



## TYROLIT TOOL CHECK

A Company within the SWAROVSKI Group

**TYROLIT**



## TYROLIT TOOL CHECK – WET CORE DRILLS

### START

- 1. TOOL IS NOT DRILLING, DRILLING IS TOO SLOW, DRILL BIT IS CHATTERING**
- 2. LIFETIME OF DRILL BIT IS TOO LOW**

#### Set-up

- RPM and machine power adapted to drill bit & application?  
see table: RPM's for core drilling
- Sufficient water in the drilling hole? (milky consistency of slurry and water?)
- Drill bit turns steadily without any sideward movements?  
(check connections: drill bit ↔ motor ↔ drill rig ↔ anchor ↔ concrete?)
- Moderate grinding pressure while drilling?

#### 1.a. Segments are overloaded

Flat segment surface, possibly deformations of segments, high number of pull-outs (> 50%), drill chatters

#### SOLUTION

- Reduce grinding pressure
- Increase RPM
- Change tool: CDL → CDM → CDH

#### 1.b. Segments are under-challenged

Smooth segment surface, polished diamonds (shiny, no sharp edges)

#### SOLUTION

- Increase machine power / grinding pressure
- Sharpening of the tool (sharpening plate)
- Reduce RPM
- Change tool: CDH → CDM → CDL

#### 2. Lifetime of drill bit is too low

#### SOLUTION

- Increase RPM
- Change tool: CDL → CDM → CDH

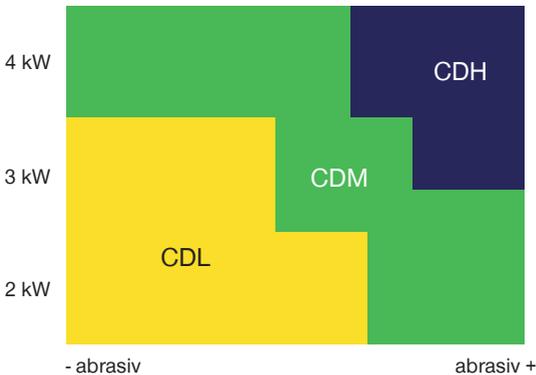


## TYROLIT TOOL CHECK – WET CORE DRILLS

### RPM'S FOR CORE DRILLING

DIAMETER (mm)	RPM FOR 2-3 m/s (min-1)	MACHINE POWER (kW)			
18	2100 - 3200	1	2	3	4 - 8
32	1200 - 1800				
42	900 - 1400				
52	750 - 1100	2	3	4 - 8	
62	620 - 950				
72	550 - 800				
82	470 - 700				
102	370 - 550				
122	310 - 470				
152	250 - 380				
162	240 - 350				
182	210 - 320				
202	190 - 280				
250	150 - 230	1	2	3	4 - 8
300	130 - 190				
400	100 - 140				
500	80 - 120				

### CORE DRILL SELECTION





## TYROLIT TOOL CHECK – WALL SAW BLADES

### START

1. WALL SAW BLADE IS NOT CUTTING
2. CUTTING RATE IS TOO LOW
3. DEVIATION OF CUT
4. LIFETIME OF THE BLADE IS TOO LOW

#### Set-up

- RPM and machine power adapted to wall saw blade and application?
- Corresponding direction of rotation: blade ↔ wall saw head?
- Correct cutting pressure on the segment? (Clearance of guidance rollers? Condition of wall saw head / power pack / hydraulic tubes / wall saw blade?)
- Correct power supply (16A ↔ 32A)?

#### 1.a. Wall saw blade is not cutting at first infeed / will not sink into concrete

Often concrete aggregates are very hard

#### SOLUTION

- Reduce infeed depth
- Lower blade gradually (lower blade, move blade right ↔ left, lower blade)
- Change tool: WSM ↔ WSH

#### 1.b. Wall saw blade is not maintaining initial cutting speed

- First infeed too deep + deviation of cut → see 3) Deviation of cut
- Steel core is rubbing concrete (water fountain, wear on steel core) → repair or change blade

#### 1.c. Wall saw blade is not cutting reinforcement

#### SOLUTION

- Free cutting of reinforcement
- Penetrate reinforcement at a suitable spot (drilling hole? check for deviation of cut, lower blade gradually, do not remain in same spot for a long time)
- Undercut reinforcement counter rotating
- Resharpen blade in concrete (shallow infeed, sharpening plate)
- Change tool: WSL → WSM → WSH



## TYROLIT TOOL CHECK – WALL SAW BLADES

### 2. Cutting rate is too low

#### SOLUTION

- Deviation of cut? → see 3) Deviation of cut
- Steel core is rubbing? → repair or change blade
- Cut with an additional infeed
- Change tool: WSH → WSM → WSL

### 3. Deviation of cut

#### Problem

- Blade is not cutting a straight line or deviation increases with cutting depth
- Steel core is rubbing concrete (water fountain, wear on steel core)

#### SOLUTION

- Reduce cutting pressure ( $\approx 60\%$  of normal pressure)
- Reduce first infeed depth
- Cut reinforcement according to 1c)
- Repair or change tool: WSL  $\leftrightarrow$  WSM  $\leftrightarrow$  WSH

