

# CERATIZIT in the automotive industry



Fascination



Challenge

# Aluminum wheel machining



- OvalFlex optimization
- Projects with machine manufacturer
- Successful projects

# Aluminium wheel machining

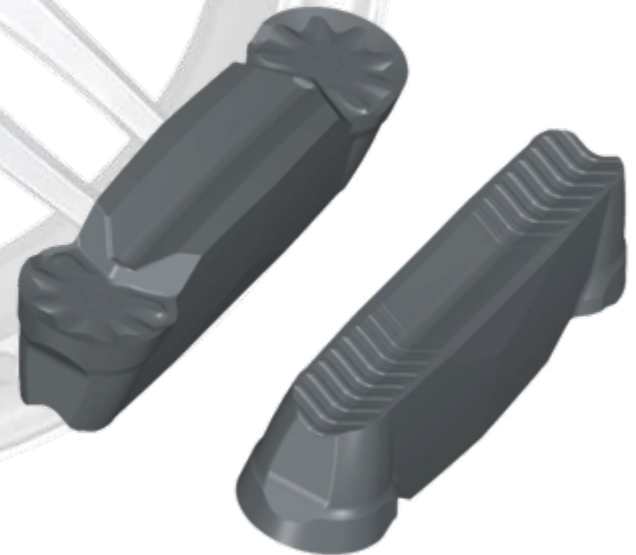
## OvalFlex optimization



# Aluminium wheel machining

## OvalFlex optimization – X32 with ribbing

- Better protection against pulling out
- Higher tool life (tool holder)
- Higher tool life (insert)
- Higher process reliability
- Defined deformation of tip seat
- Improved efficiency





# Aluminium wheel machining

## OvalFlex optimization – small HubStar

- OC50-HUB56R15K for  $\varnothing$  56 mm
- Wider wheels range
- Same indexable insert applicable
- Increasing of profitability over time saving



# Aluminium wheel machining

## Projects with machine manufacturer



# Aluminium wheel machining

## New SAP – software for OEM projects



- Project
- Work piece
- Machines
- Tooling
- Processing
- Quotation
- Confirmation of order
- Delivery note
- Archive

**Ändern Projekt O-000050**

Recordsmanagement Vollständigkeit prüfen

Projektdef. 0-000050 Alurad - Alcoa

Anwendungsstatus AGIA Angebotserstellung Status ändern

**Projektangaben**

Starttermin	30.07.2009	Währung	EUR
Termin Angebot	28.09.2009	Zeiteinheit	MIN
Termin Dokumentation	28.10.2009	Anzahl Sätze	1
Endtermin	27.11.2009		

**Partner**

Rolle	Partner	Name	Adresse
AG Auftraggeber	2100	ALCOA Kőfém Kft	ALCOA Kőfém Kft, Székesfehévár, 22
YM Maschinenhersteller	42674	DANOBAT S.COOP.	DANOBAT S.COOP., ELGOIBAR (GU

**Projektteam**

i.	Rolle im Team	Benutzername	VollstName
10	Projektleiter	WUNDELECHNERM	Michael Wundlechner
20	Projektbearbeiter	ACEVEDOA	Alejandro Acevedo
70	Konstruktion	STEINERM	Michael Steiner

# Aluminium wheel machining

## New SAP – software for OEM projects



Quotation:

- Basic equipment
- Tool consumption

OEM-DPS System Hilfe

Ändern Projekt O-000050

Recordsmanagement Vollständigkeit prüfen

Excellisten Angebot Excellisten Auftrag

O-000050 Alurad - Alcoa  
 Projektbeschreibung  
 O-000050 Spezifikation/Pflichtenheft

Werkstücke  
 O-00005001 124 FPTM REV-7 (E-77122)  
 O-00005002 23121\_FPTM\_REV\_12 (E-76125)  
 O-00005003 23172\_fptm\_rev\_0\_090402 (E-76024)  
 O-00005004 23221\_fptm\_rev\_8\_080901 (77124)  
 O-00005005 23341\_FPTM\_rev\_1 (E-77123)

Maschinen  
 0001 TV-650 W4

Werkzeuge  
 Werkzeugelemente  
 Bearbeitungsstudie

Standwerte  
 Werkzeugelement-Summen  
 Angebot/Auftragsbest.  
 Bearbeitungspläne

CERATIZIT Austria Gesellschaft m.b.H.  
 A-6800 Feuchte, Tirol  
 www.ceratizit.com  
 Gemeinsam schaffen wir echte Lösungen

