Railway
Industry

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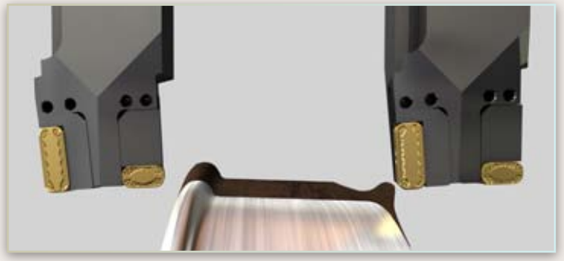
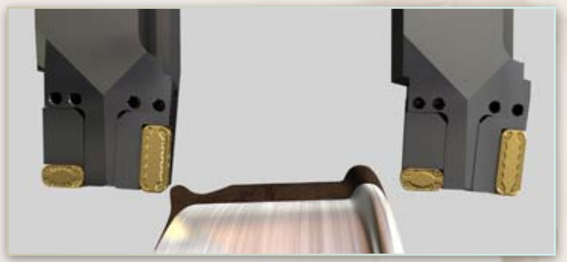
ISCAR's Machining Solutions
for Railroad Car Wheels Re-Turning

Railroad Re-Turning Wheel Machining Technology

Railroad car wheel re-turning can be found in every country where trains are used for passengers or freight transportation. It is most common for wheels to be re-turned on a dedicated portal wheel, universal lathe, or under floor lathes.



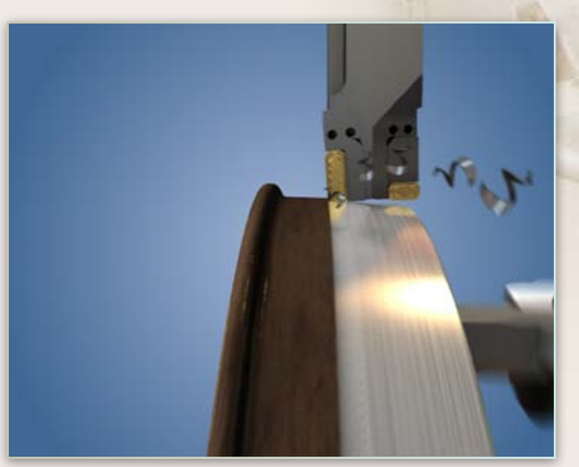
The new tools for re-turning railroad wheels can machine the entire outer wheel profile in a single cut.
They feature two cartridges with tangentially mounted inserts.



Longitudinal turning is performed with a 30 mm long and 4 mm corner radius tangentially clamped insert, positioned with its long side against the machining direction. This insert can handle large cutting depths for roughing or semi-finishing applications, depending on the outer wheel condition.

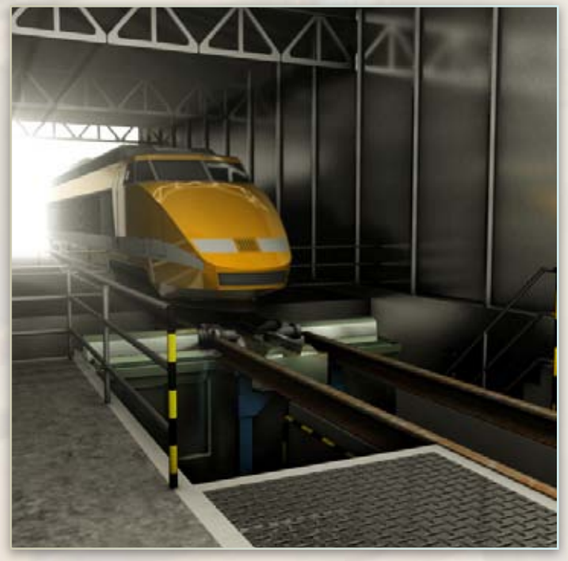
A 19 mm long and 4 mm radius tangentially clamped insert positioned perpendicularly to the larger insert is used to machine the rim zone, which becomes massively eroded and sometimes has cracks.

Machining depth can range from 0.3 mm to 12 mm, depending on the wheel's outer condition prior to re-conditioning. Large depths of cut are usually performed by several machining paths, in order to prevent heavy loads or poor insert life.