### 4. Lifetime of the wall saw blade is too low

#### SOLUTION

- Sufficient water in cut?
- Reduce cutting pressure
- Change tool: WSL → WSM → WSH

## WALL SAW BLADE SELECTION



Recommended cutting speed  
35-45 m/sec



## TYROLIT TOOL CHECK - FLOOR SAW BLADES

### START

1. FLOOR SAW BLADE IS NOT CUTTING, CUTTING RATE IS TOO LOW
2. LIFETIME OF FLOOR SAW BLADE IS TOO LOW

#### Set-up

- RPM, machine power and type of drive adapted to floor saw blade and application?
- Floor saw blade adapted to material: cured - / green concrete / asphalt? reinforcement?
- Corresponding direction of rotation: blade ↔ machine?
- Relationship of traverse speed to infeed?
- Sufficient water in the cut (water supply equipment)?

#### 1. Floor saw blade is not cutting, cutting rate is too low

##### a. Segments are under-challenged

- Smooth segment surface, polished diamonds (shiny, no sharp edges)
- Very hard concrete aggregates?
- Blade lost tension? deviation of cut? overheated steel core?

#### SOLUTION

- Reduce cutting depth, increase cutting pressure
- Resharp blade (shallow infeed, sharpening plate)
- Reduce RPM (change pulleys, smaller blade diameter)
- No blade tension → new blade → pre cut
- Change tool: FSH → FSM → FSL

##### b. Segments are overloaded

Flat segment surface, many diamonds are broken (rough)

#### SOLUTION

- Increase cutting depth, reduce cutting pressure
- Increase RPM (change pulleys, larger blade diameter)
- Change tool: FSL → FSM → FSH

## TYROLIT TOOL CHECK – FLOOR SAW BLADES

### 2. Lifetime of floor saw blade is too low

- └ Very abrasive aggregates, high sand content, very porous concrete, very short curing time?
- └ Water supply too low – very thick slurry?
- └ Segment surface very sharp?

### SOLUTION

- └ Increase cutting depth, reduce cutting pressure
- └ Increase RPM (change pulleys, larger blade diameter)
- └ Increase water supply
- └ Change tool: FSL → FSM → FSH (for sub-base concrete: FSL/M/H-A)

### Recommended cutting speed

Cured concrete	45 – 50 m/sec
Green concrete	50 – 55 m/sec
Asphalt	55 – 60 m/sec

## FLOOR SAW BLADE SELECTION

TYPE	MACHINE		MATERIAL								
	WHEEL DRIVE		CURED CONCRETE				GREEN CONCRETE			ASPHALT	
	EL/HYD	B/D	VERY HARD	HARD	MEDI-UM	SOFT	VERY HARD	HARD	MEDIUM / SOFT	HARD	MEDIUM / SOFT
FSA***	L	L	–	–	–	–	–	–	○	○	●
FSL***-A	L/M	L	–	–	–	–	–	–	○	◐	●
FSM***-A	M/H	M	–	–	–	–	–	–	◐	●	◐
FSH***-A	H/X	H	–	–	–	–	–	–	○	●	○
FSC***	L	L	○	◐	●	●	–	–	–	–	–
FSL***-C	L/M	L	○	●	●	◐	–	–	–	–	–
FSM***-C	M/H	M	○	◐	●	●	–	–	–	–	–
FSH***-C	H/X	M	●	●	●	◐	–	–	–	–	–
FSL-G3	L	L	–	–	–	–	●	◐	○	–	○
FSL-G4	M	L/M	–	–	–	–	●	◐	○	–	○
FSM-G3	M/H	L/M	–	–	–	–	◐	●	●	○	◐
FSM-G4	M/H	M/H	–	–	–	–	●	●	◐	○	◐
FSM-G5	H/X	H/X	–	–	–	–	◐	●	◐	◐	◐
FSH-G3	H	H	–	–	–	–	○	◐	●	◐	●

L ≤15kW | M > 15-25kW | H > 25-50kW | X > 50kW | EL Electric | HYD Hydraulic | B Petrol | D Diesel

● very suitable | ◐ suitable | ○ limited suitable | – not suitable



## TYROLIT TOOL CHECK - WIRE CUTTING

### START

1. WIRE IS NOT CUTTING, CUTTING SPEED IS TOO LOW
2. LIFETIME OF WIRE IS TOO LOW

#### Set-up

- Drive and power of machine adapted to wire and application?
- Correct fixing of machine, pulleys, pulling side of the wire?
- Cutting direction of wire corresponds with markings on the wire (  $\Rightarrow$  )?
- Turns in the wire counter clock wise?
- Active working length of wire?
- Sufficient water in the cut (water supply equipment)?
- Fixing of wire connections?

