

	<b>Technical Information</b>		<b>730-167-EN</b>	<b>V03</b>		
	<b>Effect of different process variables and parameters on the wash-off result of Cleaning Process Monitoring Indicators (CPI) in the GKE Spray Rig</b>			Created	09.12.2020	UK
				Changed	05.08.2021	KP
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			<b>File no.: 6.0</b>			

In this test, the influence of different parameters, such as flow rate, detergent concentration, temperature, reaction time and water hardness on the wash-off results of GKE CPIs is analyzed. All tests have been carried out with the reproducible procedure of the GKE test apparatus "spray rig"\*.

No.	Modification	Variable	Parameter	Result
1.	mechanical wash-off characteristics	flow rate	1.5 and 2.5 l/min	All CPIs are washed off quicker with higher mechanical force.
2.	washing float	detergent concentration	1.3 and 2 ml/l	at lower concentrations the wash-off is carried out only partially or not at all.
3.	water hardness	water	0 or 12°dH	At higher water hardness the wash-off characteristics are reduced.
4.	cleaning time	time	1, 5, 10 min	With increasing cleaning time the wash-off result is improved, if the wash-off characteristics are within a certain tolerance range. There is no wash-off, if the wrong indicator has been selected.
5.	temperature	temperature	55 - 30°C	At lower temperatures the wash-off characteristics are reduced.
6.	wash-off characteristic	indicator	red or pink	If all parameters remain the same, the red indicator is washed off quicker than the pink indicator. (GKE offers 7 different CPI versions).

\* A description of the spray rig test method may be available from GKE.



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Variable	Indicator Parameter/Change	CPI Red, Lot: 1255 1626			CPI Pink, Lot: 1254 1546		
		1 min	5 min	10 min	1 min	5 min	10 min
Reference	demineralized water Detergent: 2.0 ml/l Flow rate: 1.5 l/min Temperature: 55 °C						
Detergent concentration	reduced from 2 to 1,3 ml/l						
Water hardness	increased from 0 to 12°dH						
Flow rate	increased from 1,5 to 2,5 l/min						
Cleaning temperature	reduced from 55 to 30 °C						

Note: In each line the parameters of another variable of the reference is changed in the spray rig.  
All measurements were carried out with a full jet nozzle (spray angle 60°) and 20 cm distance to the sample.