ALCOA Köfem Kft  
 H-8002 Székesfehérvár


Projekt Alurad - Alcoa  
 O-000050 / 2100 Datum: 27.08.2009

Pos.	Bestellnummer	CERATIZIT Mat.	Kunden-Id-Nr.	Beschreibung	Bild	Werkzeugsätze		Verwendet in Werkzeug
						1	1	
1	X32-R4.00N-35P H216T	11443948		HM Stechwendepalte		12	12	[TU0001][TU0002][TU0003][TU0004][TU0005][TU0006][TU0007]
2	OC50-X32R45E	11233185		Ovalflex Drehkopf		2	2	[TU0001]
3	OC50-DIN69880-50IN240 10004984			Internal Oval-Flex-Adapter		4	4	[TU0001][TU0003]
4	OC50-X32R00E	11232155		Ovalflex Drehkopf		6	6	[TU0002][TU0003][TU0005]
5	OC50-DIN69880-50ER	11254178		Ovalflex Grundhalter		2	2	[TU0002]
6	OC50-X32R15H	11232156		Ovalflex Drehkopf		2	2	[TU0004]
7	OC50-X32R27.5F	11232146		Ovalflex Drehkopf		2	2	[TU0006][TU0007]
8	OC50-DIN69880-50ER150 10005479			External Oval-Flex-Adapter		2	2	[TU0005]
9	OC50-DIN69880-50IN130	11254175		Ovalflex Grundhalter		4	4	[TU0004][TU0006]




# Aluminium wheel machining

## Workpiece- and Tool description




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Together we create real solutions




**Machining Proposal** Projekt:

**Workpieces**

Workpieces				
Nr.	Description	Dwg.-Nr.	Material	Material group
1	Aluminiumwheel 38WALDQVW	987654	AlSi7	Aluminium + 12% Si



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**Machining Proposal** Projekt: AG-12345678

**Assembled Tools**

Workpiece	Operation	Tool	Order number	Material	Description	Pcs.	Remarks	Cutting data
1 E-7294	OP10 Hub	TVH	OC50-BAR-L110 E-71345-0	1145740	Adapter Okuma ZSP-V55 / OC50	1	Drawings: E-71345	
			OC50-V2SR19a	11232142	Tool Head / External machining	1		
			K3D-R4-20N-2TP-H216T	11172652	Insert / Carbide	1		
			Z-1004591-GV2-H216T	11443948	Insert / Carbide	1		
1 E-7294	OP10 Roughing	TUE	OC50-BAR-L110 E-71345-0	1145740	Adapter Okuma ZSP-V55 / OC50	1	Drawings: E-71345	
			OC50-G412 E-71347-0	11457526	Tool Head / Internal machining	1		
			VC07-2325039%-2T-H107	11202105	Insert / PCD	1		
			VC07-2325039%-2SF-H2107	11337239	Insert / Carbide	1		
1 E-7294	OP10 Finishing	TUE	OC50-EXTERNAL CLAMPING E-71364-0	11457405	Adapter Okuma ZSP-V55 / OC50	1	Drawings: E-71364	
			OC50-V2SR19a	11232142	Tool Head / External machining	1		
			K3D-R4-20N-2TP-H216T	11172652	Insert / Carbide	1		
			Z-1004591-GV2-H216T	11443948	Insert / Carbide	1		
1 E-7294	OP10 Roughing	TUE	OC50-BAR-L110 E-71345-0	1145740	Adapter Okuma ZSP-V55 / OC50	1	Drawings: E-71345	
			OC50-C90P112 5H	11232159	Tool Head / Hub Machining	1		
			VC0W-1604039%	11232159	Insert / PCD	1		
			VC07-1804039%-M41 CTD4110	11232159	Insert / PCD	2		
1 E-7294	OP10 Finishing	TUE	OC50-EXTERNAL CLAMPING E-71364-0	11457405	Adapter Okuma ZSP-V55 / OC50	1	Drawings: E-71364	
			OC50-V2SR19a	11232142	Tool Head / External machining	1		
			K3D-R4-20N-2TP-H216T	11172652	Insert / Carbide	1		
			Z-1004591-GV2-H216T	11443948	Insert / Carbide	1		
1 E-7294	OP10 Roughing	TUE	OC50-EXTERNAL CLAMPING E-71364-0	11457405	Adapter Okuma ZSP-V55 / OC50	1	Drawings: E-71364	
			OC50-V2SR19a	11232142	Tool Head / External machining	1		
			K3D-R4-20N-2TP-H216T	11172652	Insert / Carbide	1		
			K3D-R4-20TN-M41 CTD4110	11259888	Insert / PCD	1		

No standard tool, production time necessary

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# Aluminium wheel machining

## Tool element sheets


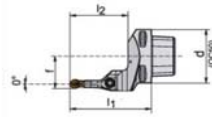
CERATIZIT Austria Gesellschaft m.b.H.