#### 1. Wire is not cutting, cutting speed is too low

##### a. Beads of wire are underchallenged

Smooth bead surface, diamonds polished (shiny, no sharp edges)

#### SOLUTION

- Increase cutting pressure
- Reduce wire speed
- Reduce active cutting length of wire (pulleys)

##### b. Very high content of steel

#### SOLUTION

- Reduce wire speed
- Reduce active cutting length of wire (pulleys)

#### 2. Lifetime of wire is too low

##### Beads of wire are overloaded

- Smooth bead surface, many diamonds are broken (rough)
- Uneven wear of beads

#### SOLUTION

- Decrease cutting pressure
- Increase wire speed
- Increase turnings of wire, change it more often
- Increase water supply, at the right place
- Change tool: DWM\*\*\*-C  $\rightarrow$  DWM\*\*\*-C



## TYROLIT TOOL CHECK – WIRE CUTTING

### Recommended wire speed

Standard reinforced concrete	21 m/sec
Hard aggregates, highly reinforced	18 m/sec
Abrasive aggregates	25 m/sec
100% steel	12 m/sec

## DIAMOND WIRE SELECTION

TYPE	SINTERED	ELECTROPLATED	MACHINEPOWER			MATERIAL				Fe high	Fe 100%	Dry cutting
			L	M	H	SOFT	MID	HARD	VER HARD			
DWM***-C		x	●	●	●	●	●	●	●	●	○	○
DWL***-C	x		●	●	●	●	●	●	○	○	–	–
DWM***-S		x	●	●	●	●	●	○	○	●	●	○
DWM***-C		x	●	●	●	●	●	●	●	●	○	○
DWL***-C	x		●	●	○	●	●	○	–	–	–	–

● very suitable | ● suitable | ○ limited suitable | – not suitable



## TYROLIT TOOL CHECK – FORMULAS

### Peripheral Speed – Revolutions

$$v = \frac{D \cdot \pi \cdot n}{1000 \cdot 60} \quad [\text{m/s}]$$

$$n = \frac{1000 \cdot 60 \cdot v}{D \cdot \pi} \quad [\text{U/min}]$$

v: peripheral speed [m/s]  
n: revolutions [revs/min]  
D: diameter [mm]

### Core drills – Speed

$$v = \frac{L}{t} \quad [\text{cm/min}]$$

v: core drilling speed [cm/min]  
L: drilled length [cm]  
t: time [min]

### Core drills – Lifetime

$$s_s = \frac{L}{\Delta X} \quad [\text{m/mm}]$$

$$s_T = s_s \cdot X \quad [\text{m}]$$

$S_s$ : specific lifetime [m/mm]  
 $S_T$ : total lifetime [m]  
L: drilled length [m]  
 $\Delta X$ : segment wear [mm]  
X: usable segment height [mm]

### Blades – Speed

$$v = \frac{A}{t} \quad [\text{m}^2/\text{h}]$$

v: cutting speed [m<sup>2</sup>/h]  
A: cutting surface [m<sup>2</sup>]  
t: time [h]

### Blades – Lifetime

$$s_s = \frac{A}{\Delta X} \quad [\text{m}^2/\text{mm}]$$

$$s_T = s_s \cdot X \quad [\text{m}^2]$$

$S_s$ : specific lifetime [m<sup>2</sup>/mm]  
 $S_T$ : total lifetime [m<sup>2</sup>]  
A: cutting surface [m<sup>2</sup>]  
 $\Delta X$ : segment wear [mm]  
X: usable segment height [mm]

## TYROLIT TOOL CHECK – FORMULAS

### Hydraulic Power Packs – Peripheral Speed

$$v = \frac{D \cdot \pi \cdot f}{60 \cdot m \cdot g} \quad [m/s]$$

- v: peripheral speed [m/s]  
 D: diameter [mm]  
 f: hydraulic flow of power pack [l/min]  
 m: motor size [cm<sup>3</sup>]  
 g: gear ratio [ ]

POWER PACK	f [l/min]
PPH20***/CR-3/CR-S4/CR-5/LH	33 / 40 / 50 / 60
PPH20**	33 / 40
PPH25*** / LR	45 / 50 / 60 / 70
PPH25**	45 / 50
PPH40*** / RD-S / RD-S RC	65 / 75 / 80 / 90
PGH18**	20 / 30 / 40
BE	16
BE-S / BE-S2 / BR-4	33
DK-S	60 / 70 / 80 / 90
CR-L	42
CR / CR-2	35 / 42 / 77
AD-S / AD-S2 / BL-S	45
AD-S3 / AD-S4 / RC	45 / 55 / 63 / 73
RD / RD-2	61 / 76

WALL SAW HEAD	g 1:[]
AZ/AZ-S/RZ/FZ-3S/GS	3
FZ/FZ-S/FZ-2S	2,5
DZ/DZ-2/DZ-iX	2
DZ-S/DZ-SE/DZ-3E/WZ	2,6
GR-1000	14
GR-700-2	11
GR-500/GR-700	7
GA/GA-2	2,75
BI-33	2,2

**TYROLIT Schleifmittelwerke Swarovski K.G.**

Swarovskistraße 33 | 6130 Schwaz | Austria  
Tel +43 5242 606-0 | Fax +43 5242 63398

Our **worldwide subsidiary companies** can be found on  
our website at [www.tyrolit.com](http://www.tyrolit.com)