

# A Guide to Oil System Cleanliness

page # 2	ISO 4406 Cleanliness codes explained
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page # 3	Scheduled Oil Testing Report example
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page # 4	Recommended ISO 4406 cleanliness codes for machine componentory
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page # 5	ISO 4406 cleanliness improvement example
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Below is a brief explanation of how the 3 digit ISO code is formulated .



FROM particles per 1ml of oil	TO particles per 1ml of oil	ISO 4406 CODE	ISO CODE IS FORMULATED BY HOW MANY PARTICLES IN 1ML OF OIL, BASED ON 3 PARTICULAR MICRONS 4µm MICRONS, 6µm MICRONS, AND 14µm MICRONS			
1300000	2500000	28				
640000	1300000	27				
320000	640000	26				
160000	320000	25				
80000	160000	24				
40000	80000	23				
20000	40000	22				
10000	20000	21	An example of a test result			
5000	10000	20	ISO CODE	Particles in 1ml of oil between		Particle size
2500	5000	19	21	10000	20000	4µm per 1ml of oil
1300	2500	18	17	640	1300	6µm per 1ml of oil
640	1300	17	14	80	160	14µm per 1ml of oil
320	640	16				
160	320	15				
80	160	14				
40	80	13	The above example test result is indicating an ISO 4406 cleanliness code of 21/17/14			
20	40	12				
10	20	11				
5	10	10				
2.5	5	9				
1.3	2.5	8				
0.64	1.3	7				
0.32	0.64	6				
0.16	0.32	5				
0.08	0.16	4				
0.04	0.08	3				
0.02	0.04	2				
0.01	0.02	1				

This is an example of a machine that is progressively getting dirty. Particular concern would be the spike in 6 micron particles in 4th quarter. this could be early onset of damage. Recommendations would be to send a sample to be lab tested and clean machine immediately. Lab test should tell what parts are likely failing.