Projekt: AG-12345678

**Machining Proposal**

**Tool element sheet**

Ordernumber	CERATIZIT M.Nr.	Customer M.Nr.	Description
OC50-X32R00E	11232155		OvalFlex head for external machining

The illustration may not correspond to the product.

Dimensions mm

Material no.	Quantity	Description	State	Available yesterday	l1	l2	f	d
11232155	1	PCE OC50-X32R00E	●	✓	70	50	30.0	50

**Bill of material**


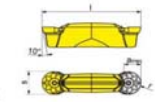
Pos.	Ordernumber	CERATIZIT M.Nr.	Customer M.Nr.	Description	Notes
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					

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**Machining Proposal**

**Tool element sheet**

Ordernumber	CERATIZIT M.Nr.	Customer M.Nr.	Description
X32-R3.00FN/TH-M41 CTD4110	11258985 / 11258990		X32 PCD insert radius 3 mm

The illustration may not correspond to the product.

Dimensions mm

Material no.	Quantity	Description	State	Available yesterday	s	l1	f	r_max	Chip groove	Grade
11258985	1	PCE X32-R3.00FN-M41 CTD4110	●	✓	6.00	32.0	3.00	4.50	3664	CTD4110

**Bill of material**

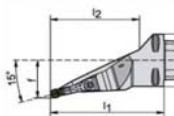
Pos.	Ordernumber	CERATIZIT M.Nr.	Customer M.Nr.	Description	Notes
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					

Seite 11 von 14

**Machining Proposal**

**Tool element sheet**

Ordernumber	CERATIZIT M.Nr.	Customer M.Nr.	Description
OvalFlex head for internal machining			



The illustration may not correspond to the product.

Dimensions mm

Material no.	Quantity	Description	State	Available yesterday	l1	l2	f	d
	1		●	✓	100	80	36.0	50

**Bill of material**

Pos.	Ordernumber	CERATIZIT M.Nr.	Customer M.Nr.	Description	Notes
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					

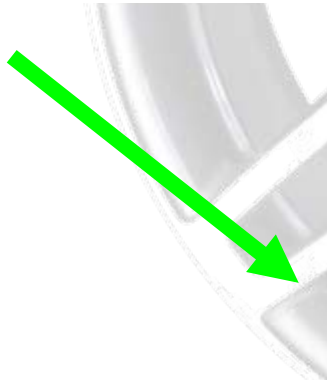
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# Aluminium wheel machining

## Time calculation with saving for the customer

Machining study / current situation													1. Set up			Machine 1		
Operation			Tool			Dimensions		Cutting data					Time calculation					
Nr.	Type	Description	Nr.	Place	Spindle	D [mm]	L [mm]	$v_c$ [m/min]	$n$ [min <sup>-1</sup> ]	$f$ [mm/U]	$a_{p\ max}$ [mm]	$i$	$t_c$ [min]	$t_h$ [min]	$t_b$ [min]			
1	Down time	Change of part			1													
2	Turning	Internal profile 1	TU1		1	402	512	722-2267	2300	0,436	2,5	1	0,11	0,016				
3	Turning	Internal profile 2	TU2		1	65	150	3200	2000	0,39-0,43	6,3	1-3	0,89	0,016				
4	Turning	External profile	TU3		1	460	190	3600	2400	0,20	4,4	1	0,40	0,016				
															1,448			

Machining study / current situation													2. Set up			Machine 1		
Operation			Tool			Dimensions		Cutting data					Time calculation					
Nr.	Type	Description	Nr.	Place	Spindle	D [mm]	L [mm]	$v_c$ [m/min]	$n$ [min <sup>-1</sup> ]	$f$ [mm/U]	$a_{p\ max}$ [mm]	$i$	$t_c$ [min]	$t_h$ [min]	$t_b$ [min]			
1	Down time	Change of part			1													
2	Turning	Hub profile	TU4		1	65	80	510	2500	0,30	1,5	1	0,15	0,016				
3	Turning	External profile / roughing	TU5		1	460	520	3500	2315	0,40	2,8	6	0,53	0,016				
4	Turning	External profile / finishing	TU6		1	460	280	3928	2400	0,4-0,75	0,75	1	0,28	0,016				
															1,008			



