

## POWER TOOLS AND EQUIPMENT

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## Content

- Battery Powered Hammer Drills
  - Different battery types
  - Different voltages
  - Different manufacturers
  - Advantages, disadvantages
- Drill bits
- Generators



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## BATTERY POWERED HAMMER DRILLS

- Battery Voltage: 12V, 14,4V, 18V, 24V, 28V, 36V
- Battery types: NiCd, NiMH, Li-ion
- Different Manufacturers:
  - Hilti
  - Bosch
  - Metabo
  - Milwaukee
  - Makita
  - Hitachi
  - Spit
  - DeWalt



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## Battery Types

- Lead acid
- NiCd
- NiMH
- Li-ion
- Advantages, disadvantages



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## Lead Batteries

- This type is used in cars and motorcycles
- Heavy, cheap, low discharge current capability
  - Higher capacity batteries are needed than NiCd,...
- Sometimes used with old tools (battery replacement)



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## NiCd Battery



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### NiCd Battery

- The first NiCd battery was made in 1899
  - Contains Cadmium, a toxic material
  - Memory and Lazy Battery Effect
  - Maintenance need, due to self discharge
  - Lowest priced power tool battery
  - Good low temperature behaviour
  - Can be charged fast (30 min.)
- Air cooled ones can be charged 3000 times
  - Can recover after deep discharge
  - The battery for craftsmen



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### NiMH Batteries

- Newer than NiCd
- Higher energy density than NiCd
- Higher capacity batteries are used usually
- No memory effect
- Poor low temperature behaviour
- Sensitive to overheating during charge



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### Li-Ion Batteries



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### Li-Ion Batteries

- The newest types used for power tools
- No self discharge, no memory effect
- No toxic heavy metals
- Light, much higher energy density than NiCd
- Dies due to deep discharge, protection circuit needed
- Can be charged in 1 hour
- Contains flammable liquid



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### 12V/14.4V/18V/24V/28V/36V

- The new hammer drills have 18-36V batteries
- Stored energy: Voltage multiplied with capacity (Ah)
- The higher the energy, the more holes we can drill
- Higher energy battery packs / more battery packs
- System compatibility is offered by some suppliers
  - Screw driver
  - impact drill
  - circular saw...



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### Which tool to Choose?

- There is no 'ultimate' hammer drill available
- For a limited number of bolts ? 18V
- Long holes for enlarging passage ? 28/36V
- Low maintenance need, reliability
- No toxic/dangerous material in battery pack
- Light, compact, powerful, affordable



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## DRILL BITS



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## Drill bits

- The hammer drill + drill bit? number of holes
- Sharp carbide tip + effective dust removal necessary
- Hilti TE-C3X: short welded tip+4 sharp spirals
- Fischer 'Driller' bit: 3 edges ( hand drill )
- Fischer Zykon drills for undercut Zykon anchors



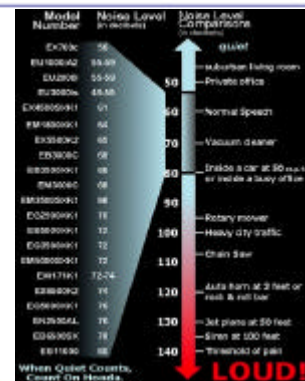
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## GENERATORS

- 4 stroke engine
- Lightweight, compact, powerful, reliable
- Low noise and low consumption
- Honda EU series generators have inverter technology
  - Load dependent speed control
- Reduces fuel consumption
- Reducing operating noise
- Lower emission



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