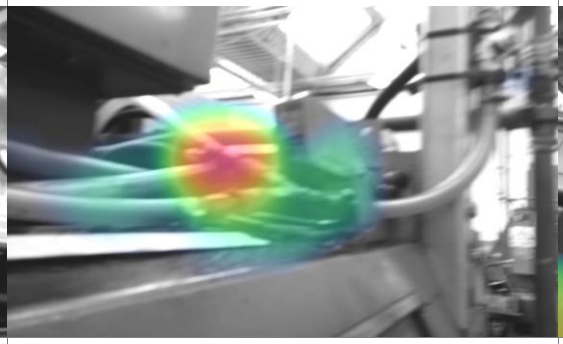
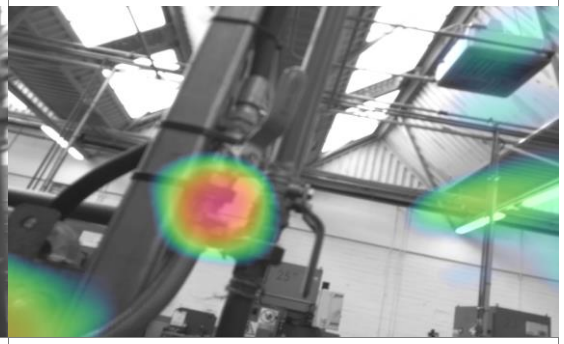
Tag number	89	90	91
Picture			
Description	MC 9 8mm Tee Connector	MC 10 Blower	MC 10 Regulator Connector
Wasted Flow	4.6 l/min	5.2 l/min	2.0 l/min
Waste Flow Cost	72 €/year	81 €/year	31 €/year

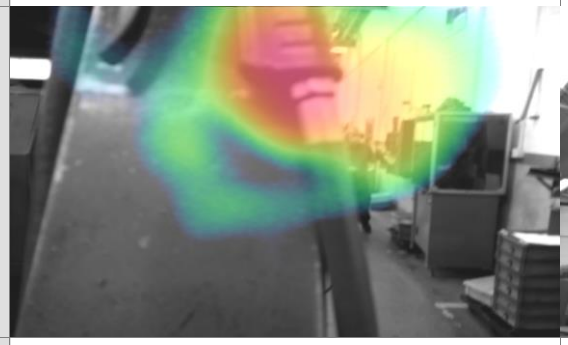
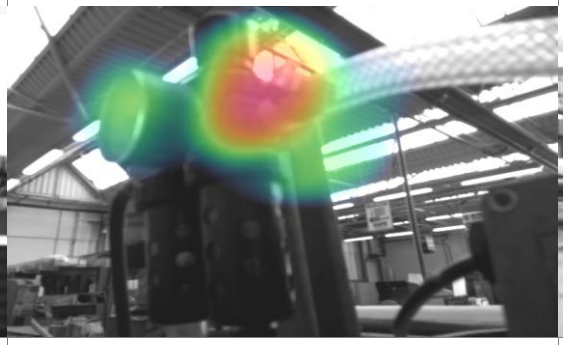
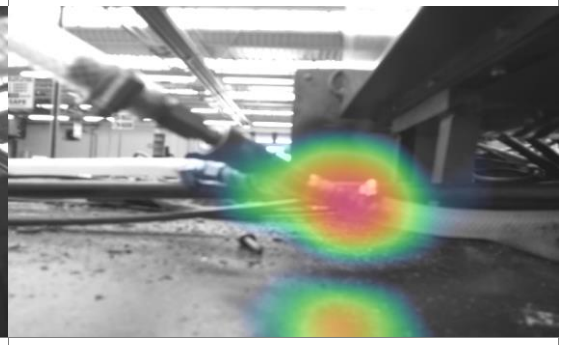
Tag number	92	93	94
Picture			
Description	MC 12 Blower	MC 11 Regulator	MC 11 Blower
Wasted Flow	5.2 l/min	4.3 l/min	4.3 l/min
Waste Flow Cost	81 €/year	67 €/year	67 €/year