Machining study / optimized proposal													1. Set up			Machine 1		
Operation			Tool			Dimensions		Cutting data					Time calculation					
Nr.	Type	Description	Nr.	Place	Spindle	D [mm]	L [mm]	$v_c$ [m/min]	$n$ [min <sup>-1</sup> ]	$f$ [mm/U]	$a_{p\ max}$ [mm]	$i$	$t_c$ [min]	$t_h$ [min]	$t_b$ [min]			
1	Down time	Change of part			1													
2	Turning	Internal profile + location face	TU1		1	402	512	2778	2000	0,60	2,5-4,0	1-2	0,43	0,016				
3	Turning	Hub profile	TU2		1	65	150	490	2400	0,50	4,00	3	0,13	0,016				
4	Turning	External profile	TU3		1	460	190	3600	2400	0,20	4,4	1	0,40	0,016				
															1,008			

Machining study / optimized proposal													2. Set up			Machine 1		
Operation			Tool			Dimensions		Cutting data					Time calculation					
Nr.	Type	Description	Nr.	Place	Spindle	D [mm]	L [mm]	$v_c$ [m/min]	$n$ [min <sup>-1</sup> ]	$f$ [mm/U]	$a_{p\ max}$ [mm]	$i$	$t_c$ [min]	$t_h$ [min]	$t_b$ [min]			
1	Down time	Change of part			1													
2	Turning	Hub profile	TU4		1	65	80	510	2500	0,30	1,5	1	0,15	0,016				
3	Turning	External profile / roughing	TU5		1	460	520	2890	2000	0,55	2,8	6	0,47	0,016				
4	Turning	External profile / finishing	TU6		1	460	280	3928	2400	0,4-0,75	0,75	1	0,28	0,016				
															0,948			

<b>Time saving with optimized proposal</b>													<b>20,36 %</b>		
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# Aluminium wheel machining

## Calculation of profitability

### Specification of cost

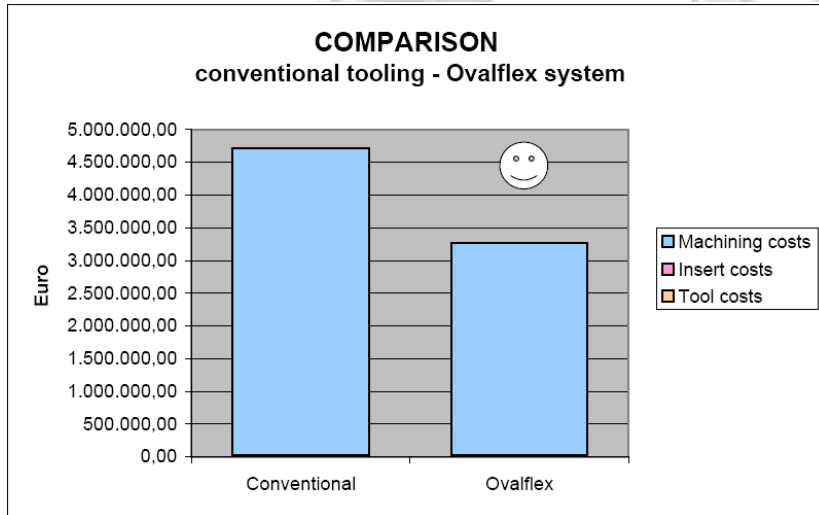
Batch size

1.000.000 wheels

Tool System	Conventional	Ovalflex
<b>Tools</b>		
Nr. of basic bodys per batch size	1	1
Nr. of holders / heads per batch size	5	4
Lifetime of tip seat per tool	200	200
<b>Estimated Tool cost / batch size</b>	<b>1.300,00 Euro</b>	<b>1.820,00 Euro</b>
<b>Inserts</b>	X32R4.00N	X32R4.00N
Nr. of wheels per cutting edge	500	700
Nr. of cutting edges per insert	1	1
Nr. of inserts per batch size	2.000	1.429
<b>Estimated inserts cost / batch size</b>	<b>20.000,00 Euro</b>	<b>14.290,00 Euro</b>
<b>Machining data's</b>		
Feed [f]	0,45 mm/rev.	0,65 mm/rev.
Revolutions [n]	2200 /min	2200 /min
Cutting length [mm]	1550 mm/piece	1550 mm/piece
Number of passes	1	1
Machine costs	180 Euro/h	180 Euro/h
Machining time	93,94 s/piece	65,03 s/piece
<b>Machining costs / batch size</b>	<b>4.696.969,70 Euro</b>	<b>3.251.748,25 Euro</b>
<b>Costs per batch size</b>	<b>4.718.269,70 Euro</b>	<b>3.267.858,25 Euro</b>