Rail Wheel Re-turning

Common Machines for Rail Wheel Re-turning



Under Floor Wheel Lathe

Conventional Wheel Lathe

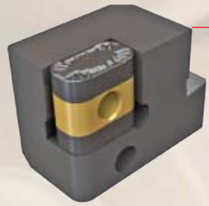
CNC Portal Wheel Lathe

Toolholders and Cartridges for Under Floor Re-turning Lathes (Model 106 Thread Profile Machine)

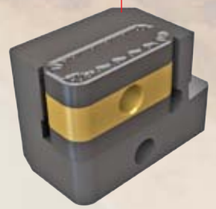
Assembly & Spare Parts

PRWR/L 50-55

PRWR/L 177-CA-19



PRWR/L 175-CA-19



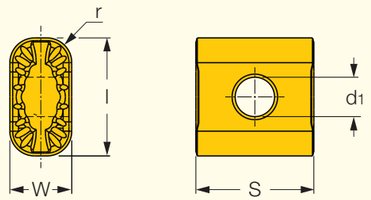
PRWR/L 175-CA-30

Designation	Screw	Lever	Key
LNMX 191940	SR LCS 5	LR 5	HW 3.0
LNMX 301940			

Inserts & Tools

Railway Industry

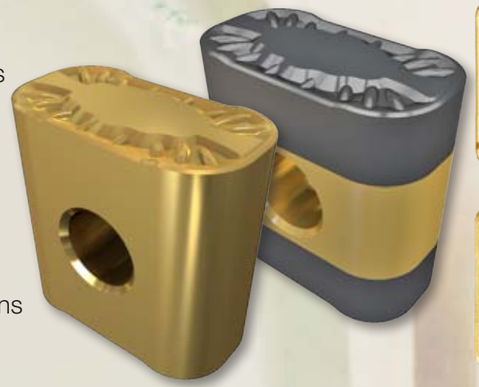
LNMX 19/30
Tangentially Clamped Inserts for Railroad Wheel Re-Turning



Designation	Dimensions l	W	s	r	d1	IC8150	IC9150	IC8250	IC9250	Recommended Machining Data ap (mm)	f (mm/rev)
LNMX 191940-WF	19.05	10.00	19.05	4.00	6.35	●	●	●	●	0.30-5.00	0.25-1.30
LNMX 191940-WM	19.05	10.00	19.05	4.00	6.35	●	●	●	●	0.30-5.00	0.40-1.50
LNMX 301940-WM	30.00	12.00	30.00	4.00	6.35	●	●	●	●	0.50-12.00	0.70-1.90
LNMX 301940-WR	30.00	12.00	30.00	4.00	6.35	●	●	●	●	0.50-12.00	0.80-1.90

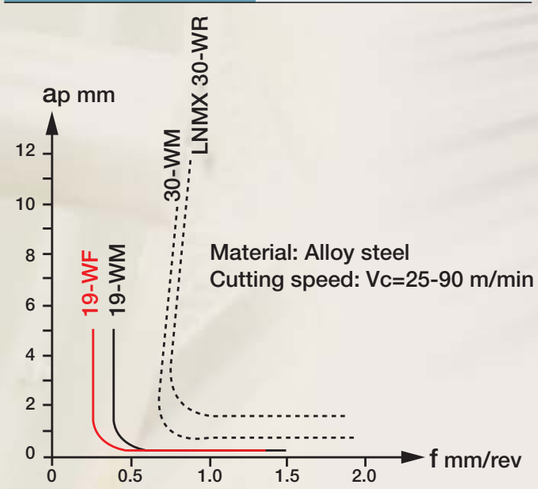
LNMX 191940-WF
For finishing operations

LNMX 191940-WM
For medium
semi-finishing operations

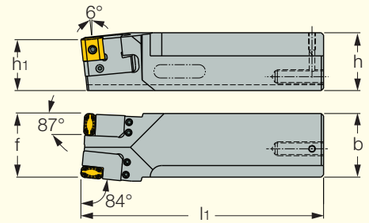


LNMX 301940-WM
For medium/
semi-finishing operations

LNMX 301940-WR
For roughing operations



PRWR/L
Toolholders with Cartridges for Under Floor Re-turning Lathes
(Model 106 Thread Profile Machine)