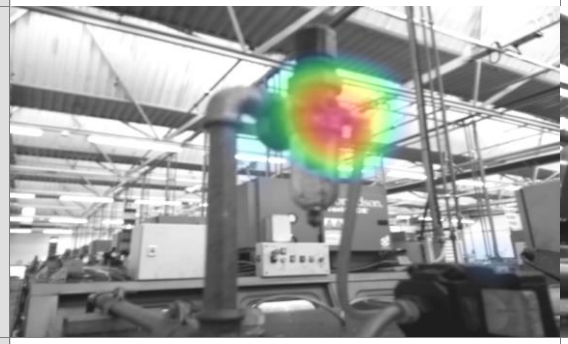
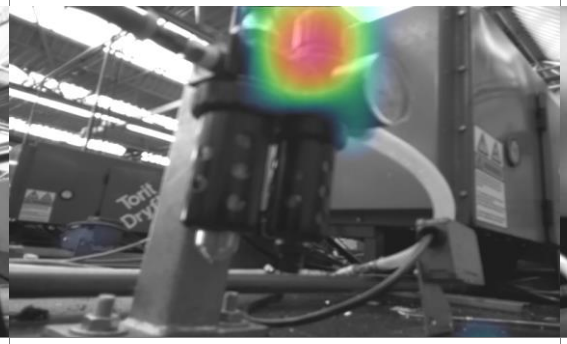
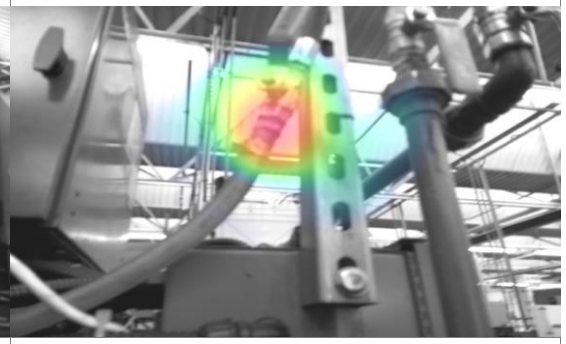
Tag number	95	96
Picture		
Description	13 Y Connector	14 Regulator Housing
Wasted Flow	16.4 l/min	5.0 l/min
Waste Flow Cost	257 €/year	78 €/year

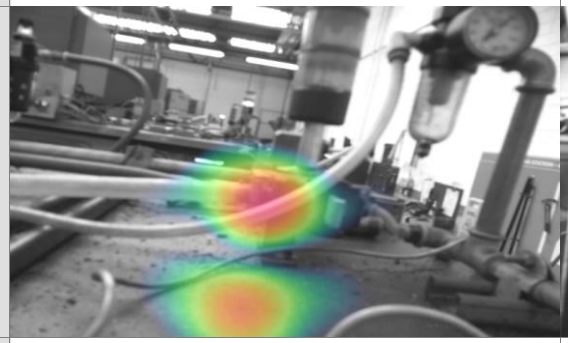
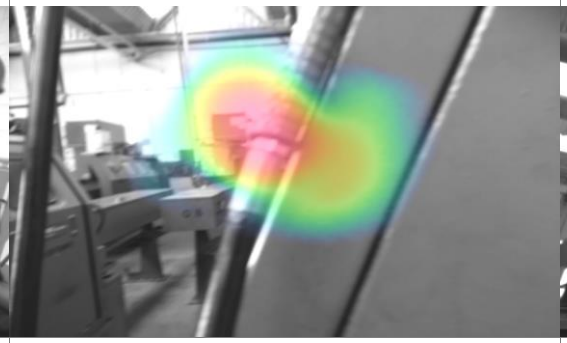
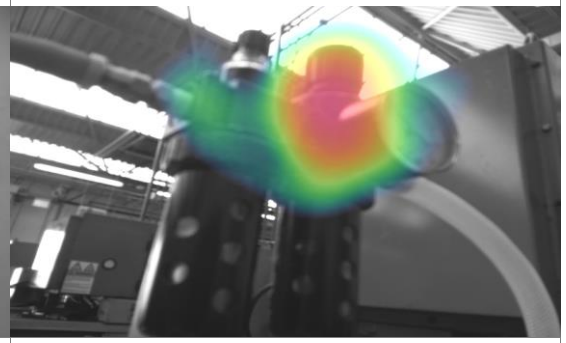
Tag number	97	98
Picture		
Description	16 Blower	16 6mm Tee
Wasted Flow	5.3 l/min	5.6 l/min
Waste Flow Cost	83 €/year	88 €/year

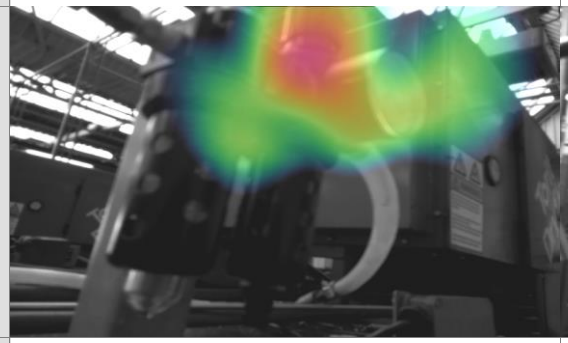
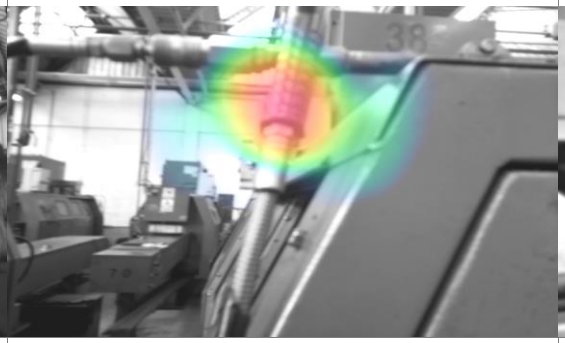
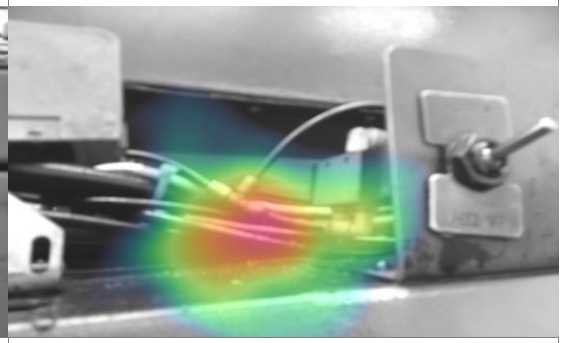
Tag number	99	100	101
Picture			
Description	MC 17 push fitting	MC 18 Blower	MC 21 Regulator Connection
Wasted Flow	17.3 l/min	5.4 l/min	10.6 l/min
Waste Flow Cost	271 €/year	85 €/year	166 €/year