company, machine, oil details

ISO 4406 Oil cleanliness

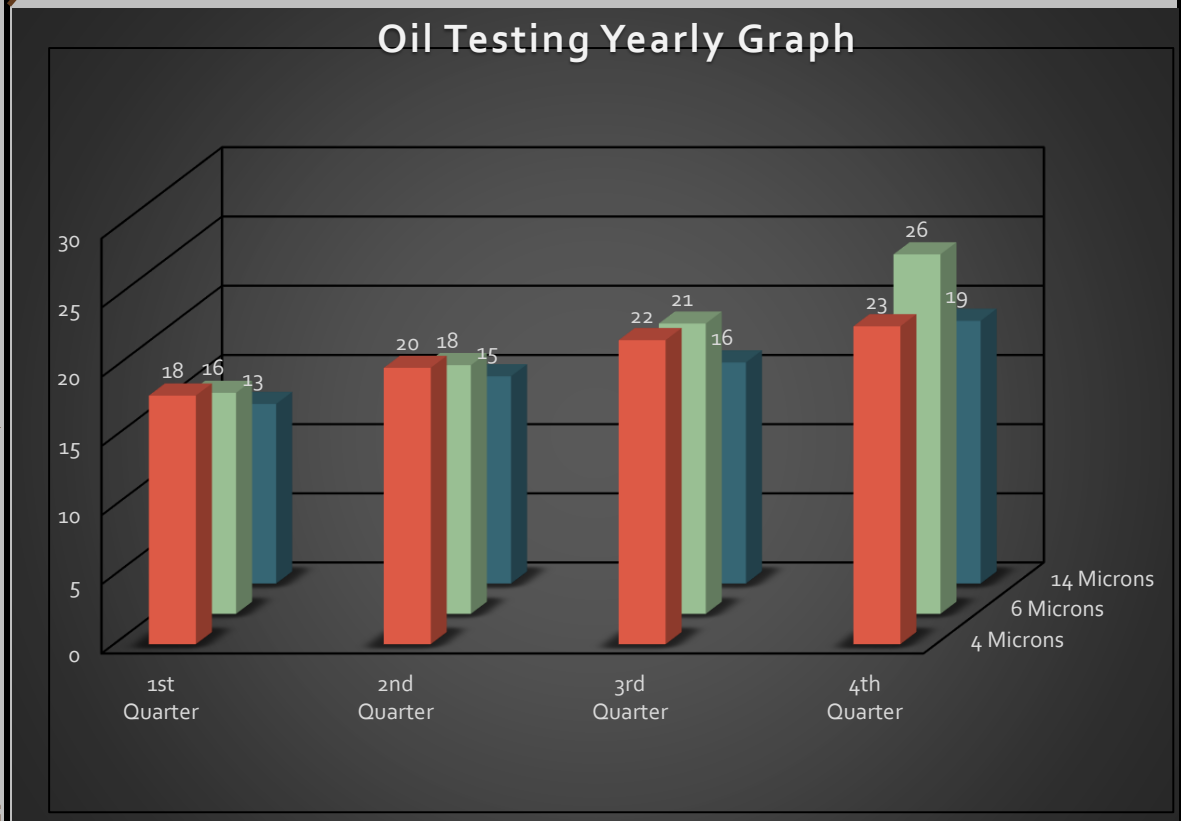
ISO 4406 machine agreed

Quarterly testing for preventative

Graphed quarterly results for visual and tracking

Signed agreed testing schedule

Company:	<b>Injection Mouldings R-Us</b>	New Oil Standard	20/18/15
Address:	<b>220 oil street hydraulic bay</b>		
Machine:	<b>Injection Moulding machine # 34</b>	Fitered Oil Standard	19/17/14
Type of Oil:	<b>Hydraulic 68</b>		
Litres in sytem:	<b>2000</b>	TARGET STANDARD	<b>18/16/13</b>
Year:	<b>2018</b>		
	Date:	4 Microns	6 Microns
<b>1st Quarter</b>	<b>21/03/2018</b>	<b>18</b>	<b>16</b>
<b>2nd Quarter</b>	<b>21/06/2018</b>	<b>20</b>	<b>18</b>
<b>3rd Quarter</b>	<b>21/09/2018</b>	<b>22</b>	<b>21</b>
<b>4th Quarter</b>	<b>21/12/2018</b>	<b>23</b>	<b>26</b>



<u>Pure Lubrication</u>	<u>Customer</u>
NAME: _____	NAME: _____
SIGNED: _____	SIGNED: _____

The Below table represents the recommended ISO code (oil cleanliness) of parts in an oil system. To choose the correct ISO code for a system, the part with the lowest ISO code will be the target for the entire system..

	Low/Medium pressure under 2000psi (moderate conditions)	High pressure 2000 to 2999psi (low/medium with some severe conditions)	very high pressure 3000psi + (high pressure with severe conditions)
<b>PUMPS</b>			
fixed gear or fixed vane	20/18/15	19/17/14	18/16/13
fixed piston	19/17/14	18/16/13	17/15/12
variable vane	18/16/13	17/15/12	NA
variable piston	18/16/13	17/15/12	16/14/11
<b>VALVES</b>			
check valve	20/18/15	20/18/15	19/17/14
directional (solenoid)	20/18/15	19/17/14	18/16/13
standard flow control	20/18/15	19/17/14	18/16/13
cartridge valve	19/17/14	18/16/13	17/15/12
proportional valve	17/15/12	17/15/12	16/14/11
servo valve	16/14/11	16/14/11	15/13/10
<b>ACTUATORS</b>			
cylinders, vane motors, gear motors	20/18/15	19/17/14	18/16/13
piston motors, swash plate motors	19/17/14	18/16/13	17/15/12
hydrostatic drives	16/15/12	16/14/11	15/13/10
test stands	15/13/10	15/13/10	15/13/10
<b>BEARINGS</b>			
journal bearings	17/15/12	NA	NA
industrial gear boxes	17/15/12	NA	NA
ball bearings	15/13/10	NA	NA
roller bearings	16/14/11	NA	NA

By Halving the particle count in your machine after every cycle through Pure Lubrication you are effectively extending your oil and also your machineries components lifecycles by a factor of 1. Targets for your particular oil system should be based and set according to the above table. For example if your machine is at an oil cleanliness of 24/20/15 and your machine has for example a check valve as the lowest ISO cleanliness recommended code, and your system is high pressure (above 3000psi, your total oil system cleanliness should be at 19/17/14. To reach this target the oil system will have to be circulated through Pure Lubrication approx 3 times. This in effect will extend your oils and components life by a factor of 3. To put this in to perspective, if your oil is recommended to be change every 1000hrs this means your oil should only last 25 weeks at 8hrs per day 5 days a week. if we clean the oil and extend the life by a factor of 3 or 3000hrs then you can effectively run for 75 weeks before another clean will be required.