Right-hand shown

Designation	l1	f	h1	h	b
PRWR/L 50-55	210.00	55.00	44.00	50.00	55.00

Spare Parts

Designation	Screw	Pin
PRWR/L 50-55	SS M6x1x16	PIN D5x13

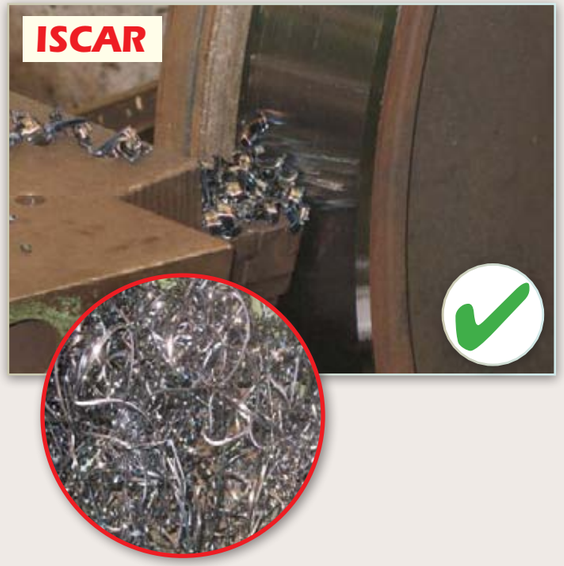
Cutting Data

Grade Recommendation

Speed: High → Low

P	
IC8150	A very hard substrate with a cobalt enriched layer, improved MTCVD TiCN and a thick alpha Al_2O_3 CVD coating. Features excellent thermal stability, resistance to chipping and plastic deformation. Recommended for high speed machining of steel at stable or slightly unstable conditions.
IC9150	A hard substrate with a cobalt enriched layer, MTCVD TiCN and alpha Al_2O_3 CVD coating. Excellent thermal stability and resistance to chipping and plastic deformation. Recommended for high speed machining of steel at stable conditions.
IC8250	A tough substrate with a cobalt enriched layer combined with improved MTCVD TiCN and a thick alpha Al_2O_3 CVD coating. Recommended for general use machining of steel in a wide range of conditions, featuring high toughness and resistance to chipping and plastic deformation.
IC9250	A tough substrate with a cobalt enriched layer combined with MTCVD TiCN and a thick alpha Al_2O_3 CVD coating. Recommended for general use machining of steel in a wide range of conditions, featuring high toughness and wear resistance.

Chip Formation at the Rim Curve



One of the common problems in wheel re-turning is chip formation during the back turning operation at the rim zone.
The new **WM** chipformer (on the 30 mm insert) has been specifically designed to prevent long chip formation during rim turning.

Cutting Data Recommendations

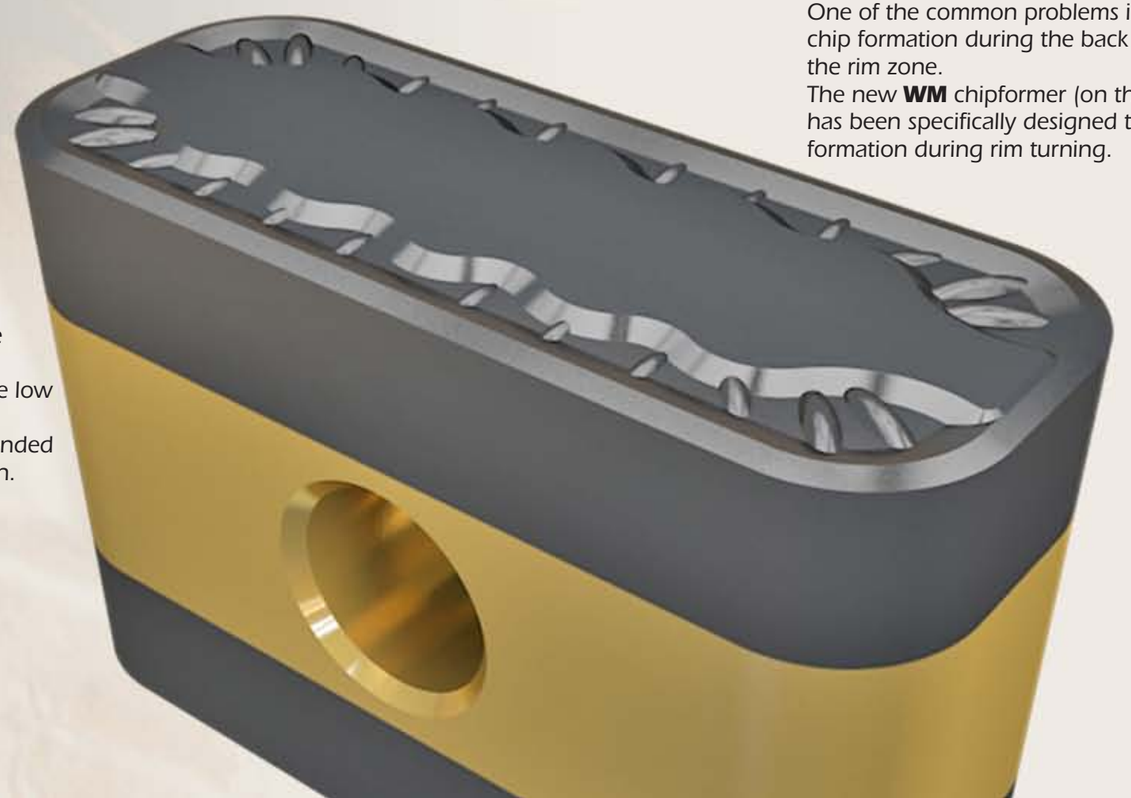
Cutting data by area:

Area	Vc	f
A	30 - 70 m/min	0.3 - 1.8 mm/rev
B	50 - 100 m/min	0.5 - 2.0 mm/rev
C	50 - 100 m/min	0.5 - 2.0 mm/rev

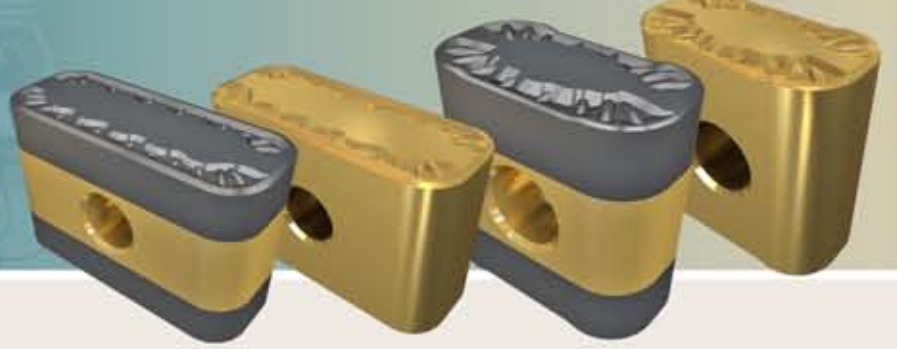
In case of worn wheels with skid flats, built-up, shelled tread or thermal cracks - ISCAR recommends reducing the cutting speed to the minimum recommended.
High carbon wheels should be machined at the low range of our cutting speed recommendations.
Feed should be optimized within our recommended range per chipformer and actual chip formation.

Depth of cut according to chipbreaker geometry:

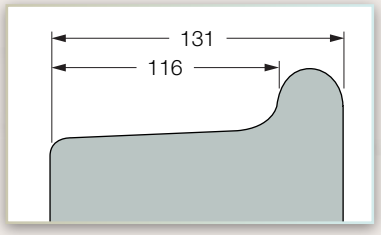
WF	0.3 - 3.5 mm
WM	1.5 - 7.0 mm
WR	3.0 - 12 mm



Test Reports



TEST NO. 1



Part name: Railway wheel
Material: Alloy steel
Machine manufacturer: RAFAMET-under floor
Coolant method: None

	ISCAR	Competitor
Insert type	LNMX 191940-WM	
Carbide grade	IC8150	
Cutting speed (m/min)	24	24
Part diameter (mm)	870	870
Feed per revolution (mm/rev)	**1.88**	**0.98**
Feed mm/min	16.51	8.61
Depth of cut (mm)	5	5
Length of cut (mm) x3	330	330
Number of edges per insert	8	8
Number of parts per edge	**72**	**40**

TEST NO. 2

Part name: Railway wheel
Material: Alloy steel
Machine manufacturer: Hegenscheidt-under floor
Coolant method: None

	ISCAR	Competitor
Insert type	LNMX 191940-WM	
Carbide grade	IC8250	
Cutting speed (m/min)	65	65
Part diameter (mm)	837	837
Feed per revolution (mm/rev)	0.94	0.94
Depth of cut (mm)	3.5	3.5
Length of cut (mm) x3	135	135
Number of edges per insert	4	4
Number of parts per edge	**31**	**12**