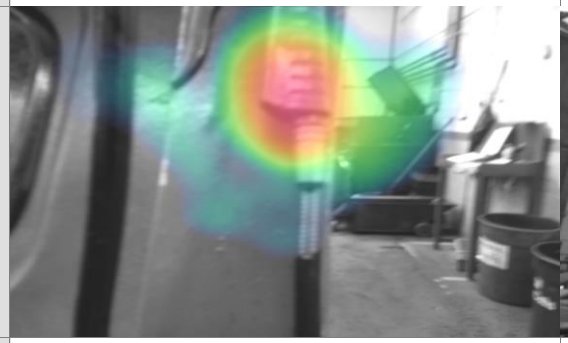
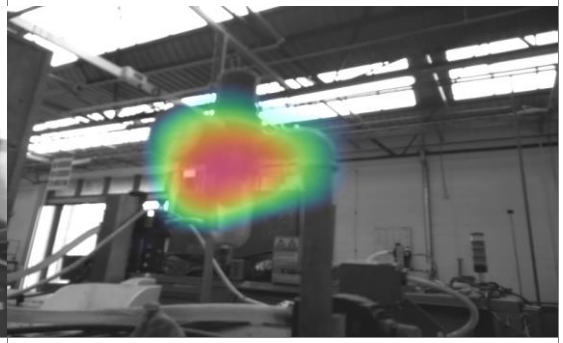
Tag number	102	103	104
Picture			
Description	MC 23 Regulator	MC 26 Push Fitting	MC 26 Supply
Wasted Flow	5.2 l/min	37.8 l/min	16.7 l/min
Waste Flow Cost	81 €/year	592 €/year	261 €/year

Tag number	105	106	107
Picture			
Description	MC 25 Blower	MC 28 Regulator Connection	MC 28 Y Connection
Wasted Flow	26.4 l/min	4.4 l/min	6.7 l/min
Waste Flow Cost	413 €/year	69 €/year	105 €/year

Tag number	108	109	110
Picture			
Description	MC 29 Regulator	MC 30 Regulator	MC 31 Supply
Wasted Flow	4.2 l/min	2.9 l/min	14.1 l/min
Waste Flow Cost	66 €/year	45 €/year	221 €/year

Tag number	111	112	113
Picture			
Description	MC 31 Hose Connection	MC 36 Blower	MC 36 Regulator
Wasted Flow	10.5 l/min	11.1 l/min	4.5 l/min
Waste Flow Cost	164 €/year	174 €/year	70 €/year

Tag number	114	115	116
Picture			
Description	MC 34 Regulator	MC 38 Blower	MC 39 Tee
Wasted Flow	5.2 l/min	7.9 l/min	8.6 l/min
Waste Flow Cost	81 €/year	124 €/year	135 €/year

Tag number	117	118
Picture		
Description	MC 39 Blower	MC 39 Regulator
Wasted Flow	16.8 l/min	7.0 l/min
Waste Flow Cost	263 €/year	110 €/year

Hole diameter (mm)	1	3	5	10
Power loss at the compressor (kw)	0.3	3	8	33

Recommendations to save energy and reduce costs.

Below you can find recommendations that may be useful to improve the efficiency of your system:

- **Repair the leaks** reported in the previous pages. Leaks are a waste of energy; therefore, it is advisable to fix it as soon as possible. To make the work simpler, you can follow the tags we have applied on each leak, starting from the big ones. Several leaks can be easily fixed using repairing kits, without stopping the compressed air system or your production.

- **Perform a leak detection once a year** in order to continuously improve efficiency of compressed air usage. Statistically air leaks range from 20% to 40% of the compressed air supplied by the room. The following table gives an idea of how much power is wasted by the compressor to cover the air leaks, in relation to the dimension of the leak, defined as equivalent diameter:

- **Replace the current distribution system** with high energy performance pipes (e. g. in case the replacement has been already planned or an expansion of the compressed air distribution system is expected). Typically, aluminum, or stainless-steel pipes produce significantly lower pressure drops compared to traditional pipes, in addition to zero corrosion and zero leaks.

Atlas Copco