**Reduction of Cost with Ovalflex**

**30,74 %**  
**1.450.411,45 €**







# Aluminium wheel machining

## Listing of all projects



**48**  
**project work outs in**  
**2 ½ years**

**159 machines equipped (OEM)**

Firma	Beschreibung	Datum
Otto-Fuchs	OC50-Bearbeitungsvorschlag	Feb 07
AAG	OC50-Bearbeitungsvorschlag	Mrz 07
Ronal	OC50-Bearbeitungsvorschlag	Mrz 07
Stahlschmidt	OC50-Bearbeitungsvorschlag	Mrz 07
Canadian Autoparts Toyo	OC50-Bearbeitungsvorschlag	Mrz 07
Hayes Lemmerz	OC50-Bearbeitungsvorschlag	Mrz 07
AAG	OC50-Bearbeitungsvorschlag	Jun 07
Speedline	OC50-Bearbeitungsvorschlag	Okt 07
Chiron	OC50-Bearbeitungsvorschlag	Nov 07
Alcoa	OC50-Bearbeitungsvorschlag	Nov 07
Alcoa	OC50-Bearbeitungsvorschlag	Nov 07
Hayes Lemmerz Brasil	OC50-Bearbeitungsvorschlag	Nov 07
Stahlschmidt&Mayworm	OC50-Bearbeitungsvorschlag	Dez 07
Stahlschmidt&Mayworm	OC50-Bearbeitungsvorschlag	Dez 07
Chiron, Solomon Alsberg	OC50-Bearbeitungsvorschlag	Feb 08
Speedline	OC50-Bearbeitungsvorschlag	Mrz 08
Hayes Lemmerz	OC50-Bearbeitungsvorschlag	Apr 08
Dicastal	OC50-Bearbeitungsvorschlag	Apr 08
Dicastal	OC50-Bearbeitungsvorschlag	Apr 08
Hayes Lemmerz	OC50-Bearbeitungsvorschlag	Mai 08
Klitzsch	OC50-Bearbeitungsvorschlag	Mai 08
Hayes Lemmerz	OC50-Bearbeitungsvorschlag	Mai 08
Hayes Lemmerz	OC50-Bearbeitungsvorschlag	Mai 08
Hayes Lemmerz	OC50-Bearbeitungsvorschlag	Mai 08
Hayes Lemmerz	OC50-Bearbeitungsvorschlag	Mai 08
Borbet	OC50-Bearbeitungsvorschlag	Mai 08
Chiron	OC50-Bearbeitungsvorschlag	Jul 08
Chiron	OC50-Bearbeitungsvorschlag	Jul 08
Enkei	OC50-Bearbeitungsvorschlag	Okt 08
Enkei	OC50-Bearbeitungsvorschlag	Okt 08
Dicastal	OC50-Bearbeitungsvorschlag	Mai 09
Borbet Hesborn	OC50-Bearbeitungsvorschlag	Jun 09
ATS Polen	OC50-Bearbeitungsvorschlag	Jul 09
ATS Polen	OC50-Bearbeitungsvorschlag	Jul 09
Alcoa Ungarn	OC50-Bearbeitungsvorschlag	Aug 09
Alcoa Ungarn	OC50-Bearbeitungsvorschlag	Aug. 09
Alcoa Ungarn	OC50-Bearbeitungsvorschlag	Aug 09
Alcoa Ungarn	OC50-Bearbeitungsvorschlag	Aug 09
Alcoa Ungarn	OC50-Bearbeitungsvorschlag	Aug 09

# Aluminium wheel machining

## Customer reference list



Ronal - worldwide



Hayes Lemmerz - worldwide



Borbet Group



BBS International



AEZ Wheels



ATS Group



Cromodora



Alcoa



Otto Fuchs



Brock Group (Jajce Alloy Wheels / Metec ...)



Speedline



ENKEI Wheels



## Aluminum wheel customers require more and more highly competent partners for solutions

1. All the conditions established for complete machining (Products, Expertise)
2. Team with technical know-how
3. Sales representative is a member of the competence-team

# CERATIZIT in the automotive industry



Fascination



Challenge